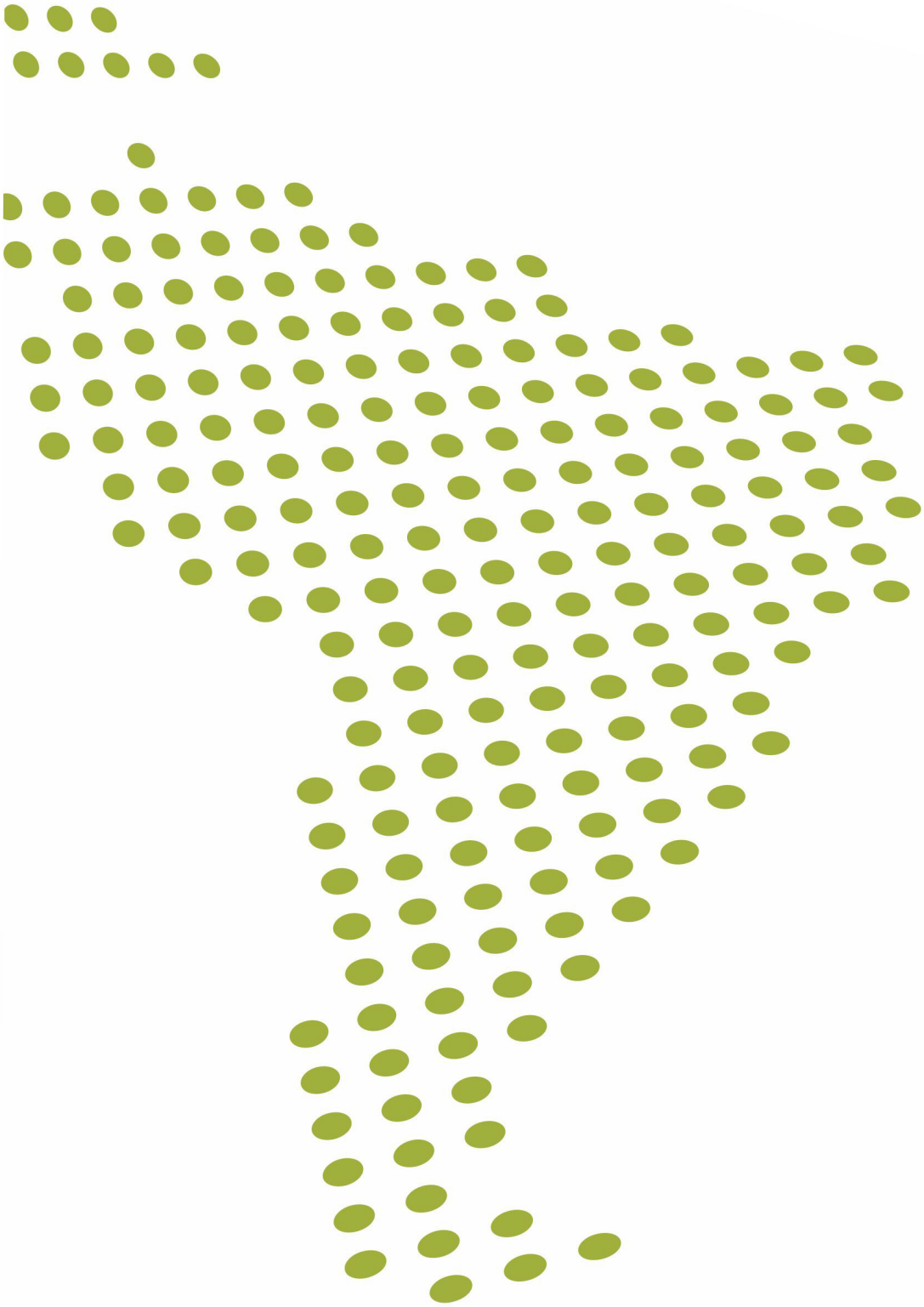
PROGRAMA DE PAA AGRONEGOCIOS Y ALIMENTOS

PENSA



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FED CATTLE MARKETING IN THE SOUTH-EASTERN OF MATO GROSSO (BRAZIL): AN ANALYSIS OF BEEF PRODUCERS' PROFILE AND TRANSACTIONS COORDINATION

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Abstract
The research aims to relate Mato Grosso's south-eastern beef producers to cattle marketing arrangements. The sample was based on interviews with fifty nine cattle producers that live in Rondonópolis (MT). It was ranked ranchers in three categories: (N1) producers that only sell animals for cash and/or for installment (thirty days), (N2) producers that do (N1), but also operate through NPR – Notas Promissórias Rurais and/or CPR – Cédulas de Produto Rural, and (N3) producers that do (N2) and also enroll on forward contracts and/or futures contracts. Based on the analysis of the data it was estimated an Ordered Logit Model in which were found the following relevant variables: property area, SISBOV/ERAS certification, cross-breeding e beef exports. In synthesis, the engagement on more demanding marketing arrangements (N3) and (N2) has positive relationship with the size of the land area, the use of cross-breeding on the cattle, and to beef exports. On the other hand, it was found that SISBOV/ERAS certification has an opposite effect. The hypothesis is that to have that certification enable producers to increase price arbitrage among packers in cash or installment transactions.

Key-words: marketing arrangements, fed cattle, governance

FED CATTLE MARKETING IN THE SOUTH-EASTERN OF MATO GROSSO (BRAZIL): AN ANALYSIS OF BEEF PRODUCERS' PROFILE AND TRANSACTIONS COORDINATION

1. Introduction

The Brazilian beef agribusiness system has an institutional environment in which transactions have low coordination. Transactions are mainly on cash for fed cattle and there is a high degree of uncertainty about packers' default and carcasses' post slaughter classification. On the other hand, quality certification programs that aim to strength coordination have low adherence among producers and industries (Caleman *et al.*, 2003). To face that challenges, new commercialization schemes have arisen: i) cattle associations to pool together inputs acquisitions and to supply fed animals to slaughter; ii) alliances among producers, packers and retailers to marketing brand quality cuts; iii) electronic auction arrangements to marketing animals; iv) exports of live cattle to slaughter abroad (mainly to the Mid-East).

At the same time, there is an increasing trend in market concentration of the packer industry. From 2000 to 2010, several Brazilian packers like Independência, Margen, Quatro Marcos, Mercosul, Bertin, among smaller ones, have been acquired by the three industry captains (JBS, Brasil Foods, Marfrig), or are in legal restructure processes. The dynamics of the Brazilian beef market became more integrated to international supply and production strategies, because of abroad investments undertaken by the leading packers.

Also bovine livestock production faces growing external and domestic pressure for greater environmental sustainability. Retailer chains based on urban centers require traceability safeguards about suppliers' non-deforestation practices and labor standards. Also European Union increased the demands on the Brazilian traceability system (SISBOV-ERAS)

On that strategic scenery, bovine livestock production in Mato Grosso from 2000 to 2010 reached the national leading position on cattle numbers. The growth in Mato Grosso slaughters increased more than the growth in cattle numbers, so that cattle slaughter rate climbed from 10% to 15% (IBGE, 2010). Feeding land capacity was improved by more productive animal and soil practices like (i) nutrition supplementation, (ii) soil fertilization, (iii) breeding genetics. In the same time, Mato Grosso's beef exports reached Brazilian second position and several new factory investments were undertaken.

However, during the last two years (2009 – 2010) most of the packer industries which operate in the State were in financial distress and that resulted in layoffs and defaults to beef producers. Uncertainty has arisen and provided incentives to the restrain of producers' supply to packers. Also feedlots' forward contracts with the industry diminished because of higher fodder costs.

The paper aims to relate the marketing of fed cattle in south-eastern Mato Grosso to production practices at the farm level. The analysis tries to understand the choices of the transactions' governance arrangements between cattle producers and packer industries in order to find the most relevant variables to vertical coordination in Mato Grosso's beef agribusiness system.

2. Bovine livestock production in Mato Grosso: history, geography and production indicators

Bovine livestock in Mato Grosso has a long life which started in the XVII century in the South-Western regions at "Pantanal" wet lands. Afterwards, plain areas of "Cerrado" in the lea of Cuiabá river were occupied by large farms of extensive grazing to supply meat, leather and transport animals to the gold mining activity. In the XX century, rice plantation increased together with bovine grazing and lumber, deforestation of large areas was the combined result of those three activities.

From the 60's forth, cattle-raising in Brazil was grounded on two factors: *brachiária* and *zebu*. Namely the production in the tropical lands was based on extensive grazing on *brachiária* planted soils and by *zebu* Asian breeds, mainly *Nelore* breed (Bonjour *et al*, 2008).

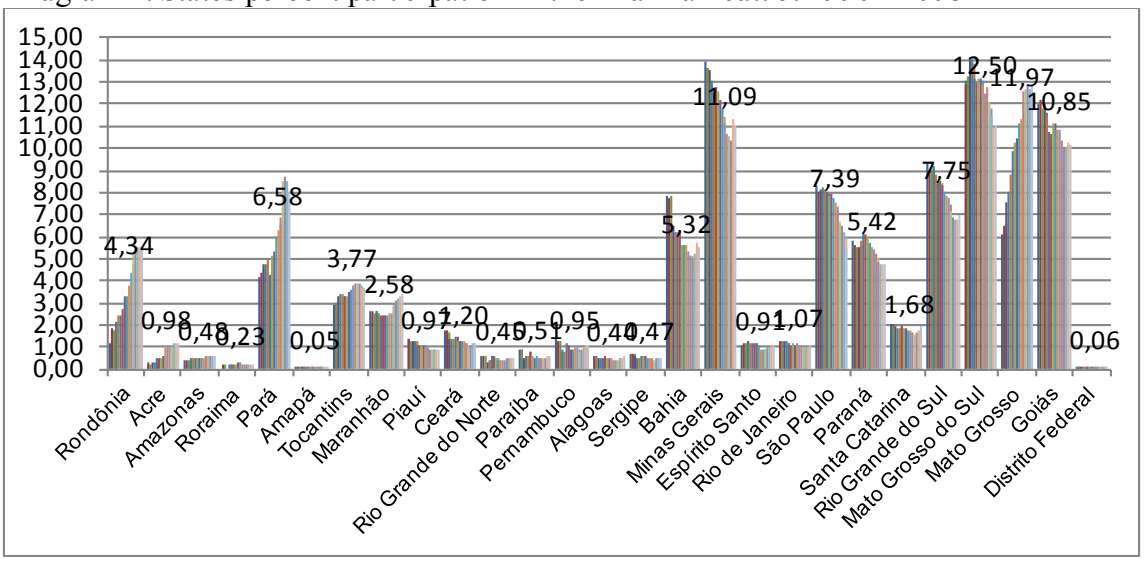
At the same time, the policies of the military regime aimed to the integration of the national territory through highways and the colonization of North and Mid-West regions with mining and agricultural activities. Those activities received the support of financial credits and tax reductions and an agricultural policy to guarantee prices. The Geisel government (1974 – 1979) started the II PND – Second National Development Plan with three programs which worked out to the expansion of the agricultural frontier to the Mid-West region: *PRODOESTE* – Mid-West Development Program, *POLO-CENTRO* – Cerrado Development Program and *PRODECER* – Japan-Brazilian Cerrado Development Program. The government also had pivotal importance to technologic innovation after 1976/77 in Mato Grosso due to EMBRAPA – Brazilian Company of Agriculture Research which worked for the adaptation of plants to the cerrado's weather and soils.

The cattle-raising in 1993 received the support for greater technological innovation by the PROMMEPE – *Mato Grosso's Program to Livestock Improvement* which worked to increase productivity at the farm level. The program was an important device during the 90's and 2000's to provide extension services to upgrade the quality of Mato Grosso's cattle. Also a PROMMEPE's side program called *Cattle Breeding Support Program for Steers,* since 1992 focus on reducing the slaughter age of cattle and improving meat quality by extension and credit policies to enhance steers slaughter (Hamer *et al*., 2010).

The cattle-raising activity in Mato Grosso amounts to the largest productive land area of the State with 21,8 million hectares. Mato Grosso's grazing lands area is also the largest in the country and between 1980 to 2006 increased at the rate of 47,4%, while Brazilian grazing lands decreased 9,0%. The size of the bovine cattle increased at an even greater rate of 277,8% and reached 19,8 million heads in 2006, while at the same time the growth of the Brazilian cattle was 45,3% (IBGE, 2010).

Among the major cattle producers, the share of Mato Grossos's livestock in Brazil was increasing since 2000 and reached the leadership in that decade (Diagram 1). The performance was due mainly to cattle expansion of 62,9% in the North of the State from 2000 to 2008. That geographical dislocation was the reason of the change in the use of grazing lands to crops in the South and South-East regions of Brazil, that movement occurred also in areas of the Mid-West region due to the increasing soya, cotton and sugar cane plantations.

Diagram 1: States percent participation in the Brazilian cattle: 1990 - 2008

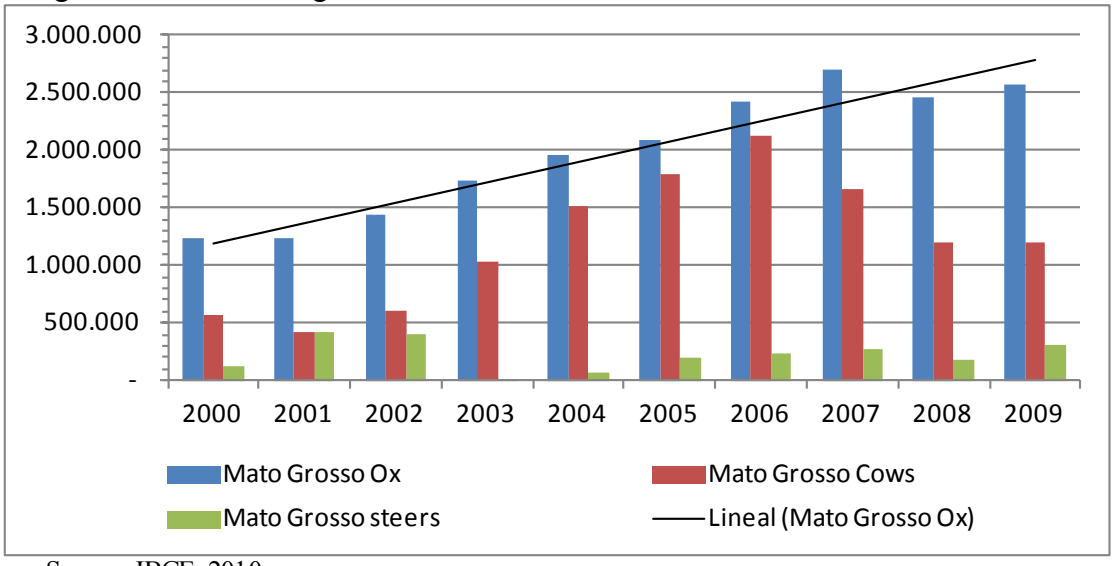


Source: IBGE (2010)

Concerning to the production system, cattle raising in Mato Grosso is extensive and based on grazing poor soils, however, in the last ten years there was an increase in supply of nutrition supplementation to cattle (fodder) mainly in the dry season (May to September). More usually cattle raisers do investments in soil fertilization with the use of lime in order to reduce soil acidity. Programs for the improvement in genetics quality of the zebu breeds had also a strong performance in the last decade. The market of artificial insemination picked up and the investments in acquisitions of elite animals for reproduction soared as a result of increasing efforts to improve cattle genetics.

The greater productivity and the opening of new grazing lands, mainly in the North of the State, had as result greater supply of animals to slaughter. The amount of slaughtered heads in Brazil increased 64,4% from 2000 to 2009, while the same indicator to Mato Grosso points to an increase of 111,5% (Diagram 2). Cows' share in the slaughter numbers decreased since 2007, because of the expansion of breeding that took place as a response to higher prices of steers and calves.

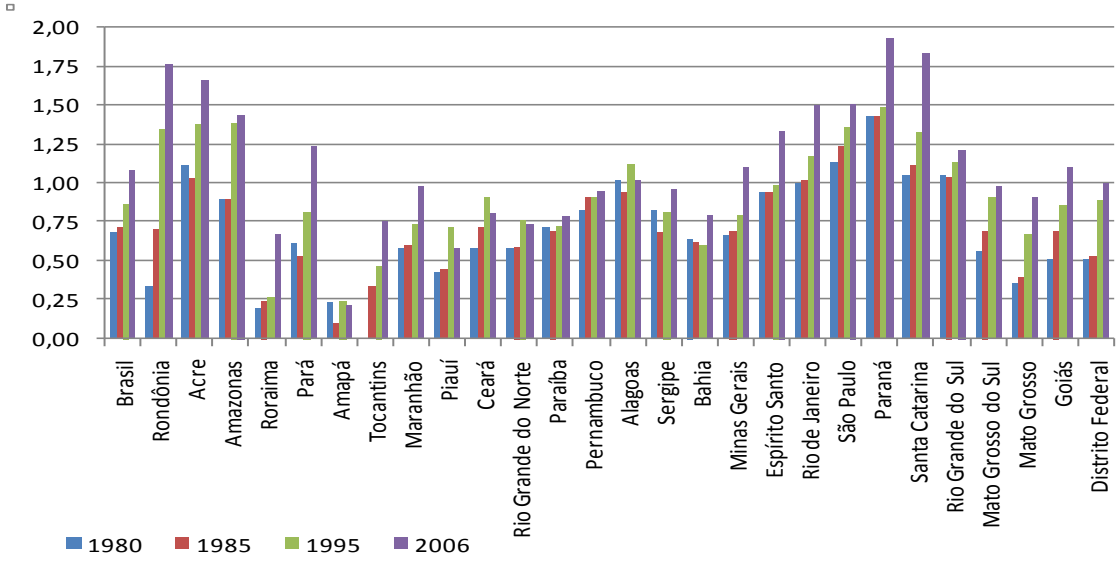
Diagram 2: Bovine slaughtered heads in Mato Grosso



Source: IBGE, 2010

The modernization of livestock handling practices, better feeding inputs, and genetics endorsed greater productivity at the farm level in Mato Grosso. Cattle slaughter rate jumped from 10% in 2000 to 14,8% in 2009 (IBGE, 2010)[1] and the amount of animals per hectare increased from 0,35 head/ha in 1980 to 0,91 head/hectare in 2006. However that indicator is still lower than Brazilian average which is 1,08 head/ha and is lower than other leading States in livestock production like Mato Grosso do Sul, Goiás, Rio Grande do Sul and Minas Gerais (Diagram 3).

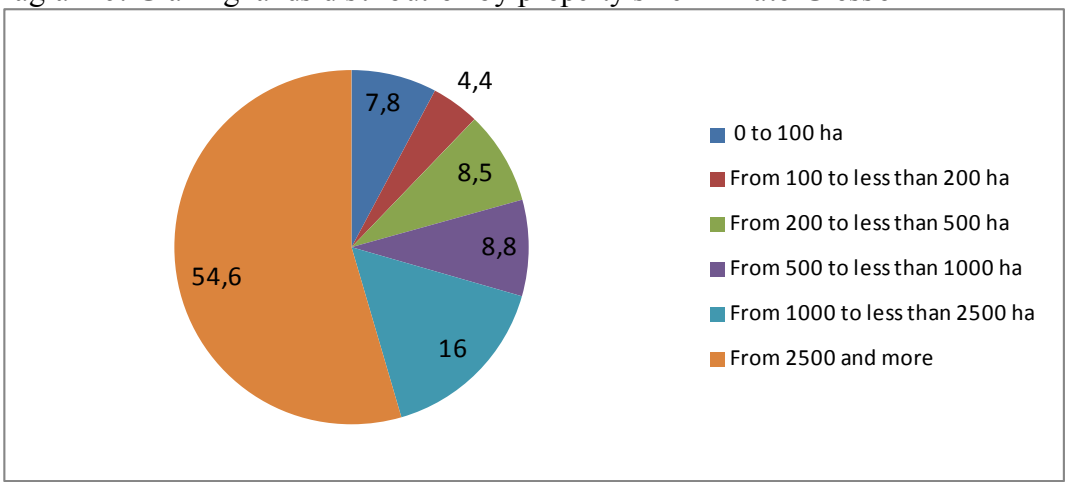
Diagram 3: Heads per Hectare: 1980, 1985, 1995, 2006.



Source: IBGE, 2010

On the other hand, the data on agrarian land distribution shows that 55% of the grazing lands in Mato Grosso are located in farms which are greater than 2500 hectares (IBGE, 2010). It points to the scale of concentration of the livestock activity in the State.

Diagram 6: Grazing lands distribution by property size in Mato Grosso



Fonte: IBGE, 2010

[1] Number of slaughtered heads in a year divided by the sum of the cattle heads.

3. Summary of the coordination literature about beef agribusiness system: International and Brazilian perspectives

Beef agribusiness system has lower coordination than broiler and hog supply chains, even in countries of higher productivity as the USA, Australia and New Zealand. The reasons why are partially due to bovines' biological characteristics, their bigger size and longer life cycle that require greater landing and feeding inputs (Bailey et al, 1994); the breed and geographical diversities in beef raising that diminishes production uniformity (Wachenhein; Singley, 1999); and the lower use of vertical marketing devices such as integration and forward contracts by the pack industry (Hayenga *et al.*, 2003).

In respect to vertical contract integration Hayenga et al. (2003) indentified three factors stimulating new contract and marketing agreements between cattle producers and the packer industry: reduced operational costs, enhanced risk management, and cattle and beef quality. Ward (2001) developed a methodology to assess beef agribusiness alliances based on four broad areas: common objectives, chain coordination, breed specification and formal commitments.

Additionally Kovanda and Schroeder (2003) described that beef alliances face performance and relational risks. Performance risk refers to partners' bilateral dependency that evolves through the alliance requirements that are not easy to assess, as feeding and breeding practices like hormone and antibiotics ministrations. On the other hand, there are relational risks among agents due to the possibility of unilateral opportunistic behavior from one of the sides to cause economic losses to its partners.

Hueth and Lawrence (2004) have shown that grid pricing mechanisms to marketing fed cattle to pack industries aim at directing farmers to the desired carcass patterns. The grid price scheme provides vertical coordination without requiring contracting or asset acquisitions by farmers or the packer industry.

The empirical investigations on comparative alliances provide some clues to its success. Boucher et al. (2005) presented three cases of calf marketing alliances, Vernom Beef Alliance, Beef Advantage Association, and Piedmont Cattle Marketing Association, and also three cases of fed steer marketing alliances, Gene Net Alliance, Caprock Cattle Feeders and B3R Country Meats, all of them sited at east and south USA. Boucher et al. (2005) concluded that strategic alliances provide feedback information about carcass characteristics to cattle producers and allows them to work on greater standardization of their animals and so forth to the slaughtered carcasses.

The Brazilian literature about the beef supply chain points to the lack of coordination among cattle producers, packer industry and retailers as a cause to the emergence of short-term strategies, based on price fluctuations and opportunistic behavior. The research tended to highlight, on the one hand, the beef agribusiness heterogeneity, in which there are informal transactions, low degree of animal standardization, lack of sanitary and quality guarantees to consumers. But on the other hand, Brazil has a pack industry that is a major international player, has the leadership in world exports, and is the second biggest beef producer.

According to Favaret Filho and Paula (1997), due to farmers' great land assets, result of the Brazilian history, emerged a speculative culture based on land price gains and not on the increasing productivity of the livestock. Adding to that, the industry used to be the weakest link in the production chain, in which live side by side modern packers and several local and regional clandestine slaughter houses that supply meat to the domestic market.

Bliska et al. (1998) pointed out that in accordance to game theory, the problems that arise in Brazilian alliance projects are due to information asymmetries and to uncertainty about the price reward for meat quality, both tended to result in a low response by farmers to economic incentives provided by alliances. In the same direction, Vinholis (1999) described

the strategic alliance formed by Gejota pack industry and the retailer chain Cândia, which used a grid pricing scheme to reward carcasses by above average market prices. However, during the late nineties financial problems have arisen at Gejota packer and the slaughter schedules were not well performed by cattle producers, finally both reasons took the alliance to a halt.

Machado Filho and Zylbersztajn (2000) have shown that the Brazilian beef agribusiness system is in reality formed by two sub-systems, a low technology system which works with short-term market transactions, low sanitary and productivity standards, and a high technology system that is growing and requires deeper governance structures, like vertical internalization arrangements and strategic alliances, specially to deliver high quality cuts to the national and international markets.

Brum and Jank (2001) have pointed out that supply requirements posed by retailer chains can provide adequate incentives and coordination to strengthen quality patterns by the pack industry and cattle producers, however, that can be done only by large retailer chains that operate at Brazilian bigger urban centers, and so forth its inductive power does not reach to the system as a whole.

Barcellos and Ferreira (2006) developed an analysis of the advantages and pitfalls of a not named Brazilian alliance in which research was performed on partners' stated perceptions: breed association, pack industry and retailer. The conclusions traced by the study pointed out to agents' similar perceptions about alliance's advantages arisen from higher value meat products, greater access to markets, and production stability. The major demanding efforts to the alliance's success are the agents' commitment and long-term production planning.

The literature as a whole indicates that the beef agribusiness system requires adequate governance structures to increase productivity in accordance to consumer demands. Uncertainty and opportunistic behavior pose a challenge to long-term and high frequency transactions and require arrangements to enable deeper bilateral dependence and increasing agents' commitment.

4. Methodology

The analysis was based on a field research performed with cattle producers who live in Rondonópolis - MT. Interviews were done through a scientific protocol which intended to identify four dimensions: farm profile; livestock production; genetics and marketing. The specific variables to assess the dimensions studied are stated in the box below:

Box 1: Interview Protocol

1 Farm profile	Owner Name / Address / Farm Name Area (ha) Location
2 Livestock	Rural activities: breeding, feeding, genetics. Traecebility (SISBOV/ERAS) Nutrition: mineral nutrition, protein supplementation, fodder Pasture: fertilization, pasture recuperation Grazing-system: rotational, alternate, deferred, silage, extensive
3 Genetics	Bulls, insemination, artificial insemination in fixed time, fetal sexing, embryo transfer, breeding season
4 Marketing	Transactions: in cash and/or in installments (30 days), rural promissory notes (NPR), rural product note (CPR), forward contracts, futures contracts Production destination: domestic wholesale, domestic retail, European Union, other export destination

Source: Elaborated by the authors.

The sample of cattle producers was defined in accordance to Rondonopolis rural association and the interviews have been accomplished along the months of August to September 2010, through personal contacts and distance interviews (e-mails); in all situations a hard copy was maintained as a saving file. The scope of the interviews aimed to describe beef cattle livestock activities and marketing transactions at delivering fed animals to slaughter. That strategy was the result of the research's purpose of understanding the coordination between cattle producers and packer industry.

The distribution is in accordance to the size of farms and follows the official criteria of minifundio, small, midsize, and large rural unities. However, as a result of the concentration of agricultural land in Mato Grosso large and midsize farms' share in the sample is greater than minifundio and small farms' participations.

Fifty and nine cattle producers agreed to participate in the research and their answers formed the dataset in which was accomplished the statistical description and modeling. The econometric modeling was performed using an *Ordered Logit Model* which is suitable when the dependent variable is dichotomous and has two or more qualitative response categories in an ordered manner (Kennedy, 1997).

The choice is the result of the dependent variable to be dichotomous and related to three groups of arrangements used by cattle producers in transactions with the packer industry. In accordance to the results of the research, it was found the following arrangements: in cash and/or in installments (30 days), rural promissory notes (NPR), rural product note (CPR), forward contracts, futures contracts. Arrangements have been pooled together in three ordered categories (L1), (L2) and (L3):

Box 2: Governance arrangements classification

Level 1	In cash and/or in installments (30 days)
Level 2	Level 1 + NPR's + CPR's
Level 3	Level 2 + Forward Contracts + Futures Contracts

Source: Elaborated by the authors.

In doing so, the endogenous variable is made of an ordered qualitative assessment which varies from 1, 2, and 3 for each sample. Level 1 regards to producers who sell animals only in cash or in thirty days of installment. Whereas level 2 is made of producers who answered to engage in transactions of Level 1 (in cash and in installments), but also deal with rural promissory notes (NPR) and rural product notes (CPR), that points to greater coordination with the industry, at least in financial terms. Last but not least, level 3 regards to producers who deal beyond Level 1 and Level 2, and are engaged with forward contracts and futures contracts. Hence, Level 3 refers to a higher degree of governance complexity in the survey, because it entails terms and conditions for quantities, quality, deadlines and patterns to carcasses, and so forth, requires greater systemic coordination. Exogenous variables are continuous (e.g. property land area) or discrete (e.g. cattle feeding, land grazing system, and market destination). The estimation results are discussed in section that follows.

5. Modeling analysis

5.1. Descriptive Statistics.

The sample is a set of interviews with fifty and nine cattle producers who live in Rondonopolis – MT and farms located in Mato Grosso. The choice for the size of the farms in

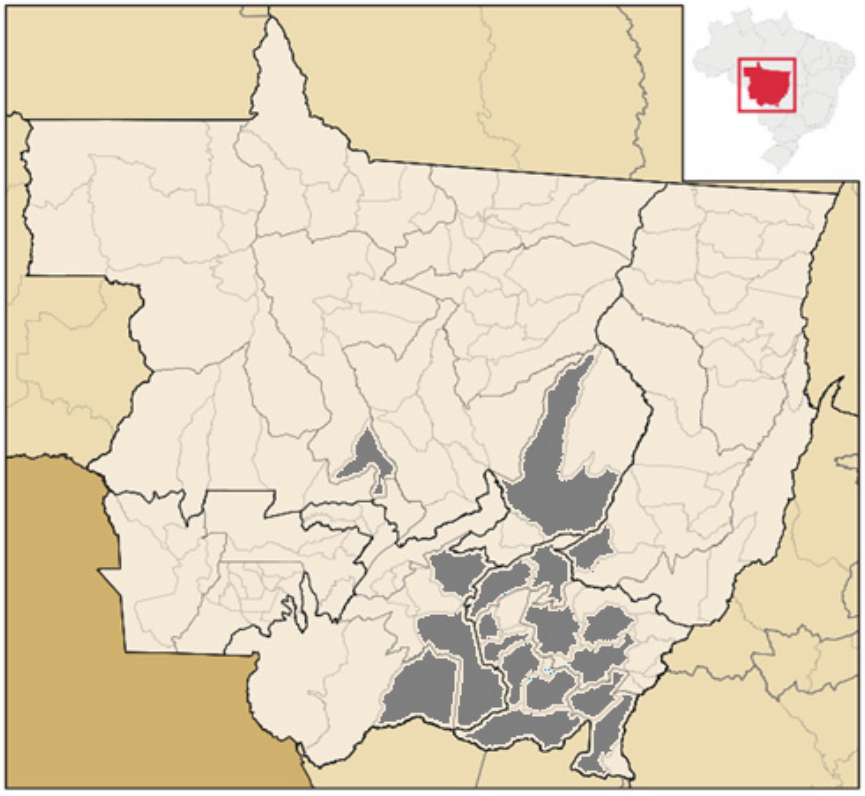
hectares is in accordance to Mato Grosso's pattern of land distribution which highlights its concentration (Table 1).

Box 3: Location and quantity of the survey farms

County	Quant.	MT Region
Alto Araguaia	1	South-east
Alto Garças	1	South-east
Barão de Melgaço	1	Mid-South
Campo Verde	1	South-east
Chapada dos Guimarães	1	Mid-South
Guiratinga	2	South-east
Itiquira	8	South-east
Jaciara	1	South-east
Juscimeira	5	South-east
Novo São Joaquim	1	North-west
Paranatinga	3	North
Pedra Preta	4	South-east
Poxoréu	8	South-east
Primavera do Leste	2	South-east
Rondonópolis	12	South-east
Santo Antônio do Leverger	3	Mid-South
São José do Povo	1	South-east
São José do Rio Claro	1	North

Source: Elaborated by the authors

Figure 1: Geographical location of the counties of the farms



Source: Elaborated by the authors

Table 1: Classification in accordance to hectares (ha)

Classification (ha)	Quant.	%
0 < 100	3	5,1
100 < 200	7	11,9
200 < 500	7	11,9
500 < 1000	12	20,3
1000 < 2500	12	20,3
More than 2500	18	30,5

Fonte: Elaborated by the authors

All cattle producers answered to use Nelore cattle breed, however, fifteen (25%) also use other breeds, European or Asia. According to the production system, the same number of answers (15) pointed out to the use of feedlots to cattle finishing. All producers provide mineral salt supplements to animals on a daily basis, fifty four producers (92%) answered to use some kind of nutrition supplementation, from those, thirty (51%) only in the dry season, fifteen (25%) during all year, six (10%) during finishing, and three did not answered.

Concerning to the management of grazing lands, the results pointed out that twenty and nine (49%) producers do some kind of soil fertilization. The usual practice is the application of lime to reduce soil's acidity in accordance to chemical analysis. Pasture recuperation is a routine to thirty and eight producers (64%), but its recurrence varies from a one to six years, the most usual response (16) was that it is done when "necessary".

The results about the application of a breeding program shows that thirty and eight (64%) cattle producers invest in natural breeding (bulls), twenty and one (36%) in breeding season, twenty and six (44%) in artificial insemination. On that last question, the options of choices are not excluding ones, in a way that each producer can answer more than one alternative, or even no one, when he is not engaged with breeding.

On the use of grazing lands, nine (15%) answered to use silage, twenty and tree, (39%) answered to do soil rotation, and fifteen (25%) are engaged in feedlot production. Concerning to marketing fed cattle it was found six arrangements: in cash and/or in installments (30 days), rural promissory notes (NPR), rural product note (CPR), forward contracts, futures contracts. It is important to stress that each cattle producer could pick more than one choice of answer, even all together, if in accordance to its marketing practice. Therefore, forty and eight (81%) cattle producers sell in cash and forty and six (78%) in thirty days of installment, thirteen (22%) are engaged with rural promissory notes (NPR). Only five (8%) sell their animals backed by a prior liability of a rural product note (CPR), while six (10%) deal with forward contracts. However, no cattle producer is engaged in a collective association to marketing animals, all of them answered to deal with the industry on an individual basis.

At last, it was asked about the final destination of the slaughtered animals, fifteen (25%) producers answered to follow the required standards to export markets, and two (3%) specifically the required by European Union. Most of producers do not know the final destiny of the beef produced, however they do have some general assessment of the carcasses' classification (age, sex, weigh, and fat layer) and therefore of the possible marketing outcomes.

In summary, the result highlights a favorable evolution in productive practices, like the supply of salt supplements (100%), nutritional supplementation (92%), and soil fertilization (62%). Genetics programs are increasingly been adopted by cattle producers, like breeding season (36%) or artificial insemination (44%). The Nelore genetic base of the cattle was found in all interviews, but there is an increasing use of other Asiatic of European breeds (39%) in cross-breeding programs.

The research shows the gap that lies between of the improvement in productive indicators in comparison to the marketing practices favorable to in cash transactions. Cattle producers' usual praxis is the negotiation on an individual basis, the frequency of the transactions is low, payments in cash or in thirty days of installment. The emission of rural promissory notes (NPR) is a device used by buyers (packers) in order to obtain short-term working capital. On the other hand, forward transactions have greater uncertainty because of packers' *default* risk in the last two years (2009 – 2010)[2]. In regard to that, Mato Grosso Federation of Agriculture (FAMATO) started a campaign to advice cattle producers to sell only in cash (IMEA, 2010).

Collective marketing arrangements had no answer, what points that in Mato Grosso beef producers are not keen to participate in associations and alliances in order to group together transactions with the industry. Taking as example of the national scenery collective marketing arrangements among cattle producers are more pervasive in Rio Grande do Sul (South region), Mato Grosso do Sul and Goiás (Mid-West region) usually by the use of grid-price schemes to assess the required standards based on carcass classification.

The main final destination of marketing fed cattle in Mato Grosso is to deliver whole carcasses (hindquarter / forequarter / spare ribs) to wholesale markets in Brazil, on the other hand, deboned cuts are delivered to retailer chains in the country and to the external markets by the three major packers: JBS/Friboi, Brasil Foods/Sadia and Marfrig (FAMATO, 2007).

Forward contracting is a device increasingly used by feedlot operators who supply fed cattle during the dry season (May – September), however, in the last two years (2009 – 2010), higher feeding costs and lower volatility in cattle prices from dry to wet seasons reduced profits in feedlot operations (IMEA, 2010). As a result only six producers answered to be engaged with forward contracts to supply fed animals to industry, but the sample also shows that higher productivity is correlated to greater operational size. Namely producers who adopt more intensive techniques tend to operate in larger farms and cattle herds.

5.2 Econometric modelling.

The Ordered Logistic Model is an extension of the dichotonic logistic model applied to situations when it is necessary to rank the dependent variable in qualitative ordinal levels. The model is based on the cumulative C_{ij} probability of the *(i)* individual in the *(j)*th or higher category.

$$C_{ij} = \Pr(y_i \leq j) = \sum_{k=1}^{j} \Pr(y_i = k) \qquad (1)$$

The maximum likelihood method is used to estimate the cumulative probability of the logistic function:

$$\text{Logit}^{(C_{ij})} = \log(C_{ij}/(1 - C_{ij}) \qquad (2)$$

The model has one constant term for each cumulative logistic function and the number of constants is equal to the number of ordinal categories minus one. The β parameters do not vary in accordance to the level of the constants and are indicators of how one-unit increase in the independent variable increases the log-odds of being higher than category (*j*).

The empirical investigation was done by ranking cattle transactions in three ordered categories: N1 = in cash + installments, N2 = N1 + NPR + CPR, N3 = N2 + forward contracts

[2] In the last years (2009 – 2010) some of the major Brazilian packers halted operations in Mato Grosso and induced several defaults against suppliers: Independência, Arantes, Frialto e Quatro Marcos.

+ future contracts. It was calculated an ordered logistic model in which was tested several functional forms with the sample data. The results of the final regression are shown in the table 2 below.

Table 2: Ordered Logistic Regression

Variable	Parameter*	Z value
Land área	4,40 e-06	0,24
	(0,0000181)	
SISBOV/Eras (traceability)	-1,3131	-1,33
	(0,9896)	
Feedlot system	2,6425	3,29
	(0,8040)	
Exports	1,5744	1,50
	(1,0477)	
Cross breeding	0,5074	0,61
	(0,8314)	
Constant 1	2,2242	
Constant 2	4,1980	
(*) In between brackets standard errors		
LR Ch^2	18,15	
Prob> Ch^2	0,0028	
Pseudo R^2	0,2382	

The model is statistically significant at the 95% level and provides a predictive performance of 0,2382 in accordance to Macfadden Method [3], the signs and the significance of the variables have interesting results. First the variable "feedlot" has no significance at the 95% level, so that production system has no statistical correlation to the choice of the marketing arrangements. All the others explanatory variables have significance at the 95% level.

The variable "land area" is related to the land properties' dimensions in hectares and it has a positive coefficient, so the greater the size of the farm, the greater the probability to be used governance arrangements based on contracts (N2 and N3). That evidence seems to provide a link between the scale of production at the farm level and the coordination with industry, mainly by the enrolment to forward contracts to supply animals in the dry season.

The variable "SISBOV/Eras" is related to the adoption of the traceability program required by European Union, its coefficient is significant as has a negative sign, so producers who have that certification tend not to use contracts to marketing cattle to packers. At the first sight this result was not the expected one, however after some contacts to producers they made clear that the ERAS certification provides price premiums obtained from case by case negotiations with packers. The competition in the industry to obtain animals which are in accordance to EU restrictions provides incentives to short-term price arbitrage and in cash transactions. However, producers also have mentioned that as the supply of traceable cattle increase there will be lesser room for price premiums and that may reward the use of forward contracts.

On the other hand, the variable "exports" relates to the final destiny of the slaughtered cattle. The positive sign of the parameter and its significance shows that producers who supply animals with the required classification to the external markets tend to use more

[3] $R^2 = 1 - \frac{LnL(Mful)}{LnL(Mintercpet)}$

Mfull = model with predictors / Mintercept = model without predictors (NORUSIS, 2007).

coordinated arrangements (N2 and N3). That finding points that the increase in beef exports in Mato Grosso works in favor to higher systemic coordination among producers and packers.

Last but not the least, the variable "cross-breeding" has a positive parameter, so producers who apply more intensive livestock techniques tend to invest in cross-breeding programs between Zebu cows and European bulls or artificial insemination[4].

6. Conclusion

The paper aimed at relating cattle producers' profiles in the beef supply chain to governance arrangements to marketing fed cattle in Mato Grosso's south-east region. The sample is made of fifty and nine interviews with cattle producers who live in Rondonopolis – MT. The research found that the variables with significance to the use of coordinated governance arrangements (i.e. forward contracts) are related to the scale of the production land area, the orientation of the production to exports and breeding practices (cross-breeding).

The research also found that production practices like supply of mineral components, nutritional supplementation in the dry season, and genetic programs, in a higher degree, and grazing land reform and lime application to soils, in a lesser degree, have not statistical significance to increased coordination. That because those practices are already performed by the majority of the producers in now days.

In an interesting finding the "Sisbov/Eras" variable was found to have a negative sign, this because that certification enable producers to negotiate price premiums with packers. At last it is striking the gap between the favorable trend in the use of more intensive productive practices *vis-à-vis* the low response among producers and the pack industry to strength transactions coordination in marketing fed cattle.

7. References

BONJOUR, M. S. C. de; FIGUEIREDO, A. M. R; MARTA, J. M. C. Pecuária de corte no Estado de Mato Grosso. In: XLVI CONGRESSO SOCIEDADE BRASILEIRA DE ECONOMIA, ADMINISTRAÇÃO E SOCIOLOGIA RURAL, 2008, Porto Velho. **Anais:** SOBER: São Paulo: SOBER, 2010. Disponível em: <http://www.sober.org.br/palestra/9/519.pdf>

BARCELLOS, M.D. de; FERREIRA, G.C. Vantagens e desvantagens das alianças estratégicas: uma análise sob a ótica dos agentes da cadeia produtiva da carne bovina. **Organizações Rurais & Agroindustriais**, Lavras, v. 8, n. 1, p. 117–130, 2006.

BLISKA, F.M. de M.; GUILHOTO, J.J.M.; PARRÉ, J.L. O programa de produção de carne qualificada de bovídeos de São Paulo sob o enfoque da teoria de jogos. **Informações Econômicas**, São Paulo, v. 28, n. 2, p. 27-36, fev. 1998.

BRUM, B.L.R.; JANK, M.S. A padronização na gestão da cadeia de suprimentos da carne bovina por supermercados. **Gestão & Produção**, São Paulo, v. 8, n. 1, p. 68-83, abr. 2001.

CALEMAN, S.M.Q.; GONZALES, F.G.; SPROESSER, R.L. The mercadological alliance between the sul-matogrossense alliance of steer producers with the Carrefour supermarket chain. In: INTERNATIONAL PENSA CONFERENCE, 3., 2003, São Paulo. **Anais...** São Paulo: USP, FEA, 2003. Disponível em: <http://www.pensaconference.org/>.

FAVARET FILHO, P.; PAULA, S.R.L. de. Cadeia de carne bovina: o novo ambiente competitivo. **BNDES Setorial**, Rio de Janeiro, n. 7, p. 1-18, set. 1997.

[4] The more quoted breeds have been Nelore, Angus, Aberdeen and Guzerá.

FAMATO – FEDERAÇÃO DA AGRICULTURA E PECUÁRIA DE MATO GROSSO. **Diagnóstico da cadeia produtiva agroindustrial da bovinocultura de corte do Estado de Mato Grosso.** Cuiabá, 2007. Disponível em: <www.fabov.com.br/arquivos/fab0121081200939536.pdf>

HAMER, E.; ZUGE, M.; SILVA, M. T. da. Análise dos fatores condicionantes da reestruturação agrícola no Estado de Mato Grosso In: XLIV CONGRESSO SOCIEDADE BRASILEIRA DE ECONOMIA, ADMINISTRAÇÃO E SOCIOLOGIA RURAL, 2006, Fortaleza **Anais:** SOBER: São Paulo: SOBER, 2010. Disponível em: http://www.sober.org.br/palestra/5/996.pdf

IBGE – INSTITUTO BRASILEIRO DE ESTATÍSTICA E GEOGRAFIA. **Banco de dados agregados da pecuária**, 2010. Disponível em: http://www.sidra.ibge.gov.br/bda/pecua/default.asp?z=t&o=23&i=P

IMEA – INSTITUTO MATO-GROSSENSE DE ECONOMIA AGROPECUÁRIA. **Boletim Semanal de bovinocultura**, 2010 (diversos). Disponível em: <http://www.imea.com.br/publicacoes.php?categoria=2&subcategoria=2>

KENNEDY, P. **A guide to econometrics.** Oxford: Blackwell Publishers, 1995

MACHADO FILHO, C.A.P.; ZYLBERSZTAJN, D. **Competitiveness of meat agribusiness chain in Brazil and extensions for Latin America**. São Paulo: USP, FEA, set. 2000, p. 1–30. Disponível em: <http://www.ead.fea.usp.br/wpapers/index.htm>.

NORUSIS, M. J. **PASW Statistics 18 Guide to Data Analysis**. Pearson, 2007.

PEROSA, J.M.Y. Papel da coordenação em alianças de mercado: a experiência do sistema agro-industrial da carne bovina, In: WORKSHOP BRASILEIRO DE GESTÃO DE SISTEMAS AGROALIMENTARES, 2., 1999, Ribeirão Preto. **Anais...** Ribeirão Preto: USP, FEARP, 1999. p. 69–80.

PIGATTO, G.; SILVA, A.L. da; SOUZA FILHO, H.M. de. Alianças mercadológicas: a busca da coordenação da cadeia de gado de corte brasileira. In: WORKSHOP BRASILEIRO DE GESTÃO DE SISTEMAS AGROALIMENTARES, 2., 1999, Ribeirão Preto. **Anais...** Ribeirão Preto: USP, FEARP, 1999. p. 200–209.

VINHOLIS, M. de M. B. Uma análise da aliança mercadológica da carne bovina baseada nos conceitos da economia dos custos de transação, In: WORKSHOP BRASILEIRO DE GESTÃO DE SISTEMAS AGROALIMENTARES, 2., 1999, Ribeirão Preto. **Anais...** Ribeirão Preto: USP, FEARP, 1999. p. 189-199.

ZEN, S. de. Produtor e frigorífico: a simbiose necessária. **Agroanalysis,** Rio de Janeiro, v. 25, n. 6, p. 35-36, 2005.

RURAL MARKETS INTEGRATION: THE CASE OF TRADITIONAL CASSAVA FOOD PRODUCTS

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Abstract
The vast majority of the cassava grown in Nigeria is processed and sold through traditional market channels. Several cassava markets support the traditional food needs of the ever-increasing population especially the urban population. The objectives of this paper were to describe the traditional cassava trade networks involving the rural (supply) and urban (demand) markets and assess the degree of market integration in selected traditional products. First, about 60 urban markets were surveyed. These markets were geo positioned using GPS equipments and information was also obtained on the major cassava products, the major source (supply) markets to the city market by volume traded in relative terms, and transportation costs to the city markets using a questionnaire. Second, about 500 rural markets were geo positioned and surveyed. Key informants in the rural markets provided information on the movement of different cassava commodities from the rural market to each urban destination (demand) market. Market integration between rural supply and one urban demand market for the cassava-based products of gari and chips were analysed. The results showed that eight cassava-based products are traded in two basic (dry and wet) forms in Nigeria. The trade flows and networks for each of the products and markets were presented and examples of major market trade networks described. Results also describe nature and character of the cross border trade in gari and cassava chips from South and central Nigeria through Kano in northern Nigeria to the Sahelian countries of Chad, Niger, Mali and Burkina Faso. The price system can be expected to respond to exogenous shocks and return to equilibrium but market information is not efficient in traditional cassava products markets.

Key words: Markets Integration, Market Channels, Networks, Rural Markets, Price System.

RURAL MARKETS INTEGRATION: THE CASE OF TRADITIONAL CASSAVA FOOD PRODUCTS

1. Introduction

Nigeria grows more cassava than any other country in the world. According to FAO (2005) total cassava output in Nigeria was estimated at 38 million metric tons. Production increased by 22% between 1995 and 2004. Area cultivated also increased by 40% but yields remained relatively stagnant at 10 tons per hectare. The production of cassava is concentrated in the hands of numerous resource poor farmers located primarily in the south and central regions of Nigeria.

About ninety percent of cassava grown in the country is consumed as food (UGWU, 1996) in several ways, which have broadly been categorized into cooked and uncooked paste, steamed and toasted granules, fermented and unfermented chips and flours (NWEKE, 1994). Cassava is processed into several products. Several cassava products are traded in various forms following informal (basic) commodity chains in Nigeria's rural and urban markets. Initiatives to improve the traditional cassava commodity chain and regional trade require understanding of the basic cassava food commodity chain. Thus, the objectives of this paper were to describe the traditional cassava trade networks involving the rural (supply) and urban (demand) markets and assess the degree of market integration in selected traditional products. The literature review is presented below.

2. Methodology

2.1 Market integration analysis: model description

In this study, it was specified a model relating prices of cassava products in rural or peripheral markets to their respective prices in a central market based on the central market hypothesis of geographical markets. The basic assumption in this model is that rural/peripheral market prices are driven by the prices, which prevail in the central market. Thus, in effect, a possibility of leading prices from the rural/peripheral markets, although in market integration, was not assumed. As observed by Goodwin and Holt (1999), there was no clear trends as in some cases, there are leading prices, while in others there are not.

It is hypothesized that within the model, the rural market price (RMP) and the central market price (CMP) are jointly determined (that is endogenous to the system) while any other variable is exogenous to the system. Given this condition, the vector auto-regression (VAR) representation of our model involving two endogenous variable, without any exogenous variable, following Sims' (1980) can be specified as:

$$Z_t = \delta + A_1 Z_{t-1} + A_2 Z_{t-2} + ... + A_{P-1} Z_{t-P+1} + U_t \quad \text{.....(1)}$$

Where:
Zt is a (n x 1) vector of non-stationary I(1) endogenous variables;
δ is a (n x 1) vector of parameters;
Ai are (n x n) matrix of parameters;
Ut is an (n x 1) vector of random variables, distributed as empirical white noise.
From the above specification,

$$Z_t = [LnRMP_t, LnCMP_t]'$$

Where:
LnRMPt is rural market price; and

LnCMPt is central market price.
Since, it is wanted to distinguish between stationary by linear combinations and by differencing, the VAR in equation (1) can be re-written in its vector error correction form thus:

$$\Delta Z_t = \delta + \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + ... + \Gamma_{P-1} \Delta Z_{t-P+1} + \Pi Z_{t-P} + U_t \quad \text{.....(2)}$$

Where:

Zt is a vector of non-stationary I (1) endogenous variables; $\Delta Z_t = Z_t - Z_{t-1}$;

Π and Γi are (n x n) matrices of parameters with $\Gamma_i = -(I - A_1 - A_2 - ...A_i)$; $(i = 1,...k-1)$ and $\Pi = I - \Pi_1 - \Pi_2 ... \Pi_k$.

From the above specification, the information about the short-run and long-run adjustments to the changes in Zt through the estimates of Γi and Π respectively can be obtained.

The Π matrix in equation 2, which is termed the long-run impact matrix of the error correction mechanism, is of primary importance. First the rank of Π provides the basis for determining the existence of co-integration or long-run relationship between variables. According to Johansen (1988) there are three possibilities with regard to the rank of Π:
if rank(Π) is zero, then the variables are not co-integrated and the model is equivalent to a VAR in first differences;
if 0<rank(Π)<n, then the variables are co-integrated; and
if the rank(Π) = n, then the variables are stationary and the model is equivalent to a VAR in levels.

Second, since the term ΠZt-k provides information about the long-run equilibrium relationship (co-integrating relationship) between the variables in Zt, the Π matrix can be decomposed into the product of matrices α and β, that is, Π=αβ. Where α is the matrix of speed of adjustment coefficients which characterize the long-run dynamics of the system, while β is the matrix representing the co-integrating relations in which βZt (the disequilibrium error) is stationary (see for example, JOHANSEN; JUSELIUS, 1990; CHANG; GRIFFITH, 1998). A large value of α means that the system will respond to a deviation from long-run equilibrium very quickly (that is, with a rapid adjustment) and vice versa. Given the above vector error correction model in equation (2), the long-run co-integrating equation for the rural market price can be written as:

$$LnRMP_t = \phi_0 + \phi_1 LnCMP_t + \varepsilon_t \quad \text{.....(3)}$$

Where:

ϕ_0 is a constant term that captures transportation costs and quality differences;

ϕ_1 is the long-run static coefficient which gives the relationship between the prices (i.e. the price transmission elasticity); and

ε_t is the random term with the usual stochastic assumptions.

Generally, if $\phi_1 = 0$, there is no relationship between the prices; while if $\phi_1 = 1$, the Law of One Price (LOP) holds, and the relative price is constant. In this case, the goods in question are perfect substitutes. If $0 < \phi_1 < 1$ (indicating a positive partial relationship), there is a relationship between the prices, but the relative price is not constant and the goods will be imperfect substitutes. If $0 > \phi_1 < 1$ (indicating a negative partial relationship), there is a relationship which indicates the goods are complements.

The study adopts the Johansen Maximum Likelihood procedure of co-integration. In this method, a preliminary analysis is carried out first to assess the order of integration of the data series through the use of unit root tests after which we test for the existence of co-integrating (long-run equilibrium) relationships among the data series. If a valid co-integrating relationship is found, then we estimate a vector error correction model, co-integration being a pre-condition for the estimation of an error correction model.

As for the test for unit roots, considering the simple first order autoregressive, $AR(1)$ model shown in equation (4) below, a stationary series is one where $|\rho| < 1$. The series have a finite variance, transitory innovations from the mean, and tendency for the series to return to their mean value. This means that a stationary series Yt for example has a mean, variance and autocorrelation that is constant over time, implying that the error structure is time invariant (Adam, 1992; Tambi, 1999; Niemi, 2003). In contrast, a non-stationary series is one where $|\rho| \geq 1$. They have a variance which is asymptotic infinite; the series rarely crosses the mean and innovations to the series are permanent. That is any stochastic shock may not return to a proper mean level. A classic example of a non-stationary series is a random walk where $|\rho| = 1$. Thus, Yt is said to be integrated of order I(1). Since ρ is unity, Y is said to have a "unit root".

$$Y_t = \alpha + \rho Y_{t-1} + \mu_t \quad \text{.....(4)}$$

A non-stationary time series has important asymptotic consequences: regression estimates do not converge in probability with increased sample size, R-square values have non-degenerate distributions, and divergence in t-value distributions often exist such that asymptotically correct critical values do not exist. Regressions involving non-stationary variables in levels often display first-order serial correlation and lead to spurious results.

To carry out the unit root test for stationarity, the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests are used to examine each of the variables for the presence of a unit root (an indication of non-stationary). The DF test assumes that the data generating process is a $AR(1)$ process, and so if this is not so the autocorrelation in the error term will bias the test. The ADF is used to avoid such bias in the test since it includes the first difference in lags in such a way that the error term is distributed as white noise. The test formula for the DF and ADF are shown in equations (5) and (6) respectively.

$$\Delta Y_t = \alpha + \rho Y_{t-1} + \mu_t \quad \text{.....(5)}$$

$$\Delta Y_t = \alpha + \rho Y_{t-1} + \sum_{t-1}^{j} \gamma \Delta Y_{t-j} + \mu_t \quad \text{.....(6)}$$

Where: the lag length j chosen for ADF ensures that μ_t is empirical white noise. Here the significance of ρ is tested against the null that $\rho = 0$, based on t-statistics on ρ obtained from the OLS estimates of equations (5) and (6). Thus if the null hypothesis of non-stationary cannot be rejected, the variables are differenced until they become stationary, that is until the existence of a unit root is rejected, proceeding to test for co-integration. In this study, the ADF test was used.

In addition the purpose of the co-integration test is to determine whether a group of non-stationary series is co-integrated or not. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. Thus, if such a stationary linear combination exists, the non-stationary time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship among variables.

To test for co-integration, we consider the vector error correction model specification in equation (2). Information about the number of co-integrating relationships among the variables in Zt is given by the rank of the Π-matrix: if Π is of reduced rank, the model is subject to a unit root; and if 0<r<n, where r is the rank of Π, Π can be decomposed into two (n x r) matrices α and β, such that $\Pi = \alpha\beta^{'}$, where $\beta^{'}Z_t$ is stationary. Here, α is the error correction term and measures the speed of adjustment in ΔZ_t and β contains r distinct co-integrating vectors, that is co-integrating relationships between non-stationary variables, as earlier stated.

The Johansen method uses the reduced rank regression procedure to estimate α and β and the trace test and maximal-eigen value test statistics were used to test the null hypothesis of at most r co-integrating vectors against the alternative that it is greater than r. The interest here is in testing for the presence of a valid co-integrating vector which gives a unique long-run equilibrium relationship. Once this is established, the vector error correction model of the form given below can be estimated.

$$\Delta RMP_t = \delta_{10} + \sum_{i=1}^{n} \delta_{11i} \Delta RMP_{t-i} + \sum_{i=1}^{n} \delta_{12i} \Delta CMP_{t-i} - \alpha(RMP_{t-1} - CMP_{t-1}) + U_t \quad \text{.....(7)}$$

$$\Delta CMP_t = \delta_{20} + \sum_{i=1}^{n} \delta_{21i} \Delta RMP_{t-i} + \sum_{i=1}^{n} \delta_{22i} \Delta CMP_{t-i} - \alpha(RMP_{t-1} - CMP_{t-1}) + U_t \quad \text{.....(7)}$$

Where all the variables are as earlier defined and Δ is the first difference operator while δ11 to δ22 are short-run coefficients and α is the error correction mechanism which measures the speed of adjustment from short-run disequilibria to long-run steady-state equilibrium. Ut is the error term assumed to be distributed as white noise. All the estimations were performed using the Standard Version of Eviews Econometric Software.

2.2. The Data

Data for this paper was obtained from a survey carried out in two phases in 2005. The first phase involved a survey of 27 major cities in Nigeria. The major cities that were surveyed in the different zones of Nigeria include: Aba, Calabar Enugu, Owerri, Onitsha, and Port Harcourt, in the Southeast zone, Abeokuta, Benin City, Ibadan, Ilorin, Lagos, and Warri, in the Southwest zone, Abuja, Jos, Lokoja, Lafia, Markurdi, and Kaduna in the North Central zone; Bauchi, Maiduguri and Yola, in the North East zone and Birnin Kebbi, Kano, Katsina, Minna, Sokoto, Zaria, in the North West zone.

About 60 urban markets were surveyed. The list of rural markets that supply cassava to the urban markets were compiled from the survey of urban markets and used for the second phase of the study. The second phase involved a survey of all the listed rural (supply) markets. The rural markets were also geo positioned using GPS equipments. About 500 rural markets were surveyed. Key informants in the rural markets provided information on the movement (in relative volumes) of different cassava commodities from the rural market to each urban destination (demand) market. Key informants provided information about source markets for cassava products. Information obtained with questionnaires include cassava products traded, major source markets, relative volumes by market source, distance of source markets to destination (urban) markets and so on.

The second phase was the survey of all listed rural markets that supply different cassava products to the urban markets, compiled from the data obtained from traders and key informants during the first phase. The rural (and urban markets) markets were geo positioned using geographic positioning (GPS) equipments. In the rural markets, key informants also

provided information on the movement (in relative volumes) of different cassava commodities from the rural markets to the urban destination (demand) market.

Other information obtained includes cassava products traded, major destination markets, relative volumes by market destination, distance to urban markets and frequency of market days. A total of 512 rural markets were visited. Supplementary information from rapid appraisal of cross border trade market in Dawanau, Kano provided further information on the nature and character cross border trade in Nigeria. The results are discussed below.

3. Results and discussions

The market for cassava in Nigeria can be categorized broadly into two: namely the traditional food oriented market for which there also exist a cross border trade and the emerging market for industrially processed cassava. Trade in traditional cassava food products is in the hands of small farmers and processors and 62% of the farmers production is reserved for sale in the local markets while 38% is reserved for home consumption (EZEDINMA et al, 2006). This can be compared to the 1990's, proportion of 45% cassava output produced for sale by small farmers in Nigeria (NWEKE, 1998).

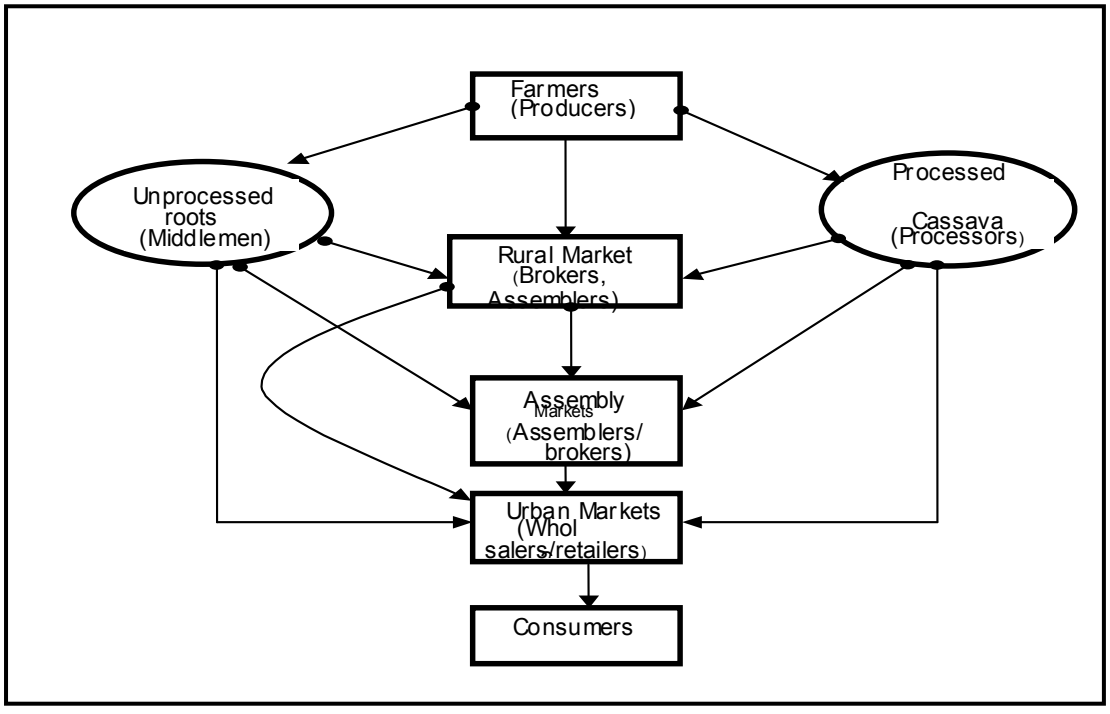


Figure 1 – The cassava commodity marketing channel in Nigeria
Source: Ezedinma, et al, 2006

Cassava chips are the next important product in the urban markets and come third to fresh roots in relative importance in the rural markets. Fermented flour is also an important cassava product and was found in 68% of the urban markets

Table 1 – Percentage distribution of dry and wet cassava products at urban and rural markets in Nigeria

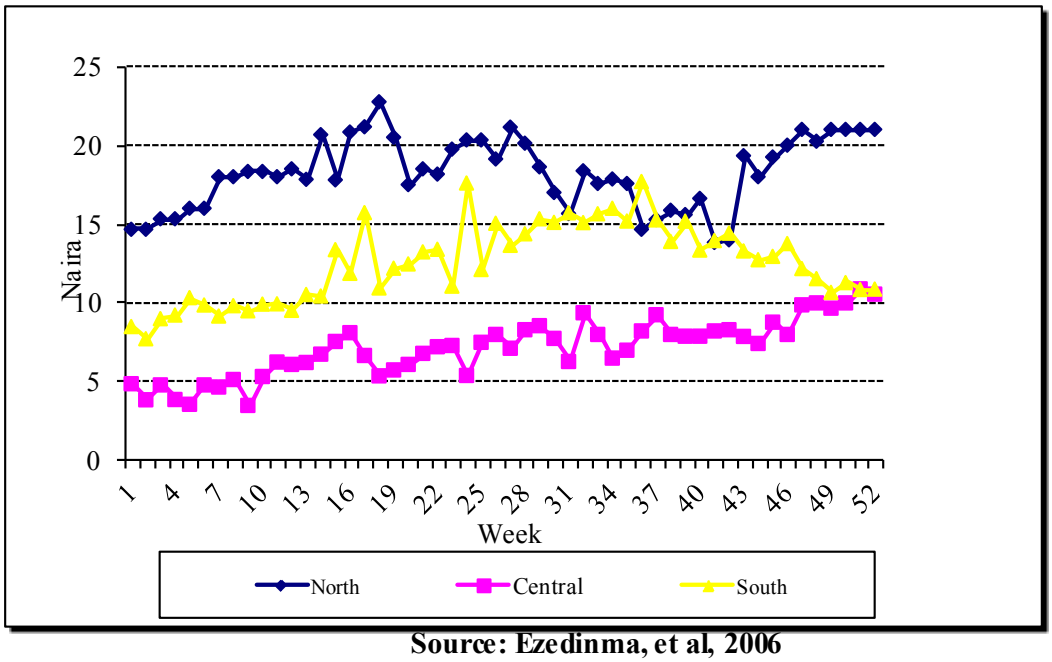
Dry Products	Percent	Wet Products	Percent
Urban market (n=60)			
Gari	100	Fresh roots	33
Fermented flour (lafun/elubo)	68	Fufu paste	22
Chips	78	Prepared fufu	35
Abacha	42	Edible starch	18
Rural markets (n=512)			
Gari	90	Fresh tuber	60
Fermented flour	33	Fufu paste	37
Chips	40	Prepared fufu	31
Abacha	6	Edible starch	15

Source: Ezedinma, et al, 2005

In general, the proportion of markets with wet products in the urban areas was relatively lower than in the case of dry products. Obviously the perish ability of wet products may account for this. In general, product prices differ by region being most expensive in the north and south and least expensive in the central region. Figure 2 shows that in general cassava fresh tubers are cheapest in the central region of Nigeria and most expensive in the northern region of the country.

At harvest time in the north the price of cassava tubers may equate the prices of fresh tuber in the south and at harvest time in the south the price of fresh cassava tubers may equate prices in the Central region of Nigeria. This is because the harvest season for other cassava competing crops (eg maize and sorghum) begins earlier in the far north and influences the price of cassava products downwards. The same also goes for other competing crops in the south (such as yams) that are harvested a little later in the southern region causing the prices of cassava products to decline.

Figure 2 – Price variation of cassava tuber across zones in Nigeria



Source: Ezedinma, et al, 2006

Fresh roots are the most important wet form in which cassava is traded in the rural markets suggesting that at least 60% of the markets surveyed in rural Nigeria can also act as raw material supply markets. Even though cassava fufu and fufu paste (an intermediate product for prepared fufu) were wet products their emergence in the urban markets suggests that they were desired convenience foods. This implies that a dried form of the cassava fufu flour will improve the quality and quantity of traded fufu flour in the Nigerian market. Micro scale technologies for dried fufu flour is available in Nigeria (Sanni et al) and may help product diversification at the rural cassava processing level.

Gari is a granulated dry food product processed from cassava roots; it is the most popular cassava product and has gained the status of an urban convenience food in Nigeria. The major gari supply markets in Nigeria are located in Benue, Delta, Edo Ogun and Oyo states. In these states it was observed that between 85 and 240 markets supply gari to major urban cities in Nigeria. Enugu, Kogi, and Osun States in which 55 – 84 markets supply gari to urban cities in the country follow these states. Ekiti, Imo, Kwara and Taraba states with 28 to 54 markets, Ebonyi, Rivers, Ondo, Nasarawa, Kaduna, Kano, and Cross River follow these with 11 to 27 markets. The major urban demand markets for gari are located mainly in Lagos and Oyo states; followed by Benue, Delta, Edo, Enugu, Imo, and Ogun. Next in order of demand are markets located in kwara, Kogi, Ondo, Anambra, Rivers, Kano and Borno States.Other important demand markets are located in Abuja, Cross River, Ekiti, Kaduna, Osun and Plateau States.

Cassava chips are processed in several ways and come in several forms. They may be fermented or unfermented peeled roots that are either sun dried or dried over the fireplace. They may also be cut into pieces and partially fermented before being drying. Chips are intermediate products that are converted into flour by milling. The major sources of cassava chips are the North Central and Western parts of Nigeria. These areas correspond to the major cassava producing zones and fall within the savannah agro ecology. The demand markets for cassava chips are located all over Nigeria.

Abacha is one of the four dry cassava products. Like other products the distribution network for *abacha* consists of rural-urban and rural-assembly-destination markets arrangement. The commodity is found mostly in the southeast States, Delta and Edo States and there is also some production in Kogi State. Sixteen rural markets supply Abacha to four urban areas. Twelve out of the 16 markets were located in Delta State, two in Rivers State and one each in Edo and Imo states respectively.

Fermented cassava flour (also called *lafun* or *elubo*) is a dry cassava product, which is mainly processed by women in the north-central and south-west regions and sold in the rural and roadside markets. Fermented flour, which was found in 68% of the surveyed urban markets in Nigeria, is predominant in the southwest and central States of Nigeria. Prepared cassava fufu is a fermented product of cassava. Until recently cassava fufu was not usually sold in ready-to-eat forms. This phenomenon arose as a result of demand for convenient foods especially in the urban centers. The data suggest that cassava fufu is traded mostly in the southwest and southeast states of Nigeria.

In Delta State southern Nigeria, cassava tubers are traditionally processed into starch for human consumption. Edible starch is an ethnic food found mostly among the Urhobo and Isoko ethnic groups in the State. Apart from its use as a household food security in these areas, wet starch have industrial and other commercial uses in major cities lik Onitsha. Figure 8 shows the trade network for cassava starch from rural markets in Delta and Edo States to Onitsha – a major commercial city in southeast Nigeria.

The rural supply markets are located in south and central Nigeria. Kano especially the Dawanau market acts as an assembly market in the movement of cassava chips and gari across the borders to the sahelian countries of Burkina Faso, Chad, Mali, Niger and Northern Cameroon, as it's shown at the Figue 4.

The Kano-Katsina-Maradi axis is a major cassava cross border trade route in West Africa. Gari and chips (flour) are the most important products traded across borders. It has been estimated that the quantity of cassava products that are moved across Nigerian borders through the Kano-Katsina-Maradi axis is about 551,100t or 1.5% of Nigeria's total production in 2004 (Ezedinma *et al* 2006).

A major research implication of this observation is that efforts at the dissemination of biologically improved disease resistance and high yielding cassava in the central and southern parts of Nigeria have positive outcomes and impact on the lives of the poor in the sahelian regions of the of West Africa. Improving local cassava production in the south and central regions of Nigeria will therefore help create wealth especially for the key actors in the commodity chain for gari and cassava chips and also help to reduce risks arising from cyclical drought in the Sahelian countries. The cointegration analysis is presented in the next section.

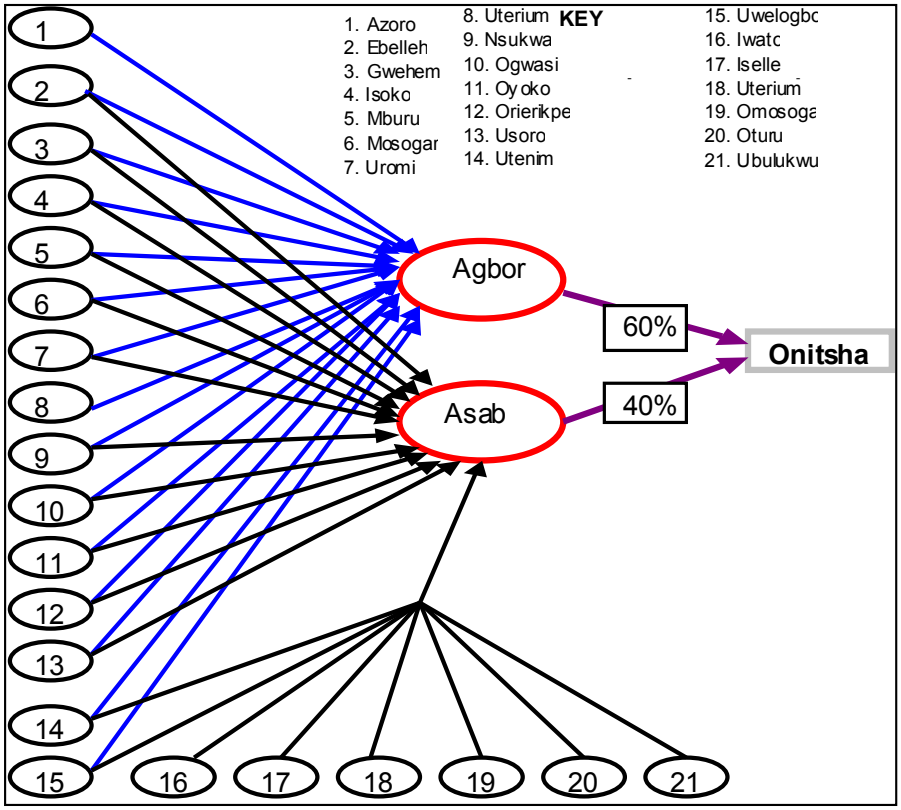


Figure 3 – Rural, assembly and urban (destination) markets for cassava starch
Source: Ezedinma, et al, 2006

On the other hand, the results of co-integration analysis and the time Series characteristics of data (Unit Root Tests) described in Table 2 shows the results of thhis tests for the entire individual price series used in the estimations. For all the series in level form (except in the price of chips in Benue) the null hypothesis of the presence of a unit root (that is non-stationary) cannot be rejected, as it is clear that the critical ADF values are larger in absolute terms than their respective calculated values. On application of the ADF test on their first different terms, they became stationary as indicated by the t-values of the ADF test, which are larger (in absolute) than the standard critical values. Thus the null hypothesis of presence of unit root was rejected indicating that all the price variables (except that of chips in Benue) are integrated of order 1 that is, are I(1), suggesting that there is a possibility for their linear combination to be stationary or co-integrated, that is integrated of order 0, that is I(0) (see Engle and GRANGER, 1987).

Table 2 – Augmented Dickey Fuller (ADF) Unit Root Test for Prices of Cassava Products in Kano (K), Taraba (T), Benue (B) Nasarawa (N) and Edo (E).

Variable Level	ADF statistic	Critical value	Variable First Difference	ADF statistic	Critical Value
Cassava Chips					
LnChipsK	-2.040	-2.895*	ΔLnChipsK	-12.770	-2.895*
LnChipsT	-2.346	-2.895*	ΔLnChipsT	-9.595	-2.895*
LnChipsB	-4.405	-2.895*	ΔLnChipsB	-9.770	-2.895*
Cassava Chips					
LnChipsK	-2.7668	-2.8959*	ΔLnChipsK	-5.8495	-2.8963*
LnChipsT	-2.4592	-2.8967*	ΔLnChipsT	-6.1420	-2.8972*
LnChipsB	-0.0324	-2.8959*	ΔLnChipsB	-8.0092	-2.8959*
LnChipsN	-1.8008	-2.8951*	ΔLnChipsN	-11.6742	-2.8955*
White Gari					
LnWgariK	-1.4926	-3.5073**	ΔLnWgariK	-13.8704	-3.5083**
LnWgariT	-3.2175	-3.5073**	ΔLnWgariT	-9.2802	-3.5073**
LnWgariB	-3.0423	-3.5083**	ΔLnWgariB	-10.2915	-3.5092**
LnWgariN	-1.4906	-3.5073**	ΔLnWgariN	-11.3992	-3.5083**
LnWgariE	-2.7184	-3.5073**	ΔLnWgariE	-11.6559	-3.5083**
Yellow Gari					
LnYgariK	-2.1968	-3.5073**	ΔLnYgariK	-10.3526	-3.5083**
LnYgariT	-3.2064	-3.5073**	ΔLnYgariT	-9.2797	-3.5073**
LnYgariB	-1.7433	-3.5092**	ΔLnYgariB	-10.3808	-3.5092**
LnYgariN	-1.6711	-3.5073**	ΔLnYgariN	-12.7729	-3.5083**
LnYgariE	-1.9311	-3.4956**	ΔLnYgariE	-5.5467	-3.5014**

Critical values of ADF tests are based on MacKinnon (1996) one-sided p-values. Lag length selection is automatic based on Eviews' Schwarz Information Criteria.
(*), (**) denote 5% and 1% critical values respectively

Consequently, the test for co-integrating relationships was performed using the log-level form of the price series. The bivariate co-integrating relations between each of the rural prices and the central market price was done to see how the individual prices co-move in the long-run, since a multivariate system may lead the problem of dimensionality and a loss of information about the speed of price transmission for each of the price series from one market to the other (see for instance JOHANSEN; JUSELIUS, 1990).

The Johansen Maximum Likelihood method was used at the co-integrating tests on a pair-wise basis (Table 3). It uses the trace test and maximal-eigen value test statistics to determine the rank r, of the long-run impact matrix Π of the error correction mechanism. Results of the trace and maximal-eigen value test indicate that co-integration exist among all the bivariate co-integration equations modeled except for Chips between Kano and Benue,

White Gari between Kano and Nasarawa, Yellow Gari between Kano and Benue, and Yellow-Gari between Kano and Edo. This implies that since the prices are co-integrated, the system can be expected to respond to exogenous shocks and return to equilibrium after a while. Prices in any of the rural markets can drift away from the central market price for a while, but would definitely return to equilibrium in the long-run. Specifically, the results for prices of chips between Kano and Benue, white Gari between Kano and Nasarawa, yellow Gari between Kano and Benue, and Yellow Gari between Kano and Edo that show no evidence of co-integration.

Table 3 – Bivariate (Pair-wise) Co-integration Tests between Kano and each of the satellite markets

Null Hypothesis	Trace statistic	5% critical Value	1% Critical Value	Max-eigen statistic	5%[1]	1%[1]
Chips						
Kano and Taraba						
r=0	16.447	12.53	16.31	16.362	11.44	15.69
r≤1	0.0850**	3.84	6.51	0.0850**	3.84	6.51
Kano and Benue						
r=0	9.8814	15.41	20.04	9.5309	14.07	18.63
r≤1	0.3504	3.76	6.65	0.3504	3.76	6.65
Kano and Taraba						
r=0	22.425	15.41	20.04	18.842	14.07	18.63
r≤1	3.584**	3.76	6.65	3.584**	3.76	6.65
Kano and Benue						
r=0	21.508	15.41	20.04	21.506	14.07	18.63
r≤1	0.0019**	3.76	6.65	0.0019**	3.76	6.65
Kano and Nasarawa						
r=0	29.635*	25.32	30.45	27.099**	18.96	23.65
r≤1	2.536	12.25	16.26	2.536	12.25	16.26
White Gari						
Kano and Taraba						
r=0	15.8277	15.41	20.04	12.109	14.07	18.63
r≤1	3.718*	3.76	6.65	3.7186	3.76	6.65
Kano and Benue						
r=0	24.0049	15.41	20.04	21.588	14.07	18.63
r≤1	2.4162**	3.76	6.65	2.4162**	3.76	6.65
Kano and Nasarawa						
r=0	8.9167	15.41	20.04	6.6799	14.07	18.63
r≤1	2.2367	3.76	6.65	2.2367	3.76	6.65
Kano and Edo						
r=0	23.303**	15.41	20.04	21.565**	14.07	18.63
r≤1	1.737	3.76	6.65	1.737	3.76	6.65
Yellow Gari						
Kano and Taraba						
r=0	21.006**	15.41	20.04	15.21	14.07	18.63
r≤1	5.7869	3.76	6.65	5.7869	3.76	6.65
Kano and Benue						
r=0	14.934	15.41	20.04	9.21	14.07	18.63
1 r≤1	5.723	3.76	6.65	5.723	3.76	6.65
Kano and Nasarawa						
r=0	22.603**	15.41	20.04	19.931**	14.07	18.63
1 r≤1	2.6722	3.76	6.65	2.6722	3.76	6.65
Kano and Edo						
r=0	12.7809	15.41	20.04	9.856	14.07	18.63
1 r≤1	2.9244	3.76	6.65	2.9244	3.76	6.65

(*) and (**) = denote cointegration at 5% and 1% significance levels respectively

This might be an indication that the central market hypothesis has failed in this cases, as there may be a possibility of leading prices in the opposite direction, or even between these four rural markets and some other markets that have not been investigated in this study. Thus, it can be infered that while all other markets are integrated, these four were not.

Table 4 shows the summary results of the long-run estimates of price transmission elasticities and speed of price transmission coefficients for each of the pair-wise vector error correction equations.

Table 4 – Summary Results of the Estimates of the Long-run Parameters (Price Transmission Elasticities and Speed of Price Transmission Coefficients)

	Estimated ϕs	Estimated αs (ECMs)	Constant
Chips			
T/K	-1.0448**	-0.1146*	1.0457
	(-3.837)	(-2.1197)	
B/K	-3.4694**	-0.0278	10.430
	(-4.5479)	(-1.0170)	
Chips			
T/K	-1.124**	-0.2678**	1.1087
	(-6.5487)	(-3.0663)	
B/K	-0.4348**	-0.4619**	-2.1942
	(-6.5433)	(-4.6303)	
White Gari			
T/K	-0.4301	-0.1457**	-1.625
	(-1.1830)	(-3.4749)	
B/K	-0.5282*	-0.4715**	-1.3347
	(-2.6911)	(-3.8746)	
N/K	-1.5809**	-0.1578*	2.4804
	(-5.8231)	(-2.4165)	
E/K	-0.5627**	-0.1645**	-1.4295
	(-3.4862)	(-4.0705)	
Yellow Gari			
T/K	-0.4376*	-0.1625**	-1.5164
	(-2.011)	(-3.5357)	
B/K	-0.8753**	-0.1553**	0.1196
	(-3.633)	(-2.7352)	
N/K	-1.051**	-0.3287**	1.4004
	(-11.2913)	(-4.0032)	
E/K	-1.0396**	-0.1166*	0.7192
	(-4.7108)	(-2.5751)	

(*) and (**) = denote co-integration at 5% and 1% significance levels respectively

The estimated price transmission elasticity between Taraba and Kano prices is approximately 1. This shows that the law of one price (LOP) holds because there is full transmission of prices from the central market. Clearly the relative price between these two markets is constant. Thus there is a constant return in prices implying that a 1% increase in Kano prices will lead to a 1% increase in Taraba prices. Furthermore, the speed of adjustment to disequilibrium errors is -0.1146 and indicates a feedback of only about 11.46% of the previous week's disequilibrium from the long-run elasticity of Kano prices for chips. Particularly, this shows that the speed at which Taraba chips prices adjust to changes in Kano prices in an effort to achieve long-run static equilibrium is 11.46%.

For chips, the price transmission elasticity between Taraba and Kano, Benue and Kano, and Nasarawa and Kano are respectively -1.1.24, -0.4348 and -1.0823, while the speed of adjustment coefficients are -0.2678, -0.4619 and -1.1012 respectively. These results indicate that while there is full price transmission from Kano to Taraba and Nasarawa,

transmission is not full for Benue. Beyond these the ECMs indicate a feed back of about 26.78% and 46.19% respectively of the previous week's disequilibrium from the long-run elasticity of Kano prices for chips in Taraba and Benue respectively

4. Conclusions

This study shows that cassava is traditionally traded as a staple food in eight different products either in wet or dry forms in Nigeria. Gari is the predominant cassava based food product. Demand for traditional food commodities from cassava is unlikely to decline given the current rate of population growth, urbanization, and food preferences that is driven by culture and poverty. Local traders play an arbitrage role between rural and urban markets and implicitly govern the basic cassava commodity chain. However, the absence of well-developed organizations implies that small farmers and processors have very little organized marketing power or negotiating ability with product buyers.

Cross border trade exists for cassava products and such trade may help to even out food shortages arising from drought in the Sahelian countries but the volume of trade may depend on the intensity of drought in the region. The trade of cassava across borders suggests that multiplication and distribution of improved disease resistant varieties should target major cassava producing areas in order to help alleviate food insecurity in the Sahlian regions.

Results of the trace and maximal-eigen value test indicate that co integration exist among all the bivariate co integration equations modeled except for certain trade routes. This implies that since the prices were co integrated, the system can be expected to respond to exogenous shocks and return to equilibrium after a while. Results of price transmission elasticities and speed of price transmission coefficients for each of the pair-wise vector error correction equations indicates variations in the speed of response to price changes between rural and urban markets for gari and chips suggesting that local market information systems may not be efficient.

The traditional cassava food market is therefore established, vibrant and responsive to price changes. There is some degree of market efficiency in the traditional cassava food market in Nigeria. Since cassava commodity prices were co-integrated the system can be expected to respond to exogenous shocks. Such shocks may be irreversible if they include increases in demand resulting from industrial processing. This may distort the local market economy and lead to food insecurity since the industrial market will compete with the traditional market for the same raw material

The fact that there is some degree of efficiency in the traditional cassava food market in Nigeria suggests that developments in the cassava industrial sub sector have to be independent of the traditional market. A dual policy approach is therefore recommended in which the government of Nigeria should encourage additional cassava production for industrial purposes and at the same time support existing smallholder production systems through the introduction of improved inputs.

5. References

ADAM, C. S., Recent developments in econometric methods: An application to the demand for money in Kenya. **African Economic Research Consortium (AERC), Special Paper** 15: 1-52, 1992.

BOKANGA, M.; O.O TEWE, O.O. **Cassava:** a premium raw material for food, feed, and industrial sectors in Africa pp 54 – 60 In: **RSB Ferris (Ed), Proceedings of a Post harvest Conference held in Accra Ghana,** 2 Nov to 1st December 1995, Ibadan, Nigeria International Institute of Tropical Agriculture, 1998.

CHANG, H. S., GRIFFITH, G. Examining Long-Run Relationships between Australian Beef Prices. **Australian Journal of Agricultural and Resource Economics**, 42(4): 369-387 , 1998.

OYEWOLE, O.B, L. O.; SANNI A.O.; DIPEOLU, K.; ADEBAYO, I.A.; AYINDE, J. L WHITE, K.I.; TOMLINS, A W. Factors influencing the quality of Nigerian fufu, In: Root Crops: the small processor and development of local food industries for market economy M. O. Akoroda (editor). **Proceedings of the 8th Triennial Symposium of the ISTRC-AB held at the International Institute of Tropical Agriculture,** Nigeria12 – 16 November 2001

ENGLE, R. F.; C. W. J. GRANGER, C.W. Co-integration and error correction: representation, estimation and testing. **Econometrica**, 55(2): 251-276, 1987.

EZEDINMA, C.; DIXON, A. G. O.; SANNI, L.; OKECHUKWU, R.; AKORODA, M.; LEMCHI, J.; OGBE, F.; KORO, E. **Trends in Cassava Production and Commercialization in Nigeria**, International Institute of Tropical Agriculture: Ibadan , Nigeria, 2006.

EZEDINMA, C.; SANNI, L.; OKECHUKWU, R.; ADEBAYO, K. **Socio economic studies on cross border trade and marketing of cassava products in Nigeria.** International Institute of Tropical Agriculture: Ibadan, Nigeria, 2006b.

EZEDINMA C.; OJIAKO, I. I.; LEMCHI, J.; OKECHUKWU, R.; SANNI, L.; AKORODA, M.; OGBE, F.; OKORO, E.; DIXON, A. **The Cassava Food Commodity Markets and Trade Networks in Nigeria.** International Institute of Tropical Agriculture: Ibadan , Nigeria, 2006c.

EZEDINMA, C.; OKECHUKWU, R.; SANNI, L. Marketing of gari in Benin City and Enugu, Nigeria, (pp 121-141), In: PORTER G.; LYON, F. (Eds). **Investigations on Building a Food Marketing Policy Evidence Base in Nigeria,** 2005.

GOODWIN, B. K.; HOLT, M. T. Price Transmission and Asymmetric Adjustment in the U.S. Beef Sector, **American Journal of Agricultural Economics** 81: 630-637, 1999.

GRANGER, C. W. J. Developments in the study of co-integrated variables. **Oxford Bulletin of Economics and Statistics**, 48(9): 213-228, 1986.

JOHANSEN, S.; JUSELIUS, K. Maximum likelihood estimation and inference on cointegration with applications to the demand for money, **Oxford Bulletin of Economics and Statistics,** 52: 169–210, 1990.

JOHANSEN, S. Estmation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. **Econometrica,** 59, 1551-80, 1991.

JOHANSEN, S. Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money. **Oxford Bulletin of Economics and Statistics**, *52*(2):160-210, 1988.

KNIPSCHEER, H.; ASUMUGHA, G.; EZEDINMA, C.; KORMAWA, P.; MAKINDE, K.; OKECHUKWU, R.; DIXON, A.Opportunities in the Industrial Cassava Market in Nigeria, A sub sector study, Ibadan, Nigeria. **International Institute of Tropical Agriculture,** 2004.

NIEMI, J. Cointegration and Error Correction Modelling of Agricultural Commodity Trade: The Case of ASEAN Agricultural Exports to the EU. **Agriculture and Food Science in Finland**, 12: Supplement 1, 2003.

NWEKE, F. I. Processing Cassava for wider market opportunities in Africa. In: RSB Ferris (ed) Proceedings of a Post harvest Conference (pp 45 – 53) Conference held in Accra Ghana 2 Nov to 1st December 1995, Ibadan, Nigeria, **International Institute of Tropical Agriculture,** 1998.

SIMS, C. A. Macroeconomics and Reality. **Econometrica,** 48: 1-49, 1980.

TAMBI, N. E. Cointegration and Error Correction Modelling of Export Supply in Cameroon, **Agricultural Economics**, 20: 57-67, 1999.

HOW DOES THE LACK OF GUARANTEES INFLUENCE ORGANIZATIONAL FAILURES? EVIDENCES FROM THE BEEF CHAIN

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Abstract
The role of formal and informal institutions in organizational economics is traditionally analyzed in terms of efficient governance mechanisms that minimize transaction costs. Based on a different perspective, the present paper focuses on organizational failures and the problem of lack of guarantees in sequential transactions. In particular, the paper examines a bundle of guarantees that supports a particular transaction and its relation with inefficiencies in the economic exchange. A model relating property rights, guarantees and institutions is proposed for the understanding of organizational failures. The model is then applied to contractual failures in the Brazilian Beef Chain. The authors perform a multiple logistic regression model regarding producers' perception of the lack of guarantees. The analysis suggests the importance of path dependence and collective actions. Hypotheses related to Transactions Costs Economics (frequency and time relationship) were not validated. The paper concludes by pointing out the consequences of the analysis for the examination of complex transactions.

Key words: coordination failures, guarantees, complex transactions, beef chain

HOW DOES THE LACK OF GUARANTEES INFLUENCE ORGANIZATIONAL FAILURES? EVIDENCES FROM THE BEEF CHAIN

1. Introduction

In recent years, the meat industry in Brazil has undergone profound changes like internationalization, concentration and diversification. As a consequence, this agri-chain has achieved a growing international market share. Despite being a case of success, conflicts between cattle producers and the meatpacking sector persist. Fraud and bankruptcy is like a routine for this industry. This phenomenon intensified in late 2008 when the global economic crisis hit the Brazilian export beef industry. As a consequence, a number of large meatpacking firms bankrupted and could not honor the payment of the slaughtered animals to producers. In February 2009, the problem became critical when one of the largest national beef exporters bankrupted. Besides this company, at least five other major Brazilian companies experienced this same situation

As a general fact, organizational failures and the problem of lack of guarantees in the Brazilian beef industry can adversely affect the future performance of the industry, reducing the success of the industry international expansion. Based on Barzel (1982, 1997), this research examines the bundle of guarantees that supports the transaction between producers and the meatpacking companies regarding the inefficiencies along the economic exchange. The aim of the paper is to investigate the reasons for a recurrent coordination problem in the Brazilian beef chain considering the institutional dimension. The research is focused on (i) analyzing the role of formal and informal institutions in minimizing conflicts in the scope of complex food chains and (ii) investigating the lack of guarantees and its determinants as a relevant cause of organizational failures.

The paper is organized into five sections, besides the introduction and the closing comments. In section 1, the theoretical background is presented where guarantees and institutions are proposed for the understanding of organizational failures. Section 2 discusses the empirical methodology and hypotheses. Section 3 presents a multiple logistic regression model regarding producers' perception of the lack of guarantees.

2. Theoretical approach

The understanding of the nature of the conflict in the economic exchange is developed in this research on the grounds of institutional failure in guaranteeing property rights. For this, it is considered Yoram Barzel's contributions which link the concept of guaranties to transaction costs. For the author, transaction costs are defined as the resources used to establish and maintain property rights, including the costs involved with the protection and the capture of such rights. In other words, transaction costs are the costs of ensuring property rights and the choice of institutional arrangements is directly related to the need to provide protection to the exchanged rights.

Economic rights and legal rights

Barzel (1997) focus on the importance of protecting and guaranteeing property rights and for that he defends that property rights should be analyzed from both legal and economic dimensions. The distinction between legal and economic rights is based on identifying who is in charge of guaranteeing the rights. The state is assigned as the responsible to ensure the rights prescribed by law, herein called legal rights and the firm and other institutional arrangements should be concerned with economic rights. Based on Barzel (2001), economic rights are those that reflect the ability to obtain benefits of a good or a service[5]. Legal rights are those that the state recognizes as belonging to an individual or to a

[5] "*Economic rights reflect the ability (in expected terms) to benefit from a good (or service)*" (BARZEL, 2001)

group of individuals[6]. Considering the exchange of goods or services, the value of economic right is the value discounted the protection and the capture costs.

The legal rights contribute to the definition of economic rights, but are not necessary and even sufficient for their existence. Likewise, there are situations in which legal rights reinforce the economic rights and in others that both complement the delimitation of property rights. Therefore, economic rights and legal rights are not exclusive. For the author, the rights that individuals have on an asset are a function of the effort played by individuals for the protection of the rights from the attempt of others to capture part of it and the protection offered by the state. The central issue is that the definition and the guarantee of rights have a cost, so the rights are not perfectly delineated. It is thus clear why the author associates property rights guarantee and transaction costs.

Assuming that perfect guarantee of property rights is not possible, except with prohibitive costs, there are failures in the delineation of rights. Thus, transaction costs are positive and some value in every transaction is always at the public domain. The reason why some asset attributes are kept in public domain is that the measurement and protection of such attributes are costly or because the marginal gains which results from their ownership are lower than the marginal costs. Also according to Barzel (1997), ownership is an ambiguous concept as assets are multidimensional and show variability.

So, the rights allocated at the public domain are likely to be captured and the agents invest in this value appropriation. In short, the opportunity to capture occurs when part of the rights is in the public domain and it is not guaranteed by the State and economically it is not yet efficiently protected by any agent. In view of this, we can say that individuals invest in maximizing their rights and not their utility as claimed by neoclassical theory. The conflict emerged from the search for capturing and protecting rights results in value dissipation. Value dissipation could be considered as a loss of efficiency and it is possible to affirm that the dispute for value capture creates a fruitful environment to organizational failures occurrence and to market power exercise. Barzel (1997) argues that there is no condition for the emergence of disputes in situations that rights are clearly defined or when the attributes are fully allocated in the public domain - polar situations. The problem is with intermediary levels of property rights delineation and especially when there are changes in the value of an attribute along an economic relationship or, in better terms, during contract time.

The role of formal and informal institutions in guaranteeing property rights

The informational aspect and specifically the measuring cost of attributes are crucial to the understanding of the efficiency in allocating property rights. According to Barzel (1997)[7], the difficulty in defining rights is related to the multidimensional nature of attributes and their variability, which in sum open room for value capture. The author defends that the analysis of attributes variability and the identification of the guarantees involved are relevant elements to investigate the achievement of efficient organizational structures to handle the transaction. Considering that efficiency is related to the minimization of value dissipation, the guarantees assume a leading role to address the variability and thus to ensure efficiency in the exchange process.

In the lack of variability or in situations that the attributes are measurable at low cost there is no need to provide assurance to the transaction and the market is the most efficient form of governance. Coase (1960) proposes that in the absence of transaction costs, the resources are efficiently allocated to those to who attach greater value to them, regardless to who is assigned responsibility for their use. In a world where transaction costs are zero the state's presence is innocuous because from economic reasoning the rights are allocated efficiently. However, transaction costs are always positive. The presence of transaction costs, from Barzel's perspective, is related to the

[6] *" Legal rights are the rights that the state recognizes as those of a particular individual or a set of individuals*" (BARZEL, 2001).

[7] According to Barzel (1997), assets should be considered as a set of attributes, which characterizes the transaction in a multidimensional concept. So, each dimension is related to the necessity of property rights delineation and guarantee. For instance, considering a fruit as the transected asset, it has several dimensions whose rights have to be delineated and protected like the weight, shape, color, variety, taste, health condition *i.e.* a set of attributes which adds complexity to the transaction itself.

presence of assets' variability. Thus, the economic problem is the allocation of variability and the guarantees offered in order to minimize the variability impact on the value creation (ZYLBERSZTAJN, 2005).

According to Barzel (1997), the allocation of variability determines whether or not the rights are well defined. Furthermore, more efficient organizational forms are those that allocate the variability with the agent that most contribute to their occurrence, in other words, to whom is responsible for issuing the necessary guarantees in order to achieve low transaction cost. Thus, the type of guarantees offered by the agents configures the institutional arrangements to be adopted. If the guarantee is represented by the coercive power of the State, formal contracts are the mechanism that should be adopted and market is the most efficient governance mode; otherwise, if the guarantee is based on reputation, relational contracts emerge as hybrid institutional arrangements to handle the transaction. Finally, when the asset variability is granted by the firm's equity capital, the most efficient solution is to internalize the transaction within the firm (Barzel, 2002).

Applying the same reasoning, Barzel (1997) argues that the firm should be understood as a set of guarantees. This concept derives from the assumption that every transaction is subject to some variability and the function of an *agreement*[8] is to allocate the risk of variability in an efficient way, *i.e.* to allocate it with the part that most contribute to their existence. It creates the figure of the *residual claimant*. However, to become a *residual claimant* the agent should have sufficient resources to offset the risks and losses that may occur depending on the variability of the asset. It turns out that in many situations the agent does not have enough wealth to provide the necessary guarantees. This could result in delivering products of inferior quality in order to reduce total costs. The identification of third parties which gives security could be another solution to the lack of residuals claimants' wealth. The last solution could be to internalize the transaction within the firm (Barzel, 2001). Thus, the firm has come as a solution to the needs of guarantees and when safeguarding the transaction with its equity, the firm has the opportunity to appropriate the transaction residuals.

In the same way that firms emerge to solve the problem of guarantees for the variability, hybrid institutional arrangements (relational contracts) also require guarantees solutions. The investment in reputation and brand building appears as an alternative to the problem of variability and the consequent need for safeguards. Both mechanisms are designed to minimize the measurement costs. The product standardization helps to reduce transaction costs, allowing the buyer to purchase the goods without getting involved in searching costs (Barzel, 1982, 2001). When standards are created, the information becomes public and available at zero cost (Barzel, 2003). Therefore, it is expected that self-regulation gives room to third parties.

In short, considering transactions which involve the exchange of legal rights, formal institutions (judiciary) provide the necessary safeguards to protect the transacted value. However, in the presence of weak institutional environment and less efficient in protecting the rights or attributes whose value is difficult to measure, there is the need for equity capital (firm) and / or reputational capital (relational contracts) to provide guarantees to transactions. Moreover, as the attributes have a multidimensional aspect, part of the transaction can be guaranteed by the State (legal rights) and part guaranteed by the firm or the institutional arrangement established by the parties (relational contracts). In other words, part of the transaction can be guaranteed by formal institutions while the other part is provided by informal institutions whose enforcement is given by third-parties and / or reputational mechanisms.

3. Methodology and hypotheses

The analysis of the lack of guarantee as a determinant factor to organizational failures is applied to the transaction between producers and the meatpacking industry in a Brazilian Beef Chain. The asset is the animal for slaughter. This is a transaction which governance is exercised by the market. The asset is a commodity and price is the reference to the exchange process.

The price of the animal sold to slaughter has a dimension of risk to producers. The risk to what this research is concerned is that related to the possibility of selling the animals to the slaughterhouses

[8] Based on Barzel (2001), the term *contract* should be applied only to the relations that occur in the market, in which legal rights are properly protected by the coercive power of the State.

and to not receive for this sale. Herein this risk is called the *risk of not being paid*. It is based on this dimension, in its variability and in the pattern of the allocation of guarantees through the economic agents (producers and the meatpacking companies) that this research is developed.

As pointed out before, the analysis of efficiency about the allocation of guarantees involves the need of identifying to whom lays the responsibility for the attributes variability and the choice of the institutional arrangements to handle the economic exchange. In this research, the meatpacking industries are the agents to whom the responsibility for the *risk of not being paid* should be charged. Therefore, it is up to the abattoirs to offer the necessary guarantees in order to have low transaction costs, *i.e.*, to achieve greater economic efficiency.

The accomplishment of the research aims encompasses a quantitative approach. The survey was performed through structured questionnaires applied among cattle raisers in Mato Grosso do Sul[9]. The purpose is to investigate producers' behavior and risk perception. The risk perception of not being paid for the sale of animals to slaughter is analyzed regarding the producers profile, the guarantees' and transaction's patterns. It also aims to understand the role of formal (legal) and informal institutions (producers' associations) to support the lack of guarantees of the transaction.

The data analysis encompasses a multiple logistic regressions in two steps. Initially, it is developed an ordered logit regression for the analysis of factors related to risk perception. Subsequently, it is proposed a recursive bivariate probit model to investigate the direct influence of collective actions in the perception of risk. The data were analyzed with the support of Stata10 statistical package. The reasoning for applying a recursive bivariate probit model derives from the importance of analyzing the direct influence of collective actions (participation in producers' associations) in the risk perception, since this phenomenon has theoretical background. Besides this, there is the necessity in testing the independence of the residuals of both regressions (risk perception and participation in producers' association).

The survey among cattle raisers encompasses 107 questionnaires applied during March, 2010. This is a non-probability sample, since part of it is characterized as a self-generated sample[10] (52.34% of questionnaires) and partly as a random sample (47.66%). The random sample is composed by farmers drawn from the list of producers of the State Bureau of Animal and Plant health Protection of Mato Grosso do Sul (IAGRO/MS). This list contained the name of farmers that sold animals for slaughter during January and February, 2010. The interviews were conducted with the farmers in charge of making decisions about the animal trade. The questionnaires were conducted preferably by telephone (67.29%), and some face to face interviews (27.10%). Others were conducted via e-mail (5.61%).

This research starts from some assumptions:

i) The farmers' risk perception is related to the lack of guarantees in the animals sale for slaughter;
ii) Regarding the sale of animals for slaughter, the producers' low or medium confidence in the courts is related to the unclear delineation of property rights and to the weak enforcement offered by the Justice which in turn is related to producers' high risk perception;
iii) The development of collective action results in greater bargaining power and guarantees to the transaction, which in turn represents a lower risk perception to producers;
iv) The history of conflict between cattle raisers and the meatpacking industry results in high perceived risk of the transaction.

Considering these points, the survey was conducted based on four main hypotheses regarding the transaction risk perception:

[9] Mato Grosso do Sul is a State located at the Midwest of Brazil which is well recognized by the importance in livestock production.

[10] According to Mattar (2001) a self-generated sample is one in which the sample composition starts from some indications of potential interviewees and grows successively from new directions. This is a non-probability sample which use is indicated when no one knows the exact size of the population to be sampled or under conditions where it is not possible to achieve a complete listing of the elements of this population.

i) ***Hypothesis 1*** (the role of formal institutions): the risk perception is minimized when the delineation of property rights is clear and guaranteed by formal institutions (legal mechanisms);

ii) ***Hypothesis 2*** (the role of informal institutions): the risk perception is minimized in the presence of collective action (informal institutions);

iii) ***Hypothesis 3*** (transaction pattern): the risk perception is minimized when the transaction is frequent, it involves longer relationships and the farm is close to the industrial plant (frequency, reputation and locational specificity);

iv) ***Hypothesis 4*** (conflict pattern): the risk perception is potentiated in the presence of past conflicts *(*path dependence*)*

4. Producers' behavior and perception risk: empirical data

Regarding the non payment of the animals sold to slaughter (coordination failures), the study of the phenomenon of lack of guarantees is based on: i) producers' profile, ii) conflict pattern, and iii) transaction and guarantees pattern. Tables 1 to 3 characterize the results.

Considering producers profile (Table 1), more than half of the interviewed group of ranchers have a high degree of education, more than 20 years in the cattle production activity, strong income dependence on this economic activity and intermediary technological level (slaughtered steers between 20 and 36 months of age, the use of feed supplementation in the dry season and the use of artificial insemination for breeding animals).

Table 1 – Producers' profile

	Qt	%		Qt	%
Time in cattle production activity			**Education**		
1 a 10 years	11	10.28	Fundamental degree	17	16.19
11 a 20 years	26	24.30	High School	15	14.29
21 a 30 years	40	37.38	College (or more)	73	69.52
>30 years	30	28.04			
Tradition			**Slaughter/year**		
1rst generation	22	20.56	< 500	35	33.98
2nd generation	37	34.58	501 to 2000	46	44.68
3 rd generation	22	20.56	2001 to 5000	14	13.59
4 rd generation (or more)	26	24.30	> 5000	8	7.77
% income / cattle production			**Production Technology**		
until 50%	17	16.04	Pasture	48	45.28
51% to 99%	24	22.64	Supplementation (dry season)	35	33.96
100%	65	61.32	Feed lot	22	20.75
Slaughter age			**Artificial insemination**		
Until 20 months	1	0.94	Yes	53	50
20 to 36 months	78	73.58	No	53	50
> 36 months	27	25.47			

Source: Research survey

The lack of guarantees in the transaction is a determining factor for risk perception, as evidenced in Table 2. More than half of the interviewed producers reported problems of not being paid for the animals sold to slaughterhouses, and of these, nearly half reported that the problem occurred more than once and half farmers reported that it happened in the last five years. It is noteworthy that among those respondents who reported problems of non payment less than half turned to justice as a way to review their rights and less than 20% of them said that the judicial mechanisms were effective to solve the problem. Overall, 63% of respondents say they have low confidence in justice. Among the main reasons cited for the low confidence and in order of importance there are: i) the justice slowness; ii) the current legislation does not prioritize the payment of cattle suppliers; iii) the low effectiveness of the justice results; iv) the existence of legal but not *de facto* shareholders; and v) the attorneys' fees.

The participation in producers' associations is reported by more than 80% of the respondents and marketing alliances have the highest rate of importance[11]. At the second level of importance are the rural unions (rural unions, federations and national confederation).

Table 2 – Conflict and guarantees' pattern

	Qt	%		Qt	%
Risk perception			**Non payment historical?**		
High	29	27.10	Yes	64	59.81
Average	40	37.38	No	43	40.19
Low	38	35.51			
Number of times / non payment			**Last non payment**		
Once	35	54.69	< 5 years	31	48.44
2 times	11	17.19	5 to 10 years	14	21.88
3 times	12	18.75	> 10 years	19	29.69
> 3 times	6	9.38			
Judicial mechanisms?			**Is the judicial mechanism effective?**		
Yes	30	46.88	Yes	5	15.63
No	34	53.13	No	27	84.38
Collective action?			**Level of confidence in justice**		
Yes	90	84.11	High	12	11.21
No	17	15.89	Average	27	25.23
			Low	68	63.55

Source: Research survey

It is noteworthy that the survey coincided with a major shift in the pattern of the transaction. Until then, the payment period was traditionally 30 days after the slaughtering and animal carcass evaluation. With the bankruptcy of several companies in 2009, it started a marketing campaign to only sell at sight. In order to ensure animal supply, the slaughterhouses began to pay with 2-3 days after the slaughtering, which was considered as a *at sight* payment. This represented an improvement in the producers' risk perception[12]. Probably because of this shift in the transaction pattern more than 80% of respondents answered *at sight* as the transaction term which would not be reasonable to expect a few months before the questionnaires application. The usual term was 30 days with the possibility of discounting the Rural Promissory Notes (RPN).

As indicated in Table 3, the acquisition of cattle is held by the employees of slaughterhouses (46.73%) and through brokers (41.12%). The intermediation through brokers is based on the necessity of reducing information asymmetry (price, scale, carcass yield guarantee) and on trust relationships. In terms of transaction frequency, nearly 80% of respondents reported selling more than 4 times per year and this decision, based on the interviewed farmers, is predominantly related to the need for risk management, liquidity (financial restrictions) and trade aspects (higher prices).

Table 3 – Transaction and guarantees' pattern

	Qt	%		Qt	%
With whom to trade?			**Transaction frequency**		
Slaughterhouse owner	3	2.80	1 to 2 times/year	6	5.61
Slaughterhouse employee	50	46.73	3 to 4 times/year	16	14.95
Brokers	44	41.12	> 4 times/year	85	79.44
Producers' association	9	8.41			
Payment form			**Relationship length (producer and abattoir)**		
Anticipated	5	4.67	< 5 years	31	29.81
at sight (2 to 3 days)	89	83.18	5 to 10 years	48	46.15
On term (30 days)	13	12.15	> 10 years	25	24.04

[11] 63% of the farmers who participate in marketing alliances consider that this action is of high importance in contrast to 29% of farmers who participate in Rural Unions and 24% in Producer's associations.
[12] This is the researcher's point of view which is based on impressions collected when applying the questionnaires.

Average distance to industrial plant					
Until 300 Km	82	78.10			
> 300 Km	23	21.90			

Source: Research survey

The data: econometric evidences

The variables included in the econometric model, their relationship with the research hypotheses and the expected sign to explain the phenomenon of lack of guarantees (risk perception) are presented at Table 4.

Table 4 – Econometric variables description and research hypotheses

Classification	General hypotheses/	Variable Description	Detailed hypothesis	Variable type	Sign
Producers' profile	Control Variables	Activity tradition (third generation =1).	To have tradition in cattle raising leads to higher perceived risk of the transaction.	Dummy	+
		Cattle raising share (%) in the rural income generation.	To have high share (%) of cattle raising activity in rural income implies a high risk perception.	Continuous	+
		Production stage: animals' fattening.	To be specialized in animal fattening results in high perception of risk.	Dummy	+
		Production technology: artificial insemination.	To use artificial insemination for animals breeding results in higher risk perception.	Dummy	+
Guarantee pattern	H1 - The role of formal institutions	High level of confidence in the Justice	H1a – to have high level of confidence in Justice results in lower perceived risk of the transaction.	Dummy	-
		Average level of confidence in the Justice.	H1b – to have average confidence in Justice implies high perceived risk of the transaction.	Dummy	+
	H2 - The role of informal institutions	To belong to producers' association/union	H2 – to belong to a producer's association (to have collective actions) is related to have high risk perception.	Dummy	-
Transaction pattern	H3 - Transaction pattern	Time relationship (years) with slaughterhouses that currently trade (the greater value in case of more than one answer)	H3a - Longest relationship with the meatpacking industry results in lower risk perception.	Continuous	-
		Distance from farm (in km) to slaughterhouses that currently trade (the greater value in case of more than one answer)	H3b – Greater distance between farms and slaughterhouses leads to higher perceived risk of the transaction.	Continuous	+
		High transaction frequency (> 4 sale/year)	H3c - High transaction frequency represents a higher risk perception.	Dummy	+
		at sight payment (3 days in average)	H3d – To sell animals with at sight payment involves a lower risk perception of the transaction.	Dummy	-
Conflict pattern	H4 - Conflict pattern	Risk perception (high/average/ low)	Dependable variable	Dummy	
		The occurrence of the event of "not being paid" the cattle sold to slaughterhouses	H4a – to have had problems of not being paid for the animal sold to the abattoir means to have high risk perception	Dummy	+
		Number of times of the events ("not being paid") occurrence	H4b - Increased number of events of not being paid results in high-risk perception.	Discrete	+
		To have problem of not being paid for the animal sold to abattoir and to have gone to Court.	H4c – to have had problems of not being paid and to have gone to Justice implies high perceived risk of the transaction.	Dummy	+

Source: Research survey

a) *Econometric models: Ordered logit regression*

Table 5 presents the results obtained from the survey data. Data are presented incrementally. Model (A) shows the results only considering the control variables. The subsequent models (models B

to D), other groups of related variables are assembled: i) standard of the conflict, ii) standard guarantees and iii) standard of the transaction.

Table 5 – The transaction risk perception (Ordered logit)

Dependable variable	*Risk perception (0 = low; 1 = average; 2 = high)*			
Method:	*Ordered logit*			
N° observations	*A*	*B*	*C*	*D*
	106	*106*	*106*	*103*
Risk perception	**Coef.**	**Coef.**	**Coef.**	**Coef.**
3rd Generation	1,3846	1,4218	1,4334	1,395
	(0,4721)***	(0,5249)***	(0,5433)***	(0,5532)**
Cattle raising share	-1,7564	-1,3581	-1,3229	-1,218
	(0,7949)**	(0,7986)*	(0,8322)	(0,8688)
Animal fattening activity	1,3051	1,6333	1,4651	1,546
	(0,8119)	(0,8316)**	(0,8755)*	(0,8988)*
Artificial insemination use	-0,5468	-0,5225	-0,7493	-0,689
	(0.3873)	(0,4116)	(0,4344)*	(0,4452)
With historical of not being paid		0,9202	0,6506	0,639
		(0,5539)*	(0,5891)	(0,5946)
Number of events of *not being paid*		0,0768	0,060	0,020
		(0,1894)	(0,1943)	(0,1969)
Problems of *not being paid* and have gone to Court		0,7265	0,9178	1,101
		(0,5518)	(0,5898)	(0,6077)*
High confidence in Justice			-0,3503	-0,374
			(0,6995)	(0,7120)
Average confidence in Justice			0,8851	0,924
			(0,4832)*	(0,5101)*
To belong to producer's association			1,7185	1,631
			(0,6503)***	(0,6726)**
Time relationship				0,0011
				(0,0291)
Distance to slaughterhouse				0,00005
				(0,0015)
High frequency of transaction				0,0154
				(0,5225)
At sight payment				-0,0153
				(0,6470)
Log likelihood	-105,61521	-98,536567	-92,971242	-90,684758
LR chi2	19,90	34,06	45,19	43,12
Prob > chi2	0,0005	0,0000	0,0000	0,0001
Pseudo R2	0,0861	0,1474	0,1955	0,1921

*(*Standard error in parenthesis*)* *** significance 1%; ** significance 5%; * significance 10%;
Source: Research survey

Based on Table 5, the regression D fits the data well ($\chi 2 = 43.12$ $p < 0.0001$) and some individual parameters are statistically significant at the 0.05 and 0.10 level. The regression neither shows multicollinearity between the explanatory variables or heteroskedasticity among residues[13]

The explanatory variables with a significance level at 0.05 are: i) to be the 3rd generation of ranchers and; ii) to belong to producers' associations. The variables that are significant at 0.10 level are: i) to have animals' fattening activity; ii) to have average confidence in Justice and; iii) to have had problems of not being paid and to have gone to Court. As it was expected, all variable with significance show a positive relationship with the dependent variable (risk perception), with the exception of "to belong to association" which has an opposite sign to that expected. It is suggested that the fact of belonging to producers' associations should be related to the need to tackle the lack of

[13] Variation Inflation Factor test for multicollinearity (VIF <10) and Breusch-Pagan / Cook-Weisberg test for heteroskedasticity - Appendix 3.

guarantees of the transaction: collective actions reduce informational asymmetry and increase the bargaining power of producers. This argument might explain the positive relationship between this variable with high risk perception.

In short, beyond the producers' profile (tradition, animal fattening activity), the formal and informal institutions (average trust in justice and belonging to producers' associations) and the history of conflict ("path dependence") are related to high perceived risk in the transaction.

Thus, it can be said that the hypotheses concerning the role of formal institutions (H1b) and the role of informal institutions (H2) were validated with significance at 0,05 and 0,10 respectively. The hypothesis related to the argument of "path dependence" (default conflict - H4c) is also valid at 10% significance.

Those variables related to the transaction pattern have no significance at 0.05 or 0.10 level. It is assumed that this is due to the low specificity of the transacted attribute (commodity) and to the low reputation of the meatpacking industry. So, the high frequency of transaction could not be related to meatpacking reputation and trust building, but to the farmer's need in managing risk, since the animal commercialization is done in various periods in order to no enlarge the potential loss. Likewise, the length of relationship with industry does not allow trust building between agents, being the historical of conflict an important factor to be considered on the path dependence behavior of ranchers.

b) *Econometric models****:*** *Recursive bivariate probit regression*

Based on theoretical arguments, there is interest in investigating the direct influence of collective actions in the risk perception, for which the recursive bivariate probit method shows to be appropriate. It is estimated the first equation in which the risk perception is associated to the existence of collective actions (participation in producers' associations/ unions) and it is estimated a second equation where collective actions become the dependent variable. The results are presented in Table 6.

Table 6 – Transaction risk perception *versus* collective actions

Dependent variable	***Risk perception (0 = lowa; 1 = high)***	***Participation on producers' association (0 = No; 1 = Yes)***
Method:	*Recursive bivariate probit*	
N° observations	**100**	
Log likelihood	*-81,47433*	
Wald chi2	*84,17*	
Prob > chi2	*0.0000*	
	Coef.	**Coef.**
3rd Generation	0,790	0,608
	(0,3547)**	(0,4403)
Animals slaughtered per year		0,0003
		(0,0002)*
Animal fattening activity	8,138	0,158
	(1,45e+07)	(0,7139)
With historical of *not being paid*		0,686
		(0,3483)**
Problems of *not being paid* and have gone to Court	0,493	0,4939
	(0,3231)	(0,5354)
High confidence in the Justice		-1,614
		(0,4898)***
Average confidence in the Justice	0,878	-0,6731
	(0,3491)**	(0,3943)*
To belong to producer's association	2,345	
	(0,3376)***	
Time relationship	-0,001	
	(0,019)	
Distance to slaughterhouse	0,0003	
	(0,010)	
At sight payment	0,669	
	(0,4199)	

Cons	-2,356	0,5431
	(0,6301)	(0,3475)
/athrho	-13,41342	
Rho	-1	
chi2(1)	2,84113	
Prob > chi2	0,0919	
Likelihood-ratio test of rho=0		

*(*Standard error in parenthesis*)* *** significance 1%; ** significance 5%; * significance 10%;
Source: Research survey

The analysis of Table 6 shows that the data fits well ($\chi 2$ = 84.17, p <0.0000) and the dependent variables (risk perception and belonging to producers' associations) are perfectly related, but in an inverse way (rho[14] = -1). The LR test for rho = 0 ($\chi 2$ = 2.84113, p <0.0919) suggests that the residuals are correlated with 0.10 level of significance. The residues correlation confirms the necessity of a bivariate recursive method for estimating the parameters.

Considering the risk perception, the variables that is significant at 0.01 level is to belong to a producers' association and at 0.10 level of significance there are the tradition in cattle raising (3rd generation) and average confidence in the Justice. Considering the participation in producers' association, at a level of significance of 1%, there is high confidence in the Justice. The number of slaughtered animals delivered by farmers and to have average confidence in the Justice have 10% level of significance to explain the participation in producers' association. Likewise, to have high confidence in the Justice shows 1% level of significance.

It should also be noted that the perfectly negative correlation between the dependent variables (risk perception and the participation in producers' associations) might be interpreted as an option that the producer has to belong to a producers' association or to have high risk perception. Thus, collective action would be as a counterpoint to the high perceived risk or the lack of guarantees of the transaction. This interpretation supports the second general hypothesis of the research that the perceived risk of the transaction is minimized in the presence of collective action of agents (informal institutions).

It is concluded that hypothesis 3 (transaction pattern) was the unique hypothesis that was not validated by this research. The variables (transaction frequency, distance of meatpacking industries, relationship time and form of payment) were not statistically significant. The hypothesis 1 - the role of formal institutions - was validated since to have average confidence in the Justice was statistically significant to high-risk perception (hypothesis H1b). Likewise, to belong to producers' association, in other words, to develop collective actions through informal institutions, is significantly associated with high risk perception (hypothesis H2). To have historical of problems of not being paid for the animals sold to slaughter and to have appealed to justice is also significant for a greater likelihood of having high risk perception (hypothesis H4c).

5. Final conclusions

This research is based on the institutional aspects of organizational failures. The analysis is focused on a Brazilian beef chain. As a general rule, beef is a commodity and the spot market is the predominant governance mode. The inefficiency of formal and informal institutions in providing the necessary guarantees for an efficient economic exchange is identified as an important reason for coordination failures within this agrichain.

The research investigates the transactions patterns of supply of cattle to slaughter and explores. A survey with 107 cattle raisers is conducted in order to identify the main factors that are associated with producers' risk perception which in turn is assumed to be related to the lack of guarantees in the transaction.

The survey points out the risk of cattle producers not being paid for the slaughtered animal. A large number of meatpacking industries do not honor their debt because they bankrupted or they faced

[14] **rho** is a correlation parameter of the two regressions of the recursive bivariate probit model and it measures the degree of residues correlation between both equations, assuming zero for no correlation and 1 for a perfect correlation.

financial difficulties. The analysis validates the hypothesis of the role of formal and informal institutions in preventing organizational failures. To have average confidence in Justice is significantly related to producer's high risk perception. In the same way, to have collective actions (to participate in producers' association) is also related to high risk perception. It appears that the perception of risk could be considered as a reason to develop collective action. In other words, informal institutions play a relevant role to face the lack of guarantees in the transaction. In the same way, the risk perception is potentiated because formal institutions (Justice) don't promote a better delineation of property rights and the legal rules are not enforced properly.

Moreover, the historical of having conflicts with the meatpacking industry and to have gone to Court is also significantly related to high risk perception validating the hypothesis of path dependence. Based on the results, the transaction pattern (location specificity, frequency, time relationship and payment term) are not significantly related to risk perception. Perhaps this is due to the commodity aspect of the asset and to the historical of conflicts that is recurrent in this transaction – high frequency is related to risk management and longer relationship is not associated with trust building as usual.

As a final comment it is important to stress that this research should be understood as a first attempt to investigate organizational failures in a complex food chain. In contrast to part of the institutional literature, the present research is based on an *inefficient perspective* instead of an efficient one. It proposes that when accessing organizational failures institutional analysis should consider the structure of guarantees within the transaction. As a future research agenda it is suggested an in depth investigation of the role of formal and informal institutions in organizational failures by inserting new questions in the survey and creating new proxies other than risk perception in order to exam the lack of guarantees in a broader perspective. Beyond this point, it should also be interesting to investigate the individuals' cognitive restriction regarding economic inefficiencies and failures. This variable was not examined in this research.

6. References

BARZEL, Y. Measurement cost and the organization of markets. *The Journal of Law and Economics*, v. XXV. apr., 1982. p. 27-48.

BARZEL, Y. Economic analysis of property right. Cambridge University Press, 2nd edition, 1997, 175 p.

BARZEL, Y. A theory of Organizations to supersede the theory of the firm, set. 2001. Available at: <http// www. econ.washington.edu/people/detail.asp?uid=yoramb > Accessed on September, 2007

BARZEL, Y. Organizational Forms and Measurements Costs. *In*: *Annual Conference of the International Society for the New Institutional Economics*, 6, 2002, Cambridge, Massachusettes. Available at: <http// www. isnie.org > Accessed on January, 2007.

BARZEL, Y. Standards and the form of agreement. In: 3rd International Society for New Institutional Economics. Budapeste, Hungria, 2003. Available at: http>*www.isnie.org* Accessed on October, *2008*.

COASE, R.H. The problem of social cost. Journal of law and economics, v.3, October, 1960, p. 1-44.

MATTAR, F.N. Pesquisa de Marketing. São Paulo: Editora Atlas, 3ª Ed., 2001, 275 p.

WILLIAMSON, O. E. The Economic Institutions of Capitalism: Firms, Markets, Relational Contracts. New York: The Free Press, 1985. 450 p.

ZYLBERSZTAJN, D. Papel dos contratos na coordenação agro-industrial: um olhar além dos mercados. Revista de Economia e Sociologia Rural. v. 43, n.3, 2005, p. 385-420

INSTITUTIONAL ARRANGEMENTS ANALYSIS THAT INVOLVES FAMILY FARMERS INTO BIO-FUEL PRODUCTION SYSTEM

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Abstract
In many parts of the world, governments seek to support family farmers to link up with the emerging bio-fuel markets, under the assumption that this connection will raise farmer income, strengthen rural development and alleviate rural poverty (FAO, 2008). For instance, Brazil created the National Program for the Production and Use of Biodiesel (PNPB) to implement a sustainable biodiesel production and to include family farmers in its production system (Brasil, 2005). Like in Brazil, Mozambique has the biophysical suitability for bio-fuel feedstock, which generates socio-economic benefits and the government attention (Schut et al, 2010). This paper aims to present the theoretical framework to analyze how family farmers' transactions can be conducted within a bio-fuel production system. The question that arises is: "Which institutional arrangement would be appropriate to each family farm typology, taking into account the product characteristics?" Transactions between family farmers and the bio-fuel industry can be organized through different institutional arrangements that include: markets, hybrid form, and hierarchy (vertical integration) (Williamson, 1991; Ménard and Shirley, 2005). Our study is based on the New Institutional Economics (NIE) and the Transaction Costs Economics (TCE) to understand these different alternatives. The institutional arrangement choice depends on the transaction costs (Williamson, 1996). These costs are attributed to the combined effect of the institutional environment (formal and informal institutions) and the transaction characteristics (asset specificity, frequency, and uncertainty) (North, 1990). The organizational environment, consisting of those organizations that facilitate the transactions, affects the institutional arrangement choice. Our theoretical framework is based on the model developed by Zylbersztajn (1996) that applies the TCE to study the agribusiness system (AGS). Further, we consider the product characteristics and the family farms typology.

Key words: family farmer, bio-fuel production system, institutional arrangement, transaction cost

INSTITUTIONAL ARRANGEMENTS ANALYSIS THAT INVOLVES FAMILY FARMERS INTO BIO-FUEL PRODUCTION SYSTEM

1. Introduction

Transactions between family farmers and the bio-fuel industry can be performed through different institutional arrangements. The question that arises is: "Which institutional arrangement would be appropriate to each family farm typology, taking into account the product characteristics?" The main purpose of this study is to present the theoretical framework to assess different institutional arrangements (market, hybrid form, and hierarchy) in the bio-fuel production system that involves family farmers. The family farmers' transactions are the principal analysis unity, where property rights are negotiated. Moreover, the transactions occur within the institutional environment that impact the process of property rights exchange. In this sense, the study is based on NIE, since it studies institutions and their interaction with institutional arrangements.

The choice of an institutional arrangement depends on economizing the transaction costs, which explains the transactions through the market or the existence of a firm (Coase, 1937). Economic agents align transactions with institutional arrangements to effect economizing outcomes; therefore, the costs of one mode of governance are always examined in relation to alternative feasible modes (Williamson, 1996). These costs are transaction costs and they consider ex-ante costs for negotiation efforts, contracts design, and safeguarding agreements, and ex-post costs for aligning and adapting the contract to situations that were not previously expected (Willamson, 1985). Williamson (1985, 1996) explored the TCE and elaborated tools for explaining different institutional arrangements. Transaction costs arise from human behavioral assumptions that are: bounded rationality and opportunism. Hence, all contracts are incomplete (Willianson, 1996) due to asymmetric information and to the impossibility for individuals knowing the future events. In term of opportunism, some agents might take advantage of unforeseen circumstances and exploit the other party. For instance, in the presence of asset specificity in the transaction, the agents face ex-post bargaining and hold-up problem (Klein et al., 1978; Masten, 1998). To avoid this problem, the agent can internalize the transaction or design a complete contract. However, the former solution can be conducted to anticompetitive effects and the latter is not feasible due to the high specification costs (Maher, 1997). The solution for hold-up problem can be the design of long-term contracts and agents' reputation is taken into account to constrain opportunism (Klein, 1992; Masten, 1998).

The agents involved in the production system design contracts to coordinate the production. The transactions can be performed through vertical integration and horizontal coordination as well (Zylbersztajn, 2005). Since we study the family farmers' transactions within the bio-fuel production system, the concept of Agro-industrial System Approach (AGS) is used. The theoretical framework used in our study is based on the model developed by Zylbersztajn (1996) that applies the TCE to analyze the AGS. This model considers institutional and organizational environments that are built to give support to production activities. Further, developing our theoretical framework, we added the family farms typology and the product characteristics in the analysis. Considering these elements for family farmers' transaction analysis and Nuijten (2011) methodology, we integrate social and agro-ecological sciences in order to have a more comprehensive on an advanced understanding of the subject analyzed.

This article is structured in seven parts, besides this introduction. Part 2 presents the theoretical framework to be used to family farmers' transaction analysis. The following parts explain the elements that influence the institutional arrangements choice. These elements are used in our theoretical framework and are presented as following: Part 3 discusses the institutional environment; Part 4 deals with the parts of production and organizational environment; Part 5 presents the transaction characteristics; Part 6 presents product characteristics and family farmers' typology as part of analysis. The last part presents the final remarks.

2. Theoretical Framework

The theory used in our analysis is TCE in order to understand the choice of institutional arrangements (market, hybrid form, hierarchy). Market is the arena in which autonomous parties engage in exchange and it is not necessary a previous planning. Hybrid form is long-term contractual relation that preserves autonomy but provide added transaction-specific safeguard. Hierarchy forms are determined when transactions are placed under unified ownership (buyer and supplier are in the same enterprise) and subject to administrative controls are managed by hierarchy.

The seminal article of Ronald Coase (1937), The Nature of the Firm, introduced the firm theory and considered internal performance of firm instead of a firm as production function. Differently from neo-classical theory that considers pricing mechanism, the NIE is a reaction of neo-classic assumptions (Zylbersztajn, 1995) and it considers costs for negotiation efforts, contract design, coordination, and so on. These costs were introduced by Coase (1937, 1960) and developed by Williamson (1979, 1985, 1990) with the name of transaction costs. Both TCE and NIE seek to understand how exchange is conducted. Since transactions involve the transfer of property rights in goods, services, knowledge and assets (Demsetz, 1967), contracts can be used to specify the rules of property rights transfer.

Coase (1937, 1960) recognized the importance of transaction costs in understanding the organization of economic activity. The economic system efficiency depends on how the organizations conduct their affairs, considering the institutional arrangements that govern the process of exchange. The institutional arrangement is called institutional structure of production (Coase, 1992) or governance mechanism (Williamson, 1996) as well. Ménard (2004) refers to institutional arrangement as mode of governance or organizational mode, taking into account the forms in which agents implement their production and exchange within an environment of rules defined by institutions. Different institutional arrangements are different contracts designs performed by agents involved in the production system (Zylbersztajn, 2005). According to Williamson (1991), specific forms of organization are selected through efforts made by agents to reduce transaction costs by aligning governance structures with transaction attributes.

The discussion about the boundary of firms explores and mobilizes theories, methodologies and techniques for designing arrangements among the agents involved into production system. The importance of research on production system is due to contribution to practical experiences. According to Trienekens and Zuurbier (2000), research develops theories and methodologies, tests hypothesis and designs new solutions, methods and tools that may add value to economic efficiency and the progress of science. Since we analyze the transaction of a production system, our theoretical framework is based on the model developed by Zylbersztajn (1995) (figure 1).

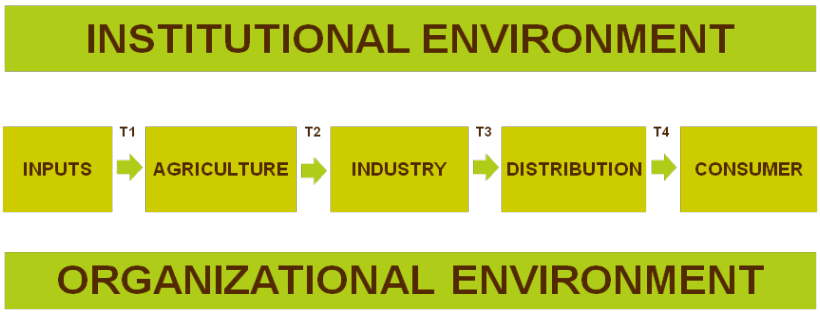

Fig. 1. Agro-industrial System Approach

Source: Zylbersztajn, 1995

The analysis applies the concept of strictly coordinated supply systems (Zylbersztajn and Farina, 1990). According to Zylbersztajn (2000), among the elements required to develop the complex agro-industrial system analysis are: key features of the agents involved in the production, the industrial organization of the chain's sectors, and the organizational and institutional environments. The figure

above presents a systemic view of transactions; however, the agents involved in the system are not static and they form complex forms of governance.

The model of arrangement can change depending on transaction attributes. For Williamson (1985), there are three dimensions of transaction: asset specificity, uncertainty, and frequency. Moreover, we added the family farms typology and the product characteristics in our theoretical framework (Figure 2). We considered these elements important because they impact institutional arrangement choice.

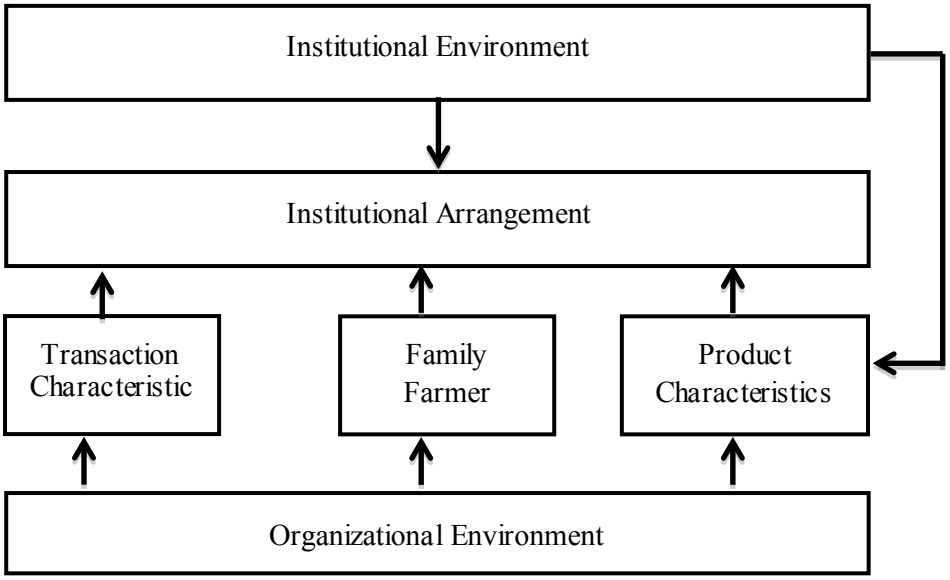

Figure 2. Elements for institutional arrangements analysis

3. Interaction of institutions and institutional arrangement

Institutional arrangements involve the players of the game within an institutional environment. The role of institutions is to reduce uncertainty and to create a favorable environment for decision-making process (North, 1990, 1991). Because of the interaction of individuals, institutions arise, evolve, and establish the basis for production, exchange, and distribution (North, 1986). Transaction costs are economized insofar as institutions facilitate economic exchange.

Thereby analyzing an economic system, institutions are taken into account, what means that price theory is insufficient to explain the economic system performance. Formal and informal institutions are part of institutional environment that is called "rules of game". These rules define the context in which economic activity takes place (Williamson, 1996); hence, the institutions influence the agents who make the choice of institutional arrangements. However, institutions have multiple definitions, for instance, Ostrom (2005) considers rules, norms, and strategies. Other types of institutions may be considered, such as share understanding of culture and trust, security situation, and political system (Dorward, 2001). In our study, we use the definition given by North (1990, 1991, 2005), considering both formal and informal rules. Additionally, taking into account the local institutional environment that family farmers transactions are part, our theoretical framework can be applied in different environments.

According to North (1991, p.97): "institutions are the humanly devised constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)". The purpose of North (1990) was to explore some characteristics of institutions for a better understanding of their involvement in economic growth. Furthermore, this macro-analytical process concerns the interaction between institutions and agents in the process of choosing organizational structures (Figure 3).

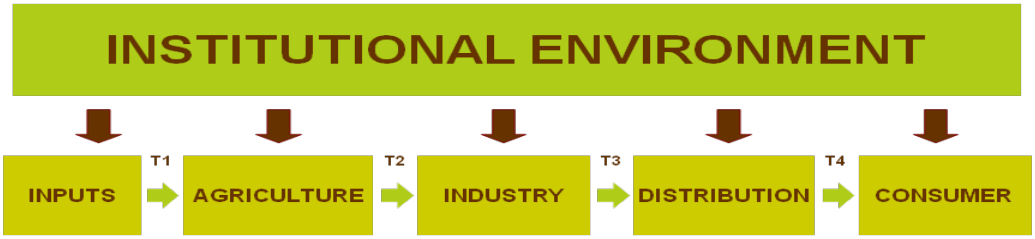

Fig.3. Institutional Environment

Considering AGS as an institutional arrangement, the transactions are interconnected and performed under both formal and informal institutions. We make an assumption that despite the existence of formal institutions, there are local rules that are governed by private agents. The both formal and informal institutions safeguard transactions by constraining the action of parties to economic exchange. If informal institutions are not sufficient to avoid opportunistic behaviors of agents, State intervention will take place to constrain these behaviors. However, if agents find difficulties to transact, because of institutional weakness, they might conduct the transaction toward vertical integration. Hence, institutional environment implies institutional arrangement choice.

As societies become more complex in terms of the degree of interdependence, more complex institutions are required to co-ordinate production and exchange. Therefore, price and quantity variables at the formation stage will have less significance (Goldberg, 1976). NIE posits that societies generate formal and informal institutions to provide certainty and structure to human interaction. According to Greif's conception (2005), the formal institutions are public and informal institutions are private. The former are rules established by State and the latter are economic and social sanctions defined and applied by private agents.

The formal institutions are important for transaction, since property rights traded on the market are established by the legal system. However, besides the formal institutions, private agents can practice self-enforcement, through informal institutions. In general, private ordering within small groups, they spontaneously generate rules and promote co-opertion among the group members. Ostrom (2008) discusses that formal rules may exist, but not be followed or even known by the group. The rules established by State have no possibility to reach all the personal expectation and informal rules might arise.

Self-enforcement can be observed in long-term relations due to agents' reputation. Informal norms may effectively substitute formal constrains. On the other hand, when the agents have not built a reputation yet, the private rules might not be effective to enforce agreements compliance and the State intervention will be necessary. For Eggertsson (1990), government regulation would induce specialized investments and motivate long-term contracts, because of State guarantee for agreement compliance. In the case of government regulation absence, the agents use private mechanisms to protect their specialized investments. On the other perspective, private and public institutions can coexist and they are complementary instruments. This perspective suggests that the use of both public and private institutions provide more efficient outcomes than the use of each institution individually (Klein, 1992; Mazé, 2005).

For analyzing transactions of a production system, institutions are selected. The institutions selection is related to the rules of game, which determine how the agents negotiate property rights to perform a transaction. Moreover, considering our theoretical framework (Figure 2), the institutions can impact on the crop choice cultivated by family farmers. For instance, the government program (formal institutions) motivates the family farmers to cultivate a specific crop. In terms of informal institutions, the family farmers' believes influence the crop choice. Hence, the selection of institutions is according to the issue that has been studied and how these institutions may impact the transaction. The institutions' selection is divided into two blocks: formal and informal institutions (figure 4).

Formal – Public	Informal - Private
Laws, constitutions	Cultural beliefs and norms, reputation, trust

Fig. 4. Formal and Informal Institutions

The formal institutions are the rules determined by the State. For instance, if we are analyzing the engagement of family farmers in the Brazilian biodiesel production system, we select institutions regarded to family farmers and Brazilian biodiesel program. The informal institutions are the private rules determined by the agents of transaction. In this case, the selection of institutions will depend on finding the documents that relate the local culture, tradition, customs, interviewing the family farmers and stakeholder engaged in the production system, and observing in locus.

4. Who are the actors?

It is essential to understand how agents organize the production system to have a view of the processing stages of the product. There are alternative ways of organizing relationships among economic units in order to take advantage of the division of labor and economize on bounded rationality and safeguarding parties against contractual hazards (Ménard, 2005). For AGS analysis, a complex form of organization is considered and it involves different agents, among whom are directly involved in the transactions of production system (Figure 5).

Fig. 5. Production System

Source: Adapted from Zylbersztajn, 1995

Despite the fact that the analysis is in a system perspective, the selection of agents is related to each transaction of the system. The agents are part of the whole system and their transaction impacts it. Considering the complex form of governance, the transaction may not be static and linear as showed in the figure 4. For instance, industry can supply farmers with some inputs and can purchase the framers' production. Regarding to our research that is focused on family farmers, the analysis is related to the transaction that involves them for the production system. Furthermore, the way that family farmers transact with the bio-fuel company depends on the typology of family farmers that will be discussed further.

4.1. Organizational Environment

In addition to agents that interact directly in the production system, there is the organizational environment that is formed by agents that participate indirectly in the production system (figure 6). These agents are important for production operation, since they facilitate the transactions. In this sense, educational and research institutions, financial institutions, public and private bureau as named by Williamson (2002), and other agents are part of organizational environment. Besides the transaction characteristics – asset specificity, frequency, and uncertainty – that determine the mode of governance, the organizational environment can influence the level of transaction costs (Zylbersztajn, 1995). Hence, the organization environment is taken into account to understand different institutional arrangements choice.

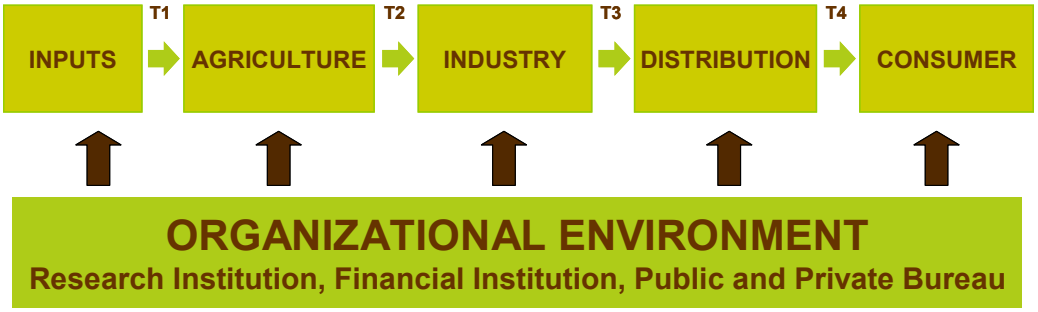

Fig. 6. Organization Environment

The selection of agents that are part of organizational environment consists in identifying those that facilitate transactions. Therefore, they are indirectly part of transaction. For instance, financial institutions, research institutions, NGO, association, cooperatives, and so on.

5. Transaction Characteristics

Different institutional arrangements depend on transaction attributes, which are part of TCE and they are related to three dimensions of transaction: asset specificity, uncertainty, and frequency. According to Williamson (1979, 1985, 1991, 1996, 2005), these dimensions affect a firm's governance decision that is based on a choice between competing alternatives, such as market, hierarchy, and hybrid form. Indeed, the analysis of a specific institutional arrangement conducted within the institutional environment is assessed comparatively, taking into account the transaction characteristics.

The main transaction dimension developed by Williamson was asset specificity, which is related to the specific investments involved in a transaction. This transaction characteristic results in a bilateral tied transaction, which conduct the transaction toward a specific organizational mode. The reason for transaction be bilateral depended is the fact that specific investment in a transaction creates a dependency relationship. Williamson (1985) defines asset specific investment as "durable investment that are undertaken in support of particular transactions, the opportunity cost of which investment is much lower in best alternative uses or by alternative uses should the original transaction be prematurely terminated". In other words, a specialized investment cannot be replaced to other transaction without value loss.

Specialized investment generates value named quasi-rent, which is the value difference of the assets specific investment within and out of the specific relation (Alchian, 1984). Taking into account the NIE assumption of opportunism behavior and the incomplete contract, transactions supported by relationship specific investments are exposed to ex post bargaining and hold-up risk[15] (Klein et.al., 1975). Hence, insofar as the asset specificity is present, the hold-up risk increases and, consequently, the transaction costs increase. In order to reduce the hold-up risk in the transaction that involves specialized investment, the transaction parties have incentive to some governance mechanisms. Some authors (Williamson, 1975, 1979, 1985; Klein et.al., 1978) considered vertical integration as an important mechanism to deal with hold-up risk created by assets specific investment. The other mechanisms to avoid hold-up problem are renegotiation and long-term contracts (Klein, 1992).

In terms of transaction frequency analysis, it is important characteristic for institutional arrangement choice. There are different levels of frequency. If the transaction occurs only once through the spot market, for instance, when a traveler stops in a fuel station to buy water, there is no reason to design a contract to avoid opportunism behavior. On the other hand, the transaction that has a certain frequency, it might be relevant the design of complex governance mechanism for the repeated transactions. Because of transaction frequency in long-term contract, agents' reputation is built what might constrain opportunism behavior such as contract breach. It is observed that when the

[15] "Hold-up risk refers to the possibility that transactors may violate the intent of their contractual understanding by expropriating the quasi-rents from the specific reliance investment that have been made by the transacting parties" (Klein, 1992, p.150)

opportunism behavior cost is higher than the benefit acquired from this behavior, the agreement compliance is kept. Hence, the transaction frequency is an important variable to determine the trust among the transaction participants. In this sense, insofar as the transaction is more frequent, reputation among the participants will increase. Reputation influences the contract design into a less detailed contract, which decreases the contract ink-cost. The other perspective obtained from transaction frequency is that the agents' efforts to transact decrease, since they acquire knowledge in the transaction. The role of transaction frequency is related to trust building and to the asymmetry information reduction. Because of these aspects, the agents efforts to transact decrease; consequently, transaction costs decrease.

In term of uncertainty, since we have the assumption that individuals have bounded rationality, the contracts are incomplete. Because of uncertainty and the existence of opportunism behavior, it motivates to design complex governance modes. In this sense, the uncertainty is connected to NIE assumptions: bounded rationality and opportunism. Whereas the former is defined as behavior that economic agent desires optimize, but cannot satisfy the desire. It is the inability of economic actors to anticipate properly the contingencies that might be relevant to long-term contracts. Opportunism is defined as self-interest seeking with guile of economic agents. Therefore, all complex contracts are incomplete by reason of these behavioral assumptions (Williamson, 1996). The uncertainty complexity is related to asymmetry information that makes the agents have more efforts to transact. In other words, uncertainty might increase the transaction costs, depending on the choice of institutional arrangement. In this sense, the role of uncertainty varies according to different choice of transacting. For instance, bilateral contracts are within the hybrid form and the adaptation of transaction requires the both parts agreements, whereas in market and hierarchy organization, decisions are taken unilaterally. Hence, the uncertainty that is a transaction characteristic might be determinant for institutional arrangement choice. Further, as the transactions are part of an institutional environment, the institutions arise to reduce uncertainty and to facilitate the transactions (North, 199, 1991).

The three dimensions to determine a transaction are: asset specificity; frequency; and uncertainty. These dimensions allow designing the institutional arrangement in order to decrease the transaction costs related to the transaction.

6. Product characteristics and family farmers typology.

In our theoretical framework based on Zylbersztajn (1996), we added the following elements: product characteristics and family farmers typology. These elements gained relevance because we are analyzing transaction within a production system. Despite the absence of production characteristic in our theoretical framework, this element is connected to the product characteristic. Further, depending on the type of product, its production is conducted in a certain way that affects the choice of institutional arrangement. Inasmuch as specific product requires special equipments for its production that cannot be replaced to other product – physical asset specificity, the institutional arrangement will be conducted to hybrid or hierarchic form. Hence, the product characteristic impacts the institutional arrangement choice.

Moreover, the product characteristic is related to family farms typology. It means that family farmer from one typology is more available to cultivate one product than others from different typology. The reason for this is that the typology is related to the socioeconomic and agro-ecological conditions. The large range of family farms characteristics, such as farm size, land use, and agro management, contribute to the complexity of the family farms. Assuming that there is a large amount of information related to family farms, the typology of these family farmers simplify these information into coherent groups that share the same characteristics. It means that the characteristics should differ among the types and have maximum homogeneity within the types.

Depending on the complexity of family farm typology, the selection of product will be complex as well. Agricultural systems are a complex interplay of social and agro-ecological factors. This complexity of agricultural system conducts to complex forms of governance that involve vertical and horizontal coordination. The farm typology would explain the different institutional arrangements that involve family farmers (figure 7). For instance, if they have other options to trade their products, they are less tied to the bio-fuel company, so their transaction is more conducted to the market. Depending on their farm typology, the family farmers cultivate or have the potential to cultivate a specific product.

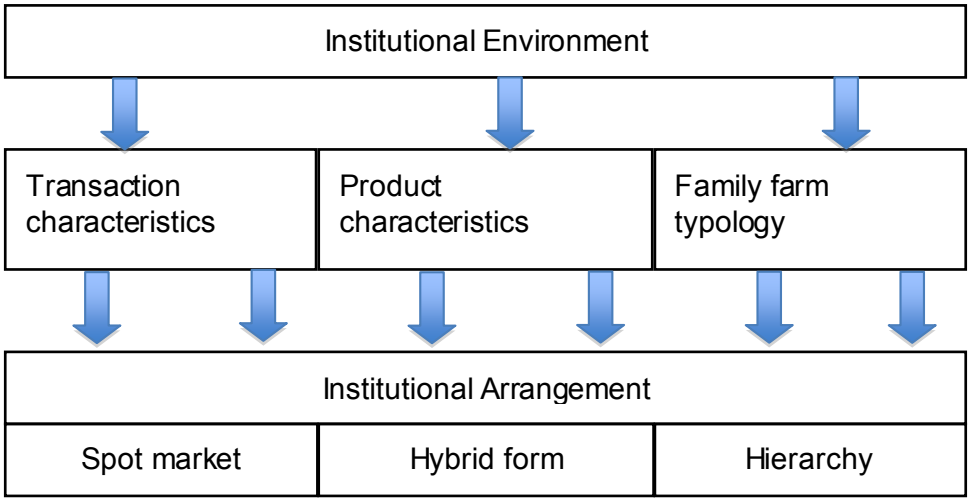

Figure 7. Social and agro-biological characteristics that influence the institutional arrangement

From both product characteristics and family farmers typology analysis, we expect to obtain the level of dependence with the bio-fuel industry (figure 8).

	Spot Market	Hybrid Form	Hierarchy
Farm Typology	More organized; idependent	Organized or no organized; dependent	No organized; belong to bio-fuel industry (e.g., family farmers sell their labor force to industry
Product Characteristic	Commodities	Specific investments	High specific investment

Figure 8. Product characteristics and farm typology related to institutional arrangements

Basing on Nuijten (2011) methodology, we integrate the social and agro-echological analysis when we consider the product characteristics and family farms typology in our theoretical framework. According to Nuijten (2011), a way to combine different disciplines is the interdisciplinary approach. This approach implies integrating different disciplines (social and agro-biological) and to recognize differences at local level.

7. Final remarks

We described the factors used in the theoretical framework for alternative institutional arrangements analysis. Considering the transaction the principal unity for analysis within a

production system, we based our theoretical framework on the model developed by Zylbersztajn (1996). The product characteristics and family farm typology have been added for analyzing the choice of different institutional arrangements. Considering these last elements in our theoretical framework, we intend to integrate social and agro-biological sciences. Despite the fact that factors such as institutional and organizational environments, transaction characteristics, and product and production characteristics, are interconnected to determine the choice of institutional arrangement, these factors are described separately for a deep analysis. We expect that the more diverse the scientific disciplines (from both social and agro-biological sciences), the bigger the chances of an increased validity of the research results, a more comprehensive on an advanced understanding.

8. References

BIJMAN, Jos; HENDRIKSE, George; VAN OIJEN, Aswin. Accommodating Two Worlds in One Organization: Changing Board Roles in Agricultural Cooperatives. June 21-23, 2007 (ISNIE).

COASE, Ronald (1937). *The Nature of the Firm*. Economica, v.4, p.386-405, 1937.

COASE, Ronald (1960). The Problem of Social Cost. Journal of Law and Economics**,** 1-23.

COASE, Ronald (1992). The Institutional Structure of Production. *The American Economic Review*. 713-719

Davis, J. H. & R. A. Goldberg. 1957. A concept of agribusiness. 136. Boston: Harvard University.

Demsetz, H. 1967. Toward a Theory of Property Rights. *The American Economic Review*, Vol. 57, No. 2.

Klein, B., R. G. Crawford & A. A. Alchian (1978) Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. *Journal of Law & Economics,* 21**,** 30.

Klein, B. 1992 Contracts and incentives: the role of contract terms in assuring performance. In: Werin, L.; Wijkander, H. *Contract Economics*. Blackwell Pub.

Maher, M. E., 1997. Transaction Cost Economics and Contractual Relation. Cambridge Journal of Economics, 21, 147-170.

Masten, S. E. 1998. Contractual Choice. 27. University of Michigan Law School.

MÉNARD, Claude. (2004). The Economics of Hybrid Organizations. *Journal of Institutional and Theoretical Economics*, 160, 345-376.

MÉNARD, Claude. A New Instituional Approach to Organization. In: MÉNARD, C.; SHIRLEY, M. (eds). *Handbook of New Institutional Economics*. Netherlands:....pp.281-318, 2005.

Ménard, C., Shirley, M. M., 2005. Introduction, in: Ménard, C., Shirley, M. M. (Eds.), Handbook of New Institutional Economics. Springer, The Netherlands, pp. 1-18

Milgrom, P and Roberts, J., 1992. Economics of Organization & Management. Prentice-Hall, New Jersey.

NORTH, Douglas. *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press. 1990.

NORTH, Douglas. *Institutions*. Journal of Economic Perspectives. Vol. 5, pp. 97-112 (November I, 1991).

NUIJTEN, E. *Combining research styles of the natural and social sciences in agricultural research.* NJAS – Wageningen Journal of Life Sciences 57 (2011) 197-205

Ostrom, E. 2008a. Developing a Method for Analyzing Institutional Change. In *Assessing the Evolution and Impact of Alternative Institutional Structures,* ed. S. B. a. N. Mercuro. London: Routledge Press.

TRIENEKENS, J.H., AND ZUURBIER, P. (eds.) (2000). *Chain Management in Agribusiness and the Food Industry,* Wageningen University Press: Wageningen

Williamson, O. E., 1979. Transaction-Cost Economics: The Governance of Contractual Relations. Journal of Law and Economics, 22**,** 233-261.

Williamson, O. E. 1985. *The economic institutions of capitalism. Firms, markets, relational contracting*. New York: Free Press.

Williamson, O. E.,1990. A Comparison of Alternative Approaches to Economic Organization. Journal of Institutional and Theoretical Economics, 146, 61-71.

WILLIAMSON, O.E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*, 36, 269-296.

WILLIAMSON, O.E. (1996). *The Mechanisms of Governance*. New York Oxford: Oxford University Press

ZYLBERSZTAJN, Decio. Estruturas de governança e coordenação do agribusiness. Uma aplicação da "Nova Economia das Instituições". Tese de Livre-Docência apresentada no Departamento de Administração da Faculdade de Economia, Adiministração e Contabilidade da Universidade de São Paulo, pp.238, 1995.

ZYLBERSZTAJN, Decio. 1996. Governance Structures and Agribusiness Coordination: A Transaction Cost Economics Based Approach. In Research in Domestic and International Agribusiness Management, ed. R. Goldberg, 245-310. Havard University. JAI Press

Zylbersztajn, D. & E. M. M. Q. Farina (1999) Strictly Coordinated Food-Systems: Exploring The Limits Of The Coasian Firm. *International Food and Agribusiness Management Review,* 2.

ZYLBERSZTAJN, Decio 2000. Conceitos gerais, evolução e apresentação do sistema agroindustrial. In *Economia & Gestão dos Negócios Agroalimentares,* eds. Zylbersztajn, D. Neves & M. Fava, 428. São Paulo: Pioneira.

ZYLBERSZTAJN, Decio. Papel dos Contratos na Coordenação Agro-Industrial: um olhar além dos mercados. *Revista Economia Rural*, Rio de Janeiro, vol. 43, nº3, p. 385-420, jullho/set 2005

NETWORKS AND CHAINS FROM A COMPLEX PERSPECTIVE

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Abstract
The evolutionary process of labor and men has resulted into systemic and complex theories that have unraveled and now sustain a world of interconnected tasks. Current links between organizations represent the dynamism of management practices and taking control of all activities as well as predicting all interactions and combinations becomes impossible. Productive units transcend the level of organizations and start interacting in a global way, constituting productive chains, or rather "productive networks". The processes of production management are facing a new task: to understand and optimize production performance in a chaining of organizations which need to collaborate with each other to ensure mutual success. As well as the processes and tools for management of the organization are evolving, the way ahead is open for study and specialization of analysis and management methodologies for the companies networks.

Key words: *Production chains, enterprise networks, performance, production management*

NETWORKS AND CHAINS FROM A COMPLEX PERSPECTIVE

1. Introduction

From the emergence of simple devices to the advancement of the arms industry highly specialized, the man began to have a greater relationship with machines. These have adopted over the years different technologies: mechanics, electronics, chemistry, etc.. Industrial output starts to work then with the meeting of several components but, more than that, the advanced production also faces the emergence of financial problems, economic, social and political. This process Ludwig Von Bertalanffy (1977) identified as the root of systemic evolution where we are today.

The progress of labor, from the one-dimensionality to multidimensional tasks, begins, according to Morin (2007), on breaking the Taylorian conception in which he considered the man only as a physical machine. A moment later it was understood that there is also a biological man. So, the biological man was adapted to his work and was given working conditions to this man. Then, when it was realized that there is also a psychological man, frustrated by the division of labor, was invented the tasks enrichment.

This evolutionary process of labor (and man) made the action of to manage organizations became an activity that requires observation, continuous monitoring, preparation and anticipation of actions to deal with the unexpected. As stated by Lissack (2002), managers relate between them and make deals with people. And people are much more difficult to understand and make deals than the machines. We live in an interconnected world where management tasks are constantly changing and the actions that are committed not necessarily have an immediate impact.

Organizations have become more dynamic. Managers spend viewing them as a whole, involved in various internal and external systems. According to Agostinho (2003), administrators have noted that the strict control of their organizations is impractical. Because of the number of relationships - internal and external, afforded by communication systems capable of connecting the most distant and different individuals - it is impossible to know the results of all possible combinations and interactions.

Every day organizations become larger and increasingly involve a large number of participants. They begin to put aside their vertical structure, especially by the fact that the transactions of buying and selling have become easier and economically advantageous between people and businesses anywhere in the world. The production units of the same product components are geographically dispersed across the globe, implying the need for an analytical perspective that transcends the level of the firm, industry or nation (TORRES, 2011).

This global movement imposes on firms the need to increase their competitive capacity, which relates not only to increase their productive efficiency particular, but also the efficiency of suppliers throughout the production chain, which can be called a need for competitiveness "systemic "(TORRES, 2011).

This interaction occurs not only between suppliers and manufacturers, but also includes distributors, retailers and customers (CHOPRA & MEINDL, 2003), ie, all agents and steps by which the movement of products passes by. In this sense, the competitive advantages found in the chains of companies can be innumerous.

The definitions of ideas that address the chaining of companies are not so simple. As well as is not simple the chain management, because of its complexity. But an approach through the global view of the chain, from the systemic point of view, would be consistent with the current thoughts of production management?

This paper seeks to demonstrate, through a theoretical construct, the relevant ideas about the associations corresponding to the study of complexity and to the characteristics of alliances between

companies, which can enable to understand the performance of productive chains and the development of diagnostics to support the management of them.

2. Chains and Networks

According to Leite et. al. (2003), the lack of more precise descriptions in the literature in relation to productive chains, supply chains and value chains, create some confusion in understanding the differences between them.

For Pires (2009) the logic of "supply chain" refers to a linear process and / or activities performed on a well defined order. on the other hand, "productive chain" is a term used to refer to a set of activities that represent a particular sector. That is, the term "productive chain" is always accompanied by a complement that determines the industrial sector. With regard to "value chains" their perspective is broader than the production itself, being a link of a greater number of activities that add value to a product (TORRES, 2011).

The terms tend to combine, without effective rule, keywords such as flow of inputs, production services, business process management (LEITE et.al., 2003; PIRES, 2009) materials management, logistics, global negotiations, networks companies, (Battle, 2009), analytical and economic perspective and internationalization (TORRES, 2011; GEREFFI, 2001), among others. It is noteworthy here that these keywords are often fused to denote what may be called a "network of interactions between companies."

According to Pires (2009), a group of authors in the area prefer, for example, use the term "Supply Network" instead of "Supply Chain" and even authors who use the term Supply Chain recognize that it is not a chain business relationships one by one, but a network with multiple businesses and relationships.

For Batalha (2009), the term "business networks" refers to a structure of links between any social system. This broad definition is according with the thought of Nohria and Eccles about the networks.

The concept of network is by Nohria and Eccles (*apud* BATALHA, 2009), important for the study of organizations and their behaviors and is based on five basic assumptions:

- all organizations are linked to an important set of social relations;
- the environment of an organization can be seen as a network of other organizations;
- the actions of actors in organizations can be better explained by their relations within the network;
- networks can to condition and are conditioned by the actions of its members;
- comparative analysis of organizations should consider the characteristics of networks in which they are inserted.

From the systemic point of view, the term "network" to the chain of companies, is the best way to understand the transactions that occur between organizations. For Agostinho (2002) the formation of networks brings with it the idea of complexity - which is part of the reality of our society and our economy, which in itself would be a great living web, in which entire storylines can appear or disappear.

3. Complexity and Networks

The origins of what is now called "paradigm of complexity" is biological. It begins at the University of Illinois in 1956, in studies of the Biological Computer Laboratory, founded by Heinz von Foerster and the company of Ross Ashby, Warren Mac Culloch, Humberto Maturana, Gordon Pask, among others (SERVA, 1992).

Humberto Maturana (*apud* RODRÍGUEZ and ARNOLD, 1991) based their studies on this biological perspective. He used the system theory as a universal language. According to him, science does not explain the world but it explain the experience. He also called as "structural coupling" the

idea that any unit made up only exist in its domain of existence in a complementary relationship with this. Maturana then brings to light the "theory of autopoiesis," according to which living beings have the capacity to produce themselves. A living system, therefore, as autonomous system is constantly self-producing, self-regulating and always keeping interactions with the environment.

In the following process from the general systems theory to the theory of autopoiesis, some authors had stood out. Ludwig Von Bertalanffy (*apud* RODRÍGUEZ and ARNOLD, 1991) found the need to build a general theory of systems to meet the difficulties of biological explanations. He did the conceptualization of an open system and explained that open systems have synergy, interrelationships, affinity, differentiation and negentropy. Bertalanffy also reused the Aristotelian premise: "a whole is greater than the sum of its individual parts", whereas the combination and relationship of parts can generate a new identity for the system. Still he said, the systemic perspective is able to discover the meeting point between the sciences and humanities, technology and history, natural science and spirit. Said Bertalanffy (1977) that the problem of the system is essentially the problem of the limitations of analytical procedures in science.

By the work of Morin (2007) emerged the ideas about the complexity not only understand numbers of interactions that drive and challenge our ability to calculate, but also comprehend uncertainties, indeterminacies and random phenomenas. In some way, the complexity *is always related to chance*.

According to Morin (2007), people should not believe that the question of complexity only appears today due to new scientific developments. The complexity must be sought even where it appears largely absent, for example, in everyday life.

By understanding that often the terms "complicated systems" and "complex systems" can be confused, Pedro Demo (2002) highlights the difference between them by means of simple examples. For him, complicated wholes, even when they are sophisticated, do not hold nothing more than the parts, plus the property of their organization. By decomposing an airplane in parts, we only have parties. And, from the parties, it is possible to retake the airplane, since each one of them is in place and recompose the whole system. So, redo the aircraft based on their shares, we will have, as a rule, the same airplane. In complex wholes, the decomposition of the parties deconstructs the whole. When cutting, for example, the human body in pieces, first, we no longer have the body and, second, from the parts we can not redo the same body before.

The premise of the Gestalt psychologists, that "the whole is greater than the sum of its parts" (MORIN, 2007) fits with the thinking of the relationships and interactions between the component parts of a system that can make it survive could not do the same when independent or disconnected.

However, on this statement, Pedro Demo (2002) considers the expression incorrect , because in his view "none complex is sum" but a plot, rhizome or web. This idea takes us to thinking about the networks previously said.

The wide applicability of complexity theory has led researchers to investigate it and bring it to social areas such as administration and management.

When we are talking about networks, you should still consider that a complex system is defined by any network with any level of complexity where there is interaction between agents (SCHULTZ, 2002). This interaction takes place by dynamic processes resulted by the behavior of individual agents. These agents can be, he said, anything: an ant in a colony, an electron in an atom or an employee in a company. Within a context, an agent can be modeled after similar rules belonging to the same context and, at the same time, different rules from those followed by other agents from other contexts.

In companies' network, the agents integrate three major blocks: production of raw materials, processing and sales (BATALHA, 2009). Or they can be identified from the perspective of Pires (2009), based on a focused company (maker / producer / industry) and identify, since these one, the upstream (suppliers) and downstream (distributors, retailers and end customers), and these others are all the agents that interact within the network.

Within this agents limitation, we can provide the management of the companies according to the assumptions put forward by Peter Demo (2002), where the "simple" part is as a rule, disposable. The "complex" part is intrinsic. In complex wholes, there are disposable parts, for example, live without hands, without teeth, without the ham, but not brainless.

It is not just the fact that, in losing some part, other parts can compensate it (losing an eye, we see even better with the other), but we are talking about parts which are essential parts, ie, are not partial. In complexity, the parties form some hierarchy that establish convergent field force between them, flowing productive dynamic, no longer contiguous and cumulative force.

The management of chains or networks of interactions between organizations, based on complex perspective, involves to influence rationally their performance trajectory (AGOSTINHO and CASTRO, 2002), although the autonomy of the system is present. According to Demo (2002), the autonomy of the complexity comes from its systemic fabric on one side, but takes place also in the dynamic non-systemic by the other, because his creativity comes from steadily maturing system and failure to himself.

Agostinho and Castro (2002) associate production chains to complex adaptive systems, which are network organizations that are formed by numerous agents, whose behavior is determined by a set of rules and by the information about the performance and conditions of the immediate environment.

The framework proposed by Leite et al. (2003) is an association between the common elements into chains and complex adaptive systems.

Features	Supply Chain	Complex Adaptative System (SAC)
Population of Agents	It consists on the set composed by the leader company, suppliers and customers.	It consists of a variety of agents that have location, memory, independence, learn and interact.
Interaction	Relationships between suppliers, customers and companies. Set up in many to many relationships and not one to one.	Represents the basis of a SAC. It is from the interaction of agents in the system that emergent properties arise, those that appear only on the interaction of the parties, since the individual parts do not have them.
Connectivity	The chain has connectivity between partners in order to maintain a structured aggregation of businesses and individuals.	It is the connectivity between the aggregation of agents that determines the complexity and structure of the SAC.
Autonomy	Companies and individuals are autonomous, capable of evaluating their own actions .	The autonomy gives to the agents the awareness of their skills, information and possibility of action in certain situations.
Control	The chains have a system of governance, in which one or more companies take the activity to coordinate or control the functioning of the whole.	As opposed to autonomy, control comes not in the sense of hierarchy, but in the sense of the autonomous agent see its limitations and seek in interaction its overcoming and evolution.
Rules	The living in a chain format assumes the existence of rules that facilitate the routines and determines the duties and rights of those involved.	There are formal rules, which are often restrictive, however the agents with autonomy produce informal rules to articulate corporate goals with individual goals.
Self-organization	In the literature about management of supply chains there is not a formal use of this term; however the process of self-organization occurs naturally by the	Spontaneous process of emergence of order without the interference of a central planner. From the interaction between agents emerges an organization without prior

	interaction of groups of people or companies by increasing the complexity and external factors as changes in corporate behavior, customers, suppliers and the environment.	planning.
Information Flow	The supply chain has a flow of information that lets the management and the creation of positive synergies for the whole supply chain agents and end customers.	The flow of information feeds the intelligence of the SAC, in the sense of recognition of repeating patterns, new information or just noise.
Joint management	It turns an associative management between suppliers, customers and companies.	It is from the management of the whole that all the SAC properties emerge. In a perfect complement between the whole and parts.

Table 1 - Description of main features common to the supply chain and the SAC (adapted from Leite et. al., 2003)

The framework allows, through association of ideas, understand how the supply chain characteristics can be influenced by a management which uses the complex perspective.

Productive chains or "networks", being formed by heterogeneous organizations that interact, influence each other. Thus, operation steps as well as the maturation of the chain, occur in an evolutionary process of trying to adapt to any circumstances at any given time, changing its context.

As the interdependence between the various organizations that make up the system is large, specific initiatives, simple or elaborate, can cause repercussions in distant points of the chain. In the effort to adapt, everyone tries to capture the signals from the environment around them and adjust their behavior or its structure to achieve better performance. Some fail and are eliminated. Others grow and thrive. Others migrate to other areas of the network (other productive chains). Various rearrangements arise. (AGOSTINHO and CASTRO, 2002).

Senge (2002) states that "most organizations have difficulty learning" and therefore can not resolve their deficiencies (and often can not even see them). Each sector of the company ends up placing the blame for failures in some other sector (what Senge calls the "transfer of responsibility") and loses sight of the organization as a whole. When talking about "vision of the whole" we're talking again about "complexity", which considers on administration, beyond the integration of the sectors of a company, the casual factors.

From the viewpoint of complexity, according to Erdmann and Mello (2009) these casual factors that need to be considered correspond to the basic elements of uncertainty, variability and unpredictability, not as undesirable traits that should be eliminated or minimized in the system, but as key dimensions in understanding the functioning of the systems and at the examination of its performance.

4. The performance of productive chains beneath a complex perspective

James Best in his book "The new competition: Institutions of industrial restructuring" of 1990 (apud BATALHA, 2009) identified that the new pattern of competition between organizations requires greater organizational flexibility at the level of organizations and more cooperative relations over the productive chain. In this context, some classic management tools can and should be modified to shape themselves for the perspective of this production chain, such as HACCP (hazard analysis and critical points of control), BPH (better hygiene practices) and QFD (Quality Function Deployment), which exceed the boundaries of the firm and are situated on the level of the chain (BATALHA, 2009). Silvio Pires (2009), for example, sought in their studies to adapt the Balanced Scorecard (BSC) for supply chains. Other tools for diagnosis and organizations management have been developed, mainly in the 1990s, aiming to improve the performance of companies based on traditional models of organizations

(Martins, 1999). But how measure performance of organizations that find themselves in a globalized context, given the multiple interactions between agents and also inserted into a complex scenario?

It was also in the 1990s that many studies started to link agribusiness concept and systemic competitiveness. Within these studies stand out Farina et al. (1998) with emphasis on application of the revealed competitiveness technique and defining productive chain as an agro-indus trial system (SAG) in order to encompass the dynamics of coordination through contracts; Pinazza & Alimandro (1999) gathered a collection of articles addressing aspects theorists, through the situation experienced by the agribusiness globally and providing evidence about the current state and prospects of agribusiness; Batalha (2000) related the concept of agribusiness to the dynamic competitiveness of Porter and assessed the need and adequacy of human resources prepared by institutions of higher education to business system (SANTANA & AMIN, 2004).

Within the model *filière* (BATALHA, 2009) the agribusiness production chain can be segmented into three large parts from downstream to upstream: Sales, represented by companies that are in contact with the end customer in the production chain, such as supermarkets, grocery stores, restaurants, etc., and distribution companies; Industrialization, represented by the firms responsible for the transformation of raw materials into finished products; And raw materials production, bringing together firms that provide inputs for other companies to develop the production process of the final product.

The diagnosis of the production chain, therefore, sees at these three macro segments that the management of organizations belonging to the supply chains requires an approach that recognizes the complexity as a relevant attribute and that can transcend the limitations of the mechanistic and objectivist approaches of the administration of individual production. Erdmann and Mello (2009) suggest the appropriateness of such holistic perspectives that consider the particularities of this universe of analysis and a strategy that, by placing the emphasis on the recognition of the dimensions that give complexity to the systems involved, highlighting relevant aspects to the assessment performance from the perspective of specific players involved, as a constructivist approach type.

Organizational production diagnostics that addressing the holistic perspective, they admit that competitiveness, for example, can be evaluated by means of elements as the "factors of result" proposed by Lozano *et. al*. (2011), as cost (low), flexibility (product and process, if high), reliability (the product in use, the delivery if high), speed (of delivery of the service, if high), and quality (product and process, if high) combined with the "factors of practice": Strategic Alliances, Human Capital, Knowledge, Cultural Factors, Innovation, Customer Relations, Social Responsibility, Control Systems, Production Techniques and Technologies of Information and Communication.

Moreover, competitiveness in the agro-industrial production chain can not be seen as the sum of the individual competitiveness of its agents. The contractual arrangements should be considered when analyzing the competitiveness of the whole system, as well as methodological models wishing to examine the competitiveness in agribusiness should consider the potential gains from efficient coordination (SILVA and BATALHA, 1999)

Just like an open system, performance indicators that attempt to evaluate a production chain should be modeled in order to include internal and external factors of this chain. According to Van Duren et al. (1991 apud SILVA & BATALHA, 1999) the competitiveness in agribusiness could be measured by market share and profitability (for a given string or a firm). The union of the impact of a serie of factors would generate a certain condition of competitiveness for a given period of analysis. These factors could be divided into four major groups: factors controllable by the firm (strategy, products, technology, HR policy and P&D, etc.); factors controllable by the government (fiscal and monetary policies, educational policies, market regulation laws, etc.) quasi-controllable factors (input prices, demand conditions, etc.) and non-controllable factors (natural and climatic factors). In practice this model recognizes the importance of systemic actions that affect the competitiveness of the chain as a whole and the part of agents.

The interdependence of the components is recognized and emphasized the systemic approach of the diagnoses of performance. However, a frequent difficulty in efforts aimed at evaluating the efficiency and competitiveness in agribusiness systems is the lack or difficulty of access to public or

private statistical information and/or data collected directly from the agents participating in the agribusiness system. The lookup, which could alleviate this problem, is often hindered by time constraints and/or financial resources (BATALHA & SILVA, 1999). The field, however, requires investment in research, given the importance of supply chains and the emerging paradigm shifts in the production.

5. Concluding Remarks

Production systems are based on paradigmatic changes that occur in the sciences, and knowledge gained from previous paradigms, in an adaptive process, culminate in a current state complex, fragmented and flexible as a complex system of production. Once the actual evolution of the production systems become complex, the use of complexity theories for study is set in a more suitable lens for understanding its characteristics.

The current ideas about production management must consider the global interactions between organizations, the direct and indirect links, and the casual factors that should not be discarded in the analysis of performance. Optimization of mutual cooperation in production is the key to successful operations.

The networks (or chains) of companies are involved in complex processes, in systems that adapt and survive by learning when they are connected because the interdependence generates survival that likely would not occur without the complementary relationship. The system becomes a circuit of constant failure and maturation.

This circuit, or web of interactions, is not closed on its agents. It is an open system that relies on the synergy of other agents and other influences on their performance. Whatever the number of agents, however, is defined a complex system since there is interaction. It can thus adapt to outside influences, financial issues, economic, social and political environment that form the productive network.

And in the evolutionary process, the more prepared and adapted will survive in this scenario. Those who fail will inevitably be eliminated, while others may strengthen. The adaptation and learning that lead to success do not come from a set formula, but has the aid of diagnostic and management tools that should be constantly used, improved and molded to the new organizational perspectives.

6. References

AGOSTINHO, Marcia E. *Complexidade e Organizações*. São Paulo: Atlas, 2003.

AGOSTINHO, M; CASTRO, G. T. *Redes produtivas: revendo a metáfora da corrente*. XXII Encontro Nacional de Engenharia de Produção. Curitiba, 23 a 25 de outubro de 2002.

BATALHA, M. O. (Coord.). *Gestão agroindustrial*. Ribeirão Preto: GEPAI - Grupo de Estudos e pesquisas agroindustriais, 2009, v.1.

BERTALANFFY, Ludwig Von. *Teoria geral dos sistemas*. Petrópolis: Vozes, 1977.

CHOPRA, S.; MEINDL, P. *Gerenciamento da Cadeia de Suprimentos: Estratégia, Planejamento e Operação*. São Paulo: Prentice Hall, 2003.

DEMO, P. *Complexidade e Aprendizagem: A dinâmica não linear do conhecimento*. São Paulo: Atlas, 2002

ERDMANN, R. H.; MELLO, N. *Avaliação de desempenho e geração de oportunidades de melhoria para a agricultura familiar: Uma proposta teórico-metodológica*. In: XXIX Encontro Nacional de Engenharia de Produção. 2009 Out. 06 a 09, BA, Brasil.

GEREFFI, Gary. *Las cadenas productivas como marco analítico para la globalización*. Problemas del Desarrollo, vol. 32, núm. 125, México, IIEc-UNAM, Abr./Jun. 2001.

HANSON, P.; VOSS, C.. *Benchmarking best practice in European manufacturing sites*. Business Process Re-engineering & Management Journal, v. 1 n. 1, 1995, pp. 60-74.

LEITE, M.; COELHO, C.; BORNIA, A. *A Cadeia de Suprimento vista como um Sistema Adaptativo Complexo(SAC): convivência dialógica de conceitos*. XXIII Encontro Nacional de Engenharia de Produção - Ouro Preto, 21 a 24 de out. de 2003.

LISSACK, Michael R. *Complexity, Management, Coherence, and Understanding. In:* **Lissack, Michael R.** *The Interaction of Complexity and Management*. Westport, Connecticut – London: Quorum Books, 2002.
LOZZANO, M. L. *et al.* *Fatores de competitividade organizacional*. Brazilian Business Review, 2011 (*no prelo*).
MARTINS, R. A. *Sistemas de medição de desempenho: um modelo para estruturação do uso*. São Paulo, 1999. Tese (Doutorado). Escola Politécnica da Universidade de São Paulo. Curso de Pós-Graduação em Engenharia.
MORIN, E. *Introdução ao pensamento complexo*. Porto Alegre: Sulina, 2007.
PIRES, S. R. I. *Gestão da Cadeia de Suprimentos: Conceitos, Estratégias, Práticas e Casos*. São Paulo: Atlas, 2009.
RODRÍGUEZ, D.; ARNOLD, M. *Sociedad y teoria de sistemas*. Santiago de Chile: Editorial Universitaria, 1991.
SANTANA, Antônio C.; AMIN, Mário M. *Cadeias produtivas e oportunidades de negócio na Amazônia*. Belém: Unama, 2004.
SCHULTZ, Ron. *Complexity and Management: Why Does it Matter? In:* **Lissack, Michael R.** *The Interaction of Complexity and Management*. Westport, Connecticut – London: Quorum Books, 2002.
SENGE, Peter M. *A quinta disciplina: Arte e prática da organização que aprende*. São Paulo: Best Seller, 2002.
SERVA, Maurício. *O paradigma da complexidade e a análise organizacional*. Revista de Administração de Empresas/EAESP/FGV/ São Paulo 32(2): 26-35 Abr./Jun. 1992.
SILVA, Carlos A. B.; BATALHA, M. O. *Competitividade em sistemas agroindustriais: metodologia e estudo de caso*. II Workshop Brasileiro de Gestão de Sistemas Agroalimentares – Pensa/FEA/USP, Ribeirão Preto, 1999.
TORRES, R.L. *A indústria automobilística brasileira: uma análise da cadeia de valor*. Dissertação (Mestrado), Programa de Pós-graduação em Economia, Universidade Federal de Santa Catarina, Florianópolis, 2011.

AGRICULTURAL INPUT MARKET SEGMENTATION IN ARGENTINA: HOW DO ARGENTINE FARMERS BUY THEIR EXPENDABLE INPUTS? THE CASE OF THE SEED INDUSTRY

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Abstract
In this paper we analyze the buying behavior of farmers for expendable inputs. In particular, we will study the case of the seed industry in Argentina. We segment them using cluster analysis, identifying 4 distinctive segments of farmers for seed purchasing: performance, price, balance, and convenience. We also use a multinomial logit model to predict Argentine farmers' segment membership based on key demographic, educational, commercial, and informational features.

Key Words: Expendable agricultural inputs, Seed markets, Cluster analysis, Multinomial Logit Regression Model.

Agricultural Input Market Segmentation in Argentina: How do Argentine farmers buy their expendable inputs? The Case of the Seed Industry

1. Introduction

Agricultural input markets for products such as seeds, crop protection, and fertilizer are important markets in Argentina. Although it varies greatly from year to year, expendable input purchases by Argentine producers can amount for several billion dollars a year: These markets for seeds, crop protection and fertilizer inputs were worth around 3.5 billion dollars for the year 2010. For the seed case, the total informal and formal seed market for major crops in Argentina is about one billion dollars a year: It would be around 400 million dollars for soybean seeds, 400 million dollars for corn seeds, and 200 million dollars for wheat and other seeds. (Vilela et al., 2009; FIS, 2010, CREA 2010)

The market for seeds in Argentina is divided in two: The self-pollinated/self-fertilizing crop markets, such as soybeans and wheat; and the hybrid crops markets, such as corn and sunflower. In the first type of markets there are serious intellectual property issues as 70% of the seeds are sold through informal markets, by which there are no easy ways for seed companies to make profits. Here in these markets there are present few international companies and there are more local ones. In the hybrid markets, on the other hand, there are no such intellectual property issues, firms can capture value, and the main players are international firms. Incomes would be split half and half between these two types of markets: Roughly, 500 million dollars each, although the hybrid markets would be more profitable. (Vilela et al., 2009; USDA-FAS, 2011)

However, Argentine farmers are not a homogeneous group, nor buy seeds in the same way: They differ in terms of key dimensions such as farm size, educational background, age, location, land tenure, attitudes, risk management practices, technology adoption, and so forth. Grouping farmers by more homogeneous classes, in terms of segmenting farmers and defining their profiles are important issues for agricultural input companies in order to define their marketing strategies. In this paper we will try to define how Argentine farmers buy their seeds for crops, segmenting these farmers in different classes with different purchasing profiles.

Marketing segmentation helps firms define particular marketing mix strategies that enable them to target customers with specific profiles and needs in each segment. This results from the fact that rarely customers in a particular market have exactly the same needs and expectations. By segmenting their customers companies can get closer to each customer by developing an appropriate marketing mix (Kotler, 1997).

Previous work has been done to segment farmers who buy agricultural inputs, especially for the US (Hooper, 1994; Bernhardt, Allen, Helmers, 1996; Gloy and Akridge, 1999; Foley, 2003; Alexander, Wilson and Foley, 2005; Reimer, Downey, Akridge, 2009). However, there is not much work done for Argentine agricultural input markets, in spite of the importance of these markets, as we have explained above.

There are some differences, though, with what previously has been studied in the US and what we intend to do: While they have focused on larger farmers, we will also target mid-size producers as well. Also, we will deal with famers that produce soybeans, corn and wheat; while previous author have studied farmers in a wide range of different crops.

Accordingly, the problem we want to study is how Argentine farmers buy their seed inputs, and how to segment these producers in order to understand better their purchasing behavior for seeds. We will restrict the study to Argentine farmers in the geographic area of the 'humid

pampas' (which is equivalent to the US Corn Belt) that produce more than 750 tons of soybeans a year.
In this way, the main goal of this paper is to identify distinctive market segments for Argentine farmers purchasing seeds. The idea is to segment farmers into buying characteristics according to their purchasing behavior, and to be able to predict farmers' segment membership. This will allow us to answer the problem of how Argentine producers purchase their agricultural inputs.

2. Data

The data we use to segment the farmers' input markets is based on the survey on "The Need of Argentine Farmers", done in the second half of the year 2009 by the Center for Food and Agribusiness of the Austral University in Argentina, with the partnership of the University of Purdue in the US[16], and the help of the Rosario Stock Exchange of Argentina. This survey was done between August 17th and September 17th 2009, through personal interviews in the farms, surveying 502 producers.
The universe under study were the farmers in the main agricultural area of Argentina ("Humid Pampa") which produce 750 or more annual tons in soybeans. This covers the provinces of Santa Fe, Córdoba and Buenos Aires. It includes the counties in which the sowing area represents more than 10% of the total production area. The total universe was formed by 7,400 producers, which produce 70% of the total soybean in the main crop area of Argentina. The sample was formed by 502 farmers (producing soybeans, corn and wheat) responsible of farms with owned or rented land, with a degree of statistical confidence of 95%.
Surveyed farmers were heads of farms (owned or leased properties) located in selected departments (counties) of the Provinces of Buenos Aires, Santa Fe and Córdoba with a production greater than 750 tons of soybeans per annum (year 2008); 70% of their income came from soybean and the rest (30%) from other crops.
Accordingly these farmers located in above defined departments (counties) in the main cropland of Argentine that produced more than 750 tons of soybeans per annum were divided into medium size farmers (250-500 hectares), commercial size (601-1840 hectares) and large (more than 1840 hectares). In annex 1 we show the segmentation of the sample`s population.
The survey was done interviewing farm operators responsible for the farmers they manage, by a team of professional people, with personal interviews for each of the 502 farmers. The questionnaire had 37 questions, and took around 60 minutes to answer. Only one was an open question, 29 were closed questions, and seven were semi- structured questions. The sample data we gathered in this survey was cross-checked with last National Agricultural Census available in Argentina, from 2002, by which the results of this survey are statistically significant for producers of more than 750 tons a year for soybeans, in the in the main agricultural area of Argentina ("Humid Pampa").

3. Methodology

Following Gloy and Akridge (1999) and Alexander, Wilson and Foley (2005), we will use cluster analysis to segment the seed input markets. The goal of cluster analysis is to divide a data set into different groups or clusters, based on observed attributes, so that the attributes in

[16]The University of Purdue did a similar work "Serving Producers in Volatile Times" (2008), on which the Argentine survey is based.

a group/cluster are as similar as possible to each other and as dissimilar as possible to the observations in other groups/clusters.

According to Aldenderfer (1984) there are five basic steps that characterize all cluster analysis studies:

a. Selection of a sample to be clustered;
b. Definition of a set of variables on which to measure the entities in the sample;
c. Computation of the similarities among the entities;
d. Use of a cluster analysis method to create groups of similar entities;
e. Validation of the resulting cluster solution.

In a cluster-based segmentation we first have to select the sampled data, which in our case are the Argentine farmers in the Humid Pampas producing more than 750 tons of soybeans a year, as we explained in the previous section. Then, identify the key variables that ought to characterize the purchasing behavior of argentine farmers for seeds. In this case, our variables are price, performance, convenience and location, personal factors, customer services, and support services for seed inputs. As in Alexander et al. (2005), the key question used in the segmentation analysis asked farmers to weigh the influence of six purchasing factors that they may use in order to purchase their agricultural inputs. The influence of these factors had to sum up 100%.
Next, the data on these variables is processed in order to place respondents with similar answers in the same segment/group or cluster. The idea is that through cluster analysis we can group observations in a way that there will be a higher level of natural association between group members than those that are not.
What follows is to define the cluster analysis method to be used. The two main cluster analysis methods to create groups of similar entities are the hierarchical and non-hierarchical (or partitioning clustering) clustering methods. The hierarchical method joins observations until the researcher decides to stop, while non-hierarchical methods require the researcher to define previously the number of clusters. (Everitt et al. (2001))
Finally, to validate the clusters we used different criteria: the pseudo F statistical value, the cubic clustering criterion (CCC) and the R^2 test. The Pseudo F-value, is used to compare variability obtained with K and K+1 groups or clusters, evaluating the relative reduction of variability as we add new clusters. The higher the F value, the higher the variability reduction that is obtained as we add one additional cluster. The cubic clustering criterion (CCC), establishes a comparative measure of the deviation of the segments regarding the expected distribution if the observations would have been obtained from a uniform distribution. A value above two would suggest that the structure of the clusters would be good; value of zero to two would suggest not a very clear structure of a cluster. The negative values of the CCC criteria would be attributed to the presence of out-layers. Finally we have the R^2 test, as the proportion of variance explained by the observations belonging to the conglomerate, the higher its value the better the conglomerate.
Hierarchical clustering involves creating clusters that are hierarchically nested within clusters at earlier iterations, in that each cluster can be included as a member of a larger, more comprehensive cluster at a higher level of similarity. The most familiar expression of the results of hierarchical clustering methods is the tree diagram or 'dendrogram', which shows graphically the hierarchical structure entailed by the similarity matrix and clustered by the linkage rule. Among agglomerative hierarchical methods, we have the Ward Method. This procedure is designed to optimize the minimum variance within clusters, and it works by joining those groups or clusters that result in the minimum increase in the variance. (Aldenderfer, 1984)

Non-hierarchical or partitioning clustering, on the other hand, are methods that divide a data set into a number of clusters by trying to minimize some defined error function. Partitioning methods do not depend on previously found clusters. Partitioning clustering methods work directly upon the raw data, therefore offer the opportunity of handling distinctly larger data sets than hierarchical methods. As they make more than one pass through the data and can compensate for a poor initial partition of the data, thereby avoiding one of the major drawbacks of hierarchical agglomerative methods. Partitioning clustering methods, however, suffer from some drawbacks, as they posit explicit assumptions about the shape of the clusters; calls for an initial guess at the number of clusters that will eventually be found; and are influenced by the choice of initial seeds, the presence of outliers, and by the order in which the seeds are observed and analyzed. (Aldenderfer, 1984)

As previous authors have done (Gloy and Akridge, 1999), we will first use a Ward hierarchical clustering method to identify the number of cluster and to get the starting points (seed values) for a second non-hierarchical algorithm procedure, which is the k-means technique. This second algorithm rearranges the results optimally given the previous results about the cluster means. The next steps would be the segmentation validation through tests of significance for group differences, and finally we have the interpretation of the results.

As Alexander et al. (2005) we will use a 'multinomial logit model' to predict segment membership for seed purchases by Argentine farmers, based on observable factors such as demography, behavior, and business management attitudes. For our case, the multinomial logit is a probability model that explains the odds ratio of belonging to a certain cluster if an observable behavior or characteristic of a farmer is present. This is, if the logit value is positive it means that if the regressor/s values (observable behavior) increase the odd that the regressand equals one increases too (become a member of the segment) (Gujarati, 2003).

4. Results

The data in order to make the clustering analysis was processed, according to how mid-size, commercial and large farmers purchased their seed inputs in Argentina. As in Alexander et al. (2005) the key question in our questionnaire was the one that asked respondents to weight the influence of six factors farmers may use to choose a seed provider. These six selected factors were price, performance, convenience and location, personal factors, customer services, and support services.

Table 1 Seed Industry Segmentation:
Mean Percent Importance of Each Purchasing Factor

Factors/Segments	Performance	Price	Balance	Convenience
Convenience/Location	2	4	9	60
Service/Information	4	5	18	8
Personal factors	2	5	18	5
Price	11	48	23	13
Performance	77	34	22	6
Suport Services	4	5	10	7
Frequency	188	147	142	25
Percentage of the Sample	37	29	28	5

The Ward Hierarchical procedure was performed to define the number of clusters that there would be for seed inputs. However, as there are no completely satisfactory methods for determining the number of population clusters for any type of cluster analysis, we validate the segmentation through the three methods explained above: the pseudo F statistical value, the cubic clustering criterion (CCC) and the R^2 test. (Everitt2001)
The results we obtained using the above mentioned criteria are that the Argentine farmers are segmented in four clusters according to their seed buying behavior; performance, price, balance and convenience segments. As it has been mentioned in Alexander et al. (2005) and Gloy and Akridge (1999), we will also show that the results meet the validation criteria by which the members of the segments differ in non-clustering variables such as demography, behavior, and business management attitudes.
In the next sections we will present the result of our cluster analysis. In the first section we present the segmentation of farmers in different clusters, as we shall see in Table 1. In the next part, we introduce the description of farmers in each of these segments by non-clustering variables, as described in Tables 2 to 9. Finally, in the last section, we present the logit multinomial regression used to predict segment membership, presented in Table 10.

Characteristics of the Segments

The largest cluster is Performance, followed by Price and Balance segments, as we can see in Table 1. The smallest cluster is Convenience, with only 5% of the population. Performance segment has a 37% share. Members of this cluster search for high quality products and services. On average members of this segment placed 77% weight on performance, and only 11% on the second most important factor, which is price. These Performance farmers are quite young (45.24 years versus 46.42 years for the entire population), and well educated, as 50% of the members have a college degree.

Table 2 Demographics and General Business Characteristics of Seed Segments
(in percentage values per segment, except averague age in years)

Demographic traits	Segments				Prob. of no association
	Performance	Price	Balance	Convenience	
% College Graduate or more	50%	46%	39%	56%	0.1548
Age <35	19%	12%	11%	20%	0.2915
Age 35-44	34%	35%	31%	32%	0.2915
Age 45-54	25%	21%	31%	32%	0.2915
Age 55-64	15%	22%	20%	8%	0.2915
Age >64	7%	10%	6%	8%	0.2915
Age (Averague years)	45.48	47.59	47.05	44.92	0.2101

In tables 2 and 3 we can see the demographics, education, farm size, income level, and future growth expectation for each group. The Performance segment is the one with the largest farms (18% farm more than 1840 hectares), with relatively high incomes (41% earn more than half a million dollars), but with low expectation of future growth (31% growth average). As we saw, they are relatively young and educated.

The second largest cluster is the Price segment, with a share of 29%. Price as a purchasing factor has a weight of 48%, which would mean that these farmers are cost-oriented: they buy their seed at a lowest price. In spite of this, performance is the second factor with a weight of 34%, and these two factors account for 82% of the total weight of purchasing factors. The members of this segment are the oldest, with an average of 47.59 years, and less than half of them have a college degree. This group also has relatively high level of incomes (44% earn more than half a million dollars), 12% farm more than 1840 hectares, and have a fairly high growth expectancy in the future with 41% growth.

The third segment is Balance, with a share of 28%. These farmers value all factors fairly equal, but give special importance to performance and price (22% and 23%) and then to services/information and personal factors (18% each). This group has the lowest number of college graduates (39%), and is the second oldest segment (47.05 years). Balance farmers are relatively large farmers (14% farm more than 1840 hectares), have high income levels as 46% of them earn more than half a million dollars.

Table 3 Farm Size, Sales, and Future Growth of Seed Segments
(in percentage values per segment)

	Segments				
	Performance	Price	Balance	Convenience	Prob. of no association
Size 250 – 600 hectares	53	53	54	56	0.4682
Size 601 – 1840 hectares	29	35	32	40	0.4682
Size 1.841 hectares or more	18	12	14	4	0.4682
Total Sales < de U$S 200.000	20	23	14	4	0.2821
Total Sales U$S 200.000 - U$S 500.000	39	33	39	60	0.2821
Total sales > 500,000 U$	41	44	46	36	0.2821
Future growth (% average)	31	41	23	52	0.5538

The last group is the Convenience segment, is the smallest as we already mentioned, with 5% share. They place most importance to convenience and location, with a 60% weight. The rest of the factors have a lower weight: 13% for price, 8% service/information, 7% support services, 5% personal factors, and only 6% to performance. They have the highest level of education as 56% have a college degree, and are the youngest group with an average of 44.92 years.

The Convenience segment is not only the smallest group, but also they are the ones who farm the smallest amount of land, as only 4% farm more than 1840 hectares. However, for 60% of these farmers their income is between 200 thousand and half a million dollars, and they have the largest expectation of future growth: 52% growth in the amount of land increase they expect to farm for the next years.

This gives us a general profile of farmers in each cluster. In the next section we will analyze the commercial attitudes of farmers in these groups.

Commercial Attitudes of Farmers in each Segment

Here we analyze how farmers consider the concepts 'Brand Similarity', 'Brand Loyalty', 'I Purchase at the Lowest Price', and 'Loyalty with the Local Dealer', in terms if they consider themselves loyal to brands, to local dealers, or if they buy at the lowest price, or if they consider brands similar. Their answers are on table 4, using a five point Likert scale, in which a 1 would mean "I strongly disagree", and a 5 "I strongly agree". An answer around 3 would convey some neutral standing regarding the question.

Table 4 Comercial Attitudes
(Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

	Segments				
	Performance	Price	Balance	Convenience	Prob. of no association
Brands are more or less similar for seeds	2.05	2.38	2.32	2.72	0.1554
Brand Loyalty for seeds	3.72	3.46	3.49	3.36	0.1819
I purshase seeds at the lowest price	1,62	2,07	1,79	2,08	0.0166**
Loyalty with the Local Dealer	3,76	3,45	3,55	3,68	0.0570*

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

Farmers in the Performance segment appear to consider brands dissimilar (2.07/5), tend to relatively loyal to brands (3.72/5), they reject buying seeds at the lowest price (1.62/5). These results for the Performance segment would be quite different than the ones for the other groups, in which farmers tend to consider brands a little bit more similar than the Performance group, less loyal to brands, and a little bit more neutral regarding to purchasing at the lowest price. Regarding loyalty to the local dealer, all segments express a weak loyal, with an average of 3.76/5).

Another aspect that we can analyze in table 4, is the statistical differences between clusters in two of the four observations. Both 'I purchase at the lowest price level' and 'loyalty with the local dealer' have low probabilities of no association, which means that the hypothesis that segments are similar is rejected in both cases. Each cluster has a significant difference in behavior regarding these two observations. In both cases the Performance segment is the one that most rejects the hypothesis of purchasing at the lowest price, and is the one who is most loyal to dealers. The less loyal to local dealers would be the Price segment, while the ones who are less likely to reject the hypothesis of buying at a lowest price are the Price and the Convenience segments.

Information Sources Useful for Managing/Purchasing Decisions: Personal and Communication Media

Tables 5 shows the useful information sources that farmers use to make managing and purchasing decisions. We present both more personal oriented sources and the communication media information sources. We make the observation that in both cases farmers in different segments have significant statistical differences for all the observations related with information sources they use to make managing and purchasing decisions.

Table 5 Useful Information Sources
(Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

	Segments				
	Performance	Price	Balance	Convenience	Prob. of no association
Manufacturers salesperson	3,41	2,99	3,01	3,00	0.0256**
Information Local Dealers	3,61	3,26	3,59	3,72	0.0802*
Other Producers	3,22	2,68	2,78	3,00	<0.001***
Meetings with suppliers	3,13	3,08	3,11	3,32	0.0212**
Emails	3,43	2,96	2,89	3,40	<0.001***
Ag Websites	3,11	2,91	2,82	3,60	0.0322**
Ag Section Newspapers	3,22	2,98	3,27	3,40	0.0752*

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

Regarding the importance of information sources we can see in table 5 that the information of local dealers is valued by all segments, a little bit less by the Price segment, and more than average by farmers belonging to the Convenience group.
Now going to the communication media information sources, we observe that both Performance and Convenience segments value all the different sources (all the values above three), although values are higher for the Convenience cluster than Performance. The Price segment does not have any relevant information source. The Balance group values the agricultural section of newspapers, and very weakly the meetings with suppliers.
As a summary, local dealers, emails, and agronomic websites would be the main sources of useful information for farmers in order to make managing and purchasing decision. The former source used by all farmers, the two latter ones more by Performance and the Convenience groups. To a lesser extent, the agricultural section of newspapers is relative good information sources for the Balance and Convenience groups.

Use of Consultants by Farmers

Table 6 presents the information regarding the usage of consultants by farmers, in terms of percentage of farmers who use consultants in different fields. In the case of accounts/tax consultants there is relative high usage for all segments, with almost 90% of all farmers using their services. Then we have the usage of independent crop consultants, which goes from 44% for the case of the Convenience segment to 70% of the Price Segment. For the Balance and Performance groups in average a little bit more than 60% of the farmers use independent crop consultants.

Table 6 Percentage of Producers Who Use Consultants by Segment
(in Percentage of usage)

	Segments				
	Performance	Price	Balance	Convenience	Prob. of no association
Independent Crop Consultant	62%	70%	61%	44%	0.0616*
Pest Control Consultant	34%	31%	28%	20%	0.4808
Environmental Consultant	5%	2%	2%	4%	0.2966
Management Consultant	14%	19%	22%	20%	0.3544
Accountancy/tax consultant	90%	88%	87%	88%	0.8365
Financial Consultant	12%	9%	16%	12%	0.2933

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

Pest control consultants are also used to a certain extent with between 20 to 34% of the farmers using their services. Another type of consultant used by farmers is the management consultant, with 14% to 19% of farmers using their services. Financial consultants are not largely used, but the in the Balance cluster 16% of all farmers demand these services. Environment consultants are not extensively used. The only type of consultant in which there would be significant differences in usage between farmers is the case of independent crop consultants.

Salespeople

Salespersons are critical assets for input suppliers in order to sell their products. In tables 8 we evaluate how farmers in different segments value the different characteristics that salespeople may have, such as honesty, technical competence, represents my interests, he is a friend, knows well my business. In table 9, on the other hand, intends to answer which are the activities that salespeople do that farmers value the most.

The most valued characteristic of a salesperson for farmers in most clusters is that he may have a high level of technical competence. Farmers in three of the four clusters valued this ranked this feature as the most important characteristic for a seed salesperson: almost half of the farmers in each of these clusters rated it as the most important feature.

The Convenience group was the one who valued this characteristic the highest (52% of farmers), while the farmers in the Balance segment ranked this feature as the second more important (32%). For the performance and Price segments 49% and 44% of farmers rated this feature as the most relevant for a salesperson.

Table 7 Salesperson Characteristics as One of the Three Most Important Characteristics of a Sales Representative by Segment (in porcentage)

	Segments				
	Performance	**Price**	**Balance**	**Convenience**	**Prob. of no association**
Has a very high level of technical competence	49%	44%	32%	52%	**0.0900***
Is honest	29%	29%	35%	32%	**0.0900***
Knows my operations well	**11%**	**10%**	**18%**	**4%**	**0.0900***
Represents my interests	7%	14%	12%	12%	**0.0900***
Is a Friend	4%	4%	3%	0%	**0.0900***

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

Table 8 Salesperson Activities Most Valued (Likert scale from d 1 to 5; 1=I strongly disagree , 5=I strongly agree)

	Segments				
	Performance	Price	Balance	Convenience	Prob. of no association
Calls me frequently by phone	2,63	3,07	3,11	2,76	0.0962*
Provides good follow up service	3,97	4,14	3,98	3,84	0.0576*
Is a consultant for my business	3,40	3,41	3,30	3,44	0.1563
Brings me innovative ideas	3,69	3,86	3,94	3,56	0.1125
Provides relevant/timely information	4,12	4,15	4,11	3,84	0.3617
Brings me the best prices	4,32	4,58	4,18	4,12	0.0145*
Provides access to supplier resources	3,77	3,65	3,53	3,56	0.6404
He helps me feel sure/ confident about my purchasing decision	3,39	3,77	3,63	3,48	0.1011

Notes: Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively

The Balance segment rated honestly as the most important characteristic of a salesperson (35%), while for the rest of the clusters this was the second most important feature, with an average of 30% rating. The third most important characteristic rated by farmers was that the salesperson knows their operations well, with the Balance segment rating it the highest (18%), and the rest with an average value of 10%. The Convenience and Price groups were not very convinced about the value of this feature choosing instead 'represents my interest' which was the fourth most valued feature for the rest of the clusters (Performance and Balance). 'Friendship' as a salespersons' characteristic was rated as the least important feature, with a rating of between 4 to 0 %. It is important to remark that in the ranking of these characteristics there are significant statistical differences of behavior between the different clusters.

Regarding the activities that a salesperson performs that are more valued by farmers, there are specially three that farmers tend to value the most: 'Brings me the best price', 'Provides relevant/timely information', 'Provides good follow up service'. In all these cases farmers tend to agree that they value these activities relatively strongly (4/5 points in the Likert scale),

and for ‘Provides good follow up service’ and ‘Brings me the best price’ there are significant statistical differences between clusters. Farmers in the Price group would value the most these activities, while the Convenience segment would value them the least.
The other activities such as ‘Provides access to supplier resources’, ‘Is a consultant for my business’, ‘Brings me innovative ideas’, and ‘He is a consultant for my business’ are also well rated for all clusters, while salespersons telephone calls was not valued highly although there are significant differences between clusters regarding this activity.
Predicting Segment Membership
Table 9 reports the results of a logit regression model, which shows the odds ratio of belonging to a certain cluster if an observable behavior or characteristic of a farmer is present. If the logit value is positive, it means that if the observable behavior increases the odd the farmer becomes a member of a certain cluster increases too. In case it is negative, the higher the value of the observable behavior would decrease the odd that a certain farmer would belong to that cluster.
This is potentially useful for marketing managers because as we will see, observing key behaviors of a client they would be able to predict to which cluster that farmer belongs, and in this way, know what that person values most in his purchases.
The model χ^2statistic (89.37 with 30 degrees of freedom) is significant at a level of 1% level of probability. Likewise, the predicted share for each cluster is consistent with the actual share in each one of the segments. In all the groups, expect for the Balance segment which has only two significant observable variables, there are at least three to six significant observable characteristics that supply significant statistical predictive power for each one of the cluster membership.
In this logit regression we find six significant relationships that provide predictive value to the segments’ membership, explaining why a positive value of that observable characteristic would make a farmer belong to a certain cluster, and the negative value why another farmer would belong to another.
In first place, the usage of independent crop consultant observation explains in an 8.25% the likelihood of a farmer belonging to the Price Segment, and in a 3.44% it would be less likely for a farmer to becoming a member of the Convenience Segment. This results from the fact that Convenience Farmers are technological self-sufficient and educated people, as we saw in Tables 2 and 6.
The frequent consultation of the manufacturer salesperson as a useful information source makes it a 5.79% more likely for a farmer to be a member of the Performance Segment, and in a 3.18 % less likely to belong to the Price Segment.

Table 9 Results of a Multinomila Logit Model Predicting Segment Membership Marginal Effects (with standard errors in parantheses)

	Producer Segment			
	Performance	Price	Balance	Convenience
Variable	dy/dx Std. Err.	dy/dx Std. Err.	dy/dx Std. Err.	dy/dx Std. Err.
Sales	-.0651826	.0118682	.0475028	.0058116
	(0.0317)**	(0.02937)	(0.03005)	(0.01084)
Crop Consultant	-.0140938	.0824578	-.0339639	-.0344001
	(0.04774)	(0.04322)*	(0.04459)	(0.01977)*
Manufacturer salesperson	.0579527	-.0318182	-.021036	-.0050985
	(0.01932)***	(0.01743)*	(0.01756)	(0.00625)
Local Dealer	-.00019955	-.0314128	.0266879	.0067203
	(0.01989)	(0.01812)*	(0.01877)	(0.00736)
EMAILS	.0664933	-.0152157	-.0450566	-.0066609
	(0.02226)***	(0.02052)	(0.02034)**	(0.00786)
Ag websites	-.0198009	.0044311	-.004261	.0196308
	(0.02186)	(0.02049)	(0.02038)	(0.00804)**
Brand similarity	-.0453926	.0164886	.0184951	.010409
	(0.01835)**	(0.0165)	(0.01665)	(0.00586)*
Lowest Price	-.0577939	.0605335	-.010912	.0081725
	(0.02374)**	(0.0196)***	(0.0211)	(0.00694)
Local Dealer Loyalty	.0401864	-.023215	-.0199755	.0030042
	(0.0174)**	(0.01572)	(0.0159)	(0.0063)
Salesperson offers best prices	-.0190974	.0769323	-.0500795	-.0077554
	(0.02595)	(0.02678)***	(0.02296)**	(0.00787)
Predicted share	37.65%	29.13%	29.39%	3.82%
Real Share	37.45%	29.28%	28.28%	4.98%

$\chi 2$=88.37*** (30 d.f.) Prob> $\chi 2$ > 0.001; Single, double, and triple asterisks (*) denote statistical significance at the 0.10, 0.05, and 0.01 level respectively.

The Email usage as a useful source of information from communication media makes it 6.65% more likely for a farmer to become a member of the Performance Segment, and a 4.5% less likely to become a member of the Balance Segment. Performance farmers are open to all sources of information, while this would not so much the case for the price-oriented farmers. This congruent with the information we analyzed in Tables 5 and 6.

Likewise, if a farmer considers brands similar he would be 1.04% more likely to belong to the Convenience Segment and 4.54% less likely to become to the Performance segment. The commercial attitudes that are shown in Table 4 explain that Performance farmer do not consider brands similar, while farmers in the Convenient group would tend to be almost neutral regarding brand similarity.

If a farmer purchases seeds at the lowest prices, he would be 6.05% more likely to belong to the price segment, and 5.52% less likely of becoming a member of the Performance Segment. Also this is show in Table 4.

Finally, if a farmer considers the most important of salesperson activity as 'bringing the best price', he is 7.69% more likely to belong to the Price Segment, and 5% less likely to become a member of the Balance Segment. Again, this is congruent with the information provided in Table 8. Overall, the logit model has strong predictive power, which is shown by the six pairs of significant relationships we explained above.

5. Conclusions

The main goals of this paper were to identify distinctive market segments for argentine farmers purchasing seeds, segmenting farmers into buying characteristics according to their purchasing behavior and in this way provide some answers of how Argentine producers purchase their agricultural inputs. Argentine farmers were segmented in four clusters according to their seed buying behavior: performance, price, balance and convenience segments. While farmers in the performance and balance segments would be business

purchasers, the ones in the price segment are cost-oriented. The convenience farmers, on the other hand, are those who prioritize location and convenience in their purchases.
The data from tables 2 to 8 fitted well with the different segments we defined in this work, as well with the regression model established to predict segment membership. It was clearly established that farmers in the Performance segment value the information coming from the manufacturer salesperson and emails, they do not consider brands similar, they are loyal to brands and would not buy seed at the lowest price. The price-oriented farmers belonging to this segment would be the ones which would purchase seeds at the lowest price and value the activities of salesperson regarding to bring the lowest price; also would tend to hire independent crop consultants.
This would represent quite clearly the profiles of Performance and Price Segments of farmers. For the case of the Balance buyers the results are also congruent with the information provided in tables 2 to 8.
As in Alexander et Al. (2005) the convenience buyer is the smallest segment. Farmers in this segment in Argentina tend to have less loyalty to brands than other segments, demand a very high level of technical competence to salespersons, and use relatively few independent crop consultants. They do not seem to be significantly more loyal to local dealers than other groups, although they value the information dealers provide them.
The Convenient segment farmers in Argentina result to be young and well-educated farmers, intending to grow fast. They are a self-sufficient group, in terms of using few independent consultants, regarding brands more or less similar and not being very loyal to brands. As we can see in annex 2, Convenience farmers are mostly mid-size and commercial operations; while large producers are mainly in the Performance group. So from the data we have, Convenience farmers in Argentina have small operations but are progressive willing to grow fast, more than relational farmers as presented in other works. They are convenience buyers in that location and convenience are important for them to grow their business and save time, not in order to make less effort.
In this way we were able to define a profile for each segment, which we summarize in the Table 10 that we present in the next two pages. This work provides two main contributions which are, in first place, identifying four different segments for the seed markets in Argentina. Secondly, defining a very special segment of farmers called ‘convenience’ with singular characteristics, different from the way they have been defined before for other markets.

Table 10 Seed Industry: Summary of Important Tendencies by Seed segments

	Producer Segment			
Description/Traits	Performance	Price	Balance	Convenience
Demographics, General features of the segment, and Education	Largest segment High quality products and services are very important Relatively young and educated Professional buyers	Second largest segment Price-oriented buyers Oldest group	Third largest group, Lowest number of college graduates Second oldest group Values all factors relatively equal, especially important are performance, price, services and personal factors	The smallest segment Importance of location/convenience Price is the second most important factor High level of college graduates Quite young, self sufficient
Farm size, incomes, and future growth	Relatively high level of income Largest Farmers Relatively low expected future growth	Relatively high level of incomes Third largest farmer group	Highest level of income Second largest farmers Lowest expected future growth	Lowest level of income in the high income braket Smaller farmers Highest expected future growth
Brands	Rejects brand similarity, relatively high brand loyalty	Weakly rejects brand similarity, and has weak brand loyalty	Weakly rejects brand similarity, and has weak brand loyalty	The segment with lowest brand loyalty , almost neutral to brand similarity
Pricing	Not very price sensitive, lower than other segments	Relatively low price sensitive segment	Relatively low price sensitivety	Relatively low price sensitive segment
Relation with the local dealer	The most loyal to local provider	Less loyal to local dealer	Less loyal to local dealer	Loyal to local provider
Personal related Information sources	The local dealer is a good information source, the manufacturer salesperson too, but weaker sense	The local dealer is weakly a good information source	The local dealer is weakly a good information source	The local dealer is a good information source
Media Related Information Sources	They consider valueble all media sources, especially emails	No relevant media related information source	No relevant media related information source, expect meeting with suppliers and ag section in newspapers	They consider valueble all media sources, especially Ag websites
Consultants	High usage of accountants and relatively high of crop consultants	High usage of crop consultants and accountants	High usage of accountants and relatively high of crop consultants	High usage of accountants and relatively low of crop consultants
Salesperson Characteristics	High requirement of technical competence and relatively high in honestty	Relatively high requirement of technical competence and honesty	Highest requirement of honestly, relatively low in technical competence	Highest requirement of technical competence and relatively high in honestty
Salesperson activities	Importance of best prices and relevant/timely information, also privides good follow up services	High importance of best prices, also relevant/timely information and privides good follow up services	Importance of best prices and relevant/timely information, also privides good follow up services	Importance of low prices, relatively lower valuation of provides relevant/timely information

6. Annexes

Annex I

Survey «The Needs of Argentine Farmers» (Center for Food and Agribusiness, 2009)			
	Size in hectares	Size in Tonns	Number of Surveys
Mid-size	250-600 ha.	750-1499 Tn	269
Commercial	601-1840 ha.	1500-4999 Tn	160
Large	More than 1840 ha.	More than4999 Tn	73
Total			502

Annex II

Segmentation Seed Markets By Size In Argentina
(In absolute values)
(Feeney et al. 2009)

	Medium	Commercial	Large	Total
Performance	100	54	34	188
Price	78	51	18	147
Balance	77	45	20	142
Convenience	14	10	1	25
Total	269	160	74	502

Segmentation Seed Markets by Size in Argentina
(In percentage)
(Feeney et al. 2009)

	Medium	Commercial	Large	Total
Performance	37%	34%	45%	37%
Price	29%	32%	24%	29%
Balance	29%	28%	27%	28%
Convenience	5%	6%	1%	5%
Total	100%	100%	100%	100%

7. References

Aldenderfer, Mark S.; Blashfield, Roger K, 1984.*Cluster Analysis*. Sage University Papers Series. Quantitative Applications in the Social Sciences

Alexander, Corinne; Wilson, Christine; Foley, Daniel. 2005. "Agricultural Input Market Segments: Who is Buying What?", *Journal of Agribusiness*, Vol. 23, Issue 2 (fall 2005), pages 113-132

Bernhardt, K.J.; Allen, J.C.; Helmers, G.A. 1996. "Using Cluster Analysis to Classify Farms for Conventional/Alternative Systems". *Review of Agricultural Economics*, Vol. 18, No. 4 (Oct., 1996), pages 599-611

CREA. 2010. *De la tierra al país: Una Radiografía de la Inversión 2010/11 en la Argentina*, September 2010, CREA Groups

Everitt, Brian et al., Second Edition. 2001*Handbook of Statistical Analyses Using SAS*. Chapman and Hall Publishers

Feeney, R; Berardi, V.; Bertossi, O.; Steiger, C.; Piazzardi. 2009. "The Needs of Argentine Farmers", *Center for Food and Agribusiness*, Austral University Argentina

FIS/ASSINSEL. The International Seed Trade Federation/The International Association of Plant Breeders for the protection of Plan Varieties. Accessed at URL http://www.worldseed.org/isf/seed_statistics.html, May 13th, 2011.

Foley, D. H. 2003. "Segmenting the commercial producer marketplace for agricultural inputs." *Unpublished Master's thesis, Department of Agricultural Economics*, Purdue University, West Lafayette, IN.

Gloy, B. A., and J. T. Akridge. 1999. "Segmenting the Commercial Producer Marketplace for Agricultural inputs." *International Food and Agribusiness Management Review* 2, 145S163.

Gujarati, D. 2003. Fourth Edition. *Basic Econometrics*. McGraw Hill Higher Education

Hooper, M. A.1994. "Segmentation of the Market for Agricultural Inputs: A Nested Approach". *Unpublished M. S. thesis, Department of Agricultural Economics*, Purdue University

Kotler, P. 1997. *Marketing and Management: Analysis, Planning, Implementation, and Control*, 9th edition. Upper Saddle River, NJ: Prentice-Hall.

Reimer, Aaron; Downey, Scott; Akridge, Jay. 2009. "Market Segmentation Practices of Retail Crop Input Firms", *International Food and Agribusiness Management Review*, Vol. 12, Issue 1, 2009

Roucan-Kane, M.; Gray, A; Downey, S.; Alexander, C.; Boehlje, Gunderson, M. 2008. "Serving Producers in Volatile Times", Center for Food and Agribusiness Purdue University

USDA FAS. 2010."Argentina-Annual Biotechnology Report", December 29th 2010

Vilela, F. et al. 2009. *El Sistema de Agronegocios de la Soja en la Argentina, su Cadena y Prospectiva al 2020*.Ediciones Horizonte, ACSOJA- FAUBA

SISTEMAS DE GESTIÓN DE CALIDAD. IMPLEMENTACION Y EVALUACIÓN DE LA PERFORMANCE MEDIANTE UN ESTUDIO DE CASO MULTIPLE EN INTA

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Abstract
La globalización de los mercados ha promovido la calidad y la implementación de Sistemas de Gestión de Calidad como un factor para diferenciar los bienes y servicios ofrecidos y facilitar el comercio. En este sentido, se ha propagado la adopción y exigencia por dar conformidad con la norma ISO/IEC 17025 en pos de garantizar la competencia técnica de los laboratorios de ensayo cuyos informes acompañan los productos permitiendo tomar decisiones en base a resultados correctos, trazables y reproducibles. El presente trabajo estudió la dinámica de implementación y *performance* tomando como caso de estudio múltiple dos laboratorios acreditados del INTA que prestan servicios a dos cadenas productivas diferentes: fibras textiles y alimentos. La acreditación conforme con la norma de referencia presenta beneficios, traducidos en: mejoras en la satisfacción del cliente, en la gestión, clima organizacional, reducción de costos e información, y limitantes caracterizados por: asignación de recursos, burocracia, y volumen de documentación. Estos beneficios y limitantes son ratificados en el presente trabajo. Sin embargo, no se observa un mayor número de clientes tras la acreditación probablemente porque pertenecen a una Institución reconocida, prestigiosa y referente en el ámbito científico tecnológico del sector. La co-innovación en torno a la normalización voluntaria, acreditación y evaluación de la conformidad, basada en acciones colectivas y capital social, deriva en cambios sistémicos en el comercio (criterio de remediabilidad). Esto ha permitido concretar transacciones en el orden privado a pesar de las distancias geográficas, sociales y culturales, condicionando el comportamiento de los agentes (oportunismo y racionalidad limitada), incrementando la confianza y reduciendo la incertidumbre. Se han generado cambios a nivel institucional, organizacional y tecnológico, evitando barreras en el comercio que permiten generar economías de primer, segundo y tercer orden reduciendo los costos de transacción a través de contratos creíbles.

Key words: normas ISO, acreditación, ISO/IEC 17025, Nueva Economía Institucional.

SISTEMAS DE GESTIÓN DE CALIDAD. IMPLEMENTACION Y EVALUACIÓN DE LA PERFORMANCE MEDIANTE UN ESTUDIO DE CASO MULTIPLE EN INTA

1. Introducción

En las últimas dos décadas, la calidad ha surgido como un factor clave para el éxito competitivo de los negocios (van der Wiele, Dale and Williams y Withers and Ebrahimpour citados por Neumayer and Perkins, 2004). La globalización de los mercados y el incremento de la competencia así como los requisitos legales y regulatorios, han promovido la diseminación del concepto de calidad y del enfoque al cliente como forma de obtener estas ventajas y en algunos casos como requisito para permanecer en la actividad (Carr *et al.*, 1996). En líneas generales, la capacidad de fabricar productos o prestar servicios de mejor calidad está asociada al nivel de desarrollo del país en el cual tiene lugar la actividad productiva (Porter, 1990). Es por esto que el hecho de que un producto sea fabricado en un país en vías de desarrollo puede ser interpretado por los consumidores de los países más desarrollados como que el bien en cuestión es de una calidad inferior (Bilkey and Nes y Verlegh and Steenkamp, citados por Castagnino, 2006).

A nivel internacional, los requisitos normativos exigidos por el gobierno de un país en particular para la comercialización de un bien o la prestación de un servicio en el mercado interno no son aceptados por otros países salvo que exista un acuerdo de homologación. Al no existir un ente supranacional que determine normativas obligatorias de aplicación generales queda en la voluntad de cada organización el someterse a los estándares y normativas certificables / acreditables que les otorguen el aval necesario para poder comercializar susproductos y servicios en los distintos mercados externos (Erkekdjian, 2003;Clougherty and Grajek, 2006). En este sentido, las normas no gubernamentales auditables por tercera parte independiente, denominadas normas voluntarias, se han convertido en un objeto de estudio como una nueva vía de *enforcement*. Esta circunstancia toma relevancia principalmente en países donde existe un débil cumplimiento de las leyes, las empresas son poco fiables y la regulación de las prácticas empresariales irregulares o inexistentes. Esto conlleva a que los distintos actores recurran a este tipo de mecanismos de regulación para reducir la incertidumbre y en pos del cumplimiento de los contratos (Blair *et al.*, 2008), proporcionando una solución, al menos en principio, a este problema de información asimétrica (Castagnino, 2006). Estas ventajas también pueden ser observadas en las transacciones de los países desarrollados. Como se plantea en el presente trabajo la implementación de normas voluntarias eficientiza el comercio en general y a la organización en particular.

Diversos organismos de normalización publican estándares voluntarios, entre los cuales se pueden mencionar la Organización Internacional de Normalización (ISO) y la Comisión Electrotécnica Internacional (IEC). Las normas de Sistemas de Gestión de Calidad (SGC), entre las cuales se encuentra la norma ISO/IEC 17025, pertenecen a este grupo. Esta última es reconocida a nivel internacional como la norma de referencia que garantiza la competencia técnica de los laboratorios de ensayo y calibración. Los laboratorios de ensayo ejercen un rol relevante en el comercio dado que los informes de resultado acompañan a las mercaderías y servicios ofrecidos brindando información sobre sus características. Son la forma de evaluación de la conformidad de tercera parte más difundida dado que es la base para otras formas de evaluación como es la certificación de productos. Distintos agentes económicos promueven y/o demandan su acreditación (SENASA, UE, OMC, IWTO, GLOBALGAP, clientes, entre otros).

Carr *et al.* (1996.) citan como ventajas de su implementación de la norma ISO 17025 una mayor conciencia acerca de la calidad y consistencia en la organización en el tiempo, una reducción de costos, una mejora en el proceso de control de gestión y una percepción positiva del cliente en relación a la organización, aumentando su satisfacción y reduciendo el número de quejas, errores y productos defectuosos. La implementación de las normas voluntarias puede ser evaluada por organismos de acreditación y/o certificación avalando la conformidad con la norma de referencia y brindando

confianza. Estos organismos también son evaluados por sus pares o por organismos de acreditación, generándose un marco de respaldo.

Este nuevo escenario ha llevado a organizaciones como el Instituto Nacional de Tecnología Agropecuaria (INTA) a adaptarse a exigencias crecientes respecto de la calidad en sus propios productos/servicios. El INTA adopta en el Plan Estratégico Institucional 2005-2015 (PEI 2005-2015) las normas ISO como modelos de gestión de calidad. En ese sentido ha aprobado una Política de Calidad Institucional que ratifica como marco orientador para la implementación y puesta en macha de SGC a las Normas ISO para los servicios y laboratorios de ensayos de Centros, Unidades, Programas y Áreas Estratégicas (Resolución Consejo Directivo N° 266/2005). Asimismo, establece como plataforma para consolidar el Sistema de Calidad Institucional a las normas ISO 9001 e ISO /IEC17025.

A diciembre de 2010, el INTA cuenta con varios SGC en implementación, con distinto grado de avance y con dos (2) Unidades certificadas y seis (6) Laboratorios acreditados. Las líneas acreditadas corresponden principalmente a ensayos sobre productos destinados al comercio internacional (importación / exportación). Se observa que sólo en lo que respecta a la norma ISO/IEC 17025 - foco de estudio de este trabajo - este número es relativamente reducido ya que el INTA posee más de cien laboratorios. Esto puede ser explicado, en parte, porque si bien un SGC mejora la gestión, investigación y resolución de los incidentes que puedan presentarse en el laboratorio (Burnett *et al.* citado por Olivares *et al.*, 2005), presenta dificultades durante su implementación como pueden ser el gran esfuerzo organizacional necesario en términos de tiempo y trabajo, los costos y gastos en los que se incurre, una tendencia a aumentar la burocracia y el volumen de documentación. Estas desventajas son compensadas por los beneficios en la satisfacción del cliente, credibilidad, mejora continua en los procesos, documentación más clara y detallada, mejor mantenimiento de equipos, mayor capacitación profesional y conquista de mercados (Olivares *et al.*, 2005).

Esta dicotomía entre las dificultades y las ventajas enumeradas en el párrafo anterior dan lugar a la necesidad de estudiar la dinámica de la implementación y la *performance* de este tipo de SGC. En ese sentido, la implementación no sólo mejoraría el aprendizaje organizacional, principalmente a través de las acciones correctivas, preventivas y de mejora generadas a partir de información de fuentes internas y externas (Olivares *et al.*, 2005) sino que, como resultado final, sería esperable obtener mejoras en la productividad, desempeño, credibilidad y reputación de la organización (Arikan *et al.* y Vlachos *et al.* citados por Olivares *et al.*, 2005). Existe una demanda creciente por reducir la incertidumbre en las transacciones principalmente internacionales, siendo esto factible a través de la emisión de informes de análisis de laboratorios acreditados que acompañen a los productos comercializados. En este contexto, el INTA es un sector conexo muy importante de las cadenas agroalimentarias como proveedor de servicios de análisis de laboratorio y factible de ser tomado como caso para abordar el estudio de la implementación y *performance* de SGC.

El objetivo principal del presente trabajo fue evaluar la *performance* de los SGC en el INTA a través del método de estudio de caso múltiple. Para cumplir con el objetivo general, se ejecutaron los tres objetivos específicos planteados. El primero de ellos era evaluar el impacto de la implementación de SGC en la organización de las tareas que se realizan en las distintas Unidades. El segundo objetivo planteado fue evaluar el impacto de dicha implementación en la relación con los clientes/usuarios. Por último, el tercer objetivo era evaluar la adaptación de la organización a los SGC implementados identificando sus puntos fuertes y débiles.

2. Metodología

La metodología de investigación seleccionada fue el estudio de caso que permite estudiar y comprender la estructura, los procesos y fuerzas impulsoras de fenómenos contemporáneos y complejos en su contexto a través del uso de fuentes de evidencia múltiples Una de sus principales ventajas es que promueve el uso de múltiples fuentes de evidencia.

Los casos de estudio seleccionados para el análisis de la *performance* fueron dos SGC acreditados del INTA: el Laboratorio de Fibras Textiles (EEA Bariloche) y el Centro de Fitofarmacia

(EEA Mendoza). Los laboratorios seleccionados analizan ítems de ensayo pertenecientes a cadenas agropecuarias diferentes cuyos informes de ensayo proveen información confiable, trazable y reproducible sobre los productos a intercambiar. El Laboratorio de Fibras Textiles realiza actividades de control de calidad en todo tipo de fibras de origen animal mientras que el Centro de Estudios de Fitofarmacia (CEF) realiza análisis de residuos de pesticidas, determina la presencia/ausencia de plagas cuarentenarias y nematodes en una amplia gama de productos (entre otros: frutas, hortalizas no grasas, vinos, tierra, plantines de frutilla). Ambos laboratorios proveen servicios a terceros, siendo en ambos casos la oferta nacional reducida por lo cual serían eslabones importantes para las cadenas productivas y sus intercambios.

El presente se dividió en dos etapas. La primera de ellas se centró en la revisión bibliográfica mientras que la segunda en los estudios de caso en sí mismos. Para la investigación a campo se utilizaron entrevistas y se analizó la documentación de los SGC implementados.

Para comprender la *performance* de los sistemas de gestión planteados se analizó el contexto en el cual se encuentran insertos (incluye entre otros aspectos los vinculados a la normalización, los esquemas de acreditación, el ambiente institucional, las organizaciones asociadas a los mismos y su interrelación).

3. Marco Teórico

La Nueva Economía Institucional (NEI) es un nuevo paradigma que permite estudiar y abordar la realidad imperante en los sistemas asociados a los agronegocios a través de un núcleo teórico multidisciplinario. A diferencia de la Economía Neoclásica que brinda un enfoque limitado y parcial dado que se basa en supuestos ideales, la NEI permite abordar el análisis de un mercado real (imperfecto: con un número reducido de agentes, con productos heterogéneos, con información incompleta, imperfecta y asimétrica, con barreras al ingreso y restricción en la movilidad de los factores de producción). Ordóñez (2009) sostiene que estas restricciones que presentan los abordajes tradicionales derivan en la necesidad de una nueva construcción teórica que permita entender la compleja trama de interacciones que determinan la *perfomance* de los negocios agroalimentarios. En pos de remediar esta situación diversos autores, entre ellos Arrow, Coase, North y Williamson, contribuyen a gestar una alternativa de análisis construyendo este nuevo paradigma .

El núcleo teórico elegido complementa la Teoría Neoclásica con el estudio de las instituciones y las organizaciones a través de los costos de transacción, el *path dependency* y el criterio de remediabilidad. El análisis de los costos de transacción, los activos específicos, la innovación, el comportamiento de los agentes y los problemas asociados a la información incompleta, imperfecta y asimétrica permiten analizar la realidad desde una perspectiva más amplia e integradora contribuyendo a mejorar su estudio y comprensión.

El desarrollo de economías de primer, segundo y tercer orden en el ambiente institucional, organizacional y tecnológico conlleva una reducción en los costos de transacción asociada a una mayor simetría en la información disponible para los actores, una mayor eficiencia y una menor incertidumbre en un marco de intercambio probablemente más confiable para las partes.

La innovación y la co-innovación permiten generar los tipos de economías mencionadas siendo una respuesta activa y adaptativa al entorno. El capital social es clave para el desarrollo del conocimiento colectivo ya que permite modificar la realidad. La innovación permite crear ventajas competitivas sostenibles y adaptarse a los cambios. Sin embargo, los supuestos del comportamiento, concepto que engloba la racionalidad limitada y el oportunismo, y la resistencia al cambio, el *path dependency* y la irremediabilidad, la condicionan.

4. Discusión

Mientras el comercio internacional fue limitado y los fabricantes y proveedores pertenecían a una misma zona económica, no existió aliciente para armonizar normas y unidades de medición. La

globalización del comercio ha llevado a la formación de sistemas económicos en una escala verdaderamente global donde el desarrollo económico no puede aislarse de los esquemas globales (Sanetra and Marbán, 2007). Nuevos actores como los Organismos de Normalización (ON), los Organismos de Acreditación (OA) y los Organismos de Evaluación de la Conformidad (OEC) contribuyen a la concreción de las transacciones. Los mismos forman parte de la denominada Infraestructura de la Calidad (IC) la cual brinda una estructura soporte para un comercio eficaz y sostenible, cumpliendo los requerimientos técnicos de los Sistemas Multilaterales de Comercio (ISO/UNIDO, 2008).

Las normas voluntarias ISO establecen los requisitos a cumplir, las "reglas de juego", siendo el resultado del trabajo colectivo de actores localizados en múltiples economías y con intereses diversos. La participación y la transparencia en el proceso de normalización permite un mayor grado de imparcialidad reflejando un balance entre los requisitos de la demanda y la capacidad de la oferta. Las normas voluntarias internacionales han permitido reconciliar y legitimizar los requerimientos de la sociedad en su conjunto evitando las barreras técnicas innecesarias al comercio (Bryden, 2004), incrementando la información disponible y la confianza entre las partes. Afectan el comportamiento y el desempeño de los actores económicos, añaden transparencia y confianza minimizando la selección adversa y condicionando las actitudes oportunistas y asociadas al riesgo moral. Su adopción en la legislación y reglamentación puede ser considerada como parte del componente de la gobernancia en el bien público (Bryden, 2004). En naciones, como la Argentina, donde el cumplimiento de las leyes es débil y se observa oportunismo en los negocios se han tornado una herramienta útil para reducir los aspectos incompletos en los contratos y la incertidumbre en las transacciones.

Como complemento a las normas ISO, las actividades de evaluación de la conformidad y la acreditación suman confianza y transparencia en las transacciones dado que estas instancias de evaluación generalmente son realizadas por agentes imparciales a las partes que negocian, estableciendo a su vez "reglas de juego" claras (como por ejemplo los criterios de evaluación, los procedimientos de evaluación, etc.) y mecanismos de *enforcement*, proveyendo información a las partes para la toma de decisión. Al igual que en las normas voluntarias, los distintos Organismos de Acreditación interactúan y determinan las "reglas de juego" en su área de incumbencia, diversas normas ISO también forman parte de las mismas. Ampliando la propuesta de Bryden (2004), la acreditación y la evaluación de la conformidad debieran ser el cierre a una apropiada y completa aplicación de los requisitos establecidos contribuyendo a mejorar continuamente la *perfomance* de las organizaciones y las empresas. Como cita Ordoñez en su trabajo (2009) el objeto es la transparencia, consistencia y vigencia de estas reglas de juego.

La adopción de las normas voluntarias, la evaluación en función de ellas y la acreditación generan una base de trabajo y acuerdo a nivel internacional, regional y nacional que brinda solución a los problemas de mercado que se generarían si distintos mercados adoptaran y exigieran distintos requisitos y formas de evaluación en los productos, procesos o sistemas a intercambiar. La equidad de las transacciones es el resultado de trabajar bajo iguales condiciones de modo que los agentes puedan confiar en que se cumplen los requisitos de sus mercados meta en el caso de la oferta o con sus requisitos (implícitos o explícitos) en el caso de la demanda.

La información generada en estas evaluaciones es utilizada por los agentes para tomar decisiones sobre las transacciones. Esta cadena de eslabones además de brindar información, incrementa la confianza y otorga seguridad, transparencia, fiabilidad y trazabilidad entre los agentes y garantías a las transacciones. Permiten intercomparar resultados independientemente de quién realice la evaluación. Adicionalmente, reduce los costos de transacción, transformándose en mecanismos de *enforcement* que contribuyen al cumplimiento de los contratos.

La evaluación de la conformidad por tercera parte y la acreditación implican costos para las organizaciones, el cual debiera ser menor que los generados en la demanda por buscar, seleccionar y evaluar a la oferta, en los oferentes por demostrar el cumplimiento y en ambos por establecer las salvaguardas y hacer cumplir los contratos. Esta sería una de las razones que podrían explicar la tendencia creciente por la participación de agentes externos a los intereses del intercambio. En aquellos casos donde la acreditación es reconocida internacionalmente otorga credibilidad y

transparencia al mercado dado que permite la evaluación en el país de origen y la aceptación en destino, reduciendo la necesidad de evaluaciones múltiples sobre los objetos y las barreras técnicas al comercio.

La IC ha permitido sostener acuerdos privados a pesar de la distancia geográfica, las brechas sociales y culturales dado que permite concretar negociaciones bajo contratos con especificaciones a las normas y al tipo de evaluación (imparcial e independiente a las partes) que aseguran su aplicación, reduciendo la cantidad de aspectos incompletos en los mismos. Es decir que establecen las reglas y los mecanismos de *enforcement* que contribuyen al cumplimiento de los contratos. Como consecuencia, reducen los costos de transacción en los mercados, entre ellos, los de negociar, redactar contratos y solucionar conflictos. Generan información que se encuentra disponible, colaboran en disminuir los problemas asociados a la misma, al riesgo moral y al oportunismo, disminuyendo la incertidumbre en la transacción.

En términos de la NEI y del criterio de remediabilidad, la IC sería una alternativa superadora que permitiría concretar compromisos creíbles en los negocios y reducir los costos de transacción brindando una solución institucional a las diferentes estructuras de gobernancia y los Sistemas Agroindustriales. Como resultado de trabajar bajo las mismas condiciones, los agentes pueden confiar en el cumplimiento de los requisitos a partir de la información generada, las reglas establecidas y los mecanismos de *enforcement* instaurados. Son las fallas o problemas en los mercados los precursores de los cambios generando demandas a las instituciones para buscar soluciones, más allá del *path dependency*. El trabajo, el compromiso y la confianza de los distintos actores ha permitido que la estructura institucional y organizacional se instaurara y permaneciera vigente.

En este marco, los laboratorios de ensayo son la forma de evaluación de la conformidad más frecuente. La confianza en la información que brindan los informes de resultados que acompañan a los productos es un factor importante dado que en función de los mismos se toman decisiones sobre las transacciones contribuyendo a generar compromisos creíbles. Los informes de resultados emitidos acompañan los productos a comercializar y permiten su ingreso al mercado y/o determinan las características que fijan su precio de venta. La implementación de la norma ISO/IEC 17025 tiene por objeto asegurar la calidad, demostrar la competencia técnica e incrementa la seguridad y confiabilidad en los resultados emitidos. Es utilizada por los clientes, las autoridades reglamentarias y los Organismos de Acreditación para constatar la conformidad con sus requisitos, siendo reconocida y aceptada mundialmente. A pesar de ser una norma de adopción voluntaria puede ser considerada en algunos casos como cuasiobligatoria. Diversos organismos, bloques económicos y organizaciones promueven su implementación y la acreditación de las líneas de ensayo de los laboratorios, entre otros la Organización Mundial del Comercio (OMC), la FAO, el Codex Alimentarius, la Unión Eurpea (UE) y SENASA. Asimismo, distintos consorcios de normalización como GlobalGAP y la Asociación Internacional de Lana Textil (IWTO), también han requerido su adopción.

La implementación de la norma ISO/IEC 17025 generaría cambios sistémicos a nivel organizacional (en la gestión e interrelación de las organizaciones) y a nivel tecnológico. Los mismos se analizan a continuación para los casos de estudio seleccionados.

Objetivo Específico 1: Evaluar el impacto de la implementación de SGC en la organización de las tareas realizadas dentro de las Unidades.

En concordancia con los beneficios indicados en la bibliografía, los laboratorios tomados como caso de estudio han identificado mejoras en la *performance* tras la implementación del SGC conforme la norma ISO/IEC 17025. Entre los beneficios ratificados caben mencionarse las mejoras en la eficiencia interna, la optimización de los recursos, la mejora continua del sistema, la preservación de la información útil a través de la documentación (que incluye los registros) para la toma de decisión y para la trazabilidad de los ensayos, el involucramiento del personal y la búsqueda de la satisfacción del cliente. Los SGC conforme a esta norma promueven el aprendizaje organizacional a través de la capacitación y entrenamiento del personal, las acciones correctivas, preventivas y oportunidades de mejora adoptadas.

Las primeras etapas de la implementación y mantenimiento del SGC implicaron un esfuerzo organizacional en cuanto a la asignación de recursos monetarios y humanos, la burocracia, el volumen

de documentación y el número de tareas a realizar se incrementaron. Con el tiempo y la detección de oportunidades de mejora los sistemas se simplificaron optimizándose los beneficios.

La implementación del SGC ha permitido innovar en el ambiente tecnológico a través del re diseño o desarrollo de procesos internos y la re asignación de recursos, generando economías de tercer orden. Por otra parte, conocer la demanda de los clientes, usuarios y contrapartes y analizar la factibilidad de cumplir con sus requisitos puede permitir detectar nuevas necesidades e innovar.

La demanda externa de clientes (exportadores), contrapartes (IWTO) y entes reguladores (SENASA) ha tenido mayor impacto en la toma de decisión de implementar la norma ISO/IEC 17025 que el compromiso institucional asumido.

Tanto el CEF como el Laboratorio de Fibras Textiles recomiendan la implementación de la norma ISO/IEC 17025 en función de los beneficios obtenidos. Sólo en el primer caso se ha observado mayor volumen de muestras ingresadas tras la acreditación.

Objetivo Específico 2: Evaluar el impacto de la implementación de SGC en relación con los clientes/usuarios.

De acuerdo a la investigación realizada, la implementación de esta norma ha permitido organizar las tareas y la comunicación beneficiando la relación con los clientes permitiendo la innovación a nivel organizacional (cambios en la gestión, en las relaciones) y tecnológico (reducir costos, rediseñar procesos, aumentar productividad, mejorar continuamente). En el marco de estos requisitos, los SGC estudiados han mencionado que los contratos con los clientes se cumplen, las quejas se analizan y resuelven y la búsqueda de la mejora continua y la satisfacción de los clientes son primordiales. De esta forma la implementación y acreditación conforme a la norma de referencia reduciría los costos de transacción micro asociados al costo de la información, negociación, contratación y salvaguardas.

Como se ha mencionado previamente, la acreditación de la competencia técnica de los laboratorios presenta ventajas en el comercio nacional e internacional dado que favorece y brinda transparencia a las transacciones. Un informe de resultados incluido en el alcance es un aval para las partes que negocian, brinda confiabilidad en los resultados y reduce en consecuencia el poder de mercado en la negociación dado que brinda información transparente y confiable. De esta manera el laboratorio contribuye a disminuir el oportunismo en la cadena y los costos de transacción.

Dada la condición de acreditado los agentes pueden identificar y seleccionar laboratorios competentes que realizan los ensayos que necesitan. No solo han demostrado que son competentes técnicamente sino que además brindan información confiable que es transmitida correctamente. Por tanto, generan confianza sobre los resultados siendo estos correctos, trazables y reproducibles. Al disponerse el listado de laboratorios acreditados y sus alcances respectivos, los costos de seleccionar un laboratorio se reducen y por ende los costos de transacción.

La oferta de servicios acreditados de los productos analizados es limitada o nula en el país siendo en su mayoría laboratorios públicos. Por tanto, el Laboratorio de Fibras Textiles y el CEF son eslabones conexos relevantes en los Sistemas Agroindustriales. En el caso del Laboratorio de Fibras Textiles a través de los parámetros de fibra y de rendimiento industrial que evalúa y en el CEF en los niveles de residuos de pesticidas en alimentos y, en la presencia de plagas ausentes en el país preservando la salud pública y el estado fitosanitario, respectivamente. En cierta medida contribuyen a reducir los costos de negociar los contratos y sus salvaguardas. Tanto para la oferta como para la demanda brindan información para la toma de decisión e incrementan la confianza en las mercaderías intercambiadas dado que la evaluación de la conformidad ha sido realizada por una parte independiente. Para los exportadores e importadores, brinda seguridad sobre los ensayos realizados. Si la mercadería cumple con los requisitos puede ser comercializada evitando el rechazo de los envíos, dado que reduce los riesgos de adquirir aquellos que no cumplen con las necesidades o requisitos establecidos en el contrato, contribuyendo a reducir los costos de transacción. Por otra parte, en el marco de los Acuerdos de Reconocimiento los informes de ensayo incluidos en el alcance de acreditación permiten reducir los costos de transacción al minimizar la necesidad de duplicar los ensayos en origen y destino, dado que promueven la aceptación de los resultados emitidos en otros países. Además de contar con líneas de ensayo acreditadas, el CEF es uno de los laboratorios autorizados para el análisis de muestras oficiales en el marco de la Red Nacional de Diagnóstico en el Área Vegetal del SENASA. De esta manera, los informes que emite respaldan las certificaciones

destinadas a los planes nacionales de lucha sanitaria y para la comercialización de productos fiscalizados por el citado Servicio Nacional en el mercado interno, de importación y exportación

A partir del análisis de la información de los SGC se observa que la relación de los laboratorios con sus clientes y contrapartes se ha beneficiado en los aspectos cualitativos y no necesariamente en los cuantitativos (número de clientes) como se indica usualmente en la bibliografía. Por un lado, esto puede encontrarse asociado al tipo de producto comercializado: de oferta estacional y precio fluctuante fijado en el mercado internacional. Como consecuencia, las ventas y el número de muestras a analizar se ven afectados. Por otro lado, los laboratorios estudiados pertenecen a una Institución reconocida y prestigiosa siendo referentes en sus respectivos rubros, por lo cual el impacto de la acreditación puede no verse reflejado como en otras organizaciones.

Objetivo específico 3: Evaluar la adaptación de la organización de la organización a los SGC implementados. Identificación de puntos fuertes y débiles.

En la Tabla N° 1 se presentan las fortalezas, debilidades, oportunidades y amenazas identificadas en la investigación. La implementación de SGC genera activos específicos, principalmente humanos, que contribuyen a reducir la incertidumbre y como consecuencia los costos de transacción.

Entre los específicos identificados se destacan la experiencia y los conocimientos técnicos del personal, la competencia técnica evaluada, y el prestigio de los laboratorios y el INTA en los Sistemas Agroindustriales. Otro de los activos específicos identificados es el reconocimiento externo en torno a los laboratorios acreditados.

La reducción de los costos tras la implementación de SGC es citada ampliamente en la bibliografía. Por un lado, se reducen los costos directos asociados a la no calidad (por ejemplo: ineficiencias, re trabajos) mientras que se incrementan los asociados a la implementación y mantenimiento del sistema (mayor número de tareas, tiempo y recursos asignados, volumen de documentación). La modificación en el balance de costos directos en la organización contribuye a reducir los costos de transacción, dado que es uno de sus componentes.

Como plantea Porter (1982) en su trabajo, la mejora de la gestión es resultado del efecto aprendizaje. La experiencia acumulada en las tareas que se realizan permite reducir los costos directos dado que se eficientizan los procesos, los métodos, y las tareas. Asimismo, se desarrolla capital social (humano y organizacional) e información.

Por último, el bajo número de laboratorios acreditados disponibles en el mercado es la principal ventaja identificada, la acreditación diferencia a los laboratorios dentro de la oferta disponible en función de su competencia técnica.

Objetivo General: Evaluar la performance de los Sistemas de Gestión de Calidad (SGC) en el INTA a través del método estudio de caso múltiple

En función de la discusión de los objetivos específicos planteados, se puede concluir que la implementación y acreditación de la Norma ISO/IEC 17025 ha mejorado la *performance* de los laboratorios tomados como caso de estudio, dadas la mejoras evidenciadas en la gestión de los mismos, las fortalezas identificadas y el aporte a las cadenas agropecuarias asociadas.

Tabla N° 1: Análisis FODA de los SGC implementados en el INTA.

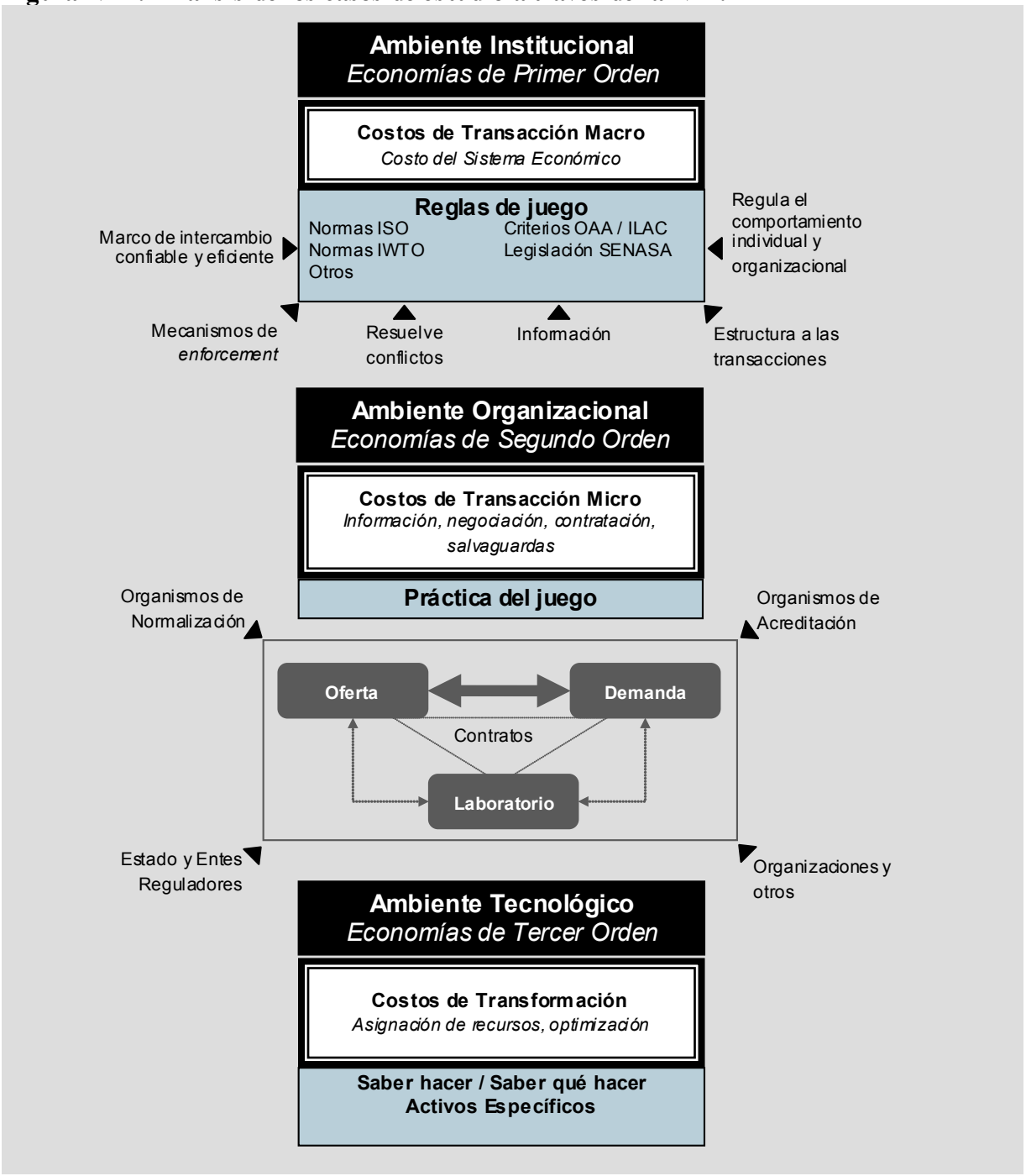
Fortalezas	Debilidades
▪ Promoción de la implementación de las normas ISO a nivel Directivo. ▪ Conocimiento y experiencia en la implementación, aprendizaje organizacional. ▪ Experiencia y conocimientos técnicos. ▪ Prestigio y reconocimiento de la institución y de sus laboratorios ▪ Competencia técnica evaluada. ▪ Personal involucrado. ▪ Trazabilidad de los resultados. ▪ Mejora en la gestión. ▪ Conocimiento de la confiabilidad de los resultados. ▪ Reducción de los costos de la no calidad. ▪ Funciones y responsabilidades asignadas. ▪ Planificación y programación de actividades. ▪ Revisión de los contratos con el cliente.	▪ Necesidad de asignación de recursos monetarios, humanos, etc., los cuales son limitados. ▪ Burocracia. ▪ Resistencia al cambio. ▪ Incrementa el número de tareas. ▪ Volumen de documentación. ▪ Bajo número de laboratorios acreditados en INTA.
Oportunidades	**Amenazas**
▪ Creciente tendencia a la adopción de las normas ISO. ▪ Demanda creciente de clientes, contraprartes y entes reguladores. ▪ Reconocimiento externo. ▪ Bajo número de laboratorios acreditados en el mercado. ▪ Facilita la implementación de Sistemas Integrados. Interacción con otras organizaciones. ▪ Extensión y capacitación a otras organizaciones.	▪ Costo de la acreditación. ▪ Reducción presupuestaria. ▪ Falta de reconocimiento en el mercado. ▪ Falta de promoción de la calidad como componente estratégico en el sector público y en el ámbito de la investigación, desarrollo e innovación en particular.

Fuente: Elaboración propia, 2010.

Análisis de los casos y su contexto desde la perspectiva de la Nueva Economía Institucional

Las "reglas de juego" que incluyen las normas ISO, los criterios de acreditación y la legislación, entre otras, las cuales interactúan para dar estructura a las actividades económicas condicionando el comportamiento de las organizaciones y los agentes. El desarrollo de la Infraestructura de la Calidad a nivel país e internacional ha colaborado en la concreción de los negocios reduciendo las asimetrías en la información y la incertidumbre. Probablemente, la Infraestructura de la Calidad es el resultado de un nuevo diseño económico que permite ganancias netas en el mercado global (criterio de remediabilidad). Como consecuencia de las acciones colectivas y de la co-innovación nuevas reglas de juego se han generado y adoptado en el comercio, la innovación en el ambiente institucional ha permitido probablemente generar economías de primer orden reduciendo los costos de transacción macro (Figura N° 1).

Figura N° 1: Análisis de los casos de estudio a través de la NEI.



Fuente: Elaboración propia, 2010.

En los casos analizados, el ambiente institucional se encuentra conformado por la legislación y por las normas voluntarias. Entre estas últimas cabe recalcar la norma ISO 17025 para la gestión y competencia técnica de los laboratorios, las normas ISO e IWTO aplicadas a metodologías de ensayo, las normas ISO asociadas a la evaluación y acreditación, los criterios del Organismo de Acreditación (OAA) e Cooperación Internacional de Acreditación de Laboratorios (ILAC).

Las organizaciones entre las que cabe mencionar los Organismos de Normalización (ISO y en Argentina IRAM) y los Organismos de Acreditación (en Argentina el OAA y a nivel internacional ILAC), los "jugadores", interactúan para conformar las reglas de juego las cuales brindan soluciones a problemas recurrentes o adoptan las reglas de juego como respuesta adaptativa a los cambios. La co-innovación en torno a la normalización, acreditación y evaluación de la conformidad deriva en cambios sistémicos en el comercio. La confianza, la cultura común, los valores compartidos permiten

sostener la Infraestructura de la Calidad. Las relaciones entre los jugadores y el rediseño de las mismas generan economías de segundo orden reduciendo los costos de transacción micro (Figura N° 1).

La normalización, la evaluación de la conformidad de tercera parte y la acreditación proporcionan una solución institucional a las estructuras de gobernancia híbridas, redes y cadenas globales dado que permiten negociar y concretar los acuerdos comerciales con especificaciones a las normas y al tipo de evaluación requerida reduciendo entre otros costos los de negociar, redactar contratos y solucionar conflictos. Además, esta cadena de actores genera información que es utilizada por los agentes para tomar decisiones, otorgando confianza, seguridad, transparencia y fiabilidad. Los ensayos realizados en un laboratorio independiente y la acreditación de los mismos implican costos adicionales para los agentes los cuales debieran ser menores a los generados en la identificación y selección de la oferta, en autodemostrar el cumplimiento, en establecer las salvaguardas y hacer cumplir los contratos.

La co-innovación ha propiciado además de los cambios a nivel institucional (reglas de juego y mecanismos de *enforcement*) y organizacional (en la gestión e interrelación de las organizaciones) cambios en el ambiente tecnológico, en el "saber hacer" y en el "saber qué hacer", generando economías de tercer orden a través de la asignación de los recursos y optimización de los procesos (Figura N° 1).

5. Conclusiones

En los casos de estudio, la acreditación en conformidad con la norma ISO/IEC 17025 ha mejorado su *performance*, ratificándose los beneficios citados en la bibliografía como pueden ser la eficiencia interna, el mejor uso de los recursos disponibles, las mejoras en los procesos, en la capacitación del personal y en la preservación de información, incrementando como consecuencia la satisfacción de los clientes y contrapartes. La acreditación no ha incrementado el número de clientes a los cuales se les brindan los servicios de ensayo. Probablemente, el impacto sea menor al observado en otros laboratorios acreditados dado que el INTA es una institución de referencia y prestigiosa en el sector. También se han observado las limitaciones planteadas como son la mayor necesidad de recursos, el mayor número de tareas, el volumen de documentación y la burocracia. Con la madurez de los SGC estas limitantes se reducen. La implementación de SGC genera activos específicos, principalmente humanos como ser el desarrollo del capital social, la competencia técnica, el prestigio, y el reconocimiento, que contribuyen a reducir la incertidumbre y como consecuencia los costos de transacción. Asimismo, la implementación de SGC reduciría los costos directos por efecto aprendizaje, componente de los costos de transacción.

Ambos laboratorios recomiendan la implementación de la norma de referencia, indicándose en uno de los casos que la acreditación debiera procurarse cuando es una demanda efectiva. A pesar de tratarse de una norma voluntaria y del compromiso institucional expresado en el PEI 2005-2015, la implementación y acreditación de los casos de estudio sería en respuesta a una demanda de los clientes, de las contrapartes (IWTO y GLOBALGAP) y de los entes reguladores (SENASA). El reducido número de laboratorios acreditados disponibles en el mercado es la principal ventaja identificada, la acreditación diferencia a los laboratorios dentro de la oferta disponible en función de su competencia técnica.

A lo largo de esta investigación se han presentado los distintos componentes que conforman la denominada Infraestructura de la Calidad, centrando el análisis en tres de sus eslabones: la normalización, la evaluación de la conformidad y la acreditación. Estos eslabones se complementan y permiten incrementar la confianza entre las partes, brindar seguridad, transparencia e información a las transacciones. Establecen las reglas y mecanismos de *enforcement* que contribuyen al cumplimiento de los contratos y a la reducción de los costos de transacción.

En función de lo expuesto, los objetivos planteados para esta investigación fueron alcanzados. La implementación de la norma ISO/IEC 17025 y la acreditación conforme a la misma ha mejorado la *performance* de los laboratorios analizados.

6. Referencias

ARIKAN, P., ACAR, R., AYCIK, G., CETINER, M., DEMIREL, H., EFE, N., GOLGE, T., TULUMEN, S., YUCEL, H., ZARARSIZ, A., AGUS, Y. 2004. **Establishing of a quality system for nuclear analytical laboratories. Journal of Radioanalytical and Nuclear Chemistry**. En: Olivares *et al*., 2005.

BILKEY, W. AND NES E. 1982 **Country of Origin Effects on Products Evaluations**. Journal of International. Business Studies, 13, 89-99. En:Castagnino, 2006.

BLAIR, M.; WILLIAMS, C. and LIN, L. 2008. **The roles of standardization, certification, and assurance services in global commerce.** Disponible en http://www.ssm.com/abstract=1120503 Último acceso: 10/08/08.

BRYDEN, A. 2004 . **Role of international standardization in world trade**. Material presentado en la Conferencia International "Provision of competitiveness of Ukrainian products on the way to the WTO and the EU" en Kiev (Ucrania) en el mes de junio. Disponible en: http://www.iso.org/iso/search.htm?qt=kiev&searchSubmit=Search&sort=rel&type=simple&published=on Último acceso: 27/06/10.

BURNETT, L., CHESHER, D., GROOT-OBBIK, D., HEGEDUS, G., MACKAY, M., PROOS, A., ROCHESTER, C., SHAW, W., WEBBER, A. 2002. **ISO compliant laboratory quality systems and inciden monitoring improve the implementation of laboratory information systems**. Accreditation Quality Assurance. 7:237-241. En: Olivares *et al*., 2005.

CARR, S- ; MAK, Y. and NEEDHAM, J. 1996. **Differences in Strategy, Quality Management Practices and Performance Reporting Systems Between ISO Accredited and Non-ISO Accredited Companies**. Disponible en http://ssrn.com/abstract=36928. Último acceso: 07/06/09.

CASTAGNINO, T. 2006. **Estándares internacionales de calidad y desempeño exportador en la Argentina. Evidencia a nivel firma**. Revista del CEI – Comercio Exterior e Integración N° 7. Páginas 93 a 106. Disponible en: http://www.cei.gov.ar/revista/07/revista.pdf Último acces: 08/01/11.

CLOUGHERTY, J. A. and GRAJEK, M. 2006 T**he Impact of ISO 9000 Diffusion on Trade and FDI: A New Institutional Analysis.** WZB-Markets and Politics Working Paper No. SP II 2006-22. Disponible en http://ssrn.com/abstract=957233. Último acceso: 10/08/08.

ERKEKDJIAN, M. 2003. **Estrategias de negocios: la importancia de la certificación de calidad.** Informe mensual de la Fundación ExportAr. 11 páginas. Copia electrónica disponible en http://www.exportar.org.ar

VAN DER WIELE, A., DALE, B. , AND WILLIAMS, A. 2000. **ISO 9000 series and excellence models: Fad to fashion to fit.** *Journal of General Management* 25**:**50-66. En: Neumayer and Perkins, 2004.

ISO/UNIDO. - 2008. **Fast Forward. National Standard Bodies in Developing Countries.** Disponible en: http://www.iso.org/iso/fast_forward.pdf Último acceso: 31/10/09.

OLIVARES. B.; PACCESI, V. P. H. Y LANÇAS, F. M. 2005. **Dificuldades e vantagens na implantação de sistemas de gestão da qualidade para laboratórios.** Tercer Congreso Virtual Iberoamericano sobre Gestión de Calidad en Laboratorios.

ORDÓÑEZ, H. 2009. **La Nueva Economía y Negocios Agroalimentarios**. Editorial Facultad de Agronomía. Universidad de Buenos Aires. 1° Edición. 128 págs.

PORTER, M. E. 1990. **The Competitive Advantage of Nations.** New York: Free Press.

——————1982.**Estrategia comparativa. Técnicas para Análisis de los sectores Industriales y de la Competencia**. México.CESCA, 404p.

SANETRA, C. and MARBÁN, R. 2007. **Enfrentando el desafío global de la calidad: una infraestructura nacional de la calidad.** Libro publicado por Physikalisch-Technische Bundesanstalt, (PBT-Alemania), Organización de Estados Americanos(OEA) y el Sistema Internacional de Metrología (SIM). Disponible en: http://www.ptb.de/de/org/q/q5/docs/OAS_SP07.pdf Último acceso: 11/07/10.

VERLEGH, P. AND STEENKAMP, J.1999. **A Review of Meta-analysis of country of origin research**. Journal of Economic Psychology, 20, 521-546. En: Castagnino, 2006.

VAN DER WIELE, A., DALE, B. , AND WILLIAMS, A. 2000. **ISO 9000 series and excellence models: Fad to fashion to fit.** *Journal of General Management* 25**:**50-66. En: Neumayer and Perkins, 2004.

WITHERS, B., AND EBRAHIMPOUR, M. 2000. **Does ISO 9000 certification affect the dimensions of quality used for competitive advantage?** *European Management Journal* 18**:**431-443. Citado por Neumayer and Perkins, 2004.

Páginas web consultadas

GlobalGap http://www.globalgap.org (07/07/10)
ILAC http://www.ilac.org (16/11/10)
INTA http://www.inta.gov.ar (10/10/10)
IRAM http://www.iram.org (05/10/10)
ISO http://www.iso.org (18/12/10)
IWTO http://www.iwto.org (05/10/10)
Labnetwork http://labnetwork.org (06/09/09)
OAA http://www.oaa.org (09/12/10)
OMC http//www.wto.org/indexsp.htm (08/10/10)

PROPOSAL TO RECOVER SMALL SUGARCANE PLANTS IN A CONSOLIDATION ENVIRONMENT

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Abstract
The goal is to identify whether it is worth investing public money through financing and deferral of taxes to save small ethanol plants in São Paulo. The method is the Monte Carlo simulation, which compared the performance in various scenarios of a traditional plant with the same plant, but improved by a specific financing for power cogeneration and deferred taxes, even with potential debt restriction which may suffer some plants. The simulation showed that in 27.0% of simulated scenarios, it is possible to reverse the current negative scenario and that the remaining 73.0% is the operation a failure.

Key Word: Sugarcane plant; Public financing; simulation.

PROPOSAL TO RECOVER SMALL SUGARCANE PLANTS IN A CONSOLIDATION ENVIRONMENT

1. Introduction

In the current quest for sustainability and renewable energy sources, the Brazilian sugarcane industry has had great prominence in the international arena. Considered the world's largest producer, Brazil has about 7 million hectares followed by India, Thailand and Australia (UNICA, 2011). The State of Sao Paulo, the largest domestic producer, accounts for approximately 58% of the national production, with 361 million tons in 2010/2011 season (CONAB, 2011). Within the State of São Paulo, the largest concentration is in the region of Ribeirão Preto, where several plants are based and it is the region where are concentrated the suppliers of equipment such as boilers and project engineering for the sugar mill companies.

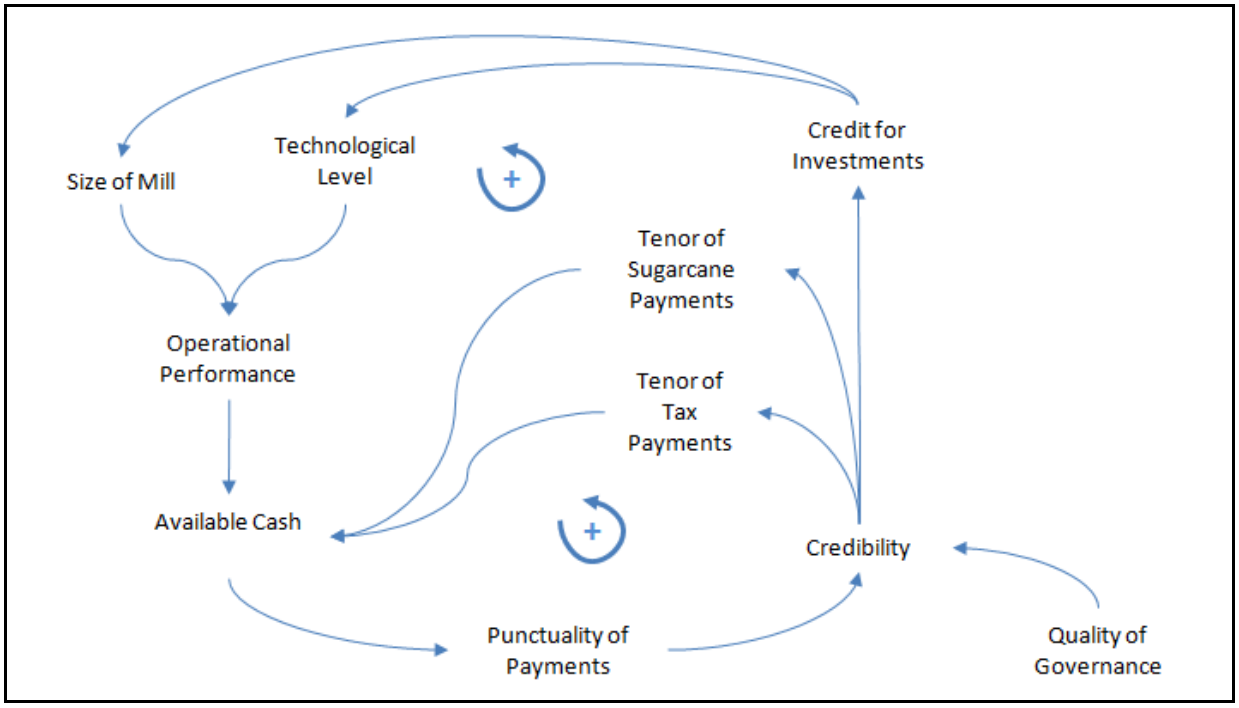
Due to the resuming the use of ethanol as fuel, the culture and consequently the crushing of sugarcane in the Center-South region of Brazil has shown an average annual compound growth of 10.65%, during the 2000/2001 harvest to the forecasted for 2010/2011 (UNICA, 2011), from 207 million tons of sugarcane to 670 million.

Sugarcane is the raw material that enables the lowest cost of production of sugar and ethanol, as evidenced by Crago *et al* (2010). In addition to the cheap production of ethanol and the sugar, the sugar cane plantation generates environmental benefits as capturing carbonic gases and straw. The straw and sugarcane bagasse, a by-product of sugarcane crushing, are used to generate electrical energy (Goldemberg, 2006). Both are used to generate steam that will be used for own consumption during the harvest and may be used to cogenerate electricity to sell it in the energy market.

The electric power generated by the sugarcane plants has a complementarity with the energy generated by hydroelectric plants, the main component of the Brazilian energy matrix. The period from May to November is when the reservoirs of hydroelectric plants have the lowest levels (ONS, 2011), it is also the harvest period. The estimated potential for power generation among the sugarcane plants in the State of Sao Paulo is 10,000 MW, equivalent to the generation of the hydroelectric of Itaipu (UNICA, 2011).

With the resumption of investment after the crisis of 2008, the scenario is favorable for a consolidation process. However, small plants are less attractive to traditional consolidation by large groups (Mitsutani, 2010). Due to its small scale and technological obsolescence, their equipment typically has a lower relative operating performance. The result is a low availability of cash that, whether is below a threshold, may jeopardize the timeliness of payments. This issue, coupled with the traditional style of governance of the plant, results in low financial credibility. The consequence, in one hand, is the tightening of payment terms from sugarcane and the main taxes, which are now paid in cash. On the other hand, is the decrease (or elimination) of additional financial leveraging capacity, which prevents the investments that would bring the necessary increase in scale and technological level of the plant. The causal diagram of Figure 1 shows the relationships between these variables.

Figure 1 – Diagram causally related to the payment capacity of the plants. Arrows indicate causal relationships between variables. There are two cycles of reinforcement. The first is the size of the mill (scale) and its technological level. The second is the deadline for payment of sugarcane and taxes. Both are enhanced and may, in the absence of sufficient counter-balance, cause the system to an exponential divergence, virtuous or vicious. Prepared by authors.



The consequence is that these companies keep between 1,500 to 2,200 employees, and are often the only option for employment in the region, go through several constraints, year after year, with no perspective of simple solution. One possible outcome is always the disappearance of these sugarcane plants, with replacement by larger and capitalized plants, which will have a higher power of bargain in the industry. In this case, given the level of mechanization of these new players, the total number of manufacturing jobs should fall. Another consequence for the State is the permanent loss of the tax arrears of these plants.

A possible solution includes the feasibility, through state action, a financing solution that will generate cash through the cogeneration of electricity and standardization of tenor of payment of taxes. The question that arises is the feasibility of this solution:

- The probability and the effect of this plant be saved is enough for worthwhile state intervention?
- Alternatively, it makes sense to give them a quick end and replaced by a larger and more competitive plants?
- What indicators can be used to identify the plants that worth or not worth to recover?

2. The Sugarcane Industry in Brazil

While the U.S. has limited potential for the increase of the production of corn for ethanol, Brazil uses only 1.6% of its total cropland and pasture land, and only 5% for the production of cane sugar (Crago *et al*, 2010).

Although the main discussion of ethanol revolves around the fact that it is renewable fuel, its production competes directly with another product with high demand: sugar. Increasing demand for

sugar in the worldwide market, which has promoted a surge in this commodity prices, which in turn encourages increasing of production (Mitsutani, 2010).

The demand for sugar, ethanol and cogeneration of electricity generated interest from investors from other industries in this sector. Large national groups, such as Petrobrás, Cosan and ETH (Odebrecht), as major foreign investors like British Petroleum, Louis Dreyfus, Glencore and Shell began a competitive process, starting the consolidation of the sector.

This process was interrupted by the crisis of September 2008, which frozen many invest-ments were being made in the sector, especially greenfield projects, destabilizing the level of leverage of the projects. At the same time many plants had financial problems because of rising operating costs. The sum of the inexperience of new entrants to the high debt of the sector led many plants to have difficulty paying their debts, with the entry of many in chapter 11 and bankruptcy process (Jank, 2009).

The Brazilian sugar and ethanol industry in South-Central region is classified into three groups:

1) Consolidated Group: capitalized groups with access to capital markets. Purchased and renovated large plants or built-in new ones with state-of-art technology. The crushing capacity is on a large scale. Possess or seek large crushing capacity, which forces them to compete for sugarcane in some regions.

2) Groups Big Plant: ancient groups with good capitalization, which made adjusts and/or retrofits to increase productivity and competitiveness of plants. They produce much of the cane used.

3) Traditional Plants: formed by traditional sugarcane plants, but they have no investment capacity due to high leverage. Allied to this have low operating performance.

Table 1 Prospects for Expansion and Production. Elaboration: UNICA, Copersucar and COGEN. The CAGR (cumulative average growth rate) was calculated by the authors.

Sugar Cane Products	2009/2010	2015/2016p	2020/21p	CAGR
Sugarcane production (mm tons)	605	829	1.038	6%
Sugar (mm tons)	33.0	41.3	45.0	3%
Domestic Consumption and Inventory	8.9	11.4	12.1	3%
Export	24.1	29.9	32.9	3%
Ethanol (billion liters)	26.0	46.9	65.3	9.5%
Domestic Consumption and Inventory	22.9	34.6	49.6	8%
Export	3.1	12.3	15.7	18%
Bioelectricity (Average MW)	1.800	8.158	13.158	22%
Participation in the energy matrix (%)	3%	11%	14%	

The addition of new productive capacity in sugarcane industry has two ways. The first is the retrofit of the plant, where the main objective is to induce energy efficiency, increasing productivity and reduction of emissions from existing plants. In this process, various investments are made in plants, seeking the modernization of equipment that are used. The other way is through Greenfield projects, where modern plants are built with the use of state of the art equipment, aiming at maximum performance and productivity.

Analyzing the productive chain of the sector, the agricultural sector which represents 65% of the total cost of the process, is the one with the greatest potential for productivity gains. The quality planning in the process of mechanization indicates the achievement of low cost and good operating performance of the harvest (Pauli, 2009). Such processes that directly influence productivity require long-term investments, which are often not made.

3. New system of ICMS in São Paulo State

The normal system of payment of ICMS ("*Imposto sobre Circulação de Mercadorias e Serviços"*) equivalent to VAT, valid for all sectors of activity, is the payment of the tax after the sale of the product, either be the company who will use it as raw material or as a commodity to be sold commercially, or be the final consumer. When the buyer is not the final consumer, the ICMS paid is the difference between the ICMS sales of the month and the ICMS embedded in purchases of the same month. Where, in a month, purchases are substantially higher sales, excess ICMS credit is deferred until the following month. In business in general, the occasions on which this occurs are rare and bring a few problems.

In the sugarcane industry, there is a strong seasonal impact. The crop has an average duration of 9 months and the purchase of raw material is mainly performed in the beginning of the harvest and sale of products is performed in the mid to late harvest. The mismatch is on average 4.5 months. To adapt the sector to the same spirit of recovery that is made for most business activities, the ICMS of the raw material was deferred until the time of sale of the final product, when the plant is capitalized and can pay their taxes without difficulty.

However, the same industry has a history of tax evasion, concentrated in small traditional plants. In reaction to this situation, the Government of the State of São Paulo introduced on December 1st, 2009, a new system for payment of the ICMS by the sugarcane sector. Thereafter, the plants begin to collect ICMS of raw materials in the purchase order that is on average 4.5 months earlier than they did previously.

This means that a small traditional plant has to disburse 18% of the total amount of purchased sugarcane one day after the order. Without this payment, the sugarcane producer is not allowed to authorize the shipment to the sugarcane industry. The penalties to the sugarcane producer that does not respect this procedure are several. Then, the sugarcane plant, that usually has constraints of cash, has to finance this amount in the banking system at very high interest rates.

Nevertheless, for plants that pay their taxes on time, is allowed a special regime, which follows the previous system. A survey at the Treasury of the State of Sao Paulo shows that 24% of plants in the state cannot fit in the special regime. In addition to being in arrears with their taxes, are usually the same suffering capital constraints.

4. Proposed Solution

It put a situation in which a segment of the sugar and ethanol is operating with low efficiency, high debt, credit crunch, short-term payment of taxes and low ability to invest in improving its facilities, and especially in the cogeneration of electricity. Among these shortcomings, the latter draws attention. Due to not get credit to invest in cogeneration plants, formed by the free fuel bagasse and the straw is wasted or sold by low prices. This fuel could be used to generate as much clean energy as funds to repay for investment and help to settle, even partially, the tax and bank debts in sugarcane plants.

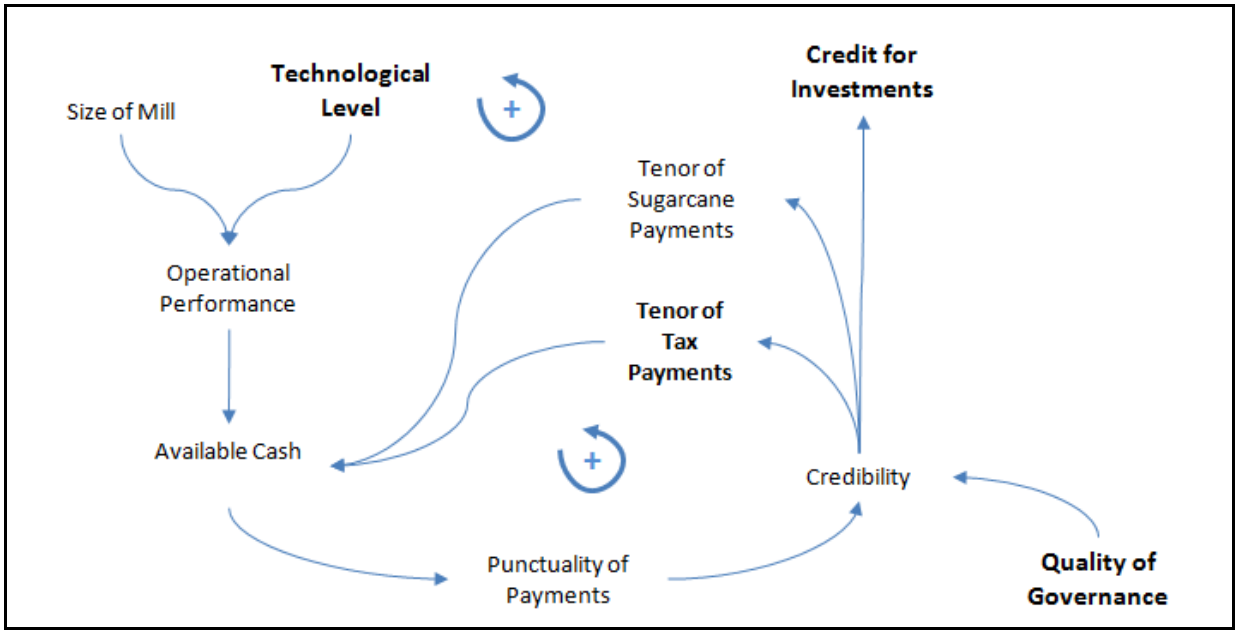
One way proposed to eliminate this gap between taxpayers, undergoes a broad solution: use specific lines of financing for clean energy offered by a regional development bank, to finance a new special purpose company ("SPC") that will generate energy using the steam boiler plants of the sugarcane plant. With attractive interest rates and terms consistent with these projects, the goal is to help small plants to gain a higher return, coming from selling of the energy, and expand the supply of electricity.

In order to avoid draw criticism that public funding is financing tax debtors, the whole transaction is bounded since the beginning. During the construction the financing bank will have an insurance of completion and the equipments as guarantee. When the SPC is operational, the financing bank continues with the equipment under warranty, but has the pledge of shares and the purchased power agreement receivables.

Repaid the financing, the shares of the SPC are pledged to the State Government, and then the cash flows of the SPC are used to reduce tax debts. When all tax debts are paid, the shares will return to the sugarcane's shareholder. Due to this future commitment, the sugarcane plant is allowed to adhere to the special regime at the moment of the signature of all documents that will make feasible the proposed structure. What is an apparent self-reduction of immediate revenue for the State that should be seen as the restoration of tax citizenship of the sugarcane plant, which is going to honor their tax debts, improve your cash flow and increase the supply of electricity.

Figure 2 shows the causal diagram in Figure 1, highlighting the variables that are intervened. It is given credit for investment in cogeneration, which is a form of technological change updates. The deadline for payment of taxes is normalized, which leads to an immediate injection of resources. Good governance, therefore the credibility of the plant in relation to the operation, is enhanced through the creation of the SPE. The question is the viability of the solution.

Figure 2 – Diagram of causal with remedial measures in highlight. In bold, the variables affected by the remedial measures under discussion. Arrows indicate causal relationships between variables. Authors.



5. Methodology

Faced with a scenario with several variables, where companies make their decisions and are affected by the decision of third parties, the simulation shows a versatile tool that allows viewing results of several possible alternatives. The simulation can be deterministic, where there is no random variable, or stochastic where there is one or more entries of random vari-ables.

Analysing the sector and the problem to be analyzed, the Monte Carlo method proves the right tool for modeling the stochastic problem. This method has as principle the generation of random values to create a scenario of a problem (Pllana, 2007). The use of this method can simulate in a very realistic way many uncertainties inherent in estimates that are considered in decisions to long-term investments. Mahoney and Kelliher (2000) states that the model of discounted cash flow benefits of a

Monte Carlo method, because it provides a structured approach and puts explicit and transparent the uncertainties considered in the model.

The ability to assign parameters for each variable and still be able to specify correlations between any of them make the methodology is suitable to analyze the problem.

According to Evans and Olson (1998), the Monte Carlo simulation must follow five steps:

1) Development of a conceptual model: this step should be to understand and define the research problem, identify the objectives of the modeling and determine the following variables and format of input output variables.

2) Building the simulation model: develop formulas or equations that reproduce the effects according to the input variables, determining the probability distribution of activities that capture the uncertainty of the variables.

3) Check and validate the model, is to eliminate logical errors, validating the consistency of the equations representing the model.

4) Designing experiments using the model.

5) Run experiments and analyze results.

The construction of the model to answer the research question of this article were:

- Review of articles on industry competitiveness;

- Analysis of greenfield projects under implementation.

- Analysis of operating performance and financial statements of plants in operation characterized as Traditional plant;

- Formulation of a mathematical model where you can simulate the operation of the plant in two scenarios: as it is today ("as is") and a scenario where there is public funding for the startup of electricity generation.

- Monte Carlo simulation for probabilistic analysis of value creation of the plant in both scenarios, considering the existence of a greenfield plant in the area of influence that require raw material in increasing amounts, pushing the price in the region

6. Simulation Model

The proposed model provides a simulation of the operation of a greenfield plant against two versions of a Traditional Plant: a) Version "as is" where the operation is reproduced as it is currently, and b) Version "+ UTE" where investments are made for power generation.

The starting date of the model is January 1st, 2011. Made the decision of the investments, the greenfield plant will begin to produce in late 2013, and the operation of the cogeneration will start its operation by March 2013.

The simulation variables are:

• Harvest Days: These are the days when the harvest is carried out effectively and crushing of sugar cane. Average harvest days is 207 days, with standard deviation of 10%.

• Price of Sugar: Prices of Sugar is defined by the commodity market worldwide. For this simulation it was considered a projection until 2018 for the domestic price, based on the historical prices informed by UNICA. The other types of sugar were calculated based on the correlation with domestic sugar price and a random residual based on the actual distribution of the prices.

• Price of Ethanol: The price for all kinds of ethanol (hydrous, anhydrous, industrial) were calculated based on the correlation with domestic sugar price and a random residual based on the actual distribution of the prices.

• Price of electricity: The price remained constant, corrected by inflation, in order to reproduce a possible purchase power agreement priced in June 2011.

• Cost of Own Sugarcane: the cost considers the cost of production and reflects gains or losses due to the average age of the cane field and the level of mechanization. The considered values reflect the low investment in the sugarcane plantation and low technological level of mechanization, compared with 100% mechanized projects.

• Competition for Third Party Cane: Many of the smaller plants continue to get cane for crushing through the purchase of related family production. This family bond acts as a line of credit, where the financial arrangements are made after the sale of the product. However, due to the idle capacity of large plants associated with crop failures, in some regions the pressure rises in the prices of sugarcane. This is reflected in the rising price of sugarcane, or even the purchase of raw material at distances greater than the ideal, which is 50 km. The prize offered by major companies is around 15%, which are absorbed by the lower cost of own cane and improved operational efficiency. This variable is still set by the more aggressive (higher than GDP growth) the plant "greenfield" that operates in the region.

• Advance ICMS Collection: works from the binary models of small plants. In the simulation "as is" is charged a financing cost of the 18% of ICMS for a period of 4,5 months. In the case "UTE +" this value is zero, assuming the company adhered to special regime.

• Regional Development Bank financing: followed a structuring quoted for a sugarcane plant with 2 million tons capacity. The tenor is 6 years with a grace period of 2 years, totaling R$ 20 million, and potential export of the 6MW. The cost of this loan is fixed 8.5% per annum for R$ 15 million, and IPC-FIPE (inflation index) +6.5% for the remaining.

The above described variables were considered into a financial model which generates an income statement and a cash flow. The cash flow was simulated for each company by the end of 2018, and for the purposes of calculating the present value of discounted cash flow, was added to this flow of 2018 with a perpetuity growth rate equal to 4.5%, equivalent to the inflation index and to represent that due to the geographic limitation, the sugarcane plant will reach its full capacity.

Then it was simulated a series of ten thousand scenarios, which generated an equal number of operating cash flows. The cash flows were discounted to the present value by weighted average cost of capital of each of the companies. The cost of weighted average of capital considered for the Greenfield was 12.0%, the “As Is” was 18.9% and “UTE+” was 18.2% per annum. The WACC calculation is demonstrated in annex 1.

Considered the calculated present value it was calculated the firm value, which is the the calculated present value discounted by the value of debt, both as the bank tax. In case of positive value, we believe that the company survives in the sense of it to create value greater than the total of its liabilities. The number of survivor results per total number of simulations was called survivor rate. This model was disregarding the company's liquidity problems during the projection. The financial model is presented in annex 2.

7. Simulation Result

The results of ten thousand simulations are presented in table 2:

Table 2 Result of Monte Carlo's simulation. Values stated in Reais, except when mentioned. Calculated by the authors.

	Greenfield	"As Is"	"+UTE"
Average	433,259	(193,378)	(75,575)
Median	432,108	(211,496)	(79,043)
Standard Deviation	107,298	86,621	107,962
Survivor Rate (%)	100.0%	3.2%	27.0%

As result of the simulation it is evident that the greenfield project, which brings the most modern equipments and a high level of mechanization presents the best financial performance, with a survivor rate of 100%. The sugarcane plant used as base for the modeling presented a survivor rate of 3.2% in the generated scenarios. In this situation, it is expected a long weakening process, which may cause more noise in the industry. At last, the addition of some capital to make feasible the export of energy and bring in more technology and cash flow to the sugarcane plant increased to 27.0% the survivor rate. It is an evidence of the reinforcement result described in the Figure 2.

Considering the actual information of the sugarcane plant considered for the modeling, the State of São Paulo, would have the following scenario described in Table 3:

Table 3 Result for the State of Sao Paulo. Values stated in Reais, except when mentioned. Calculated by the authors.

	Survivor Rate	Debt with State SP	Expected Result
As Is	3.2%	41,700	1,330
UTE+	27.0%	61.700	16,644

The Table 3 is the answer for the first question proposed to this article. Considering an financial point of view, in spite of the increasing in the expected return, from R$ 1,330 to R$ 16,644, the return in this case is not enough. In other words, to invest additional R$ 20,000 in order to receive R$ 15,314 does not make sense. Considering the same assumptions, this case would make financial sense whether the survivor rate was over 32,5%.

Regarding the second proposed question, there is no doubt about the stronger performance, operational margin and financial (cost and structure), as described in Table 2, of the new and modern plants. In an industry, which becomes target for huge and capitalized groups, apparently there is no alternative other than leave the traditional plants to have a quick end. Considering the regional economy, the employees will have to look for new activities and the State will receive its taxes on time. In terms of the market, the sugarcane producers and the buyers of sugar and ethanol may suffer against the bargain power of these strong groups.

As there is public financing available with competitive interest rates, it is important to identify if exist sugarcane plants with potential to improve performance. If so, which plants worth to recover, preserving a higher and healthy competition in the market? To answer this question, it was generated two set of 1,000 simulations for each combination, with the objective to identify the increase of the survivor rate for traditional plants with the addition of the cogeneration with different structure of capital and different operational margins. Using the same market simulation already describe, it was considered an assumption of operational margin constant during the projection period and different level of leverage. Below, the results for traditional plant "as is" – Table 4, and traditional plant "UTE+" - Table 5.

Table 4 – Simulation result for traditional plant "as is". According to different levels of debt and different level of operational margin, it was plotted "B" for survivor rate over 90% and "o" for survivor rate lower 50%. Elaborated by Authors.

OPERATIONAL MARGIN \ DEBT / TOTAL ASSETS	65%	70%	71%	72%	73%	74%	75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	85%
40%	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		o
39%	B	B	B	B	B	B	B	B	B	B	B	B		o	o	o	o
38%	B	B	B	B	B	B	B	B	B	B	B		o	o	o	o	o
37%	B	B	B	B	B	B	B	B			o	o	o	o	o	o	o
36%	B	B	B	B	B			o	o	o	o	o	o	o	o	o	o
35%	B				o	o	o	o	o	o	o	o	o	o	o	o	o
34%		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
33%		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
32%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
31%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
30%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
29%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
28%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
27%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
26%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
25%	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o

Table 5 – Simulation result for traditional plant "UTE+". According to different levels of debt and different level of operational margin, it was plotted "B" for survivor rate over 90% and "o" for survivor rate lower 50%. Elaborated by Authors.

OPERATIONAL MARGIN \ DEBT / TOTAL ASSETS	65%	70%	71%	72%	73%	74%	75%	76%	77%	78%	79%	80%	81%	82%	83%	84%	85%
40%	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
39%	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
38%	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
37%	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
36%	B	B	B	B	B	B	B	B	B	B	B	B	B	B		o	o
35%	B	B	B	B	B	B	B	B	B	B	B	B			o	o	o
34%	B	B	B	B	B	B	B	B	B			o	o	o	o	o	o
33%	B	B	B	B	B	B	B	B			o	o	o	o	o	o	o
32%	B	B	B	B	B	B	B			o	o	o	o	o	o	o	o
31%	B	B	B	B	B	B			o	o	o	o	o	o	o	o	o
30%	B	B	B	B				o	o	o	o	o	o	o	o	o	o
29%	B	B	B				o	o	o	o	o	o	o	o	o	o	o
28%	B				o	o	o	o	o	o	o	o	o	o	o	o	o
27%	B			o	o	o	o	o	o	o	o	o	o	o	o	o	o
26%	B	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
25%		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o

Without the effect of the cogeneration, the survivor rate will be above 90% only for plants with operational margin over 35% and debt to total assets ratio below 72%. With the addition of the cogeneration, it is clear the increase of the survivor rate, specially for plants with debt to total assets ration below 75%, but lower operational margin.

8. Conclusion

The environment in the traditional sector of sugarcane in Brazil has been changed. The current and forecasted high demand for sugar worldwide is an important attractive for financial capital that is looking for new opportunities, specially with high grow perspectives. In Brazil, beside the sugar, there is a huge ethanol market which is used as substitute of gasoline, and now, due to the new technologies it is feasible to produce electricity through the use of biomass, a by-product of the sugarcane crushing process. The new established plants bring high scale of production, high operational productivity, an adequate capital structure and an integrated cogeneration in a promising future within the forecasted horizon.

On the other hand, the traditional plants are doomed to disappear. In a competitive scenario, there is a survivor rate of 3.2%. The improvement of internal efficiency caused by cogeneration and specially

the adherence to special regime caused an increase of survivor rate to 27%. From the financial point of view this is not a feasible alternative. However, using the same methodology it was identified where the proposed solution may create the expected return. This means that sugarcane plants with current debt to total asset ratio up to 77% and an operational margin between 30-35% may have at least 90% of chances to survive.

The main contribution of this article is to create a table with the main characteristics of which traditional sugarcane plant worth to be invested by public funding. This means to the Government the return of the financing, maintenance of employees, tax paid on time and reduction of tax debt. As a premium, it was created an additional offering of electricity. An important limitation of this article is the fact that it was not considered any new agricultural technology that can increase the productivity of plants.

9. Reference

Agroerg. Recovered on June 19, 2011 from [http//www.agroerg.com.br]

Conab. Recovered on June 19, 2011 from [http//www.conab.gov.br.]

Crago, C.L.; Khanna, M.; Barton, J.; Giuliani, E.; Amaral, W. (2010). *Competitiveness of Brazilian sugarcane ethanol compared to US corn ethanol.* Energy Policy.V. 38, p.7404-7415.

Evans, J.R.; Olson, D.L. (1998). *Introduction to simulation and risk analysis.* Upper Saddle River: Prentice Hall.

Goldemberg, J.(2006). *The ethanol program in Brazil***.** Environmental Research Letters 1. 2006. Recovered on June 19, 2011 from [http://iopscience.iop.org/1748-9326/1/1/014008]

Jank, M.S., (2009, November 6). Etanol:benefícios e desafio. *O Estado de São Paulo*, pp. A2.

Kelliher, C. F.;Mahoney, L. S**.** (2000) *Using Monte Carlo Simulation to improve longterm investment decision***.** The Appraisal Journal. V. 68, n.1, p 44-56.

Mitsutani, C. (2010). *A Logística do Etanol de Cana-de Açúcar no Brasil: Condicionantes e Perspectivas***.** (Master dissertation, University of São Paulo, 2010).

ONS. Recovered on June 19, 2011 from [http://ons.com.br]

Pauli, D. G. de.(2009) *Planejamento da Qualidade do plantio mecanizado de cana de açúcar.* (Master dissertation, University of São Paulo, 2009).

Pllana, S. *History of Monte Carlo method.* Recovered on June 19, 2011 from [http://web.student.tuwien.ac.at/~e9527412/index.html]

Unica. [http//www.unica.com.br]

10. Annex

ANNEX 1
Demonstration of WACC Calculation

	Greenfield	AS IS	UTE +
Cost of Equity (K_e)			
	2011	**2011**	**2011**
Risk free (Krf)	4,38%	4,38%	4,38%
EMBI Brasil (SoT)	1,66%	1,66%	1,66%
Unleveraged beta	0,84	0,84	0,84
D/E	150,00%	468,01%	498,14%
Tax shield	34,00%	34,00%	34,00%
Leveraged beta	1,67	3,43	3,60
Market Premium (US)	4,50%	4,50%	4,50%
Nominal Cost of Equity in US$	13,56%	21,49%	22,24%
Brazilian Inflation (%a.a.)	4,50%	4,50%	4,50%
US Inflation (%a.a.)	2,00%	2,00%	2,00%
Nominal Cost of Equity in R$ (K_e)	**16,06%**	**23,99%**	**24,74%**
Cost of Debt (K_d)			
	2011	**2011**	**2011**
Cost of Debt Nominal em R$ (K_d)	**14,15%**	**27,00%**	**25,60%**
After taxes (K_d)(1-t)	**9,34%**	**17,82%**	**16,90%**
Weighted Average Cost of Capital (WACC)			
	2011	**2011**	**2011**
Cost of Equity (Ke)	16,06%	23,99%	24,74%
E / (D + E)	40,00%	17,61%	16,72%
Cost of Debt (Kd)(1-t)	9,34%	17,82%	16,90%
D / (D + E)	60,00%	82,39%	83,28%
Nominal WACC in R$	**12,03%**	**18,91%**	**18,21%**

ANNEX 2
Financial Model used in the simulation

	USINA "AS IS"							
SUGAR CANE	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Daily capacity of milling (tones)	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
effective daily Milling (tones)	8.696	8.696	8.571	8.451	8.036	7.469	9.524	9.836
Days of harvest	207	207	210	213	224	241	189	183
Capacity of Milling (tones)	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000
Processed Sugar cane (tones)	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000
ATR (kg / ton sugar cane)	145,00	145,00	145,00	145,00	145,00	145,00	145,00	145,00
ATR Available (tones)	261.000	261.000	261.000	261.000	261.000	261.000	261.000	261.000
Bagasse of available sugar cane (tones)	450.000	450.000	450.000	450.000	450.000	450.000	450.000	450.000
Generated Energy (MW)	9,2	9,2	9,2	9,2	9,2	9,2	9,2	9,2
Energy for Proper Consumption (MW)	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5
Co-generated Energy (MW)	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7
PORTFOLIO OF PRODUCTS	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Sugar	79%	79%	79%	79%	79%	79%	79%	79%
ton	197.460	197.460	197.460	197.460	197.460	197.460	197.460	197.460
ATR utilized (ton)	207.234	207.234	207.234	207.234	207.234	207.234	207.234	207.234
Ethanol	21%	21%	21%	21%	21%	21%	21%	21%
Ethanol processed from ATR (m3)	35.486	33.873	33.873	33.873	33.873	33.873	33.873	33.873
Ethanol residual	-	-	-	-	-	-	-	-
ATR utilized (ton)	53.766	53.766	53.766	53.766	53.766	53.766	53.766	53.766
BREAKDOWN OF SALES - MARKETS	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Crystal (GC)	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Domestic market	50%	50%	50%	50%	50%	50%	50%	50%
Export market	50%	50%	50%	50%	50%	50%	50%	50%
Anhydrous	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Domestic market	50%	50%	50%	50%	50%	50%	50%	50%
Export market	50%	50%	50%	50%	50%	50%	50%	50%
Electric energy for sale (MWh)	-	-	-	-	-	-	-	-

ANNEX 2 (cont.)
Financial Model used in the simulation

NET PRICES (R$)	2011	2012	2013	2014	2015	2016	2017	2018
SUGAR (R$/50kg)	*62,5*	*70,4*	*74,3*	*79,2*	*84,1*	*89,0*	*93,8*	*98,7*
Crystal	**62,5**	**70,4**	**74,3**	**79,2**	**84,1**	**89,0**	**93,8**	**98,7**
Domestic market	55,4	62,5	65,9	70,2	74,6	78,9	83,2	87,5
Export market	69,6	78,4	82,8	88,2	93,6	99,0	104,5	109,9
Granulated Controlled (GC)	77,6	87,4	92,3	98,3	104,4	110,4	116,5	122,5
VHP - Exports (FOB Santos)	58,6	66,1	69,7	74,3	78,9	83,4	88,0	92,6
Liquid	80,6	90,9	95,9	102,2	108,5	114,8	121,1	127,4
ETHANOL (R$/m3)	934,1	1.012,0	995,0	1.070,4	1.090,6	1.055,8	1.379,1	1.234,0
Hydrous Ethanol	934,1	1.012,0	995,0	1.070,4	1.090,6	1.055,8	1.379,1	1.234,0
Anhydrous Ethanol	1.039,0	1.125,6	1.106,8	1.190,6	1.213,1	1.174,4	1.534,0	1.372,7
Domestic market	972,3	1.053,4	1.035,7	1.114,1	1.135,2	1.099,0	1.435,5	1.284,5
Export market	1.105,7	1.197,9	1.177,9	1.267,0	1.291,0	1.249,8	1.632,5	1.460,8
Industrial	953,2	1.032,7	1.015,4	1.092,2	1.112,9	1.077,4	1.407,3	1.259,3
			-	-	-	-	-	-
ELECTRIC ENERGY (R$/MWh)	145,0	151,5	158,3	165,5	172,9	180,7	188,8	197,3

NET REVENUE	2011	2012	2013	2014	2015	2016	2017	2018
Sugar	246.804	278.191	293.566	312.818	332.071	351.366	370.628	389.881
Sugar - domestic market	109.431	123.348	130.165	138.701	147.238	155.793	164.334	172.870
Sugar - external market	137.373	154.843	163.401	174.117	184.833	195.573	206.294	217.011
Ethanol	33.147	34.278	33.704	36.256	36.941	35.763	46.714	41.800
Ethanol - domestic market	33.147	34.278	33.704	36.256	36.941	35.763	46.714	41.800
Total	279.951	312.469	327.270	349.074	369.012	387.130	417.342	431.681

Sugar Cane	2011	2012	2013	2014	2015	2016	2017	2018
Total Sugar Cane Crushed	**1.800.000**	**1.800.000**	**1.800.000**	**1.800.000**	**1.800.000**	**1.800.000**	**1.800.000**	**1.800.000**
% owned cane	50%	50%	50%	50%	50%	50%	50%	50%
Cost of Owned Sugar Cane (R$/ton)	58,50	70,79	83,53	98,57	120,25	144,30	176,05	209,50
(+) Inefficiency	19,0%	21,0%	18,0%	18,0%	22,0%	20,0%	22,0%	19,0%
Cost of Owned Sugar Cane (R$ 000)	**52.653**	**63.710**	**75.177**	**88.709**	**108.225**	**129.871**	**158.442**	**188.546**

Third Party Cane	2011	2012	2013	2014	2015	2016	2017	2018
Third Party Cane (tons)	900.000	900.000	900.000	900.000	900.000	900.000	900.000	900.000
ATR Recovery Third Party Cane (kg)	145,0	145,0	145,0	145,0	145,0	145,0	145,0	145,0
ATR Production/Harvested (tons)	130.500	130.500	130.500	130.500	130.500	130.500	130.500	130.500
Cost Per Kg of ATR from Third Parties (Consecana Index)	**0,3908**	**0,4317**	**0,4811**	**0,5219**	**0,4647**	**0,5826**	**0,5344**	**0,5946**
Cost of Third Party/Supplier Cane (R$ 000)	**50.999**	**56.333**	**62.782**	**68.105**	**60.649**	**76.032**	**69.734**	**77.594**
(+) Competition by sugarcane	**12%**	**8%**	**15%**	**14%**	**13%**	**18%**	**14%**	**18%**

COGS	191.611	216.416	243.425	271.832	290.969	344.674	378.136	433.372
(+) TOTAL COST OF CANE	103.652	120.043	137.959	156.814	168.875	205.903	228.176	266.140
(+) Fixed Cost	48.571	50.757	53.041	55.428	57.922	60.529	63.253	66.099
(+) Variable Cost	39.388	45.616	52.425	59.589	64.172	78.243	86.707	101.133
SG&A	26.764	28.845	29.792	31.188	32.464	33.623	35.557	36.475
(-) SG&A - Sugar								
Selling	17.917	19.998	20.945	22.341	23.617	24.776	26.710	27.628
General & Adm	8.847	8.847	8.847	8.847	8.847	8.847	8.847	8.847
(=) OPERATIONAL INCOME	**61.576**	**67.208**	**54.053**	**46.055**	**45.578**	**8.832**	**3.649**	**(38.166)**
(-) Depreciation & Amortization	6.162	6.162	6.162	6.162	6.162	6.162	6.162	6.162
(-) Interest Expenses	84.042	84.071	84.102	84.135	84.156	84.221	84.259	84.326
(=) LAIR	**(28.628)**	**(23.025)**	**(36.211)**	**(44.242)**	**(44.739)**	**(81.551)**	**(86.772)**	**(128.654)**
(-) CSSL/IRPJ	-	-	-	-	-	-	-	-
(=) Net Income	**(28.628)**	**(23.025)**	**(36.211)**	**(44.242)**	**(44.739)**	**(81.551)**	**(86.772)**	**(128.654)**

CASH FLOW	2011	2012	2013	2014	2015	2016	2017	2018
EBITDA	61.576	67.208	54.053	46.055	45.578	8.832	3.649	(38.166)
(-) Cost of Anticipation of ICMS	(1.929)	(2.234)	(2.567)	(2.918)	(3.143)	(3.832)	(4.246)	(4.953)
(-) CAPEX	(16.666)	(17.416)	(18.200)	(19.019)	(19.875)	(20.769)	(21.703)	(22.680)
(-) CSSL/IRPJ	-	-	-	-	-	-	-	-
(+/-) Working Capital	(8.089)	(8.935)	(9.958)	(10.802)	(9.620)	(12.059)	(11.061)	(12.307)
(=) Free Cash Flow from Operations	**34.892**	**38.623**	**23.328**	**13.315**	**12.942**	**(27.828)**	**(33.361)**	**(78.106)**

sim	0	Equity Value	VPL	FC1	FC2	FC3	FC4	FC5	FC6+Perp
vivo	0	0	-333.018	-22.421	23.328	13.315	12.942	-27.828	-33.361	-78.106

AUTO-CONSUMPTION AND INFORMAL SALE ESTIMATION IN THE GOAT MEAT AGRI-FOOD CHAIN IN THE PROVINCE OF LA PAMPA, ARGENTINA (2009).

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Abstract
Several studies demonstrate the informality of goat agri-food systems. The auto-consumption and informal sale are not only important in the provincial or regional areas, but also in the rest of the country and in several countries around the world. These systems have particular characteristics that differentiate them from others, mainly: the lack of an institutional market, subsistence activities in agro-ecologically marginal regions, relatively little importance in household consumption and in the formal economy, among others. In the province of La Pampa goat activity is important in the western, which are arid and semiarid zones. In 2009, there were 77,907 goats in stock, the slaughter registered was of 2,393 cabrito and 2,518 goats (among other minor categories), and 3,021 animals were moved with guide to other provinces. The potential productivity of the provincial herd was far from the record of the formal channels. The objective of this work is to make a sensitive analysis to estimate a range of informality and auto-consumption of caprine animals in La Pampa's province in 2009. Formal records were used, interviews to qualified agents in the province and country were conducted, and bibliographies on the subject were analyzed. With a provincial average productivity of 0.75 cabrito/goat/year was estimated that 12.64% of the billy goats were registered by the formal system. The theoretical range of consumption is of 13-18%, which would produce an apparent consumption of 12-17 kids/farm/year. The informal sale represented a 43-49%, which is to say that in the informal articulation producer-purchaser animals were sold by 1.8 and 2.1 million argentine pesos (0.49 - 0.55 U.S. million dollars). It was estimated that 78.45% of the replacement goats were allocated to auto-consumption and sale through informal channels, implying a value of 0.5-0.6 million pesos (0.15-0.16 million U.S. dollars).

Key words: articulations, black market, subsistence, sensitive.

AUTO-CONSUMPTION AND INFORMAL SALE ESTIMATION IN THE GOAT MEAT AGRI-FOOD CHAIN IN THE PROVINCE OF LA PAMPA, ARGENTINA (2009).

1. Introduction.

Goat meat agri-food systems have characteristics that distinguish them from other livestock systems. We can mainly mention: a) the lack of a central market to function as a referent in price formation and in determining the quality of them, b) the relatively little importance in household consumption of major consumer markets, c) the poor contribution to the formal system, d) spatial distribution in areas with limited agro-ecologically unfavorable or difficult access; e) the system's role in the livelihoods of marginalized families.

Goats marketing is mainly characterized by informality. A feature that not only is given in the provincial-regional context (Bedotti et. al. 2005; Pallero, 2005; Cangas and Dominguez, 2009; Ferro Moreno and Balestri, 2010), but also at a national level (ADEC, 2007; UIA 2007, National Goat Table) and in several countries in the world (National Agricultural Marketing Council, 2005, USDA, 2005; Alberta Goat Breeders Association, 2009; Jesus Valeiro Cabrera, 2009).

The informality and auto-consumption are formulated as problems of goats agri-food systems in all Goats Tables conducted, a factor that was (is) identified as crucial and transversal (National Goat Tables, 2009). It is a problem that is difficult to quantify and qualify because of the characteristics of the sector in general and particularly in every region.

The informal market is relevant, especially if the following cases are considered as valid: 1) the existence of unregistered activity in slaughterhouses, 2) the clandestine slaughter at retail (mostly butchers and eating houses), 3) the direct sale from producer to final consumer and / or intermediary, 4) other informal options are not considered.

In the province of La Pampa goat activity is important in the most disadvantaged areas from an agro-ecological point of view: "the western pampas." Five regions[17] focused in 2009 and 2010 more than 88.2% of the total provincial goat animals[18]. This area is characterized by being arid-semiarid, soils that consist of a thin layer of sand, very poorly developed and without distinct horizons (Caviglia, Lorda and Lemes, 2010), with scarce rainfall regimes. With limited road access from the quantity and quality points of view (state).

The main product is the “cabrito” of 6-12 kg alive, taken from the place by intermediaries and/or final consumers. It is followed by the sale of culling goat, mainly oriented to foreign markets.

There are several scientific and technical background that mention the important informality and auto-consumption of agri-food system (SAA) goats[19]. In the province, according to a study made by Bedotti, et. al. (2003) a follow up was made from 3 to 7 years farms with goat breed “Colorada Pampeana” with a flock of 170 animals approximately (including goats, cabrillonas and castrones) one annual service and extensive management (to natural pasture without food supplementation). The following production rates were obtained: 87.85 % of fecundity, 92.12 % fertility, 4.45 % of abortions, 7 % of mortality, 1.897 for real proliferation and 1.752 of trade proliferation..

[17] Chalileo, Chical Co, Curacó, Limay Mahuida y Puelén.
[18] SENASA (2009, 2010).
[19] Provincials and national Goats Tables. Jobs of: National Universities, INTA, Argentina Industrial Union (UIA), Organization of Food and Agriculture the United Nations Organization (FAO), Inter-American Institute for Cooperation of Agriculture (IICA), Ministry of Agriculture, Livestock and Fisheries (MAGyP), provincial Ministries of Production (or similar equivalents), other.

Bedotti et. al. (2005) and Bedotti et. al. (2007) interviewed 48 goat farms randomly selected in the zones of Puelén and Limay Mahuida. The average production rates were: 97.3 % fertility, 89.4 % fecundity, 1.772 real proliferation and 1.606 business proliferation. It was obtained that in average 18 % of production is intended for home consumption and 50-60 % to sale. The main form of sales (68.8 %) was through mediators and butchers (it was often the same person), 25 % occasional sales final consumer and 6.3% did not sell animals. The 12.5 % trade breeders and 16.7 % sell adult goats (14.6 % to intermediaries and 2.1 % other producers).

Based on a Producers of the West Survey, conducted by the Government of La Pampa to 550 farms in the west of the province (EPO, 2005), a report was presented at the National Goat Table proposing the following indicators: 80% goat birth, 20% replacement, 55-60% used for sale (0.6 index of commercial sale cabrito/goat/year), 13-15% of auto-consumption (for newborns).

In the year 2009, the estimated stock of caprine animals in places with bovine cattle in La Pampa province was of 83,295 heads (SENASA[20], 2009), of which 55.38 % were included in goats category. If Registry of Agricultural Production (REPAGRO[21]) is considered as a source, the amount of provincial caprine animals for that year was 92,247 distributed in 621 farms. The number of goats represented the 84.45 % (77,907).

By 2010 the estimate stock for the province was 81,962 heads distributed in 711 of goat farms with bovine cattle (SENASA, 2010). The 60.79% belonged to the goats category. According to the data from REPAGRO, this year there were 74,865 goats in stock, of which 63,198 were goats (84.42%).

The provincial slaughter recorded by the National Office of the Agricultural Control Trade (ONCCA) for the year 2009 was of 4,959 animals. It was primarily focused on goats and cabritos categories, both of them represented the 99.03% of total slaughter. This activity was mainly concentrated in the months of December-January for cabritos/as and in May and November for goats. In 2009 the slaughter activity represented 2.73% of the national total. In the goats category the number was higher, 12.72%.

It was possible to appreciate that the number of slaughtered animals in the formal system was far from the productive potential, it was mainly estimated by the productive potential of the stock declared bellies. Therefore the objective of this work is to realize a sensitive analysis to estimate a range of informality and auto-consumption of the caprine animals in La Pampa's province in 2009.

2. Materials and methods.

In the province of La Pampa, there are two sources from which we can estimate the goats stock: 1) The "Registry of Agricultural Production" (General Directorate of Statistics and Censuses of La Pampa), and 2) the annual vaccination disease of aftosa campaign (Agri-food Health and Quality National Service).

The information of the goats stock from REPAGRO are valid because of: 1) they are a result of a mandatory affidavit for all farmers and it involves the majority (places with goats, with or without cattle) and 2) missing records are estimated by a proportional expansion. The data are annually supplied by the producer in the municipalities concerned. This source will be used to calculate the productive potential of provincial goat stock.

The information stock from SENASA is not complete due to: 1) they are obtained during the cattle vaccination period, thus it corresponds to a specific population group (farms with bovine animals), 2) although they are affidavit they are taken as secondary,they are not the main objective, 3)They do not

[20] Agri-food Health and Quality National Service.
[21] Provincial program, installed by law, which means that each farmer must go to the pampas where it has placed its common plot, in order that he take the appropriate affidavit on the characteristics of exploitation, mainly in regard to data from agricultural and livestock production.

have a control to ensure veracity in the declarations (whether in cattle: are vaccinated). Data are collected in cross section in March every year. This source will be used for the calculation of cabritos/as that are available in stock.

Slaughter data were taken from the annual reports of National Office of the Agricultural Control Trade (ONCCA). These include: a) records of inspections and controls from SENASA, and b) those which were authorized provincially and municipally. Therefore they are complete and accurate data from all the refrigerators and the country's formal slaughterhouses affidavit.

Definitions of the caprine animals categories are different in each source. The REPAGRO takes into account only three categories: goats, cabritos/as and castrones. While SENASA and ONCCA identify five: cabritos/as, cabrillas/chivitos, goats, capones y chivos (Resolution N° 43/2008 ONCCA).

The particular rating that is given to the animals in each area or region makes the interpretation of statistics difficult. According to the customs and jargon of the area, the same animal may be labeled differently. This affects the field data collection, which confuses both the data collector and the supplies (the clearer example is in the farmer).

In La Pampa, it is called "chivito" or "cabrito" the animal from birth until it is sold. The "cabrillona" is the female who has not had service, which is left for reproduction. The entire year male, it is also called "chivo" and sometimes "botijón". "Castrón" is the whole male (no “chivo” or “macho cabrío”). These labels are shared with the Mendoza, Neuquén and Rio Negro provinces, but not with the rest of the country. The "capones" are divided into two groups: annual capón (usually for home consumption) and capón (older than a year)[22].

It is likely that when it comes to cabrito/a, chivito or chivo, the conceptual differences are weak, and in fact we are referring to the same category. This is a difficult hypothesis to confirm, but empirically it hinders the interpretation of statistics.

The only category that is common in the sources is "goats" (bellies) to be taken as an axis in the analysis. Because of the characteristics of marketing "cabrito/a" (seasonal and casual), and its importance in income, it is likely that the data collected do not allow to calculate the cabrito/goat rate certaintly. Potential estimator of the productivity sector (rate dial: bright cabritos/goat/year).

The equilibrium extraction rate is an estimator of the natural productivity of the flock, it is valid if the number of goats considered is certain (bellies). With this rate it can be estimated the production range directed to the informal market and auto-consumption (less natural productivity task name).

To estimate the production rates were made: a) interviews to agents of the National Institute of Agricultural Technology (INTA), b) consultations with participants of the national project "Economics of Agrifood Agroindustrial Chains" (AEES 302421) and to members of National and Provincial Goat Tables c) interviews to qualified agents in the chain (Government of La Pampa, proffesionals from agribusiness, collectors); d) data analysis from West Producers Survey (EPO, 2005), e) bibliography revision from the work in La Pampa west area.

This estimation took into account the two most important categories of goats from the consumer/marketing: cabritos/as and goats point of view. The data used were the following: 1) goat stocks 2009 (REPAGRO, 2009), 2) cabritos/as stock 2010 (SENASA, 2010), 3) formal slaughter 2009 (ONCCA, 2010), 4) average production rates (0.6 to 0.95 cabritos/goat/year, 20-25%[23] restocking-discarding of the total goats). These provided the goat births and mortality percentages.

[22] Interviews with: qualified agents, assemblers and technicians of the INTA and UNLPam.
[23] Should be considered that a percentage goes to increase the bellies stock. All depends on the weather of the year, the price per head, the expectations of the producer, the family size (labor supply), etc.

From the sensitive analysis of these data, it will be obtained estimate production rates for 2009. Considering the given formal slaughter, there will be made an estimation of the auto-consumption and informal range.

The algebraic procedure to calculate the levels of auto-consumption and informal sale of cabritos/as is the following:

$$\% \text{ AC-VI}_{\text{cabritos}} = [(C * PP) - (R + F + M + S) / C * PP]$$

Wherein:
% AC-VI $_{\text{cabritos}}$: Percentage of auto-consumption and informal sale.
C: Number of goats declared in stock.
PP: Average productivity (cabrito/goat/year). Considering the rates: fertility, fecundity, calving, weaning and mortality.
R: Replenishment (% restocking by goats stock).
F: Record of formal slaughter.
M: Animals moved with guided to other provinces.
S: Stock of the cabritos/as of year t + 1.

To calculate the range of of auto-consumption and informal sale will be used the following formula:

$$\% \text{ AC-VI}_{\text{cabras}} = [(C * \% R) - (F + M) / C * \% R]$$

Wherein:
% AC-VI $_{\text{cabritos}}$: Percentage of auto-consumption and informal sale.
C: Number of goats declared in stock.
% R: Percentage of replenishment.
F: Record of formal slaughter.
M: Animals moved with guided to other provinces.

The intention of this estimation is to complement the first one, quantifying and valuing the auto-consumption and informal sale to a market price. The analysis is more limited because there is no accurate information about: a) a year's stock t +1, b) auto-consumption (in Bedotti et al, 2005 would be within the 18% average), c) guided goats moved out of the province, d) the importation of goats for slaughter from the meat goat industry.

3. Limitations and assumptions.

The goat sector has no reliable statistics, as the bovine sector has. Informality, geographic dispersion and the poor contribution to the formal economy diminishes the resources available for research by public institutions and/or private.

The affidavits have their limitations, from their own methodological nature. In the case of REPAGRO, they are held once a year, the producer must remember all the productive aspects of the previous season. There is no crossover data to identify inconsistencies or missing information. In order to use the data, producers are supposed to have declared with certainty the number of animals under their ownership.

The production rates are highly variable in time. They depend on environmental and management factors (Barioglio et. al., 1997). In consultations at the Coordinator of the Provincial Goat Table and technicians of the INTA the following influential factors were identified:

1. Productivity: a) supplementation at critical times (winter); b) characteristics of rainfall, photoperiod, temperature range; c) productive aptitude of the breed and the particular flock.

2. Auto-consumption: a) proximity to urban centers (closest farms, less consumption), b) number of stock animals (greater number, less relative auto-consumption), c) productive characteristics of the year (worst condition, less auto-consumption), d) characteristics of the family unit (culture and number of members), e) the price of goat (the higher price, the less auto-consumption).
3. Replacement: a) productive-climate characteristics of the previous year (under unfavorable conditions, less replacement porcentage, more quantity to sale), b) labour available for the subsequent cycle (under evidence of less amount of labor, particularly family, less percentage of replacement), c) financing programs (fe: in the Goat Law there are lines for increasing funding for stock), d) production and price expectations.

In 2009 the climatic conditions were restrictive. The Provincial Government declared 95% of the provincial area under "agricultural emergency" and "agricultural disaster". The drought in the area was compounded by the limited capacity of soil to retain water and high temperatures. This situation of extreme drought may be one of the causes of the decline in recorded stock REPAGRO: - 19.11% of total stock and - 18.9% of goats.

For a more accurate calculation of the provincial herd productivity would be needed to have data on stock, slaughter and movement of goats animals to guide harvest to harvest (approximately September of the $year_t$ to September of the $year_{t-1}$).

4. Development.

ESTIMATED RANGE OF AUTO-CONSUMPTION AND INFORMAL SALE.

By 2009 the number of goats in stock for the province of La Pampa was of 77,907. Considering that were obtained 0.75 cabritos/goat per goat, there were 58,430 cabritos/as, to which are taken away the 20% of the goats, 15,581 females are reserved for replacement. Then, it is discounted the formal registered slaughter of cabritos/as (2,293), the animals moved to other provinces with guide (3,021) and cabritos/as in stock (11,065[24]). The information recorded in the formal system would involve the 12.64% of the productive potential of cabritos/as and a 25.82% in stock. The remaining 61.54% can be interpreted as auto-consumption and sale by informal channels.

Considering feasible the average productivity of 0.6 cabritos/goat/year it is obtained 47.12% of informality and auto-consumption, and with 0.95 cabritos/goat/year 71.8%. If these indexes are taken as valid it is possible to estimate that the auto-consumption and informality percentage of cabritos/as in 2009 was in the range of 47-72% (from 22,026 to 53,138 cabritos/as).

[24] Cabritos/as + cabrillonas/chivitos.

Table 1: Estimate % AC-VI of cabritos/as (2009).

	2009		
Goats	**77.907**		
Cabritos/goats/year	0,6	**0,75**	0,95
Potential Cabritos/as	46.744	**58.430**	74.012
Replacement (-20 % goats)	15.581	**15.581**	15.581
Formal slaughter of cabritos/as	**2.393**		
Moved to guide other Provinces (*)	**3.021**		
Stock of cabritos/as 2010 (**)	**11.065**		
% slaughter and moved	17,37%	**12,64%**	9,27%
% in stock	35,51%	**25,82%**	18,94%
% Informal trade/auto-consumption	47,12%	**61,54%**	71,80%

Source: Based on REPAGRO data (2009), SENASA (2010), ONCCA (2010). (*) It is assumed that all the caprines which were moved with guide were cabritos/as. (**) SENASA data.

If we consider as the analysis axis the average productivity of 0.75 cabritos/goat/year we can estimate that:

1. Some 35,959 cabritos/as went for auto-consumption and informal sale.
2. The 621 farms would have a theoretical consumption of 13-15% on cabritos/as born (EPO, 2005) to 18% (Bedotti, et al. 2006). Considering the proposed range (13-18%), would talking about 7596 to 10,517 cabritos/as, about 12-17 cabritos/farm/year.
3. The balance to informal sale would be in the range from 25,442 to 28,363 heads (by 43.5 to 48.5% of the potential production of cabritos/as).

If we consider the average price current paid for the meat-industry Santa Isabel 2009 ($ 71.92 per cabrito/a), we can estimate the economic implications of the informal market in the articulation producer-buyers ("mercachifle", butcher, final consumer, others) was between 1.8 and 2.1 million pesos (0.49 to 0.55 U.S. dollars[25]).

To this amount should be added replacement goats that have been left out from the production system. According to all the interviewees and field observations, this is the category with greatest importance in auto-consumption (the "old goat").

To estimate the amount of old goats intended for informal sale or auto-consumption there were taken into account three possible replacement rates: 0.15, 0.20 and 0.25. It is a very variable indicator and difficult to estimate because it depends on many factors.

[25] Average exchange rate 2009: $ 3.73 / Dollar U.S. (Central Bank of Argentina).

Table 2: Estimate % AC-VI of old goats (2009).

	2009		
Goats	**77.907**		
% Replacement	15%	20%	25%
Old goat	11.686	15.581	19.477
Formal slaughter of goat	**2.518**		
% Slaughter	21,55%	16,16%	12,93%
% Informal trade/auto-consumption	78,45%	83,84%	87,07%

Source: Based on data from ONCCA (2010); REPAGRO (2009).

With a replacement of 20% (15,581 goats), the informal market and auto-consumption meant a 78.45%. In the proposed range the informality and auto-consumption was between 78-88% of the potential goats that were left out of the production system by discard.

Considering the 621 farms and an auto-consumption of 13-18% it is possible to get the auto-consumption of 3-5 goats/farm/year, an estimation that is below than the one observed in the field and expressed in interviews and consultations with qualified agents. If all the animals were sell at the average market price of 2009 (average value paid by the meat-industry Santa Isabel: $ 35.42), it would give a total of 0.5-0.6 million pesos (0.15 to 0.16 million U.S. dollars).

5. Conclusions.

Taken into account the provincial average productivity of 0.75 rodeo cabritos/goat/year it can be estimated that a 12.64% of La Pampa productive potential was in the formal market (formal registered slaughter and moved guide goats). Considering the possible production alternatives, the formal market was in the range of 9-18%.

Approximately, 35,959 cabritos/as were intended for auto-consumption and sale through informal channels. Apparent consumption per farm, considering the percentages of consumption of the bibliography, was of 12-17 cabritos/farm/year. The sale through informal channels was in the 43-49% range. The informal articulation between producer-buyer ("mercachifle", butcher, final consumer, others) meant, at current average prices in 2009 of 1.8 to 2.1 million argentine pesos (0.49 to 0.55 U.S. dollars).

If we consider a replacement of 20%, it is estimated that the 78.45% of old goats were intended to auto-consumption and/or sale by informal channels. If the 13-18% went to auto-consumption, the apparent consumption was between 3-5 goats/farm/year, a lower number than the one observed in the field work and in the interviews made to qualified agents. If all were sent to informal sale, the black market of this category represented 0.5 to 0.6 million argentine pesos (0.15 to 0.16 million U.S. dollars).

6. Bibliographic references.

- ADEC (2007). Estrategias comerciales para el sector caprino. Estudio de caso de la cadena caprina. Programa Desarrollo de Cadena Productivas en la Provincia de Córdoba. Agencia para el Desarrollo Económico de la Ciudad de Córdoba. Argentina.
- ADMINISTRACIÓN PROVINCIAL DE AGUA (2011). Régimen pluviométrico histórico por departamento, provincia de La Pampa. Consulta web (http://www.apa.lapampa.gov.ar).

- ALBERTA GOAT BREEDERS ASSOCIATION (2009). An analysis of the current goat industry with a focus on Alberta. Tradex AgriSystems Inc.
- Banco Central de la República Argentina (2011). Cotización histórica del dólar estadounidense. Consulta web (http://www.bcra.gov.ar/index.asp).
- BARIOGLIO, C.; DEZA, C.; ARIAS, M.; VARELA, L.; BONARDI, C. y M. VILLAR (1997). Evaluación de algunos parámetros reproductivos en cabras regionales. Agriscientia XIV: 37-42.
- BEDOTTI, D., GÓMEZ, CASTRO A., SÁNCHEZ RODRÍGUEZ, M., GARCÍA MARTÍNEZ, A. y J. MARTOS PEINADO (2003). Características reproductivas de la cabra colorada pampeana. Archivos de zootecnia 52: 371-377.
- BEDOTTI, D., GÓMEZ, CASTRO A., SÁNCHEZ RODRÍGUEZ, M., GARCÍA MARTÍNEZ, A. y J. MARTOS PEINADO (2005). Aspectos sociológicos de los sistemas de producción caprina en el oeste pampeano (Argentina). Archivos de Zootecnia, vol. 54, Nº 208: 599-608. Univ. de Córdoba España.
- BEDOTTI, D., GÓMEZ, CASTRO A., GARCÍA MARTÍNEZ, A., SÁNCHEZ RODRÍGUEZ, M., PEREA MUÑOZ, J. y V. RODRÍGUEZ ESTÉVEZ (2007). Estructura productiva de las explotaciones caprinas del oeste pampeano (Argentina). Archivos de Zootecnia, vol. 56, Nº 213: 91-94. Univ. de Córdoba España.
- CANGAS, H. y F. DOMÍNGUEZ (2009). Caracterización de la cadena de carne caprina de la provincia de La Pampa. UNLPam.
- CAVIGLIA, J.; LORDA, H. y J. LEMES (2010). Caracterización de las unidades de producción agropecuarias en la provincias de La Pampa. EEA INTA Anguil. Ediciones INTA. Argentina.
- de JESÚS VALEIRO CABRERA, D. (2009). Análisis de competitividad del sistema ovino y caprino del noroeste de la República Dominicana. Universidad de Córdoba. Departamento de Producción Animal. España.
- FERRO MORENO, S. y L. BALESTRI (2010). Sistema agroalimentario agroindustrial cárnico caprino de la provincia de La Pampa. Caracterización y canales comerciales. FA-UNLPam.
- MESA CAPRINA NACIONAL (2009). Resumen de Reunión. Malargüe, Mendoza, Argentina.
- MESA CAPRINA PROVINCIAL (2008). Presentación de la provincia de La Pampa. Santa Rosa, La Pampa, Argentina.
- NATIONAL AGRICULTURAL MARKETING COUNCIL (2005). Report on the investigation into the potential for the South African goat industry. Investigation by the Goat Working Group.
- ONCCA (2010). Informe mensual de carnes. Diciembre 2010. Caprinos.
- PALLERO, R. (2005). Encuesta a productores del oeste pampeano. Gobierno de La Pampa.
- DIRECCIÓN DE ESTADÍSTICAS Y CENSOS DE LA PAMPA (2009). Registro de la Producción Agropecuaria (REPAGRO). Ministerio de Producción.
- DIRECCIÓN DE ESTADÍSTICAS Y CENSOS DE LA PAMPA (2010). Registro de la Producción Agropecuaria (REPAGRO). Ministerio de Producción.
- SENASA (2010). Existencias Ganaderas por Provincia y Departamento - Marzo 2010. Sistema de Gestión Sanitaria/SIGSA - Coordinación de Campo - Dirección Nacional de Sanidad Animal.
- UNIÓN INDUSTRIAL ARGENTINA (2007). Cadena caprina en la región noroeste, 6to foro general de la industria, región noroeste, Salta.

VAN ROOYEN, A. y S. HOMANN (2007). Matabeleland's informal goat markets: Their role and function in smallholder livestock development. Briefing Note No 3, ICRISAT.

AN OVERVIEW OF THE BRAZILIAN CITRICULTURE.

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Abstract
Brazil is currently the world´s largest orange producer and is also responsible for over 50% of the world´s orange juice offer, putting the Brazilian citrus agro industry in a national and worldwide outstanding position. The development of technology and expertise within the citrus production chain has supported the increase in production and the industry´s expansion, gaining social and economical importance. This study aims to show an overview of the Brazilian citriculture, including its mapping and quantification, in order to promote a better understanding of the business and the variables that impact its trends while bringing more transparency to the sector.

Keywords: Citrus, mapping, quantification, agro industry system, production chain.

An Overview of the Brazilian Citriculture

1. Introduction and objectives

Since the beginning of Brazil´s colonization process, orange trees have been cultivated and spread throughout the national territory due to the excellent edaphoclimatic conditions. But it was not until the year of 1962, when a severe frost hit orange orchards in the State of Florida in the United States of America (USA) – at the time the world´s largest orange juice producer – that the Brazilian citrus industry found impulse to grow. It´s consolidation took place during the decades of 1970 and 1980 when new frosts caused more damages to Florida´s orchards.

By the end of the eighties, the combination of an established competitive citrus industry and a developed crop production made it possible for Brazil to become the world´s largest orange fruit producer, outgrowing the USA not only in production, but also in technology. The high prices for orange juice attracted new producers and the implantation of new citrus orchards grew at rates of 12% to 18% per year. Since then, Brazil´s production has doubled while the USA´s has decreased year after year, representing today less than half of Brazil´s production.

During the same period, the industry also showed a high level of investment. In 1970, Brazil had 76 extracting machines. In 1980 there were 511 and in 1990 the number went up to 815. By the year 2000, there were 1,022 extracting machines and in 2010 there were 1,178.

The development of technology and expertise supported the increase in production, which raised the quantity of citrus fruits offered in the internal market, and the industry´s expansion made it possible for Brazil to elevate its orange juice exports. Brazil is currently responsible for half of the world´s orange juice production and citrus fruits are accessible to all social classes of its population. This puts the Brazilian citrus agro industry in a national and worldwide outstanding position.

In light of these facts, the objective of this study is to give an overview of the Brazilian citriculture in order to promote a better understanding of the business and the variables that impact its trends while bringing more transparency to the sector.

The specific objective includes the mapping and quantification of the Brazilian citrus chain in order to gain a detailed knowledge of its economical and social importance, which initiates with the acquisition of agricultural productive inputs and extends up until the products that are available for consumers.

The information gathered from this study results in gains of market intelligence to the sector that supports the structuring of strategic plans aiming at the promotion of business innovations, exploration of new market opportunities and actions to enhance competitiveness.

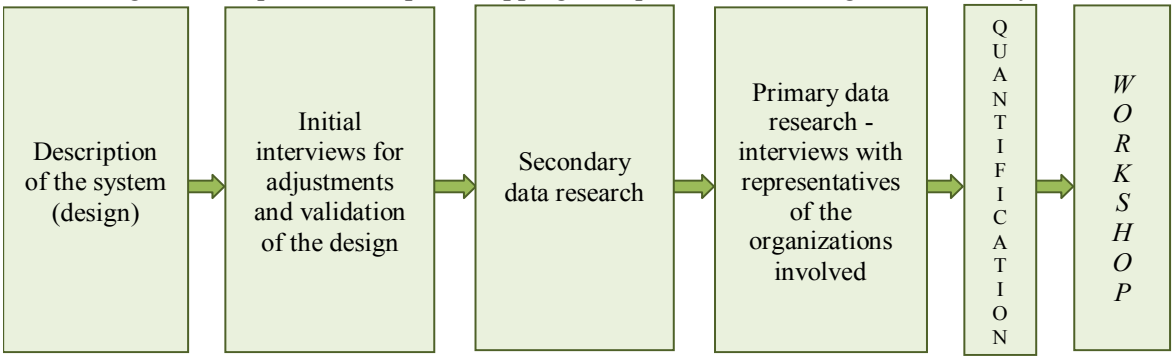
2. Procedures and operationalization

The first step to characterize and to analyze a system is to define its objectives as well as boundaries and scope, participant subsystems of the system, and its environment (Malhotra, 2001). Batalha (2001) comments that for a chain analysis, the researcher must define some conditions and those are consequences of the objectives to be reached. The most important and difficult definitions are related to the analysis scope and levels that should be detailed. Zylbersztajn (2000) also comments that the definition of the agro industry system´s boundaries should be dependent of the researcher's purposes, generally focused in a product.

In this study, the established scope was the citriculture chain in Brazil, with major details in the State of São Paulo, focusing citrus and its main derived products. However, in some cases we present data that surpasses this scope, in order to analyze the dependence and importance of some agents and sectors in the system.

This work will present, by means of a descriptive survey, the characterization of the citriculture chain in Brazil. The methodology used in this study was developed and applied by Neves et al. (2004), Neves et al. (2005), Neves et al. (2007) in the PENSA's studies of the Brazilian orange, wheat and milk agro-industry systems respectively. The sequence of this methodology can be summarized in six stages (Figure 1).

Figure 1: Sequence of steps to mapping and quantification of agro industrial systems.



Source: Neves et al. (2004).

The first step consists of elaborating a preliminary design of the chain based on theory and the researchers' experience. It is also necessary to scope which segments will be studied, keeping the focus in the central axle of the system, due to the objective of the research. In this paper, the option for citrus was made as central object of the system, contemplating the Goldenberg (1968) notion of commodity system approach (CSA), as well as emphasizing a product as the starting point for the system analysis. After the system's design, the second step is submitting it to specialists and interviewing them in order to make the necessary adjustments to get a current reality of the system.

The third stage consists of the secondary data research, which according to Malhotra (2001) is collected for purposes that differs from the problem on the research. For this step, data was collected until the agricultural year 2009/10 from sources that have academic and statistical credibility, reputation and integrity, such as USDA, SECEX, IBGE, among others. Additional efforts were made not to capture unnecessary data to the object in study choosing documents according to the facility in accessing them and their analysis following Godoy (1995) indications.

After the collection of the available secondary data, the collection of primary data (fourth step) was initiated, that is the research of data originated by the researcher with the specific purpose to solve the problem in question (Mattar, 1993; Malhotra, 2001). In this work, visits were paid to the industries, large, medium and small, and interviews and debates with industries executives took place at CitrusBR. Two international visits also occurred, one to Nice (France) in order to attend the World Juice Congress and the other one to Tetra Pak´s Technology Center in Modena (Italy) to immerse in world data on fruit juices.

The quantification (fifth stage) determines the turnover of each sector in the chain, through the companies' revenues and estimative, stated in Brazilian Real currency to several sub sectors of the citriculture chain. The values were then converted to US dollars. In order to guarantee the data liability some secondary and primary data were contrasted, attempting to find incongruous possibilities. In this process it was attempted to use at least two different data sources to check the results, with additional interviews with similar agents when needed.

In the sixth step, instead of a workshop, the data validation was accomplished by discussing the materials with relevant agents of the chain when they had the opportunity to collaborate one more time. After that, the research was presented in October of 2010 at the seminar "Challenges faced by Brazilian Citriculture" in São Paulo, Brazil, an encounter that brought together the greatest specialists in citriculture in the country.

3. Results and discussions

Mapping of economical factors in Brazil´s citrus agro industry

Brazil´s leadership in citriculture and its exports

Brazil is notorious for its capabilities in agribusiness. This is enhanced by the sector´s contribution to the country´s GDP, between 24.5% and 28.5% from the years 1995 to 2008, and also by its importance in maintaining a surplus in net exports. In 2009, Brazil´s agribusiness was

responsible for US$ 65 billion in exports and US$ 10 billion in imports, generating a surplus of US$ 55 billion. If it weren´t for this sector, the country´s trade balance in that year would go from a surplus of US$ 24 billion to a deficit of US$ 30 billion.

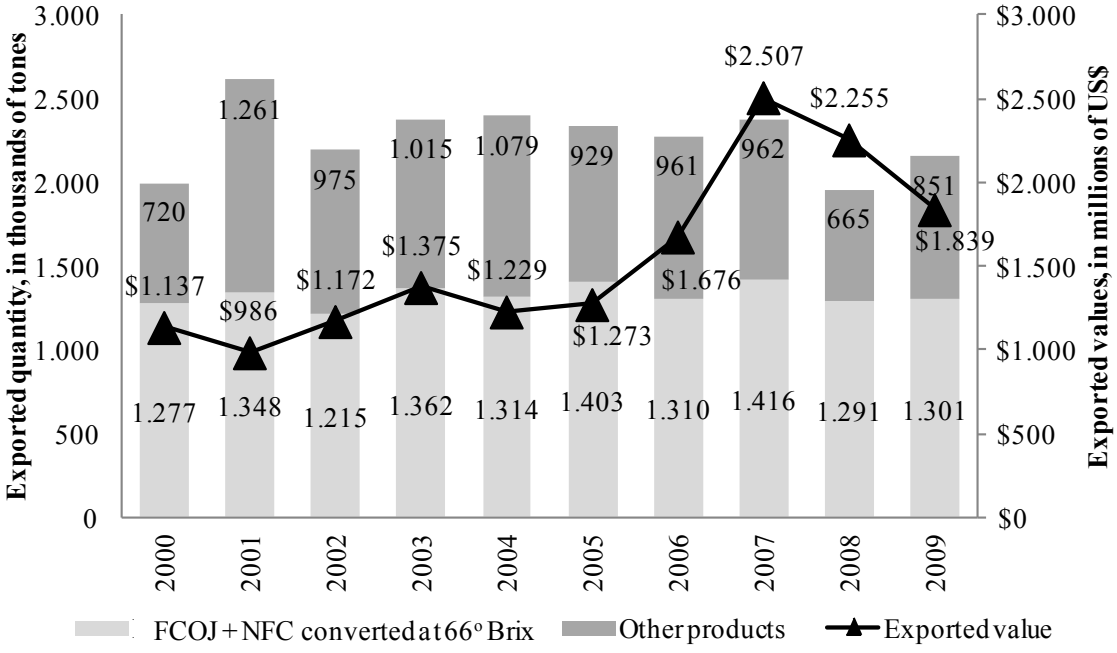
When looking at Brazil´s contribution to the world´s agribusiness sector, it´s possible to observe that the country is the largest producer of orange juice, coffee and sugarcane, second largest producer of soybean and cattle meat, third largest producer of corn and chicken and forth largest producer of swine meat. In the international market, Brazil is responsible for 45% of the sugar trades and 32% of coffee trades. But it is in the orange juice market that the country shows its leadership: for every five glasses of orange juice consumed worldwide, three were produced in Brazil.

The numbers obtained for the Brazilian citrus ago industry are impressive. Brazil detains 53% of the world´s orange juice production and exports 98% of its production of the commodity. In 2009, exports from the citrus complex totalized 2.15 million tones and US$ 1.84 billion in revenue (Graph 1), representing 3% of the countries agribusiness exports. From this total, frozen concentrated orange juice (FCOJ) and not from concentrated (NFC) orange juice was responsible for US$ 1.62 billion, or 88%. Between the years of 1962 and 2009, citriculture has accumulated almost US$ 60 billion in export revenues, bringing an average of US$ 1.3 billion per year in foreign exchange.

It is important to note that orange juice production around the world has decreased in 13% from the agricultural year 1995/96 to 2009/2010, the equivalent to 308 thousand tones. The State of Florida presented a decrease of 295 thousand tones and the Brazilian citrus belt (composed by the State of São Paulo and the Triângulo Mineiro region) of 31 thousand tones. But the two regions still account for more than 81% of the world´s production.

In 2002, the Brazilian citrus agro industry took an important step with the beginning of the NFC exports. This showed the industry´s capacity in innovating before a change in consumer´s habits, switching to less processed products with a more natural image. NFC has a more pleasant taste because its flavor is more similar to the fresh orange juice and its image is associated with a healthier product.

Graph 1: Brazilian citrus complex exports, from years 2000 to 2009.



Source: Elaborated by Marketstrat with data from Cacex, Banco do Brasil and SECEX/MIDC.

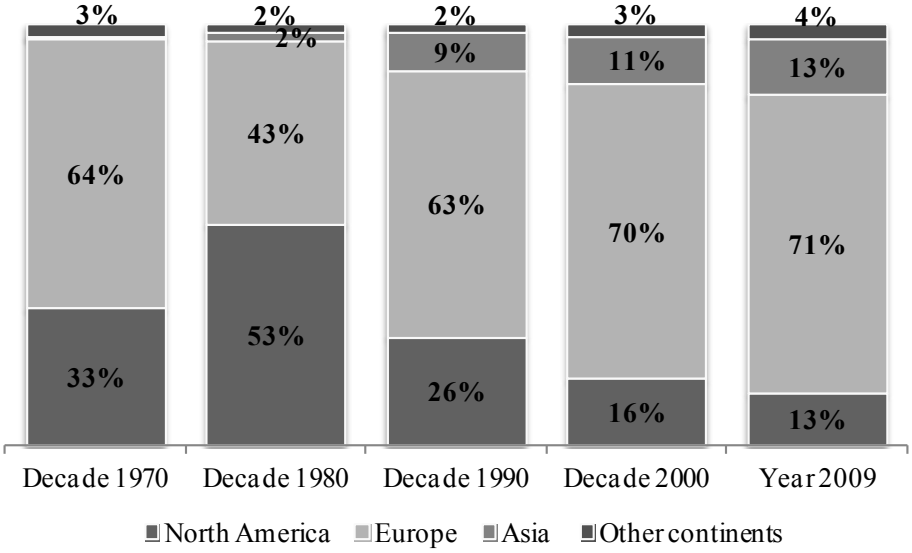
This same capacity was again enhanced during the past decade with the diversification of the exports destination as a response of the citrus industry´s search for new and non saturated markets.

Traditionally, Europe and USA imported together over 90% of Brazil´s orange juice exports. Currently, the most promising markets in growth potential are Asia, due to its population, and the Middle East, mainly because of the population´s habit in not consuming alcohol. In 2009, Brazil exported orange juice to seventy different countries, of which twelve imported NFC (Graph 2).

Apart from the demand for less processed products and the need to search for new non saturated markets, the citrus agro industry export´s is also challenged with tax, phytosanitary and technical barriers which reduce its competitiveness in the international market.

With the exception of the USA, where Brazilian produced orange juice is taxed with a fixed value per ton, in other countries, such as in Europe, Japan, South Korea, China and Australia, the tax value is calculated as a percentage of the financial volume imported. This tends to amplify the effect of a rise in orange juice prices in the international market to the final consumer because once orange juice prices are elevated more taxes will be paid for the same quantity of the commodity. In 2009, orange juice exports from Brazil were taxed with US$ 260.4 million.

Graph 2: Brazilian´s orange juice exports by destinations, by decade and in the year 2009.



Source: Elaborated by Markestrat with data from Cacex, Banco do Brasil, Siscomex and SECEX/MDIC.

Phytosanitary and technical barriers are related with packaging characteristics, consistency in product quality and punctuality in delivery. In Europe, for example, the main demands are product security (consumer health, contaminant levels, and pesticide residue), quality (sensational appeal and compliance with technical specifications), authenticity (adulteration and compliance with the legislation), traceability (product identification and readiness in identifying the source of any potential problem) and consumer perception (product image and origin).

4. Orange and orange juice prices

Citrus producers, just as other agricultural producers, are price takers and are exposed to price variations in the international market according to supply and demand and expectations in consumption of citrus fruits and juices. Prices received by citrus producers also depend on the fruits destination. In general, the fresh fruit market pays better than the processing industry due to their greater demand in quality.

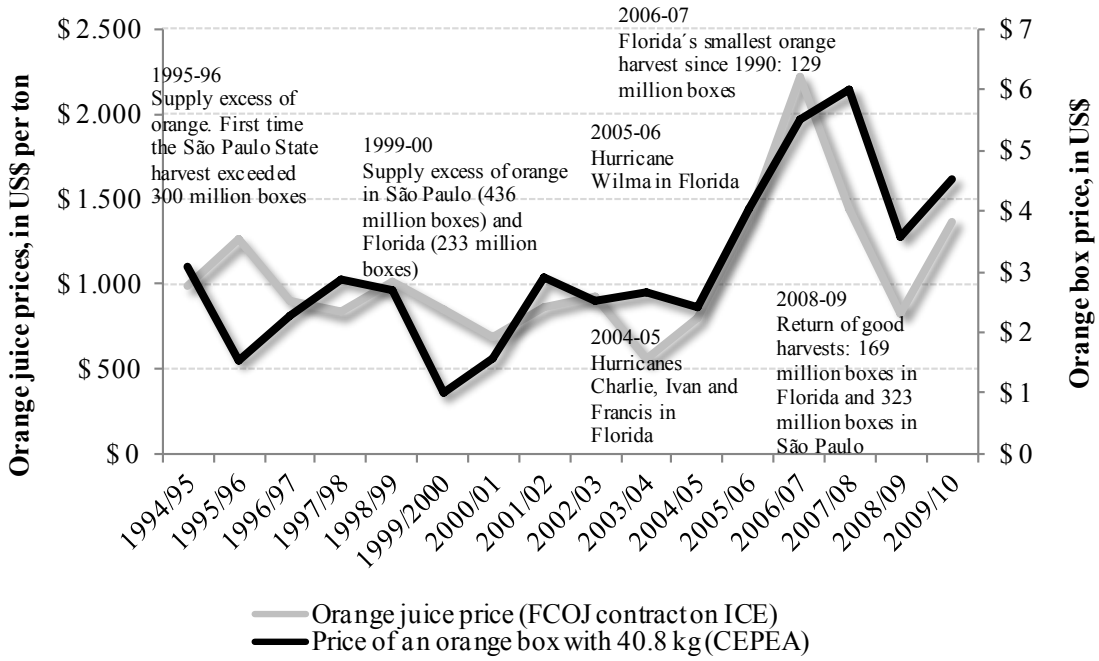
The negotiations between citrus producers and the processing industry in the Brazilian market occur through some standard contracts, such as: long term contracts with fixed pre-determined prices;

long term contracts with or without a guaranteed minimum price and with prices automatically indexed to an audited average orange juice price effectively obtained by the industry in its offshore sales during an agricultural year (from July of one year to June of the next year); long term contracts, with or without a guaranteed minimum price, with prices varying according to the international market, referenced to daily and annual averages of the FCOJ contract negotiated on the Intercontinental Commodity Exchange (ICE); spot market; and long term contracts of partnership or lease.

In general, prices received by orange producers are closely related to orange juice prices in the international market, as can been seen in Graph 3. Orange prices have a direct influence in orange juice production costs, affecting its competitiveness in relation to other fruit juices and non-alcoholic beverages.

Graph 3 also evidences the impacts that an excess or a deficit of supply in orange fruits have upon orange and orange juice prices. In years of excess in supply in the States of São Paulo or Florida prices are usually pressured lower, and in years with production losses in one of these states prices usually trend higher. In more recent years, lower consumer demand for orange juice has contributed to pressure orange juice prices lower and, consequently, also orange prices. This can be partly explained by a change in consumer preference, substituting the traditional orange juice for other beverages with lower calories, like flavored waters, among others.

Graph 3: FCOJ prices on ICE *versus* orange box prices in Brazil´s spot market.



Source: Elaborated by Markestrat with data from CitrusBR and CEPEA.

Since these price fluctuations must be absorbed by the orange juice industry and also by the producers, it is important for both sectors to accompany market expectations and adopt management strategies and tools to reduce their price risk exposure.

5. Mapping of productive factors in Brazil´s citrus agro industry

Citriculture is present in almost every Brazilian state. With over 800 thousand hectares in orchards, orange is the most cultivated fruit in the country, with an area twenty times bigger than apple orchards and 10 times superior to the areas destined to mango and grapes. The State of São Paulo concentrates 70% of the area with orange orchards but the States of Bahia and Sergipe are the ones where the expansion has been occurring more intensively. This is due to the necessity to attend a rise

in demand for fresh fruits from the population living in Brazil´s North and Northeast regions and reflexes a recent increase in their purchasing power.

Orange fruits can have three basic destinies: processing industry, internal market and external market. In the States of Bahia and Sergipe, 77% of the production is absorbed by the fresh fruit market. In the Brazilian´s citrus belt 86% of the production is destined to the processing industry. This is due to the characteristics presented by the orange fruit which enables the industry to have a high efficiency in its conversion into FCOJ at 66º Brix. In the agricultural year 2009/10, it was necessary the processing of 257 orange boxes to produce 1 ton of FCOJ at 66º Brix. In general, 70% of Brazil´s orange production is destined to the processing industry.

Despite the fact that orange cultivated areas in Brazil have reduced in 8% since the beginning of 1990, production has increased in 22% during the same period due to an amazing increase in productivity. While in 1990 the national average for productivity was 380 boxes per hectare, in 2010 it went up to 475 boxes per hectare. A significant part of this increase is justified by the changes in the citriculture´s technological standards which are more enhanced in the citrus belt. This region currently detains over 80% of the national citrus production. Although it is a continuous area, there are some particularities to each location. To simplify the study and for a better understanding, in this research, with the orientation of specialists in the sector, the citrus belt was divided into five different productive regions: North, Northwest, Center, South and Castelo.

Amongst the changes observed in the technological standards it is important to note the increase in tree density within the orchards. In 1980 the average planting density was of 250 trees per hectare, in 1990 it was of 357 and in the early years of 2000 it was of 476. Currently, the most modern orchards are implanted with 833 trees per hectare.

Other significant changes that positively impacted productivity include the use of seedlings with better quality which were produced in nurseries that oblige to a very strict legislation; management expertise accumulation and application aiming at more efficient orchards and gains in phytosanitary control quality; the increase in use of irrigation systems in areas where water deficit problems are more severe; and new considerations in order to determine the optimum moment to renovate an orchard.

Within the citrus belt there was also a migration of the orchards from the regions North, Northwest and Center to the regions South and Castelo. This movement began in the year 2000 and was initially motivated by a more favorable climate condition, lower land values and an absence of threat to the orchards from the diseases “citrus sudden death” and “citrus variegated chlorosis (CVC)”. Currently the main motivations for this movement include risk mitigation of the “greening” disease, which has already affected 239 municipalities in the State of São Paulo, and the expansion of the sugarcane crop thru ought the State of São Paulo, which has occupied citrus areas that presented lower productivity and inadequate profitability.

This rearrange in the production location has put into evidence the Castelo region. Between the years of 2005 and 2009 its number of trees has shown an increase of 89%, bringing the Castelo region from last to second place in quantity of trees within the citrus belt. Also, 42% of new trees (from zero to two years of age) are concentrated in this region, meaning that its participation and importance in production will increase in the years to come. Table 1 shows some numbers detailing the production within the citrus belt.

The Brazilian citrus belt can also be characterized according to the producer´s profile. The data for such characterization was provided by CitrusBR and was based on the producers that delivered orange fruits to the industry within the agricultural year of 2009/10. It enabled the construction of the producer´s profile for the first time, according to the industry´s records regarding area, number of trees and produced volume. These records represent aproximatly 80% of all the fruits processed by the industry and where compilated by an international audit company to ensure their integrity.

Table 1: Citriculture production details within the Brazilian citrus belt.

Agricultural year	Adult productive trees over 2 years of age (millions)	Productivity (boxes* per tree)	Production (millions of boxes)	Oranges to fresh fruit market (millions of boxes)	Oranges to industry (millions of boxes)	Industrial efficiency (boxes / ton of juice**)	Orange juice production (1,000 of tones)
2005/06	159.3	1.9	303.4	38.1	265.3	228	1,164.5
2006/07	158.4	2.22	351.0	34.4	316.6	231	1,369.2
2007/08	159.6	2.23	356.0	38.3	317.7	233	1,362.7
2008/09	160.7	2.01	323.3	35.5	287.8	254	1,132.9
2009/10	164.2	1.93	317.4	43.3	274.1	257	1,064.7

* 40.8 kg boxes.
** orange juice at 66^{o} Brix.
Source: Elaborated by Markestrat with data from CitrusBR and USDA.

The results show that 87% of producers belonging to the citrus belt can be categorized as small (a total of 11,011 producers), with properties that have up to 20 thousand trees, and are responsible for 21% of all trees. 11% of producers (a total of 1,496) are categorized as medium size, with properties that have from 20 to 199 thousand trees, and detain 32% of all trees. And only 2% are categorized as large producers (total of 120), with properties that have over 200 thousand trees, and detain 47% of all trees (Table 2).

Table 2: Brazilian citrus belt producer´s stratification according to their number of trees, for the years 2001, 2006 and 2009.

Thousand of trees	2001			2006			2009		
	Trees (%)	Producers (%)	Number of producers	Trees (%)	Producers (%)	Number of producers	Trees (%)	Producers (%)	Number of producers
> 400	16.15	0.15	23	33.65	0.35	46	39.25	0.40	51
> 200 and < 399	7.65	0.25	38	8.05	0.55	73	7.35	0.55	69
> 100 and < 199	10.60	0.70	105	8.10	1.05	139	8.95	1.30	164
> 50 and < 99	12.40	1.75	263	11.45	2.70	356	10.75	2.95	372
> 30 and < 49	12.30	3.15	473	7.70	3.35	442	7.00	3.50	442
> 20 and < 29	8.95	3.90	585	5.50	3.80	502	5.30	4.10	518
> 10 and < 19	16.45	14.50	2,175	9.45	11.35	1,498	8.00	11.15	1,408
< 10	15.45	75.55	11,333	16.15	76.90	10,151	13.40	76.05	9,603
Total	100	100	14,995	100	100	13,207	100	100	12,627

Source: Elaborated by Markestrat with data from CitrusBR.

The data also makes it possible to observe the increase, in number of trees, in the participation of large producers. This is justified by the economy of scale obtained in larger properties which allows gains in competitiveness due to a more efficient use of technology and orchard management.

In other words, inneficient producers will be forced out of the activity due to their inability to compete with other players in the market. The producers that remain in citriculture must find the most adequate path for their profile and determine a strategy to be followed, be it low cost, diferentiation or diversification.

A low cost strategy involves constant efforts to maintain low production and distribution costs which requires strong habilities in production processes, efficiency in operations and access to inputs at lower costs. This strategy must be pursued by large scale producers that destine most of their production to the processing industry, a market that works with lower margins.

The producers that adopt the diferentiation strategy must produce orange fruits with attributes valued by the fresh fruit market where consumers are willing to pay higher prices for better quality. It

also involves the hability to produce high quality fruits in months corresponding to the intercrop season in order to seek higher margins.

Diversification is another strategy that can me adopted by small and medium sized producers within the citrus belt. This involves cultivating not only citrus fruits but also other related fruits, such as mango, grapes, passion fruit and guava. This reduces the risk of concentration but the producer must be careful in order to not lose focus.

6. Financial impacts of diseases in the Brazilian citrus belt

Without any doubts, this topic is one of the most important threats to the Brazilian citriculture. During the last decade four diseases (citrus canker, CVC, sudden death and greening) alone were responsible for the erradication of thirty nine million trees within the citrus belt. This elavated the mortality rate from 4.5% to 7.3%, reducing annual production in aproximatly 78 million boxes of 40.8 kg, when considering an average productivity of two boxes per tree. This figure represents 25% of the 2009/10 harvest of 317 million boxes of 40.8 kg (Table 3).

Table 3: Number of thousand of trees erradicated within the citrus belt due to four diseases, from the year 2000 to 2009.

Disease	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
Citrus canker	795	191	71	164	177	153	186	151	115	240	2,243
CVC	678	2,406	2,380	1,023	2,887	4,043	3,320	3,299	3,276	3,070	26,382
Greening								5,330			5,330
Sudden death					5,158						5,158

Source: Elaborated by Markestrat with data from Fundecitrus and CitrusBR.

7. Quantification of Brazil´s citriculture chain

Brazil´s singularity and leadership in citriculture is recognized again in this quantification study completed in 2010. This is possibly the most complete and recent overview of the Brazilian citrus production chain. This material can be used by the private and public sector for decision making and strategic planning because it elucidates the interaction between the segments and their capacity in generating resources, taxes and jobs.

This study estimated the GDP value of US$ 6.5 billion (Table 4) for the Brazilian citrus production chain in the agricultural year of 2008/09, which corresponded to approximately 2% of the country´s agribusiness GDP. Of this total, US$ 4.39 billion were generated in the internal market and US$ 2.15 billion in the external market. 34% came from the sales of fresh fruit in the internal market and 28% from orange juice exports (FCOJ and NFC). It is important to note that orange juice exports accounted for 94% of the citrus complex exports. The citriculture´s GDP was estimated by the sum of the sales of final goods within the citrus agro industry system.

Table 4: GDP estimate for the Brazilian citrus production chain based on final goods.

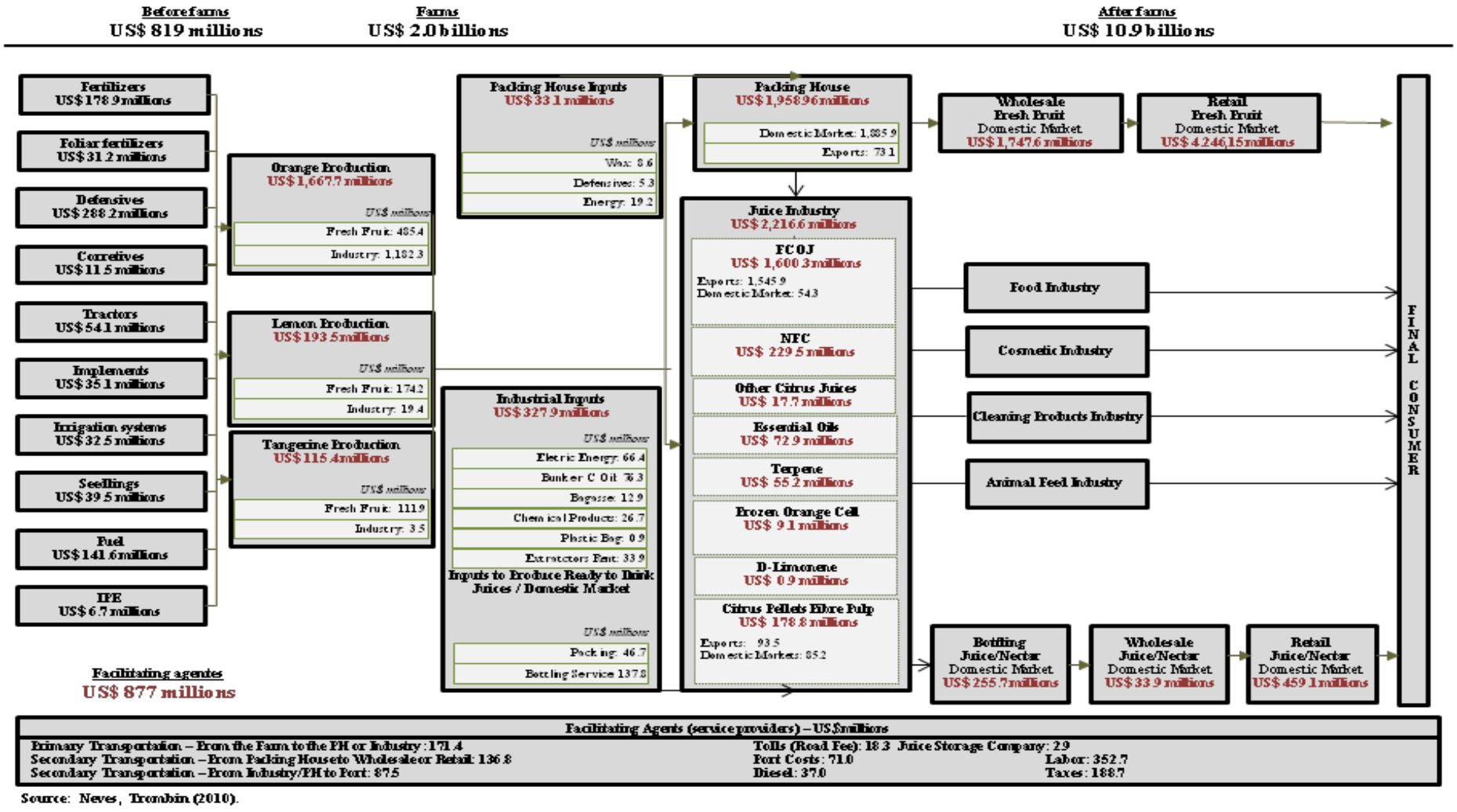
Product	**Internal Market (IM)** US$ (millions)	**External Market (EM)** US$ (millions)	**Total (IM + EM)** US$ (millions)
Orange	2,232.9	19.1	2,252.0
Lemon	673.1	48.2	721.2
Tangerine	945.9	5.8	951.7
FCOJ	-	1,545.9	1,545.9
NFC	-	299.5	299.5
Citrus pulp	85.2	93.5	178.8
Essencial oils	-	72.9	72.9
Terpene	-	55.2	55.2
Frozen cells	-	9.1	9.1
D-Limonene	-	0.9	0.9
Orange juice/nectar	459.1	-	459.1
Total	**4,396.21**	**2,150.10**	**6,546.31**

Source: Neves and Trombin from data elaborated by Markestrat (2010)

Figure 2 represents the citrus production chain system and the value beneath each segment indicates the gross sale of that particular segment in the agricultural year 2008/09. The gross revenue of the citrus sector in this period was of approximately US$ 14.6 billion. This value represents the sum of the estimated sales from the several segments of the productive chain and the financial transactions of the facilitating agents.

Brazilian Citrus Production Chain

GDP: US$ 6.5 billions / Gross Revenue 2008/2009: US$ 14.6 billions

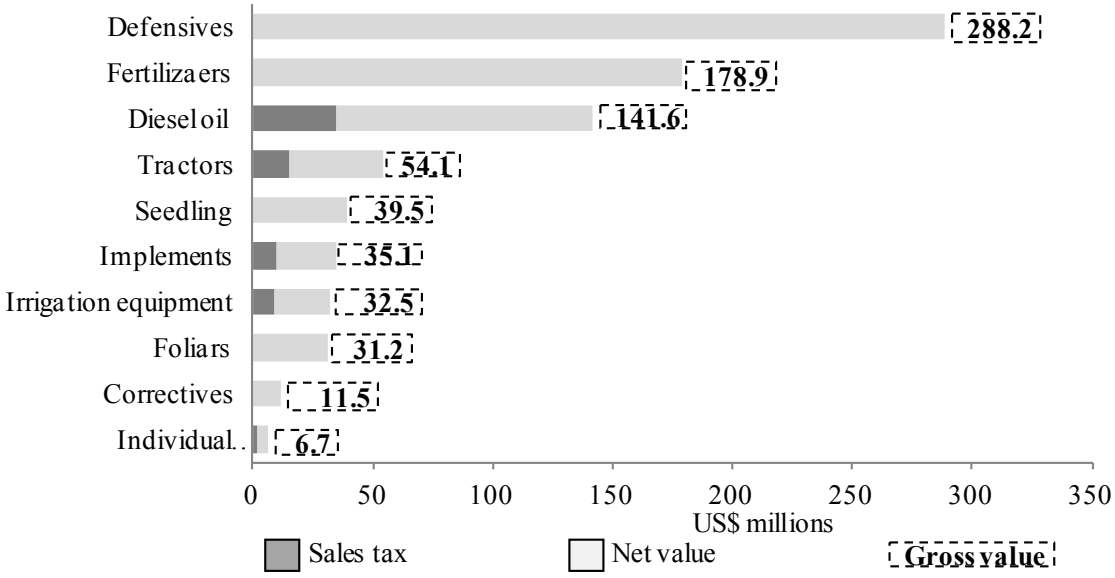


Source: Neves, Trombin (2010).

8. Before farms

The agricultural input industry sold to the citrus sector US$ 819 million in the agricultural year 2008/09. The sales are detailed in Graph 4. It is important to note that 84% of the total value comes from sales with acaricides, fungicides and pesticides due to the elevated standards needed for pest and disease control.

Graph 4: Sales from the input industry to the citrus sector in 2008/09



Source: Neves and Trombin from data elaborated by Markestrat (2010)

9. Farms

As shown in Graph 5, the citrus fruit (orange, lemon/lime and tangerine) revenue in 2008/09 totaled US$ 2 billion. From the total production, 67% was destined to the processing industry, 32% to the internal fresh fruit market and 1% was exported as fresh fruit. From the total of oranges processed by the industry, 35% were produced by the industry, 34% were bought from orange producers with pre-established long term contracts and 31% were bought from orange producers on the spot market.

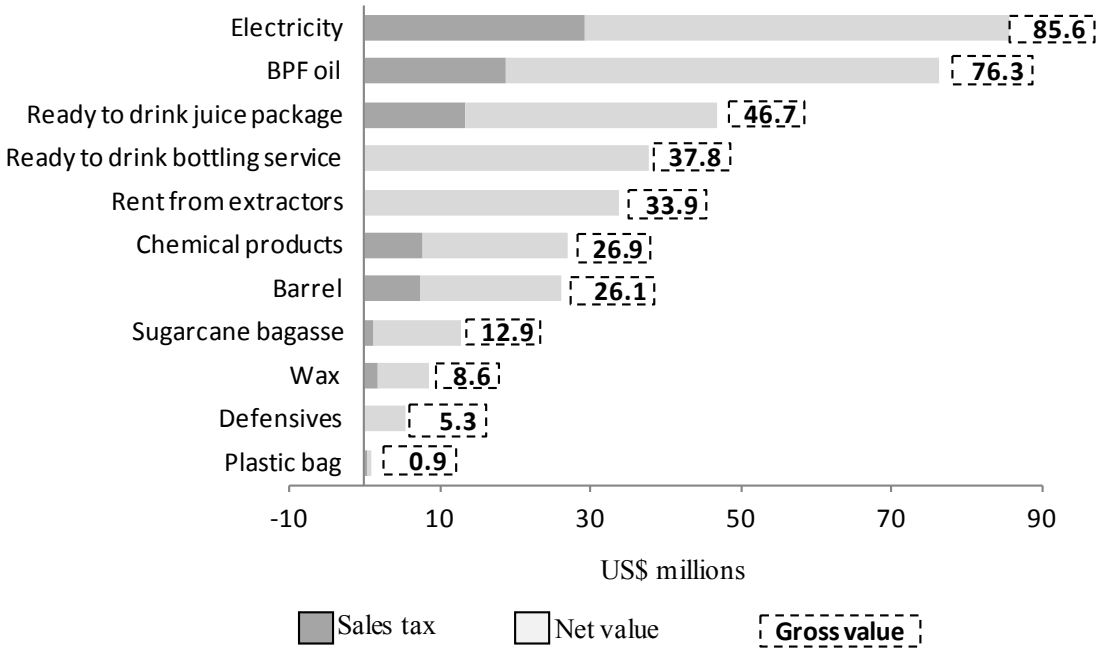
Graph 5: Citrus fruit (orange, lemon/lime and tangerine) revenue in 2008/09

Source: Neves and Trombin from data elaborated by Markestrat (2010)

10. After farms

The inputs acquired by packing houses and juice factories for citrus processing totaled US$ 360.9 million, as detailed in Graph 6. Electricity represented 24% of the total value and BPF oil/bagasse 25%.

Graph 6: Industrial inputs revenue with the citrus productive chain in 2008/09.



Source: Neves and Trombin from data elaborated by Markestrat (2010)

In 2008/09 packing house revenue with fresh fruit was of US$ 1.8 billion, 96% of which was obtained in the internal market. Fresh fruit wholesales revenue was of US$ 1.7 billion and the retailers obtained US$ 3.8 billion, of which 58% came from orange sales, 17% from lemon/lime and 25% from tangerine.

Juice and sub product sales totaled US$ 2.2 billion, of which 95% was obtained in the external market and 5% in the internal market. From the revenue gained from exports, US$ 2.07 billion, 86%, came from juice. Bottling companies, wholesalers and retailers presented the following revenue with orange juice or nectar, respectively, US$ 255.7 million, US$ 33.9 million and US$ 459.1 million.

11. Facilitating agents

The facilitating agents´ revenue with the citrus production chain in 2008/09 was of US$ 877.5 million.

Regarding transportation, on average, over six trucks per hour passed through a toll booth on their way to Santos´ Port. This made it possible for highway concessionaires to gain revenues of US$ 18.5 million, corresponding to 5% of all freight expenses paid by the citrus sector, which totaled US$ 396 million. Diesel represented 9% of this total. Freight can be divided into primary, transports made from farms to packing houses or processing industry, which showed total revenue of US$ 171.4 million; and secondary, which refer to transports from packing houses to wholesalers or retailers, with total revenue of US$ 137 million, or to the port, with total revenue of US$ 2.7 million. Secondary freight can also refer to transportation between processing industry and port, with total revenue of US$ 85 million.

Regarding port costs, it is estimated that in 2008 Santos´ Port earned US$ 71 million relative to clearance, elevation and supervision of orange juice boarding. It is important to state that 97% of Brazil´s orange juice exports were through the Santos Port.

Regarding payroll, the agricultural year 2008/09 ended with 132,776 employees in the citrus sector, of which 121,332 were registered to fruit production activities and 11,444 to the juice industry. During this period, over 69 thousand workers were hired, contributing to the US$ 352.7 million spent on salaries and benefits.

12. Aggregated taxes

Total tax expenses were calculated by adding the taxes generated in each segment of the production chain, from the sales of agricultural and industrial inputs to the sales of final goods. From this total, taxes generated in the beginning of the productive chain (agricultural and industrial inputs) were subtracted to eliminate double counting and to consider the aggregated taxes in the productive chain. It was presumed that companies opted for the actual profits tax contribution system.

The results of this estimate indicates that taxes charged to the citrus productive chain totaled US$ 339.4 million, of which US$ 150.67 were generated by agricultural and industrial inputs sales. This means that aggregated taxes were estimated at US$ 188.74 million.

13. Conclusions

The results presented in this paper show an overview of the current situation of the Brazilian citriculture with discussions about the most relevant subjects that impact the sector. It also highlight´s the citrus agro industry´s strengths, it´s social and economic importance and points to some of the major challenges for the future. Among these latter, some must be mentioned:

- Strengthen the representative associations in order to enrich debates that promote proximity between the segments of the productive chain;
- Disseminate the best management practices in order to increase productivity and competitiveness among the citrus production chain;
- Stimulate partnerships with Universities related to Brazil´s agribusiness with the objective to create excellent data banks with technical and economical information;
- Publish frequently relevant information in order to promote more transparency within the sector;
- Promote campaigns to stimulate growth in orange and orange juice consumption in the domestic and international market;
- Seek reduction in importing taxes among Brazil´s orange juice consumers;

The changes that occur throughout the Brazilian citrus production chain have the same origin: the understanding that the final consumer doesn´t want to and will no longer pay for the inefficiencies of the supply chain. These new demands have brought new challenges that will not be solved under the assumption of an isolated and static system. It will take the coordination of the production chain as whole and it´s never-ceasing search for efficiency and low costs to stimulate the performance of all the links that compose the chain.

14. References

Batalha, M. O., (org) 2001. Gestão agroindustrial. 2ª ed. São Paulo: Atlas, 2001. v.1, p.23-63.

Godoy, A.S., 1995. Pesquisa Qualitativa, Tipos fundamentais. Revista Administração de Empresas, São Paulo: v.35, n.3, p.20

Malhotra, N. K., 2001. Pesquisa de Marketing: uma orientação aplicada. 3.ed. São Paulo: Bookman.

Mattar, F. N., 1993. Pesquisa de Marketing – edição compacta. Atlas.
Neves, M. F.; Rossi, R. M.; Castro, L.T.; Lopes.F.F. Marino, M.; K., 2004. A Framework for Mapping and Quantifying Value Chains Towards Collective Actions. European Marketing Academy, Murcia. International Food Agribusiness Management Association, Montroeux.
Neves, M. F.; *et al*., 2005. Estratégias para a laranja no Brasil. São Paulo: Atlas, 2005. 225p.
Neves, M. F.; *et al*., 2007. Planejamento e gestão estratégica do sistema agroindustrial do leite no estado de São Paulo. São Paulo: SEBRAE, 2007. 362p.
Neves, M. F.; Trombin, V.G., 2010. O retrato da citricultura brasileira. Ribeirão Preto: Markestrat, 2010. 137p.
Zylbersztajn, D. Neves, M. F. (org.), 2000. Economia & Gestão de Negócios Agroalimentares. São Paulo: Pioneira, 2000. 428 p.

PROPOSITION OF A METHOD TO ELABORATE PLANS FOR IMPROVING COMPETITIVENESS IN LOCAL PRODUCTIVE ARRANGEMENTS (CLUSTERS)

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Abstract
From the Perroux region to the modern technologic parks of the Silicon Valley, the local productive arrangements, gradually became an important form of proposed development by local agents. However, the difficulty of strategic cooperation between the clusters managers and the competitiveness of the after globalization markets now require methods that are more efficient in identifying the operation of these clusters market structures, as well as understanding the critical factors that could impact the success of strategic plans. The general objective of this study is to propose a method to elaborate plans for improving competitiveness in clusters. The specific objectives are (i) to understand the current market structures of the clusters, (ii) to review the Marketing and Strategy literatures, (iii) to identify Critical Success Factors in clusters in according to the productive activity and (iv) to propose a method that can define strategic objectives and actions plans. The relation between Objectives and Methodological Procedures are: Understand the current market structures of the clusters; Literature Review: Strategy and Competitiveness and Market Structures of Clusters; Interview with actors the cluster; Identify convergence points; Propose a method that can define strategic objectives and actions plans. The proposed method can be utilized in different clusters, considering the local conditions and market structures that frame the competitive environment of the arrangements. This study intends to present an effective method for elaboration of Improving competitiveness plans in clusters, proposing an analysis model that allows the local managers to consider the productive specificities, to identify critical success factors and to propose more efficient actions.

Key words: Clusters, Competitiveness, Plan Strategic

PROPOSITION OF A METHOD TO ELABORATE PLANS FOR IMPROVING COMPETITIVENESS IN LOCAL PRODUCTIVE ARRANGEMENTS (CLUSTERS)

1. Introduction

Production of clusters of Perroux to modern technology parks of Silicon Valley, the Local Productive Arrangements (APLs) gradually became an important way to propose regional development through the organization of local agents.

Historically, this process of organization has arisen from the integration of markets, carried out mainly by globalization. From this perception and the competition scenario in which Kotler (1999) puts the abundance of products, high level of consumer demand and high expectation of quality offered, and Albagli Lastres (1999) say that the best way to be successful in this new business environment is the very articulation of the agents, proposing further strengthening the relationship between companies, such as occurs in clusters. According to Erber (2008) from the time that companies are structured in clusters, they are able to gain efficiencies that would be impossible to achieve if they continue to plan in isolation. Lins (2000) argues that clustering enables, among other things, the direct increase competitiveness through collective action, major gains in innovation, learning, concentration of suppliers, specializing in labor, reporting higher earnings, increased bargaining power in negotiating with suppliers, joint investment in research and closer alignment of business with government agencies.

However, despite the advantages highlighted the difficulty of maintaining strategic synergy between the managers of these clusters and competitiveness in this globalized markets after, began to demand methods that are more efficient in identifying the strategic functioning of the structures that operate in these clusters and how to understand critical factors that can impact the success of strategic plans of action.
But to propose a method allowing the construction plans in Improving Competitiveness clusters whose dominant feature is the specificity of production and organizational differences between the agents integrated?

To better conduct of the studies, the objectives were divided into general and specific purpose. As a general objective, it is proposed to establish a process for drawing up plans for Improving Competitiveness in Local Productive Arrangements, in order to sustain the competitiveness of different production arrangements in the medium and long term.
To achieve this goal, we conducted the following objectives:

- Understand the current market structures in the clusters;
- Review the literature for Strategy and Competitiveness;
- Identify Critical Success Factors in APL as productive activity;
- Propose a method to define strategic objectives and action plans.

2. Methodology

From the assertion Hair Junior et al. (2006, p. 33) that "the boundaries of management research are virtually limitless," and that good research should generate reliable data and are conducted professionally can be used safely in management decision making (COOPER; SCHINDLER , 2003, p. 33), it is necessary to define the concept of research and

ways in which it operates its development through a proposed initial problem.
In this sense, the study aimed to construct a new understanding of the phenomenon, which characterizes it as an exploratory research. From this analysis, we attempted to increase knowledge of the research method called grounded theory. After greater theoretical understanding, we propose a method that meets the solution of problems, thus enabling an applied research, interdisciplinary.

For the development of this exploratory study was consistent in order to achieve the proposed goals were made the following phases:

i. *Theoretical research on clusters and strategic management in production arrangements:* how interdisciplinary study, we sought here to understand how the clusters organize their competitive strategies. From the theoretical review, it was possible to relate the existing studies for the proposition of a primary method;

ii. *Proposition of a method and application in 9 clusters:* to test the consistency of the proposed method, field applications were carried out in 9 clusters located in the state of Bahia, Brazil. At this stage, there were several interviews with local staff who work in various stages of production. APLs were: Fish Culture, Derived from Sugar Cane, Tourism, Caprinovinocultura, Automotive, Plastics derivatives, Sisal, Fruit and Ornamental Stones. This stage was marked by field work. According to Bryman (2005), this step can be classified as a qualitative research based on interviews with respondents chosen because they have specialized knowledge;

iii. *Validation of the method:* from the knowledge obtained by a theoretical review and the proposed method of starting and managing your templates, together with the results of the validation interviews, the final method is proposed in accordance to the overall goal of this research.

It is important to emphasize that this step has been discussed the approach of grouded theory related to the method of in-depth interviews and case studies as facilitators for the creation of management methods consistent with the proposal discussed in this study. Grounded theory in essence is a qualitative research method for exploratory research that has emerged in the U.S. in the 60s, with the proponents Barney Glaser and Anselm Strauss. Later that concept has been supplemented by Strauss and Corbin (1990) and Glaser (1992). The grounded theory is advocated as an inductive method that aims to develop theories as field work progresses and to this end, the researcher should not go into the field with a theoretical model finished (GLASER, STRAUSS, 1967). Now that the theoretical model is finalized, it is necessary to collect data from literature or from empirical tests performed.
Thus, for this method, it becomes relevant to the selective collection of data, categorizing data and theoretical saturation discoursed with approach to the subject by the researcher. Frederikson and Ashill (2003) seek to integrate the grounded theory method with the case study, conducting extensive interviews with marketing managers to obtain data, allowing a cyclical process of literature review and conduct of multiple cases, the proposition of a method for marketing planning.

The case method can help the development of work under the support of grounded theory, since they can be carried out case studies and / or interviews with experts in the field discoursed. Conceptually, "the study of cases is one way of doing empirical social research to investigate whether a current phenomenon within its real-life context, where the boundaries between phenomenon and context are not clearly defined and the situation in which multiple sources of evidence are used "(Yin, 1989).

3. Clusters and Plan Strategic

Clusters and local productive arrangements (APLs) are two concepts as synonyms can be observed by comparing the definition of clusters proposed by Porter (1998) and the definition of clusters proposed by RedeSist (2003).

> "Clusters are groups of interconnected companies and associated institutions in a specific branch, approximate geographically linked by similarities and complementarities ... The cluster can have different forms depending on their depth and sophistication, but most companies includes final products or services, suppliers of specialized inputs, components, machinery and services, financial institutions, and companies from related industries."

> "Clusters are territorial agglomerations of economic agents, political, and social - with a focus on a specific set of economic activities - which have links even if inchoate, often involve the participation and interaction of companies - which can range from producing final goods and services by supplying inputs and equipment, providing consultancy and services, suppliers, customers and others"

The formation of clusters and clusters and their impacts are being studied by several researchers from the savings and strategies, and the main advantages of clustering in clusters and clusters are presented below (Lins, 2000):

• Companies may go to the practice of collective actions that can reduce costs or increase efficiency, resulting in increased competitiveness;

• Improve the relationship and exchange of information, obtaining gains in innovation, and increased level of learning;

• The formation of clusters and clusters attracts a large number of suppliers to the region;

• The region begins to specialize in the performance sector of the cluster, causing it to have a specific qualification of the local workforce to meet the needs of the Clusters;

• Companies can organize themselves in order to coordinate the purchasing process and increase bargaining power with suppliers;

• May prepare investment and research together to develop new products and business;
• Can a better and closer coordination and representation before public bodies.

Generally you can see that firms that are grouped together forming clusters and clusters can reach efficiency levels, which could not remain if acting alone. (Erber, 2008).

It is also important to mention that according to Erber (2008) the formation of clusters usually happens spontaneously, or some companies decide to settle in the region for their own reasons, and after that starts to create the feeling of community. But despite the initial stages of the cluster are completely spontaneous and individual, with the passage of time is essential that there is a director of this group, so that the APL can optimize their development, and director of this major development is the process of strategic planning and clusters,which this study is called the Plan for Improvement of competitiveness.

The concept of an organization's strategy has been defined by many authors in the area of administration perhaps the most simple and easy to understand is that the strategy is the means to achieve the proposed objectives. But authors such as Mintzberg, Ahlstrand and Lampel (2000), Hax and Majluf (1991), Porter (1996) and Drucker (1999) and others further developed the study and definition of strategy. According to these authors, the strategy can be seen in the following ways:

- Standard of performance of the organization
- Plan developed to establish how things will be done
- Maneuver to achieve some competitor
- Position the company wants to get into the environment
- Individual expectations as the company intends to develop.
- Method of setting goals and targets
- Shape of achieving various levels of engagement in business
- Method of determining the returns to investors
- Form to enable the organization to meet the pressures of external and internal environment.

The Strategic Planning then, is nothing more than the operationalization of the strategy, it is an administrative technique that creates awareness of the threats, opportunities, strengths and weaknesses of the organization to be able to plan actions and meet the goals set (ALMEIDA, 2003). The plan to improve competitiveness (PIC) is nothing more than the name used for the strategic plan developed to clusters.

4. Method of Proposition PMC

From the theoretical review, the authors proposed a model composed of 7 steps, as described in Table 1

Step 1: Characterization and mapping of Cluster
Topic 1.1: Characterization of Cluster
Topic 1.2: Mapping of Cluster
Topic 1.3: Status and trends of the market
Step 2: Strategic Review of Cluster
Topic 2.1: Description and analysis of strategic groups
Topic 2.2: Analysis of strengths and weaknesses, threats and opportunities
Topic 2.3: Strategic diagnosis of Cluster
Step 3: Definition of business strategies
Topic 3.1: Identification of critical success factors
Topic 3.2: Vision for the Cluster
Topic 3.3: Strategic Positioning
Topic 3.4: Growth Strategy
Step 4: Establishment of the strategic goals of the PMC
Topic 4.1: Dimensions and goals of the PMC
Topic 4.2: Medium-term Strategic Objectives
Topic 4.3: Long-term Strategic Objectives
Step 5: We propose structuring the project
Topic 5.1: Detailing of structural design
Step 6: Breakdown of executive actions
Topic 6.1: Preparation of action plan
Step 7: Schedule and budget for the project structuring
Topic 7.1 Project Schedule structuring

Topic 7.2 Project budget structuring

Figure 1 – Method of Proposition PMC
Source: Authors

Step 1: Characterization and mapping of Cluster

The first step of the method to characterize and map the cluster being analyzed. In this phase, activities will take place as described below:

1.1 Characterization of Cluster: topic is intended for the characterization of APL in terms of: historical aspects (origin, relevant facts, incentives and regulatory framework), geography (territory and crowding); aspects of governance (leadership, decision-making structure, membership and cooperation); institutional aspects (institutions acting, action methods, infrastructure, local institutional, infrastructure, scientific-technological, infrastructure, financing and infrastructure engineering), technology aspects (product, process and management);

1.2 Mapping Cluster: topic is intended for the mapping of APL in terms of: design of productive network (available to agents as their role in the productive network); identifying agents (description of the production chain, role of support organizations and facilitating agents), identification of subgroups and inter-firm relationship (identification of subgroups, protagonist local entrepreneurship and social capital);

1.3 Market Situation and Trends: This topic is intended for analysis of the situation and market trends in terms of: the international market (trends, its good and bad points) national market (trends, its good and bad points), the regional market (trends, its good and bad points)

Step 2: Strategic Review of Cluster

The second step of the method aims to analyze strategically the APL. In this phase, activities will take place as described below:

2.1 Description and Analysis, Strategic Groups: topic is intended for the identification and analysis of key strategic groups that comprise the cluster. Strategic group is a set of firms in an industry following a similar strategy in relation to attributes such as expertise, branding, product quality, technologies used, among others. This topic will be defined variables for strategic segmentation of the companies participating in the APL, classifying the major groups exist;

2.2 Analysis of Strengths, Weaknesses, Threats and Opportunities: This topic is intended to carry out the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) of Cluster in terms of: strengths and weaknesses (historical, geographic, governance, institutional and technological) opportunities and threats (suppliers, competitors, distributors, customers, supply chains related, political-legal, economic environment, natural environment, socio-cultural and technological environment);

2.3 Cluster Strategic Diagnosis: This topic is intended to consolidate the strategic diagnosis of APL in terms of: positive aspects (strengths and opportunities); bad points (weaknesses and threats).

Step 3: Define Business Strategies

The third step of the method aims to define business strategies for APL. In this phase, activities will take place as described below:

3.1 Identification of Critical Success Factors: This topic is intended to identify the critical success factors in terms of the APL: drivers of demand (needs and wants of customers), cost drivers (efficiency); drivers of differentiation (effectiveness);

3.2 Vision for the Cluster: topic is intended for drawing up the vision of the future of APL. The vision statement refers to the bases of development of APL, aiming to reach a desired future in terms of: strategic groups; markets served, distinctive competencies;

3.3 Strategic Positioning: This topic is intended to define the strategic positioning of the APL. This analysis uses the model proposed by Porter (1980) indicates that three generic options for strategic positioning: overall cost leadership, differentiation and focus;

3.4 Growth Strategy: This topic is intended to define the growth strategy of APL. This analysis

uses the model proposed by Ansoff (1965) indicates that four strategic options for growth: market penetration, product development, market development and diversification.

Step 4: Setting Strategic Objectives

The fourth stage of the method aims to establish strategic objectives for APL. In this phase, activities will take place as described below:

4.1 Dimensions and Objectives for Improving Competitiveness Plan (CMP): This topic is intended to distinguish the dimensions and objectives of the PMC for APL. The dimensions represent the definition of project scope. Each dimension consists of objectives (medium and long-term) to justify the relevance of project structuring;

4.2 Strategic Goals Medium-term: this topic is intended to describe the strategic goals of medium-term (time horizon of three years).

4.3 Strategic Objectives Long-term: this topic is intended to describe the strategic objectives of long-term (time horizon of eight years).

Step 5: Proposition of Structuring Project

The fifth stage of the method is to provide the detail (s) of project (s) structuring (s) for APL. In this phase, activities will take place as described below:

5.1 Detail (s) Project (s) Structuring (s): This topic is for the detail (s) project (s) structuring (s) of APL in terms of: strategic objectives; tactics to achieve each strategic objective, goal, analysis variables; formula or metric for benchmarking, source for analysis of the variables, frequency of performance measurement

Step 6: Details of executive actions

The sixth stage of the method is to provide the detail (s) of executive(s) actions (s) for APL.

6.1: Preparation of action plan: This topic is intended for the details of each executive action that makes up the action plan for implementation (s) of project (s) structuring (s). In this topic, for each share, will be presented: the action name, description of action, expected outcomes, stakeholders and responsibilities, budget and other resources needed, type of action (training and business consultancy, technology industrial base and technological and organizational innovation; environment and social development, logistics, marketing, market research and exports, management, administration and governance in APL), status of the action; execution schedule

Step 7: Schedule and budget for the project structuring

The seventh stage of the method is to provide the structuring project timeline. This step is aimed at presenting the overview of the timeline showing what will be the implementation period of each sub-action

5. Results

The method of preparation of plans to improve competitiveness (PMC) proposed in the previous step was applied in 7 Local Productive Arrangements (APL) of the state of Bahia.

- APL for Sugar Cane Derivatives of southern and south central region of Bahia
- APL automotive suppliers in the metropolitan area of Salvador in Bahia
- Fruits of APL in the region of Juazeiro in Bahia
- APL region of Aquaculture Paulo Afonso, Glory and Straws in the state of Bahia
- Sisal APL in the micro northeastern state of Bahia, a place called sisal area
- APL plastic processing in the metropolitan area of Salvador in Bahia
- APL Tourism in the coastal regions of cocoa formed by the cities of Itacaré Uruçuca, Ilheus, Itabuna, Una, Santa Lucia and Canavieiras in the state of Bahia.

The arrangements used as a case study in this study are completely different situations and, by observing the clusters of sisal and fish for example, small producers are found primarily in the state, with low investment capacity when compared with the APL vendors the automotive industry and plastic processing, for example. Despite these differences between each of the arrangements, the method proved effective in all cases, it is possible to build sound analysis that led to structuring projects very well regarded by staff of the APL. Table 1 and 2 shows the main outputs of the method for each of the nine arrangements studied by analysis of the table you can compare and understand the main differences between the plans proposed to improve the competitiveness clusters.

APL	Location	Strategic Groups	Future Vision
Sugar Cane Derivatives	South central region of Bahia Mesoregion Southern Bahia	Producer enterprise with high technology, professional producer with medium technological level, informal producer with low technological level	"Being a region renowned for producing derived from cane sugar high quality, from production to marketing, besides attending to their customers, offering them the best products derived from sugar cane."
Suppliers of the Automotive Industry	Metropolitan region of Salvador	Small local supplier, National Middle supplier, a global leading provider	"The APL Suppliers of Automotive Industry of Bahia will be a benchmark in quality of products offered to the automotive industry and supply to other industries, is responsible for the industrial development of the State of Bahia and the Northeast region of Brazil."
Fruits	Petrolina / Juazeiro	Producer with high technological level operating in the international market with middle-tech producer with operations in the domestic market, producer of low technology operating in the local market.	"Being a competitive region in the production, processing and marketing of grocery irrigated by 2015 from the Local Productive Arrangement structure, contributing to environmental development."
Aquaculture	Paulo Afonso Glória Canudos	Micro producer with capacity utilization between 10% and 40% Micro producer with capacity utilization between 40% and 70% small farmers with the capacity utilization between 10% and 40%, Small producer with capacity utilization production between 40% and 70% Middle producer with capacity utilization between 30% and 70% Middle producer with capacity utilization of around 10%	"Being the largest producer of aquaculture in Latin America, a reference in quality and technology used in the production of fish."

Sisal	Territory sisal - the micro-northeast of the state.	Low technological level with a reduced scope of products Medium-technology products with a medium scope Low technological level of products with a high scope.	"The Sisal APL is a national and international production and supply of high quality products, with economic, social and environmental sustainability, strengthening the productive chain of sisal, with improved quality of life of sisal."
Plastic Processing	Metropolitan region of Salvador Feira de Santana	Small local customers thermosets; Small recycled local customers, small customers local compounds and additives; Customers average finished and semi finished national, average customer service of local, medium and large customers of molds and equipment locations; Medium and large national customers thermoplastic resin.	"The APL Plastics Transformation of Bahia will be a benchmark for regional integration of their suppliers with producers of processed plastics, exploiting the flexibility in the organization with the business practice of outsourcing (outsourcing), ensuring the quality of supply standards and certifications, always innovating in eco-efficiency and design of final products to fully exploit the potential of the market segments in North and Northeast Brazil. ".
Tourism	Itacaré Uruçuca Ilhéus Itabuna Una Santa Lucia Canavieiras	Low skill and low associations, associations and high specialization Low, Medium and high specialization associations, high specialization and low level of association, highly specialized and very small associations.	"Being a cluster of profitable and competitive tourist agents, who act cooperatively, following the principles of sustainable tourism can serve different segments of tourists always with excellence in quality of products and services, set up a tourist destination widely recognized for integrating diverse routes, located very close together and easily accessible for tourists."

Table 1: Main Results
Source: Authors

APL	**Strategic dimensions**	**Objectives**	**Structuring Project Goals**
Derived from Sugar Cane	technology organization market	Bank of yeast selection, analysis laboratories, creation and management of the center; Institutional Plan, Distribution Channel, Communication, Marketing Information System	Creation and management of the center Distribution channels.
Suppliers of the Automotive Industry	Organization; Market Production;	Access to markets, promoting the expansion of field Vertical Organization; supplier development program; certification center	Market Access Supplier development program
Fruits	organization development	Vertical Organization; analysis laboratory; market information system, training management; Development varieties / cultures; Customs office	vertical organization Laboratory analysis.

Aquaculture	Organization; Market Production;	Vertical Organization; Restructuring of the production model; breeding center, Centre of collective procurement of inputs, processing center Xingó; Attracting new UBPs, communication and marketing, information systems market, Unity Marketing.	Vertical organization Breeding Center
Sisal	Organization; Market Production;	Integration of development initiatives, promotion of the products sisal; Development of distribution channels; Center for new products, training and support; Standardization classification and certification, innovation in products and processes, modernization of the industrial	Center for new products Promotion of sisal products.
Plastic Processing	Organization; Market Production; Training	Infrastructure of common use; Vertical Organization; Central Business, Promotion internationalization Service Center professional training	Infrastructure of common use Service Center Professional Training Center
Tourism	Organization Infrastructure Market Capacity	Structuring of the agency; Promotion of network connectivity; Portal of the city; improvement program of the tourism infrastructure; program to promote Coast cocoa; Training professionals to work in tourism, community outreach program	Structuring the agency City Portal Program to promote Coast cocoa Training professionals to work in tourism.

Table 2: Main Results
Source: Authors

6. Conclusion

The method described in 7 clusters for the development of Plans for Improvement of Competitiveness (PMC) provided, the project managers, a logical structure for organizing the primary and secondary data, and facilitate strategic decision making by local managers, with the definition of structuring projects more relevant to the development of each cluster. As shown, the arrangement used for this study are completely different situations and, by observing the clusters of sisal and fish for example, small producers are found primarily in the state, with low investment capacity when compared with the APL of industry suppliers automotive and plastic processing, for example.

Despite these differences between each of the arrangements, the method proved effective in all cases, it is possible to build sound analysis that led to structuring projects very well regarded by staff of the APL.

7. References

ALMEIDA, M. I. R. **Manual de Planejamento Estratégico: desenvolvimento de um Plano Estratégico com a utilização de Planilhas Excel**. 2. ed. São Paulo: Atlas, 2003.

CASSIOLATO, J. E; LASTRES, H. M. M., **Arranjos e Sistemas Produtivos Locais na Indústria Brasileira.** Revista de Economia Contemporânea, Rio de Janeiro, v. 5, n. Especial, p. 103-136, 2001.

ERBER, F. S. **Eficiência Coletiva em Arranjos Produtivos Locais Industriais: Comentando o Conceito.** Nova Economia (UFMG), 2008.
FESER, E. J.; BERGMAN, E. M. **National Industry Cluster Templates: A Framework for Applied Regional Cluster Analysis**, Regional Studies, 34: 1, p. 1 — 19, 2000.
HAX, A. C.; MAJLUF, N. S. **The strategy concept and process: a pragmatic aproach**. Englewood Cliffs: Prentice Hall, Inc, 1991
LASTRES, M. M.: ALBAGLI, S. **Informação e Globalização na era do Conhecimento**, Rio de Janeiro: Campus, 1999, p. 163.
LINS, H. N. **Clusters industriais, competitividade e desenvolvimento regional: da experiências à Necessidade de Promoção**. Estudos econômicos, São Paulo, 2000. P. 233-265.
MINTZBERG, H.; AHLSTRAND, B.; LAMPEL, J**. Safári de Estratégia: um roteiro pela selva do planejamento estratégico.** Porto Alegre: Bookman, 2000. 299p.
NEVES, M. F. **Strategic Marketing Plans and Collaborative Networks**. Marketing Intelligence & Planning, v. 25, p. 175-192, 2007.
_____ Planejamento **e Gestão Estratégica de Cadeias Produtivas Visando à Competitividade: Aplicações nos Agronegócios**. In: XXX Encontro da Associação Nacional de Pós-Graduação e Pesquisa em Administração (EnANPAD), 2006, Salvador. XXX Encontro da Associação Nacional de Pós-Graduação e Pesquisa em Administração (EnANPAD). Salvador, 2006. v. 30.
PASSADOR, C. S. (Org.) ; PASADOR, J. L. (Org.) . **Gestão Pública e desenvolvimento no século XXI.** 1. ed. São Paulo: Annablume, 2008. v. 1. 288 p.
PORTER, M. E. **Cluster and Competition – New Agendas for Companies, Governments, and Institutions**. In PORTER, M.E. On competition, Cambridge: Harvard Business School Press, 1998, p. 496
REDESIST, in LASTRES, H. M. M, CASSIOLATO, J. E. **sistemas de inovação e arranjos produtivos locais: novas estratégias para promover a geração, aquisição e difusão de conhecimentos.** Ver. Cont, Cienc. Admin. Fortaleza V. 9 n.2 p. 189-195, Dez. 2003

REDES AGROEMPRESARIALES Y TERRITORIO-RAET: UN CAMINO DE ANÁLISIS (AGRIBUSINESS NETWORKS AND TERRITORY: A PATH FOR ANALYSIS)

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Abstract
La agricultura colombiana actualmente cuenta con buenas perspectivas y posibilidades de mercado, tanto en términos de la demanda interna como de la demanda externa; sin embargo, también hay factores que lo convierten en un escenario complejo para su estudio, aspectos como la ubicación en el trópico, el conflicto entre marcos institucionales o la fragilidad de los modelos de organización empresarial obliga a análisis más cuidados y profundos. En su interés para que el sector y el país puedan avanzar e insertarse en las oportunidades globales; el Grupo de investigación interuniversitario sobre Redes Agroempresariales y Territorio –RAET, común a la Universidad de Bogotá Jorge Tadeo Lozano y a la Pontificia Universidad Javeriana-Bogotá, presenta un camino de análisis con el cual se ha buscado dar coherencia y organización a los temas y problemas de trabajo, en la perspectiva de hacer contribuciones en lo analítico y en lo normativo a cadenas y territorios agroindustriales de nuestro país. De manera complementaria se incluyen una síntesis de los temas abordados por el grupo. Con esta ponencia, se hace un llamado a otros grupos e investigadores independientes del mundo que se sientan atraídos por estos problemas y temas de trabajo para configurar una red ampliada de investigación en perspectiva de acción.

Key words: Redes agroempresariales, territorio, marco analítico, modelos de organización empresarial.

REDES AGROEMPRESARIALES Y TERRITORIO-RAET: UN CAMINO DE ANÁLISIS (AGRIBUSINESS NETWORKS AND TERRITORY: A PATH FOR ANALYSIS)

1. Planteamiento

La Universidad Jorge Tadeo Lozano en Colombia, es una institución privada de origen liberal, inspirado en los principios de la Expedición Botánica, particularmente de las ideas de Jorge Tadeo Lozano, impulsor intelectual de la independencia y de quien se ha tomado el planteamiento que guía el Proyecto Educativo Institucional de la Universidad:

> *"Sin que los hombres trabajen en paz, sin que las tierras se cultiven, la agricultura y la industria florezcan, no hay que esperar remedio alguno"*

Hoy, quizás como nunca antes, la agricultura colombiana tiene enormes posibilidades de mercado, tanto en términos de la demanda interna como de la demanda externa. En general las cifras muestran que la economía del país crece, el desempleo disminuye, la inflación está controlada, se respira un ambiente vigoroso, positivo y alentador. "VAMOS PALANTE" siguiendo una expresión del Territorio Caribe colombiano.

Sin embargo, también hay factores que se reconocen como de dificultad media y alta en el sentido de la dimensión de los retos para poderlos superar, de tal manera que el sector y el país puedan avanzar e insertarse haciendo más grande la torta de las oportunidades globales. Uno de estos problemas se refiere a la persistencia de un conflicto entre marcos institucionales cuyo costo en vidas, bienes y presupuesto es dolorosamente significativo, especialmente en el escenario de la sociedad rural (Bernal y Martínez Nogueira: 1999). Otro problema, de naturaleza diferente, está en el ámbito de la empresa, de la manera como se organizan los recursos y las transacciones y de cómo se participa en el mercado. El asunto está en que estos dos problemas tienen afectaciones reciprocas: mientras que la crisis institucional, en cabeza de la economía apropiativa[26], es generadora de una enorme incertidumbre para productores y mercado, la ausencia de empresas robustas, articuladas en cadenas globales de valor o en esquemas territoriales especializados, son fuente de frustración social recurrente, de sin-salidas y desempleo, especialmente entre la población de jóvenes con todo lo que ello está implicando. Finalmente ha de agregarse el conflicto minero – ambiental- agrícola que en este momento se encuentra en la cresta de la ola en el país.

Estos acontecimientos despiertan interés desde diferentes esquinas de análisis, dando lugar a muchas preguntas más que a algunas respuestas, porque lo que está en cuestión es la comprensión de esta realidad para actuar en ella. El camino de análisis precede el camino de la acción. En esta perspectiva, la ponencia presenta el marco de análisis estructurado por el grupo de investigación sobre Redes Agroempresariales y Territorio -RAET[27] o Grupo

[26] Por economía apropiativa se entiende a la generación de riqueza a partir de la riqueza creada o sostenida por otros. El principio general que subyace en esta economía es que los recursos económicos pueden ser usados no solamente para producir, sino también para propósitos apropiativos como la guerra y el robo. Las condiciones institucionales en crisis son el ambiente para que dicha actividad prospere sobre todo en períodos de conflicto y pos-conflicto (Rugeles y Delgado, 2003).

[27] Redes Agroempresariales y Territorio: Grupo de investigación que sostiene la Maestría en Mercadeo Agroindustrial de la Universidad de Bogotá Jorge Tadeo Lozano,

RAET, con el cual se ha buscado dar una mínima coherencia y organización a los temas y problemas de trabajo con el fin de hacer contribuciones en lo analítico y en lo normativo a cadenas y territorios agroindustriales de nuestro país. De manera complementaria se incluye una síntesis de los temas principales abordados por el grupo.

La intención de esta presentación es compartir con nuestros colegas del mundo un marco analítico elegido y unos problemas abordados en el escenario de un país que registra un modelo atípico en el que el crecimiento ocurre en medio de circunstancias y de acontecimientos conflictivos. Los deseos consisten en encontrar interlocutores que tengan preocupaciones temáticas y problemáticas semejantes, con los cuales podamos compartir criterios, metodologías y experiencias prácticas y ampliar la masa crítica de apoyo.

2. El marco de análisis:

Guiados por el compromiso de aportar a la prosperidad del sector agroindustrial, de las empresas, incluyendo a los pequeños productores, y de los territorios agroindustriales del país, en el año 2004 se crea el Grupo de investigación interuniversitario sobre Redes Agroempresariales y Territorio –RAET común a la Universidad de Bogotá Jorge Tadeo Lozano y a la Pontificia Universidad Javeriana-Bogotá. Este grupo resulta de la necesidad de articular críticamente los diferentes trabajos que se venían realizando en el marco de la Maestría de Mercadeo Agropecuario de la Universidad de Bogotá Jorge Tadeo Lozano, de apoyar la transición de lo agropecuario a lo agroindustrial conforme al funcionamiento de la realidad del país, y finalmente, de estructurar de manera coherente un camino de análisis, de acción y normativo identificable en el corto y mediano plazo (Rugeles y Jolly, 2006).

RAET se reconoce como un modelo en construcción y la principal pregunta que se hizo en su momento fue sobre: cómo avanzar de los estudios sectoriales hacia los estudios que articulen lo sectorial con lo territorial como acontecimiento conjunto dentro de una lógica de competitividad para el mercado global[28]. En esta perspectiva de articulación, las empresas se convirtieron analíticamente en el pivote que sostiene las tensiones y movimientos de los dos ejes articulados. El espacio creado por lo sectorial productivo con lo territorial, o de acuerdo con Milton Santos (1997), de lo vertical con lo horizontal, dio origen a la hipótesis de que:

> …la competitividad agroindustrial del país para las condiciones que el mercado requiere, está en función de la capacidad que se tenga de de incentivar, diseñar y poner en marcha modelos agroempresariales en una perspectiva territorial…Las verticalidades que no cuentan con una fuerte horizontalidad de soporte registran una menor competitividad…Los territorios que no cuentan con verticalidades diferenciadas o que tienen muchas verticalidades registran indicadores de competitividad (territorial) menores. (Rugeles y Jolly: 2006, 307)

Estas hipótesis así formuladas ponen al descubierto "el papel público que desde su perspectiva privada pueden ejercer las actividades agroindustriales en el escenario local; papel que se revierte como una estrategia central para aumentar la eficiencia agroindustrial" (Rugeles y Jolly: 2006, 302). Esta forma de relacionar lo productivo con lo territorial es la que permite derivar que existe una afectación reciproca entre marcos institucionales y debilidad empresarial agroindustrial y, por consiguiente, que la reacción de las empresas agroindustriales a las tensiones del mercado es necesaria pero no resulta ser en ningún caso suficiente porque se

[28] En parte, el trasfondo problemático que ha dificultado hacer investigación alrededor de este planteamiento, se origina en el hecho de que en Colombia la perspectiva sectorial productiva tiene una supremacía sobre la visión territorial de la agroindustria. Este acento no debe sorprender y es comprensible porque la socio-economía y la economía política del país tienen una historia sectorial agropecuaria determinante, que ahora requiere ir más allá.

requiere la reacción de lo público, es decir de la ciudadanía activa, de la civilidad moderna, de la sociedad civil (Cepeda: 2002).

Aquí se hace la transición del camino de análisis al camino de acción y entran en juego las agendas territoriales como decisiones que dan salida a diferentes dilemas y al pesaje de tensiones territoriales. La verticalidad es el elemento perturbador, el portador de cambio al territorio; si se quita la verticalidad desaparecen los factores de cambio. En la medida en que cada territorio esté cruzado por varias verticalidades (cacao, frutas, palma, ganadería) surge el dilema de qué verticalidad elegir o de qué arreglos horizontales establecer.

Así las cosas, lo sectorial, la organización empresarial y los territorios alcanzan a ser una misma cosa, a tener lugares e intereses comunes y de beneficio mutuo. Por consiguiente, deben ir juntos y responder con una capacidad compartida y solidaria a las tensiones generadas por la globalización. Las políticas desarticuladas configuran agendas desarticuladas permitiendo que cada uno busque instalarse independientemente en los vericuetos y lugares de la globalización, obviamente sin buenos resultados como país.

En esta perspectiva, la pregunta estaría menos en cómo compensar a los arroceros, palmeros, azucareros sino en cómo consolidar la competitividad de los territorios arroceros, palmeros, azucareros en los cuales, de hecho, se han venido acumulando capacidades y posibilidades de ser flexibles ante unas condiciones de mercado inesperadas y cambiantes. En aquellos territorios donde ni sectorialidad, ni empresas han tenido la oportunidad la pregunta se vuelve cómo crear capacidades competitivas. Es entonces posible afirmar que la competitividad territorial beneficia a todos los actores incluso a los consumidores, pero siempre y cuando se creen redes agroempresariales en cada territorio.

3. Contexto actual colombiano

El sector agropecuario y agroindustrial en Colombia representan un importante renglón de la economía; en el año 2007 la agricultura representó el 8% del total del PIB y la agroindustria el 4.5% respectivamente, ubicándolos en el primer lugar de los sectores económicos si se consideran en conjunto (DANE 2007). En la actualidad el sector agro ha sido definido en el Plan Nacional de Desarrollo (2010-2014) como una de las 5 "Locomotoras de la prosperidad"; aunque su crecimiento fue negativo durante los tres últimos años, en el primer trimestre del presente año se registró un crecimiento positivo insospechado de 7.8%, mayor al crecimiento del PIB total en el mismo período (DANE 2011), esto a pesar de tener que sortear todas las adversidades que implicó la fuerte ola invernal.

El interés por el estudio del sector agroindustrial en los diversos territorios colombianos y en los sectores que lo componen, encuentra suficiente justificación teniendo en cuenta que los sistemas agroindustriales cumplen una función vital desde varias perspectivas: seguridad y calidad alimentarias, interdependencia con otros sectores económicos, control de la inflación, producción de bioenergía, significado para la vida rural y urbana, estabilidad institucional y, custodia de los recursos naturales, entre otros. Es importante reconocer la incidencia que tiene la ventaja geopolítica del país, y finalmente, los procesos institucionales que están definiendo una nueva forma en que la nación debe funcionar, con particularidad en los territorios de vida mayoritariamente rural (Ley de tierras).

Sin embargo, la agroindustria, como objeto de estudio, es en sí misma uno de los sectores más complejos de la economía; de un lado, la condición de país tropical y de otro, los dilemas a resolver en cuanto al uso de recursos principalmente de suelo y agua frente al

amplio portafolio de oportunidades en el mercado de bienes de origen biológico como alimentos, biocombustibles y materias primas, indirectamente se agrega la minería y las zonas protegidas. Finalmente, la economía del narcotráfico que persiste en el país, constituye uno de los factores de mayor incidencia en las acciones violentas y en patrones complejos de negocios; la conducta oportunista amparada en vacios regulatorios y judiciales ha permitido una acción intensa de los buscadores de rentas especialmente en el escenario oficial. Estos dos últimos factores afectan la confianza y determinan condiciones de incertidumbre para la toma de decisiones.

4. Los temas abordados por el Grupo RAET

Los temas abordados por el Grupo RAET se presentan acá organizados conforme a los tres ejes de análisis: desde los territorios, desde lo sectorial y desde la empresa. Sin embargo, difícilmente constituyen compartimientos aislados porque siempre predomina la perspectiva de interrelaciones y de afectación reciproca explícitamente contenida en los planteamientos fundamentales de RAET.

4.1 Desde los territorios

La violencia en territorios y sectores agroindustriales:

Este tema realmente fue el origen para la formalización del grupo de investigación. Desde una perspectiva neoinstitucional y comparada se abordaron dos territorios de tradición agropecuaria afectados por acciones de violencia extrema: el departamento de Córdoba en la Región Caribe con la actividad ganadera y la región del Magdalena Medio con palma de aceite. Los resultados que están en un informe reservado de investigación y en varios artículos disponibles (Rugeles y Delgado, 2003) constituyeron un aporte a la teoría y particularmente permitieron probar el peso de la especificidad de los activos en la toma de decisiones de los empresarios cuando se enfrentan a la incertidumbre extrema y a las amenazas creíbles. La confrontación entre marcos institucionales diferentes se hizo explicita en estos dos escenarios tomando como motivo de operaciones la defensa de vidas y bienes de un lado, y de otro, aumentar la rentabilidad de la economía apropiativa. Hoy día el Estado apunta al imperio de la ley, judicializando a los actores principales de estos acontecimientos y diseñando herramientas estructurales, de compensación, militares y de inteligencia sin lograr del todo eliminar los factores de tensión: un negocio rentable y unas condiciones sociales de exclusión, diferenciadoras y desengranadas de las expectativas económicas.

Territorios con conflicto entre lo ambiental y el abastecimiento alimentario:

El espíritu de estos trabajos está marcado por la responsabilidad sociopolítica de la academia respecto a la calidad alimentaria de la población colombiana y a la sostenibilidad ambiental con centro en el recurso agua. El problema radica en que territorios de importancia estratégica ambiental como los páramos[29] y los bordes de lagunas producen de manera

[29] Los páramos, también conocidos sólo como "páramo", son ecosistemas de montaña andinos que pertenecen al Dominio Amazónico. Se ubican discontinuamente en el Neotrópico, desde

significativa alimentos que están presentes en todos los platos de la dieta nacional; ejemplos concretos son la cebolla y la papa, además de muchas otras hortalizas. Los acercamientos del grupo a este problema apenas comienzan con trabajos exploratorios que han dado señales claves de ausencia de regulación y de toma de decisiones concernientes con los resultados de hacer un balance entre las externalidades de estas actividades y la ocupación de los recursos de la población rural. En este escenario está entrando la minería como otro eje fuerte de conflicto. Aunque se ha abordado este tema desde la perspectiva territorial, se considera que es conveniente hacer entradas analíticas tomando a las cadenas como unidad de análisis porque permite profundizar en toda su trayectoria desde la pre-siembra hasta el comportamiento y afectación de los consumidores.

Territorios que modifican sus atributos por la acción del Estado:

En la perspectiva de aumentar la competitividad de la economía en el mercado global, en particular de la actividad agroindustrial, el gobierno colombiano ha trazado dos estrategias consecutivas: primero la "Seguridad Democrática" (2003- 2010) y segundo, la "Prosperidad Democrática" (2010- 2014). Ambas estrategias han cambiado y buscan transformar atributos de los territorios que de consolidarse representarán una ventaja competitiva de grandes dimensiones para la economía. Junto con la "confianza inversionista" se están haciendo inversiones en megaproyectos viales de impacto nacional y en megaproyectos y pequeños proyectos de riego en territorios de vocación y potencial agroindustrial. Tres ejemplos para citar son: La Ruta del Sol constituida por una carretera que une la capital del país con los puertos en el océano Atlántico, el distrito de riego del rio Ranchería en el departamento de la Guajira y distrito de riego del Triangulo del Tolima en el departamento del Tolima. En estos escenarios el Grupo RAET ha incursionado a través de contratos de consultoría con el gobierno y con el sector privado. Los énfasis de análisis han estado puestos, de una parte, en la evaluación de tierras para usos agrícola específicos de especies con mercados ciertos, y de otra, en los recursos de educación e investigación disponibles en los territorios de estudio, todo esto, en la perspectiva de trasladar el potencial productivo al ámbito de "Agendas Territoriales" para la organización hortofrutícola territorial exportable. Los vínculos entre el sistema de educación e investigación con las empresas se sustenta en las necesidades permanentes de innovación y de recursos humanos cada vez más capacitados y de alcanzar un engranaje entre estos dos ejes.

Territorios estratégicos sin aclarar su destino y oportunidad competitiva

Es más frecuente de lo imaginado encontrar territorios con dilemas o sin rumbos claros a cerca de su desarrollo a pesar de disponer de ventajas comparativas evidentes. Desde la misma perspectiva neoinstitucional (principalmente: Williamson: 1989 y1996; Jessop, 2002; Langlois & Roberts: 2000; Zylbersztajn: 2009, Kalmanovitz: 2010, North: 1990) y la de política pública y gobernanza (Muller, 2010, Jolly, 2010), se ha dado peso al papel de los actores, incluyendo al Estado, y de la proximidad en los análisis realizados. El caso del departamento de Nariño al sur del país es representativo, ya que se trata de un territorio fronterizo y costero con innumerables oportunidades sin aprovechar. En éste, se observa una tendencia a desconocer el estado del arte respectivo y a repetir estudios y acciones en el mismo punto. De alguna manera esta tendencia guarda relación también con los problemas

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altitudes de aproximadamente 2900 msnm hasta la línea de nieves perpetuas, aproximadamente 5000 msnm.

de oportunismo y corrupción de los organismos públicos y privados de los territorios centrales y periféricos en el país.

4.2 Desde lo sectorial

En el eje sectorial, y específicamente en el trabajo sobre cadenas, se ha tenido un sesgo tecnológico con una perspectiva de mercado global, buscando de alguna forma anticiparse a las tendencias del mercado a través de la aplicación de herramientas de la inteligencia comercial y tecnológica.

El caso más reciente es el estudio de las Cadenas de valor de los ingredientes naturales para las industrias farmacéutica, cosmética y alimentaria (2010); igualmente los estudios para cadenas hortícolas como el caso de la Agenda prospectiva de desarrollo tecnológico para la cadena del ají (2009), hecha por encargo del Ministerio de Agricultura en el marco del Proyecto de Transición de la Agricultura[30]. Durante estos procesos se verificó la importancia de la coordinación de los actores para el éxito de la formulación y puesta en marcha de las agendas sectoriales, así como de la necesidad de establecer un equilibrio disciplinar y temático en la definición de prioridades, con el fin de encontrar más espacio para las investigaciones de naturaleza propiamente económica.

4.3 Desde las empresas

Dado que las empresas se han constituido en el pivote que sostiene los giros entre lo territorial y lo sectorial, cada vez se hace más importante investigarlas con el fin de probar que en la agricultura colombiana la organización empresarial tiene un nivel incipiente e inestable y, por lo tanto, con predominio de la informalidad y de las transacciones clásicas de mercado.

Desde el Grupo RAET se vienen estudiando tres temas sobresalientes:

- La asociatividad en agricultura, como un modelo de acción colectiva que se viene aplicando indiscriminadamente a pesar de las múltiples evidencias de su escasa sostenibilidad y posibilidad de autonomía. Dos estudios de caso desarrollados deben mencionarse dada su capacidad explicatoria de cuando un modelo asociativo puede resultar exitoso y cuando no. El primer caso se refiere a una cooperativa de productores de palma de aceite; el segundo caso de una cooperativa de productores de hortalizas. La idea es ampliar el campo probatorio con nuevos estudios de caso en especies diferentes.

- La informalidad de las empresas agrícolas y la necesidad de establecer cuál es su dimensión y las implicaciones, fundamentalmente en el orden de la política pública. A través del trabajo de varios estudiantes de la maestría, por medio de sus tesis de grado, se ha venido realizando una caracterización comparada de las empresas agroindustriales formalmente constituidas en Colombia; hasta la fecha se han analizado cuatro territorios: Boyacá,

[30] En el marco de este proyecto se realizaron estudios similares para más de 20 cadenas productivas a nivel nacional.

Cundinamarca, Nariño - Putumayo y Orinoquia. Los resultados preliminares están mostrando una participación muy baja de las empresas agrícolas dentro del total de las empresas registradas en las Cámaras de Comercio que comprenden el sistema agroindustrial, es decir: producción primaria, transformación e industria, comercio y servicios. Dicha informalidad implica que para la política pública agrícola, los registros administrativos de las Cámaras de Comercio no están expresando la realidad sobre los actores intervinientes en esa actividad.

- Los modelos empresariales en agricultura como determinantes del nivel de innovación sectorial. Desde esta hipótesis, y con la cofinanciación del gobierno nacional a través de COLCIENCIAS, el Grupo RAET constituyó una red de grupos de investigación existentes en cuatro territorios del país con el fin de hacer la investigación correspondiente en seis cadenas diferenciadas: flores, papa y tomate, palma de aceite, carne porcina y carne bovina. El proyecto está midiendo innovación y sus determinantes utilizando encuestas para la captura de información y un modelo econométrico para el análisis de resultados. Las expectativas se direccionan a la ampliación del estudio a otras cadenas y a otros territorios tanto del nivel nacional como internacional, con el fin de ir enriqueciendo está línea y continuar aportando desde la agroindustria a los estudios de innovación y sus determinantes.

5. Síntesis y conclusiones:

El modelo RAET para la investigación en agroindustria es un modelo en construcción que ha mostrado pertinencia y coherencia para la realidad colombiana pero que necesita continuar alimentándose, dada la gran diversidad de comportamientos tanto en términos territoriales como de los atributos de las especies. La expectativa fundamental está puesta en la utilidad de los estudios para la toma de decisiones públicas y privadas desde una perspectiva que, alrededor de la empresa, combine lo sectorial y lo territorial.

Con ocasión de este Congreso, el Grupo RAET hace un llamado a otros grupos e investigadores independientes del mundo que se sientan atraídos por estos problemas y temas de trabajo para que configuremos una red ampliada de investigación en perspectiva de acción. Todos los aportes serán apreciados al máximo en cuanto comprendemos las limitaciones de los avances alcanzados pero también las urgencias analíticas y normativas que pueden llegar a salvar vidas y a convertir la agroindustria en un sector consistente, realmente competitivo, generador de riqueza y de empleos suficientes.

6. Bibliografía:

Anlló, G. Bisang, R Berardi, V. Erbes, A. Stubrin, L, (2010). Los problemas de medir innovación en las actividades primarias: Dilema a resolver en los países de la región. En RICYT (Ed) *El estado de la ciencia, principales indicadores de Ciencia y Tecnología Iberoamericanos / Interamericanos (83-105)*. Buenos Aires: Argentina.

Bernal, F. Martínez Nogueira, R. (1999). *La Institucionalidad en el Sector Rural Colombiano: Claves para el Debate*. Debate en RED Misión Rural.

Cepeda, F. (2002), *ID Lecturas Dominicales* El Tiempo, mayo 9.

Departamento Administrativo Nacional de Estadísticas (DANE), *Cuentas Nacionales,* 2007. Bogotá: Colombia.

Departamento Administrativo Nacional de Estadísticas (DANE), *Producto Interno Bruto, primer trimestre de 2011 base 2005,* 2011. Bogotá: Colombia.

Jessop, B. (2002). *Dinámica de la asociación y fallas de la governance.* Administración y Desarrollo, 8, 6-29. Bogotá D.C.

Jolly, J.-F., (2010), *Regir el territorio y gobernar los territorios. Políticas públicas de vivienda de interés social, servicios públicos domiciliarios y educación en Colombia.* Bogotá: Editorial Pontificia Universidad Javeriana.

Kalmanovitz, S. (Editor) (2010). *Nueva historia económica de Colombia.* Fundación Universidad de Bogotá Jorge Tadeo Lozano. Bogotá D.C.

Langlois, R, & Robertson, P. (2000). *Empresas, mercados y cambio económico: una teoría dinámica de las instituciones empresariales.* Anthropos Editor.

Mariño, M. (2007). *La empresa agroindustrial en Colombia: Caso Boyacá 2007.* (Tesis de Maestría). Universidad de Bogotá Jorge Tadeo Lozano. Bogotá.

Muller, P. (2010), *Las políticas públicas*, traducción al español y contextualización por Jean-François Jolly y Carlos Salazar Vargas, 3° edición. Bogotá: Universidad Externado de Colombia, Estudios de caso en políticas públicas n° 3.

North, D. (1990). *Institutions, Institutional change and economic perfomance*. Cambridge University Press.

Red RAET de universidades, (2010-2011). *Innovación y modelos de organización empresarial en la agroindustria en Colombia: un estudio comparado por departamentos.* (Estudio en desarrollo). Universidad de Bogotá Jorge Tadeo Lozano. Bogotá.

Rugeles, L. Delgado, C. (2003). *La construcción de lo público desde el sector local productivo colombiano. la especificidad de los activos en palma de aceite y ganadería.* España, Instituciones Y Desarrollo ISSN: 1560-5264, 2003 vol:14 -15 fasc: págs: 271 – 307.

Rugeles, L. y Jolly, F. (2006*). Hacia la construcción de modelos agroempresariales en una perspectiva territorial.* Revista Cuadernos de Administración, Universidad Javeriana, 19 (32), 295-317.

Rugeles L, Avila, J. Morales, A. Huertas, A. Guaitero, B. Bonilla C. (2009). *Agenda prospectiva de investigación y desarrollo tecnológico para la cadena de hortalizas, salsa de ají.* Bogotá. Ministerio de Agricultura y Desarrollo Rural - Universidad de Bogotá Jorge Tadeo Lozano- Universidad Nacional de Colombia.

Rugeles, L. Roveda, G. Méndez, H. Guaitero, B. Correa, L. (2010). *Zonas con potencial productivo de especies hortofrutícolas adaptadas a las condiciones agroecológicas de la región Caribe, área de influencia de la ruta del sol: departamentos del César; Norte de Santander y Guajira.* Bogotá. Corporación Andina de Fomento –CAF, Asociación Nacional de Comercio Exterior- ANALDEX, Universidad de Bogotá Jorge Tadeo Lozano-UJTL.

Sabogal, F. Camacho, L.F. (2011). *La empresa agroindustrial en Colombia.* (Tesis inédita de maestría). Universidad de Bogotá Jorge Tadeo Lozano. Bogotá.

Williamson, O. *Las Instituciones Económicas del Capitalismo.* México, FCE, 1989.

Williamson, O. y Winter, S. (comp.) (1996). *La naturaleza de la empresa, orígenes, evolución y desarrollo.* México, FCE.

Zylbersztajn, D. (2009). *Role of institutions in reshaping the global agricultural landscape: perspectives from Brazil.* Paper presented at the annual conference of the International Association of Agricultural Economists. Beijing.

THE INNOVATIVE POTENTIAL OF GRAIN MARKETING IN ARGENTINA

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Abstract
Only few farmers in Argentina plan ahead cereal´s sales in contrast with most farmers that sell cereal depending on their financial needs and speculation through cash sales.
The objective of this research is to demonstrate the potential economic benefits of maize marketing planning through the use of business management tools.
The analysis focuses on process technologies available in grain marketing, and making assumptions on farmer's behaviour, who would make their decisions according to their bounded rationality and opportunism.
Three real cases and two hypothetical scenarios of farmers with different business profiles from South of Santa Fe province were selected in order to analyze the results of trading during seasons 07/08, 08/09, 09/10 and 10/11.
This study shows the potential economic benefits and the reduction of price risk that farmers could obtain due to planning grain trading.
The innovative potential observed in the technological processes of commercialization corresponds to the quality of its dissemination, given the negative patterns of thought regarding the benefits of these technologies which separate the farmer from the pursuit of knowledge and application of them.

Keywords: planning, grain marketing, business management tools, behavioral assumptions, innovation potential.

THE INNOVATIVE POTENTIAL IN GRAIN MARKETING OF ARGENTINA

1. Introduction

In Argentina, only few farmers plan cereal´s sales ahead, in contrast with most farmers that sell cereal depending on their financial needs and spot market speculation.

It becomes clear that marketing has an increasingly important role in the economic performance of agricultural enterprises, however there are evident deficiencies in market and strategic information in several areas of future planning. There is also low quality in the processes of business decisions, with little use of management and market instruments, futures and options, pre-financing, warrants, and export consortia (REBOLINI J. M. 2005. "Alternativas en la comercialización de granos". Magazine "Márgenes Agropecuarios", N 246, page 24.).
If you calculate the amount of money lost by Argentinean farmers for not taking cover prices, you can see it impacts negatively on their growth capacity. The covers are a vital tool to carry forward an agricultural enterprise and as such, its use should be planned prior to crop planting, and even when other inputs are scheduled, like hybrid election, management strategies, fertilizer, and agrochemicals, (PEROTTI E. 2002. "Eficiencia Comercial…ese es el punto". Department of Market Capacitation and Development ,Bolsa de Comercio de Rosario.).

The aim of this work is to specifically analyze the case of maize marketing in southern Santa Fe province (Argentina), the third most planted crop in this region.. Economic analysis have shown that maize has larger operative costs in relation to other crops (Peretti, 2003) and even when economic and agronomic benefits arise, it is harder to include this crop in the sequence in farms with little scale of production and / or limited access to financing. It has been shown that maize production is associated with a greater risk than soybean, the most planted crop in the area, (DELGADO G. 2009. "Estimación de tasas de descuento para actividades agrícolas". Doctoral thesis conclusions). Therefore, the return required for maize is greater than that expected forsoybean. In this context, it is relevant the use of ools that reduce risk in expected.
One of the factors, that affect the adoption of management tools in grain marketing, is local institutional environment that poses unclear rules in this area. In addition, there is no search for production alternatives and / or a deficiency in the difussion of these management tools by institutions and companies in the area.
The objective of this research is to demonstrate the potential economic benefits of maize marketing planning through the use of business management tools.

2. Methodology and Theoretical Framework

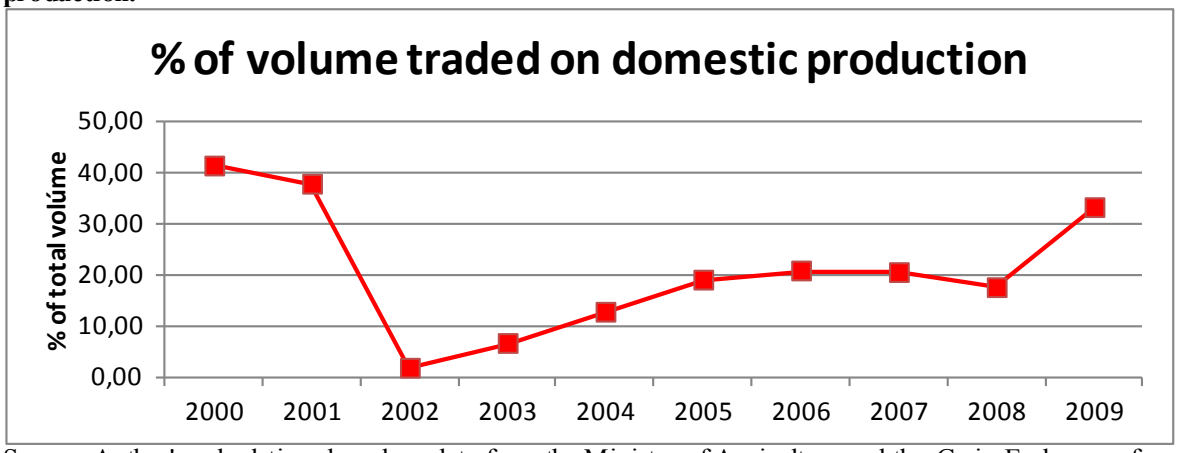
Methodology:
This document is based on the analysis of both primary and secondary data. 58 Interviews with farmers in the study area were carried out during the last quarter of 2010, 3 cases were selected to study their marketing habits in depth and to compare their results with those obtained from two hypothetical commercialization models. Farmers belong to department of Belgrano, in the province of Santa Fe. Secondary information obtained from various public and private organizations, involved in the process of grain marketing, was verified. These data were obtained via Internet and allowed to describe the context of grain marketing in Argentina, as well as comments broadcast by referents local in this area.

Theoretical Framework:
Research was carried out following the approach of new institutional economics (Coase, 1937, North 1990, Williamson 1985, 1993, etc). It describes the institutional and organizational environment prevailing in the grain marketing, from the point of view of their effect on the decisions of farmers.
The analysis focuses on the technological environment of the economies of third order, the agricultural enterprises.
In the technological environment there is a difference between process and product technologies, process technologies available in the marketing of grain were specifically observed.
In this environment it is important to define the main technological paradigm, technological gaps and potential for innovation.
Regarding the technological paradigm there are two important aspects, first the behavioral assumptions, which Williamson recognized as "bounded rationality" and "opportunism", as economic agents pursue their own interests and act in a world of bounded rationality, where information is costly, asymmetrically distributed and contracts are incomplete. On the other hand, transaction costs of grain sale contracts are considered, which are positive and include the cost of making a transaction (spot or contract), the costs of contractual failures (cancellation or opportunism) and the costs associated with rent-seeking behavior and defense against it. This concept is in contrast with the traditional concept of firm made by neoclassical theory, criticized for holding assumptions such as that information is complete, actions of the agents are fully rational and there are no transaction costs, since there are no influences on behavior and decisions of individuals within it and market forces are the only dominant forces.
Respecting the potential for innovation, it will be directly linked to the potential to create new knowledge and it will depend on the potential of social capital development.

3. Institutional Environment

Farmers' decisions regarding marketing are conditioned by the rules that frame the local market, which has been generated in the Argentinean economy after years of turmoil and regulations. Farmers still argue that trade analysis is a fruitless exercise and that the use of commercial tools does not provide tangible benefits to justify its use, so that "sitting on the harvest" waiting for the "data" of a devaluation or inflation gap to improve prices seems to be a good option.
One way, to see the relationship between the uncertainty created by the institutional environment and the use of commercial tools, is by observing the variation of the volumes of grains operated in the futures and options markets in recent years. Graph 1 shows the variation in the percentages operated in forward markets in Buenos Aires and Rosario (Matba and ROFEX) respect to the total amount produced throughout the country over the past 10 seasons.

Graph 1: Total volume traded in the future market, ROFEX and Matba, regarding the National production.



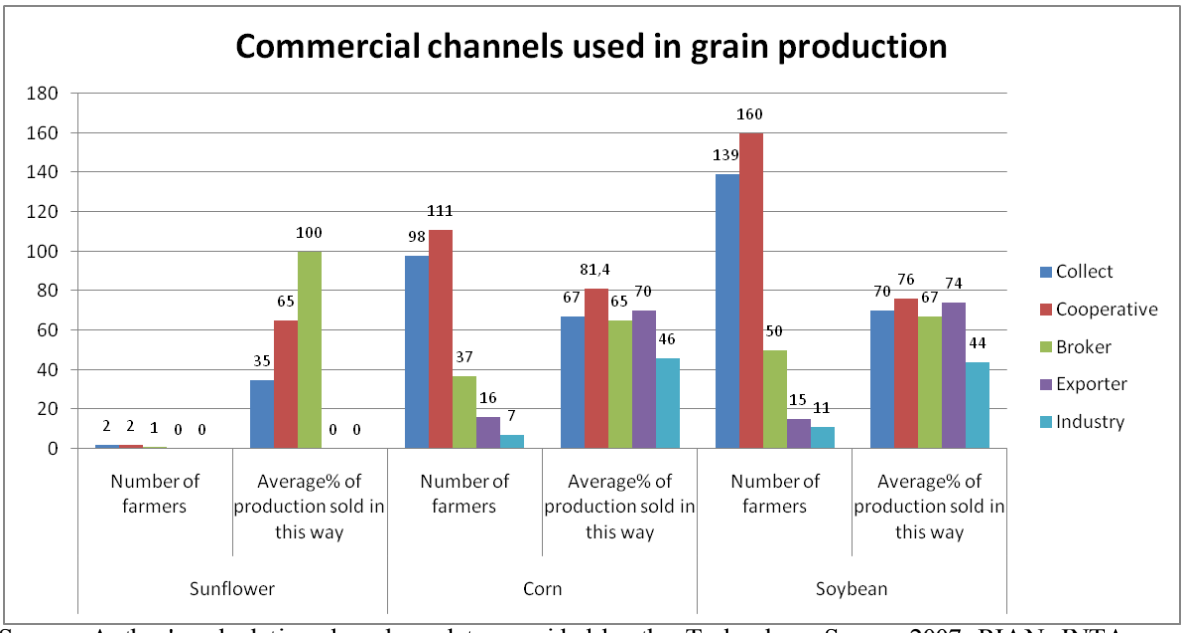
Source: Author's calculations based on data from the Ministry of Agriculture and the Grain Exchange of Rosario and Buenos Aires.

It is remarkable the significant impact of the currency crisis of 2001 and the changes in the rates of export taxes, along with the closing of grain exports in 2008, on the evolution in the volume of grains operated in these futures markets.

4. Organizational Environment

The grain marketing channels most commonly used by producers in the South of Santa Fe are first and second degree cooperatives, except for sunflower growers, the private grain collectors in second place, and to a lesser extent brokers, exporters and industries. Graph 2 shows the participation of the different commercial organizations in the South of Santa Fe, according to a survey from 2007.

Graph 2: Number of producers and average percentage of production marketed by each commercialization channel in South Santa Fe

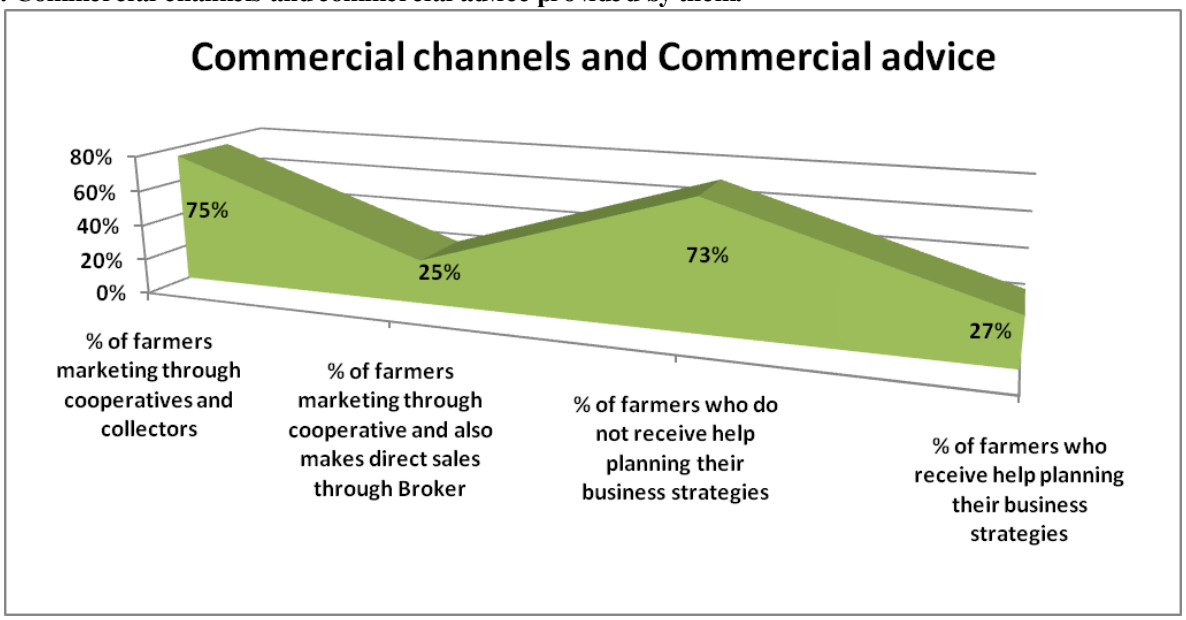


Source: Author's calculations based on data provided by the Technology Survey 2007. RIAN. INTA. South of Santa Fe

Transactions done through cooperatives and private grain collectors are simple contracts of grain sale on the spot market, and there could be sales through forward contracts in case of a farmer request, however this is not common practice.

On the other hand, cooperatives do not provide commercial advice or access to training in this area. Graph 3 shows the results of interviews with farmers in department Belgrano. It can be seen that the proportion of farmers whose main marketing route is the cooperative, coincides with the percentage of those who reported not receiving advice on the use of commercial tools or in the assembly of business strategies.

Graph 3: Commercial channels and commercial advice provided by them.



Source: Authors based on interviews conducted in 2010 to 58 farmers.

The spread of commercial tools that contributes to the commercial management of the farm company, is run by public organizations such as Rosario Grain Exchange (BCR), the Forward Market of Rosario (ROFEX), the Forward Market of Buenos Aires (Matba), and by private companies dedicated to market analysis and / or brokering of cereals, to name a few.

These organizations are committed to bring the information necessary for farmer's decision-making, through various transfer methods, such as update seminar, articles in technical journals, training courses, exchange groups in producer associations, among others.
The information provided is abundant and diverse, however, the use of commercial strategies is still extremely low (Melo H., Mosciaro M., Iorio C. "La comercialización de trigo y el riesgo de precios. Análisis de distintas estrategias"), as was noted. This behavior sets the distances between information and adoption of these tools by farmers, so there is great potential for innovation from the design of new strategies for the dissemination of these technologies.

5. Technological environment

Within the technological environment of the farm company, we studied the process technologies taking place in the stage of grain marketing, which operate in the grain market through the diferent marketing channels mentioned above. Commercial tools used in these technologies are pricing insurance contracts, like options puts or calls, and contracts of price positioning, such as futures and forwards, which are held between the farmer and the forward market in the case of futures and options, or between the farmer and a buyer in the case of forwards.
In summary, the different hedging strategies that can be implemented with the use of these commercialization tools are listed below, taking into account their suitability against expectations contexts bullish, bearish or uncertain[31].

- Strategies for bearish expectations:
  - ✓ Sell Futures contracts or cash Forward contracts
  - ✓ Synthetic future (buy put + sell call)
  - ✓ Sell Future contract + buy put
  - ✓ Sell Call
  - ✓ Call Spread Bearish (buy call + sell call)
  - ✓ Put Spread Bearish (buy put + sell put)
- Strategies for bullish expectations:
  - ✓ Buy futures contracts or cash Forward contracts
  - ✓ Buy Calls
  - ✓ Buy Synthetic Call (buy future contract + buy put)
  - ✓ Sell Put
  - ✓ Bull Spread Call (buy call + sell call)
  - ✓ Bull Spread Put (buy put + sell put)
  - ✓ Stay without hedge
- Strategies for uncertain expectations:
  - ✓ Buy Put
  - ✓ Buy Synthetic Put (sell future contract + buy call)
  - ✓ Sell Straddle (sell put + sell call)
  - ✓ Purchase Straddle (buy put + buy call)

Transaction costs of these contracts are positive and can be measured in terms of percentage of brokerage commissions, in the case of futures and forwards, and in terms of cost per premium in the case of options. These costs may be considered as business investments and the results can be evaluated in terms of profitability.

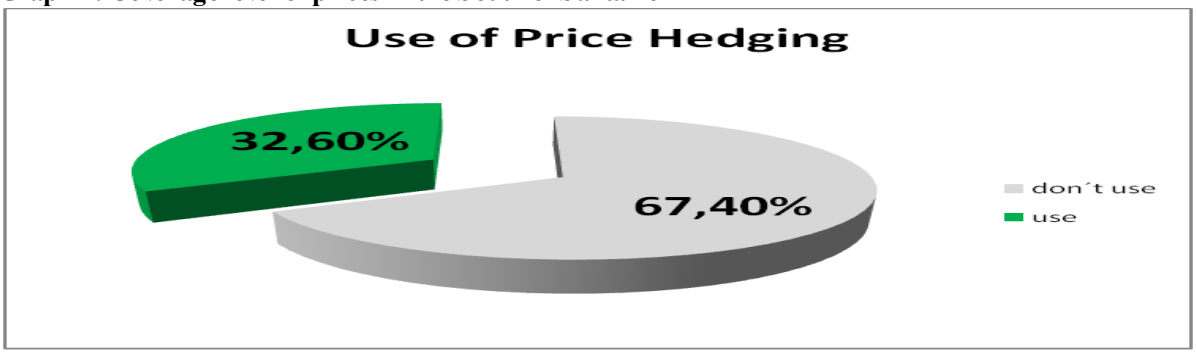
[31] Is not the objective of this paper explain the way that these strategies works.

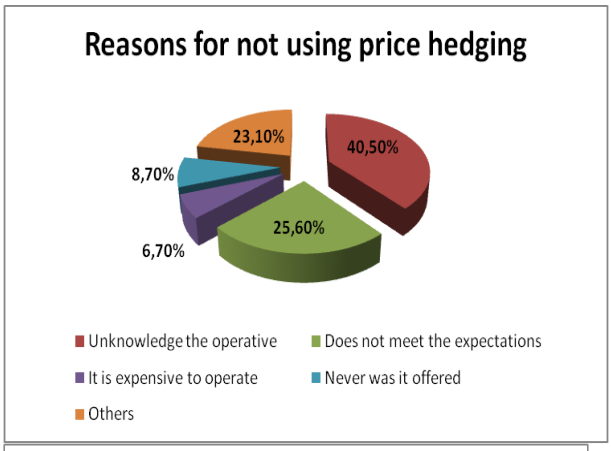
However, this position is far from what it is adopted by farmers in the South of Santa Fe, whose commercial habits are generally conservative, in addition to the limitations of the institutional and organizational environment, that discourage the pursuit of commercial alternatives.

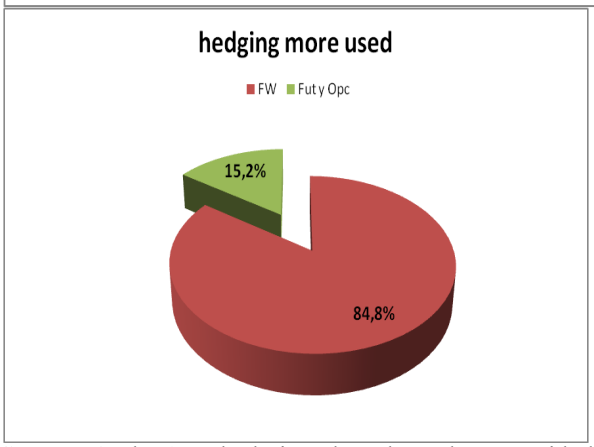
This is why the technological paradigm that arises in the process of commercialization is refered to the alleged behavior of the farmers, who makes decisions based on bounded rationality and opportunistic habits. The rationality of their decisions are based on information received regarding the context of the grain market, their training on the usefulness of commercialization tools, and their ability for interpreting and generating knowledge. Opportunism is seen as a speculative habit in farmers, because they speculate with market prices hoping to have a bull market after harvest, risking them to take an opposite direction.

Depending on the level of knowledge and speculation that predominates in the actions of farmers, those who plan their marketing can be differentiated from those who only react to the prices of spot market. Farmers who use some level of price hedging are close to the notion of management and business planning of production. Graph 4 shows that among the price hedging tools, the Forward contract is the most used by farmers.

Graph 4: Coverage level of prices in the South of Santa Fe







Source: Author's calculations based on data provided by the Technology Survey 2007. RIAN. INTA. Santa Fe South

Those who do not use any type of hedging, attribute this to their lack of knowledge about them, or the fact that hedging does not fulfill their expectations. The interviews showed that hedging tools were used without planning, with unsatisfactory results for farmers, who concluded that the tools were not helpful.
In addition to this lack of management in making business decisions, there are prejudices about the scale of production of farmers. Small and medium farmers believe that the use of commercial tools is justified only in large companies, so they assume that their access to management is limited by their production scale. These mindsets are very difficult to break and put invisible barriers for these actors diminishing their potential for innovation.

6. Commercialization Plan

Marketing decisions involve not only the place and the sale channel, but also the choice of the saling moment, as part of a marketing strategy appropriate with the objectives of the company and the entrepreneur.
A commercial plan should be based on a fixed objective, which is no-brainer for farmers. Normally, farmers put all management effort to obtain good performance, so if you ask about their productive aim for next season, answers are like :
-I try to get the maximum benefit, and because of this I chose rotations and how to sell, which varieties I should sow in each paddock, and everything depends little on weather;

-We try to see different areas in the field, then we look for the best inputs for each one, depending on its potential and according to the year, for making the best use of each lot and achieve the maximum yield.
Marketing, however, seems to be a problem for considering harvest onwards. So if you ask them about their commercial purpose prior to harvest, you will get answers such as:
*-With these prices I do not know, it seems that you do not know what will happen-(*referring to the local market and institutional environment*).*
- Sometimes you don´t know if it´s appropriate to make a future sale, it is like playing Russian roulette, what if government discovers an inflation of 20-30% within a month? -.
The following comment expresses signs of commercial planning, and in turn manifests shortcomings in the knowledge of price hedging tools.
- ... we covered in soybean futures market about 25-30% of what we expect to produce, in order to cover costs and other stuff. In maize we didn´t do it because we thought the price could be better, but maybe if there is a way of getting a price cover without selling it...
The comments above correspond to middle-sized farmers from the city of Las Rosas, during a marketing workshop held in January 2011, in the Extension Agency of INTA Las Rosas.
If farmers were trained and informed about grain marketing, they would have more accurate expectations, as they would recognize the importance of marketing planning in reducing price risk, so they would think of commercial objectives, which would lead to select positioning tools according to a "Marketing Plan".

Bases of a marketing plan:
A well-conceived marketing plan is based on at least the following points of support:
• Training: Understanding the basic characteristics of grain markets, supply and demand, and other key factors that affect price formation, from local to international level. Getting knowledge about the different alternatives available to operate.
• Information: Access to timely information and trends of the grain market.
• Decision: Having the ability to make decisions in a timely manner, knowing in advance the need for profitability of the enterprise.
• Financing: The credit rating and financial support of farmers will be determining factors in defining the tolerable risk in the commercialization plan.
• Logistics: The logistics requirements are related to the alternative chosen and marketing channel.
• Administrative and accounting capacity: In order to have the receipts, delivery and billing structure tidy, it is essential have a good administrative capacity.
With these bases, farmers may consider multiple objectives when designing their commercialization plan.

To demonstrate the potential economic benefits of grain marketing plan through the use of business management tools, three real cases of farmers, with different business profiles, and two hypothetical cases, with different commercialization strategies, will be described and the results of the last 4 campaigns (2007/2008, 2008/2009, 2009/2010, 2010/2011) will be discussed. These campaigns showed upward trends in prices, except 2008/2009, which presented a downtrend. The constant rise in prices is the main reason why average prices in all cases are generally very good compared to historical prices.

7. Real Cases

In order to collect data from case studies as well as to present the hypothetical cases, maize is used as a test crop, given the greater need of money invested in implantation. Business planning of maize, help to reduce price risk to acceptable levels, according to the financial realities of each company. Table 1 shows the profile of these producers.

Table 1

	Case A	Case B	Case C
Age	53	43	41
Area (ha)	500 (25% owned; 75% rented)	850 (88% owned; 12% rented)	440 (100% owned)
Commercialization habits	Spot market, asking for base prices.	Spot market, futures and Forwards.	Spot market, 20 % in advance with Forwards.
Sales channel	Cooperative	Broker, private grain gatherer, cooperative.	Cooperative and broker.
Commercialization objectives	To get a good price, according market evolution after harvest.	To ensure part of revenues for payment obligations, and get better average prices than previous campaigns.	Getting good average price and ensure a profit margin.
Formal education	Completed primary school	Incomplete University (Business administration)	Complete University (Agronomist).
Risk of producing corn according to farmer´s opinion	Productive risk, to achieve the harvest.	Commercial risk, to be able to sell the corn.	Productive risk, to achieve the harvest.
Access to commercial information and training.	Annual meetings of the cooperative, given by speakers on commercialization.	CREA monthly workshop group. Meetings with his broker. Courses in BCR.	Courses in BCR. Meetings with his broker.
Commercial advice	Not receiving any advice.	Advice from cereal broker.	Advice from cereal broker.
Use of Commercial Tools.	He does not trust in other pathways outside the cooperative.	He uses them frequently, FW, futures and direct sales.	He often uses Fw, depending on the market scenary.
Information	Internet and board prices of spot market.	Internet, price reports and his broker.	Internet, journals and his broker.
Decision to sell.	According the price and liquidity needs.	According to commercial objectives of the campaign.	According to price and needs.
Financing.	Little use. Agricultural bank Card, cooperative cereal trade.	He does not use, he has access but prefers self-financing rather than paying interests.	He only uses bank financing to make investment in agricultural machinery. he uses self-financing to produce grain.
Logistics	Own storage of 1050 TN in metal silos and bag silos.	Own Storage of 2500 TN in metal silos.	Own Storage of 1600 TN in metal silos.
Administrative capacity.	Administrative secretary and accountant.	Administrative Secretary, accountant and grain broker.	Accountant and grain broker.

Case A: No marketing planning.

The farmer thinks the decisions in commercialization affects the outcome of the company. The commercial strategy lies on selling at the spot market and establishing base prices in the Cooperative, through which the farmer sells 100% of its production, mainly out of habit and confidence in it.

This farmer knows about price hedging tools and made a sale through forward contracts, but did not gave satisfactory results according the expectations, so decided not to use them and deal with the available price.

Another reason for not learning how to use commercial tools is the age, as believes it is an area in which future generations will enter.

Case B: Commercial planning.
The farmer thinks competitive advantages are achieved through commercial management, beyond the yield, so looks for what helps increase the knowledge in order to make better business decisions.
This farmer sells primarily through a broker or directly with exporters, due to a relationship of trust with them and a quest to reduce transaction costs avoiding intermediaries. To a lesser the farmer sells through cooperatives and private grain collectors and uses future sales tools, but does not use hedging prices options up to now. Although this decisions did not always gave satisfactory results, the farmer analyzes and learns from the consequences, so thinks redesigns the strategies.

Case C: Parcial marketing planning.
The farmer thinks the way to decide the commercialization affects the outcome of business, and in turn it can ensure a range of profitability through the use of marketing tools and limit the price risk. This farmer thinks it is a very important area, and uses forward hedges in a 20-25% of what is expected to produce. This sells through the cooperative and a broker, because of the relationship of trust with both marketing agents. The farmer makes plans the commercialization and believes it can be improved through greater use of management in taking decisions.
H- HYPOTHETICAL CASE: A case of a small-scale agricultural enterprise is presented, with 150 ha of its own in the South of Santa Fe, 1/3 of the area is intended to be sown with corn, whose yields are averages of the area (Las Rosas, Santa Fe South) in the campaigns mentioned above. Under these assumptions, two ways of commercialization are supposed, called H1 and H2.
A small-scale agricultural enterprise is proposed in order to show that there are no scale limits when using commercial tools.

H1 Strategy: The following sales strategy[32] will be systematically applied and it is flexible to price changes.
The first days of September the following coverage[33] will be taken:

1. In the local market:
    - ✓ Sell cash Forward contracts of 274 Tons of corn, to delivery in April, after harvest, taking the price reference from the Forward Market of Buenos Aires (MATBA).
2. In Chicago Board of Trade (CBOT):
    - ✓ Purchase two Call[34] at-the-money[35], with the right to take a future position at May.
    - ✓ Sell two Call out-of-the-money[36], with the same expiration date of the call purchased.
    - ✓ Sell two Put out-of-the-money, with the same expiration date of the two contracts above.

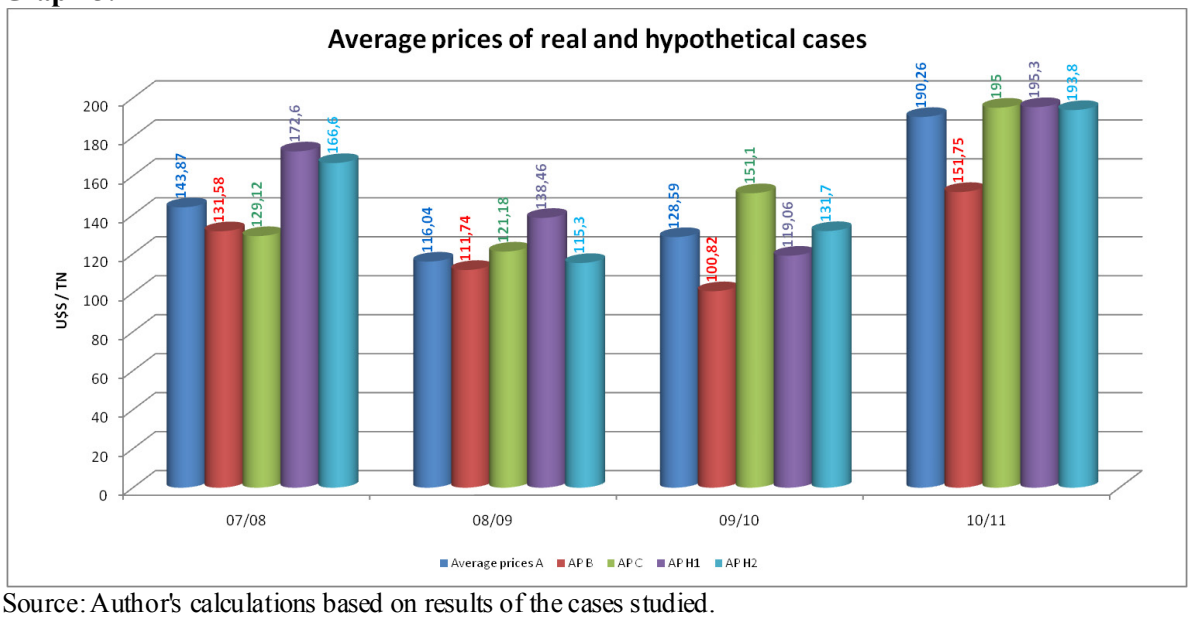
[32] Sales strategy suggested by Ing. Agr. Fernando Botta. Broker from Rosario, Argentina.
[33] Future prices in the strategies correspond to historical prices of MATBA and CBOT.
[34] These contracts are of 137 tonnes each.
[35] ATM Options (at the money): Las opciones en el dinero son aquellas cuyo precio de ejercicio coincide con el del subyacente por lo que su ejercicio no supone ni beneficios ni pérdidas. Definición obtenida del libro "Opciones II. Estrategias con opciones" de la Bolsa de Comercio de Rosario.
[36] OTM Options (out of the money): Las opciones fuera del dinero son aquellas cuyo ejercicio supone una pérdida, es decir no son ejercibles.

The volume sold through these tools covers approximately 60% of production expected to be obtained in the hypothetical case.
The rest of the production will be sold throughout the year on the spot market in three equal volume sales, in the months of May, June and July after the harvest of grain, if the market allows it, taking into account the export trade restrictions that local corn market had in recent years.
H2 Strategy: There will be corn sales during four months following harvest, considering market prices available on the dates it is open, due to export restrictions for maize. This scenary simulates what would happen to a producer who does not have his own storage capacity or prefer to store other grains instead of maize, like soybean, so he sells all the maize production in equal parts during post-harvest months.

8. Analysis of results based on average prices

Average prices (AP) achieved by farmers A, B and C in the last 4 seasons, and the scenaries H1 and H2, were used to build graph 5, from which analysis was performed.
Cases in which sales are conducted primarily in the spot market (A, C and H2) have comparatively good results in bullish campaigns in the post harvest period; the result of hypothetical case H1, which performs coverage of 60% of estimated production, gives a higher average price compared to the rest in campaigns 07-08 and 08-09, the first is bullish and the second is bearish.

Graph 5:



Source: Author's calculations based on results of the cases studied.

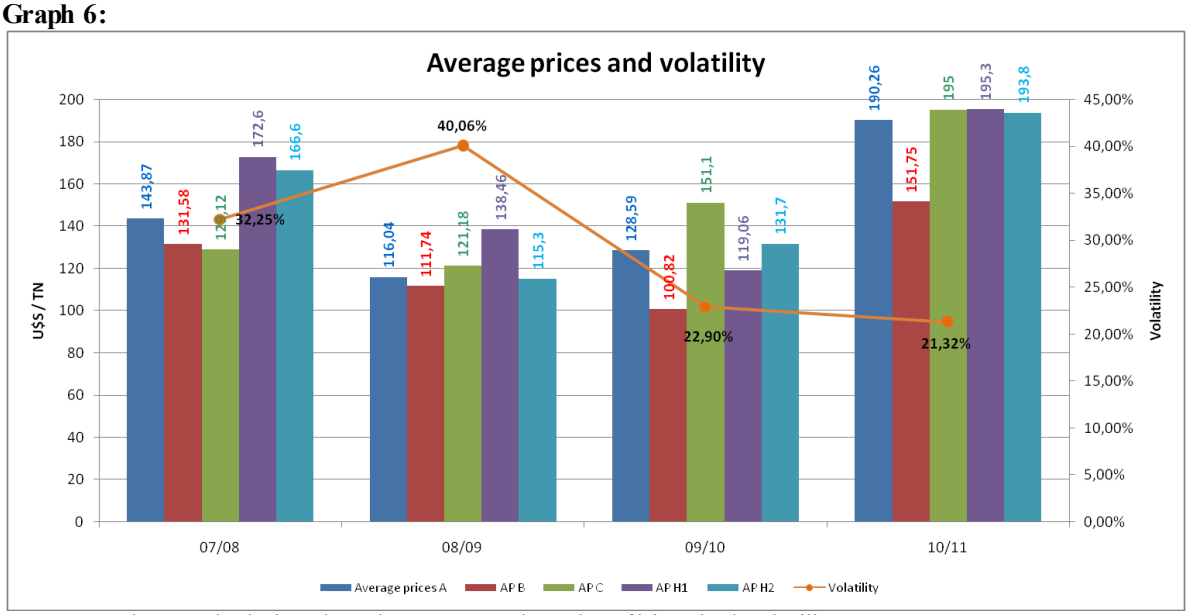
In front of expectations of bullish markets staying uncovered and speculating on the spot market is one of the best options. However, the results of the case that applies coverage (H1), even in campaigns with bullish markets, can equal or exceed results achieved through speculation.
In case B, average prices in general do not exceed the remaining cases, however, this is the only farmer that invests in training to manage the commercialization, so it can lead to erroneous considerations, like saying that it is not worth training in this area.

When knowing the case in depth, the farmer has focused primarily on the historical average prices, so made sales in advance when prices were apparently competitive with the previous season, but didn´t make coverages to a bullish market because of the resistance to use the future options contracts, which led this farmer to lose competitiveness in this scenary. However, this farmer observes the own company and analyzes the higher returns that could have caught if had applied the right strategy, so is ready to expand the use of commercial tools. The graph presented above may lead to the conclusion that one case is better than another due to higher average prices achieved. However, this view is only part of the analysis and could lead in fact to overly simplistic conclusions.

9. Analysis of outcome by historical volatility

The evidence shown in graph 5, regarding the functionality of the coverages of prices, requires a deeper analysis than the mere observation of the resulting average prices. So it is analysed the average prices of each case based on the historical volatility of maize market in Argentina for each season. Historical volatility is a simple measure that represents the price risk faced by farmers in the business decisions of each campaign.
Graph 6 gives the average prices of graph 5, and historical volatilities of the analysed periods.

Graph 6:



Source: Author's calculations based on cases and results of historical volatility.

As was observed, in periods of greater price volatility the hypothetical case, that applies a hedging strategy, obtains greater average prices compared to the other cases.
The knowledge of the volatility of each campaign allow the assessment not only of the prices, but also the risk of price fluctuation as well as the coverage of the strategy used in case H1. Those who do not use coverage are exposed to sprice fluctuation far below or above the expected price. Thus, if fluctuations are heading upward, they will get good results, as observed in H2 case for campaigns with bullish markets, but if the direction of volatility is bearish, the results may fall into differences greater than U$S 30/TN, as in the case of H1 and H2 in 08/09 campaign.

10. Conclusions

After observing the cases in the present investigation, it was shown that there are potential economic benefits that could be obtained from planning the marketing of grains. It is also noted that the risk of price fluctuations can be reduced through the use of price hedging in the futures market , with greater evidence of its functionality when the grain market shows more volatile scenaries and / or downward price trends.
From the point of viewof the technological environment, knowing that the price hedging tools are part of the process technology available in grain commercialization, it is concluded that greater knowledge about their characteristics and potential benefits will allow the farmers to design and implement management more efficient systems, with lower costs and higher profits, as proposed by Williamson when refering to transaction costs.
The innovative potential observed in the technological processes of commercialization, corresponds to the diffusion processes that have not been made properly, so farmers have negative patterns of thought regarding the benefits of these technologies, and this distances them from the pursuit of knowledge and application of these technologies.

11. References

DELGADO, G. (2009). *Estimating discount rates for agricultural activities.* Conclusions dissertation.
GONZALES, C. (2008). *Survey of current use of agriculture technology in 2006-2007.* National Agricultural Information Network. National Institute of Agricultural Technology. ORDOÑEZ, H. (1999). *Methodological contributions of study and intervention in Agribusiness.*
ORDOÑEZ, H. *Glossary of the New Economy Business and Agri-food.*
PEROTTI, E. (2002). *Trade Efficiency ... that's the point.* Department of Training & Development Markets Rosario Stock Exchange.
REBOLINI J. M. (2005). *Alternatives in grain marketing*. Magazine "Agricultural Margins", No. 246, page 24.
WILLIAMSON, O. (1985). *The economics institution of capitalism: firms, market, relational contracting*. New York. The free press. Mac Millan.

Websites consulted:

- www.bcr.com.ar
- www.fyo.com
- www.inta.gov.ar
- www.matba.com.ar
- www.rofex.com.ar
- www.sagpya.gov.ar

REDEFINICION DE LOS ALCANCES DEL SISTEMA AGROINDUSTRIAL DE LA ARGENTINA PARA EL PERIODO 1980-2005

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Abstract
It is redefined the accounting of the Argentine agro-industrial system for the period of 1980-2005. It includes activities traditionally belonging to the secondary and tertiary sectors, so far not considered as part of that system.
Using the proposed methodology the agro-industrial system (AS) represented, on average, 22% of GDP, computed at 1993 prices. Gross Value Added (GVA) variable is considered as a proxy of the GDP. The average share of GVAAS of Agriculture, Livestock, Hunting and Forestry in total GVA of the economy was 6.1%, the average share attributed to manufacturing GVAAS was 7.4% and for services and other GVAAS (Electricity, gas and Water, Construction and Others) was 8.2%.
The new activities coming from the tertiary sector had the highest growth rate. On average, the tertiary-sector activities plus the construction sector explain 38% of GDPAS; the secondary-sector activities, 34%, and the primary-sector activities, 28%. The AS generated an important labor demand and its exports have been growing relative to the total product. The redefinition of the PIBSAI during the considered period represented an increase of 8.4 percentage points of share in GDP.

Key words: Agribusiness System Redefinition, Gross Value Added, Share AS in the Economy.

REDEFINICION DE LOS ALCANCES DEL SISTEMA AGROINDUSTRIAL DE LA ARGENTINA PARA EL PERIODO 1980-2005

1. Justificacion

Como consecuencia de trabajos realizados por especialistas de organismos internacionales y regionales se ha comenzado a imputar al sector agropecuario el valor agregado de actividades del sector manufacturero que tienen como principal proveedor al sector primario agropecuario y forestal, dándose paso así a un enfoque de encadenamiento hacia delante (World Bank, 2005). En esta línea de pensamiento, se definió los alcances del Sistema Agroindustrial (SAI) en la Argentina. Este sistema se modernizó y se estima que ha sido un factor significativo de desarrollo y encuentra su limitación en las políticas comerciales e impositivas que no contemplan su potencialidad como herramienta para el crecimiento.

Este trabajo propone considerar a la Economía Argentina desde un enfoque sistémico basada en la redefinición del Sistema Agroindustrial (SAI) y de sus efectos sobre la economía.

Para ello se efectúa el cálculo de los alcances del SAI para el período de 1980-2005, por cuanto se considera que este sistema, que surge de la actual agregación de las cuentas nacionales, está subestimado. En tal sentido se procede a su redefinición y para ello se computan, además del valor agregado del sector primario, excluida la pesca, las actividades manufactureras que resultan sus principales proveedores y compradores. A partir de estas variables se agregan las actividades de la construcción y servicios que demandan estos sectores primario y secundario agroindustrial. Como consecuencia, queda imputado al SAI la parte terciaria correspondiente, así como la de la construcción, entre otras actividades. La dinámica de este sistema redefinido y su relación con el PIB y el empleo justifican este trabajo. En la actualidad el alcance del SAI respresenta el 13,5% del PIB

2. Objetivos

- **Objetivo general:**

Redefinir los alcances del Sistema Agroindustrial (SAI) a partir de la consideración de actividades del sector secundario de la economía no computadas hasta ahora y el sector terciario correspondiente. Identificar los efectos sobre el empleo. Asimismo establecer la relación de sus exportaciones totales en su producto.

- **Objetivos especificos:**

1. Identificar los alcances del Sistema Agroindustrial para el periodo 1980-2005 y su relación con el PIB y el empleo.
2. Explicar la relación entre las exportaciones del SAI con su PIB.

3. Marco conceptual

El concepto denominado como Administración Sintética (Ackoff, 1983), comprende el enfoque sistémico. Se llama sistema a un conjunto de partes componentes que se hallan interrelacionadas funcionalmente para lograr cierto objetivo.

Cuando un sistema es desmembrado, para buscar soluciones específicas a sus partes, pierde sus propiedades esenciales. "El buen funcionamiento de un sistema dependerá más de cómo interactúan entre si las partes, que de cómo actúan cada una de ellas independientemente".

Se considera que un sistema económico y social está en crecimiento cuando la relación entre ambiente externo, estrategia país, estructura y capacidad de gestión se encuentran en un continuo ensamble. Se podría expresar como el nivel de apertura que tiene un país como consecuencia de las instituciones públicas y privadas, sus recursos y el nivel de conocimiento y de decisiones que tienen los dirigentes y empresarios.

En tal sentido, Leontief (1973) en el prólogo de "Análisis de la Economía Input – Output", plantea que este análisis no es más que una consecuencia de aquella teoría clásica que postula la interdependencia general de las variables económicas y que considera que el conjunto de la economía de un país, región o el mundo, constituye un sistema único que se esfuerza por expresar la totalidad de sus funciones en términos de aquellas propiedades estructurales susceptibles de cuantificación.

En "La Ventaja Competitiva de las Naciones", (Porter, 1991) se considera que una de las fuentes de una ventaja competitiva son las mejoras de las actividades en la cadena de valor, teniendo en cuenta su funcionamiento e interdependencia respecto de su competencia. Pero además, destaca como otra fuente la ventaja que genera el **sistema de valor**. Este concepto incluye a los proveedores de la empresa, los canales de distribución y a los compradores.

Porter, asigna un rol fundamental a la Nación como base para el desarrollo de una ventaja de una empresa en un sector. En tal sentido, considera que la Nación constituye un ambiente en el cual se fomenta o entorpece la creación y manutención de ventajas competitivas. Los determinantes de este ambiente están definidos por las partes de un sistema que comprende "las condiciones de los factores (recursos físicos, recursos humanos, recursos del conocimiento, recursos de capital e infraestructura), las condiciones de la demanda interna, los sectores conexos y de apoyo" que tienen que ser internacionalmente competitivos y "la estrategia, estructura y rivalidad de las empresas". Asimismo define dos variables que afectan la competitividad que son: la casualidad y el gobierno.

4. Metodologia

La metodología utilizada es de carácter cuantitativo y descriptivo, comprende la sistematización y análisis de actividades económicas en entre los años 1980 – 2005.

En el período comentado, debido a que no hay información uniforme con anterioridad, se redefine el concepto del SAI, incorporando al sector primario identificado, los sectores secundario y terciario conexos a partir de información suministrada por el Ministerio de Economía -Secretaría de Política Económica, Dirección de Cuentas Nacionales e INDEC -, sobre el Valor Agregado Bruto de las actividades que se encuentran en el trabajo realizado sobre el empalme del PIB entre los años 1980 y 2005, así como la información suministrada por la misma fuente respecto del 2005. Para estimar ciertas interrelaciones entre las variables se utiliza la Matriz de Insumo-Producto de 1997 (MIPArg/97). En el rediseño del PIB del Sistema Agroindustrial (PIBSAI) se procede a computar los Valores Agregados Brutos (VAB) de las actividades definidas a precios de 1993, aplicando un criterio de prudencia para el desarrollo del

cómputo (cuando no se obtienen coeficientes de imputación confiables no se consideran). Se parte de la base de que el VAB es una Proxy del PIB a los efectos de la estimación que se registra en cuanto a su metodología. Con respecto al comportamiento de las actividades que conforma los sectores primario, secundario y terciario del SAI en el período señalado se presentan en promedios quinquenales más el año 2005. Un mayor grado de especificación de la metodología se presenta a continuación.

El VAB de la Agricultura, Ganadería, Caza y Silvicultura se computa en su totalidad (sector primario).

En manufacturas, como demandantes del sector primario definido, se computa la totalidad del VAB de las siguientes actividades: Elaboración de productos alimenticios y bebidas; Elaboración de productos del tabaco; Fabricación de productos textiles; Curtido y terminación del cuero; Producción de productos de madera y caucho; Fabricación de productos de paja y trenzables; Fabricación del Papel y productos del Papel. Asimismo como oferentes se computa en su totalidad el VAB de la Fabricación de Abonos y Compuestos del Nitrógeno y Fabricación de Plaguicidas de origen Agropecuario; Fabricación de Maquinaria Agrícola (incluido tractores).

Por otra parte, si se tiene en cuenta la demanda que realiza el sector primario y secundario manufacturas que conforman el Sistema Agroindustrial, en base a coeficientes que surgen sobre la demanda total de diferentes actividades, según la Matriz Insumo-Producto del 1997, se estima el porcentaje del VAB computable al sistema de las siguientes actividades: Fabricación de Coque, Productos de la Refinación del Petróleo y Combustible Nuclear; Fabricación de productos de caucho y plástico.

En cuanto a la actividad de Vehículos automotores, remolques y semirremolques se computó en base a la demanda del sector primario a través del coeficiente demanda que surge de la MIPAr97 más otro coeficiente de demanda de inversión equivalente a la participación del sector primario rezagado un período en el VAB total correspondiente del país por el VAB del período de vehículos, automotores, remolques y semirremolques. Ante la falta de confiabilidad en la estimación de la demanda de esta actividad por parte del sector manufacturas, se prefirió omitir el VAB de la actividad asignable, en consecuencia queda en claro que se subestima el resultado final del valor del Sistema Agroindustrial por la aplicación de un criterio restringido.

Para estimar el Valor Agregado Bruto computable de Electricidad, Gas y Agua a los sectores primario y secundario del SAI, se aplicó el coeficiente que surge de la demanda de estos sectores sobre la demanda total de Electricidad, Gas y Agua, en base al que se obtiene de la MIPAr97, sobre el VAB de la actividad mencionada. En cuanto a la actividad de la Construcción se computó también una parte del VAB de la construcción que surge de la demanda en la Matriz, más la inversión que realizan el sector primario y secundario del SAI, que resulta del coeficiente de participación del VAB primario rezagado un período en el VAB total país correspondiente y el coeficiente del VAB de las actividades manufactureras demandantes de productos primarios sobre el VAB total de la economía, multiplicado la suma de ambos por el VAB construcción del período

En cuanto al cómputo del sector terciario respecto del SAI, en el caso del VAB de Transporte, Almacenamiento y Comunicaciones, se aplicaron sobre este los coeficientes que surgen de los márgenes de transporte, almacenamiento y comunicaciones correspondientes a los sectores primarios y manufacturas sobre el total de márgenes, de acuerdo a la Matriz de Insumo-Producto. Similar fue el caso del VAB de Comercio al por mayor y al por menor; reparación de vehículos automotores, motocicletas, efectos personales y enseres.

Respecto de los Valores Agregados Brutos de Actividades Inmobiliarias, Empresariales y de Alquiler; Administración Pública, Defensa, Seguridad Social de afiliación obligatoria;

Enseñanza, Servicios Sociales y Salud, se procedió a la estimación del VAB computable mediante la aplicación sobre el VAB de estas actividades de los coeficientes que se obtienen de la demanda de los sectores primario y manufacturas del SAI en el total de las respectivas demandas. Un caso aparte fue la imputación del VAB de Intermediación Financiera, debido a que al coeficiente que surge de la matriz de Insumo-Producto se le adicionó el coeficiente del porcentaje del VAB Agricultura, Ganadería, Caza Silvicultura, rezagado un período, sobre el VAB total rezagado y se lo multiplicó por el VAB de intermediación financiera del período. Del mismo modo se actuó sobre las manufacturas que son demandantes del sector primario pero sin rezagar. En este punto cabe destacar una posible subestimación, debido a que en los años considerados la participación de las deudas del sector agropecuario y sus manufacturas, en todo concepto, sobre el total de deudas del sistema financiero, de acuerdo con información del Banco Central de la República Argentina, resultaron levemente más altas año por año que los coeficientes señalados.

Una vez efectuado el cálculo del VABSAI, se estimó durante el período 1980-2005 su participación relativa en el VAB, por sector y conjuntamente, también se procedió a establecer los porcentajes de participación de las actividades, primaria, secundaria y terciaria identificadas en el total del VABSAI. Asimismo se indentificó por cada unidad de Valor Agregado primario cuantas unidades se requirieron en los sectores secundarios y terciarios.

En base a la construcción de las exportaciones del SAI a precios de 1993, primarias más manufacturas de origen agropercuario (MOA), se procede a estimar su relación con el PIBSAI en el período considerado.

Se cuantificó el nivel de empleo del SAI, a partir de la Matriz 16 de la MIPAr97, sobre ingreso y empleo. Debido a la falta de información sobre la Población Económicamente Activa (PEA) por actividades para el año 2005 se aplican sobre la PEA ocupada los coeficientes hallados anteriormente, más el efecto tendencia que se registra en los sectores.

5. Redefinicion y alcance del sistema agroindustrial: la relacion con las exportaciones del sai y su impacto en el nivel de empleo

5.1. La redefinición del Sistema Agroindustrial

Diferentes trabajos reconocen que el sector agropecuario es más importante de lo que expresan las estadísticas oficiales (World Bank, 2005). Por esa razón se procedió a redefinir el Sistema Agroindustrial para el período de 1980 al 2005 a precios básicos de 1993, sobre la base del trabajo realizado por el Ministerio de Economía de empalme de las series de las distintas actividades de la economía entre 1980 y 2005. El nuevo SAI comprende el Valor Agregado Bruto SAI (VABSAI) de los ítems desarrollados en el capítulo sobre la metodología

Es importante señalar que el período definido responde a la información disponible acerca de la posibilidad de agregar sobre el sector primario agropecuario, silvicultura y caza, aquellas actividades manufactureras que resultan importantes oferentes y demandantes del sector primario (sector secundario SAI), como también la parte de construcción, otras actividades y de servicios (sector terciario SAI) que demandan los sectores antes definidos.

El enfoque sistémico del SAI ha sido definido adecuadamente, pero es posible que la estructura que se presenta esté sujeta a un proceso de realimentación, producto del desarrollo de la actividad primaria y el cambio tecnológico, cuyos efectos se presentarán en el futuro a través de los sectores secundarios y terciarios que lo conforman.

Los conceptos más similares usados han sido los del complejo agroindustrial y el de la cadena agroindustrial. En la mayoría de los casos se omitieron algunas actividades como las terciarias y la intedependencia de las actividades. El trabajo de la Sociedad Rural comprende desde 1970 hasta 1986, es una serie corta, expresada en australes de1970, pero es el que más se acercó al concepto del SAI, si bien excluye algunas actividades por problemas de los cambios en las funciones de producción y en la tecnología.
Un concepto acotado del SAI estaría determinado por la producción primaria y ciertas manufacturas que, en su conjunto, representaron gran parte de las exportaciones del periodo 1870-2005 (136 años).

Se presenta en el cuadro siguiente la redefinición del SAI a partir de lo expuesto en la metodología y cabe destacar que significó, en el promedio del período, aproximadamente, 8,4 puntos porcentuales de aumento en la participación en el PIB con respecto a la definición tradicional, básicamente por la incorporación de actividades terciarias y construcción, y la fabricación de maquinaria agrícola y de agroquímicos del sector secundario manufacturas, entre otros.

Cuadro 6.1.1. Redefinición del PIBSAI según sectores y actividades, años 1980-2005, a precios de productos básicos, millones de $ de 1993

	VAB Sector primario del SAI	**VAB Sector manufacturas**		
Quinquenios 1980-84 a 2000-04 y año 2005	**VAB Agricultura, ganadería, caza y silvicultura**	15. Elaboración de productos alimenticios y bebidas	16. Elaboración de productos del tabaco	17. Fabricación de productos textiles
1980-1984	10.352	7.603	178	2.155
1985-1989	10.665	7.907	182	2.239
1990-1994	11.732	8.429	188	2.204
1995-1999	13.790	9.083	230	2.209
2000-2004	14.809	8.377	234	2.199
2005	16.967	10.347	275	1.754

Quinquenios 1980-84 a 2000-04 y año 2005	18. Fabricación de productos de vestir	19. Curtido y terminación del cuero	20. Producción de productos de la madera y caucho. Fabricación de productos de paja y trezables	21 Fabricación de papel y productos de papel
1980-1984	1.372	953	1.002	642
1985-1989	1.461	835	1.056	759
1990-1994	1.746	1.054	1.146	936
1995-1999	1.560	1.063	1.364	1.064
2000-2004	983	677	1.285	1.166
2005	1.242	847	1.769	1.399

Quinquenios 1980-84 a 2000-04 y año 2005	23. Fabricación de Coque, productos de la refinación del petróleo y comubustible nuclear que demanda el SAI primario y secundario	2412 y 2421. Fabricación de abonos y compuestos de nitrógeno y plaguicidas de uso agropecuario	25. Fabricación de productos de caucho y plastico que demanda el sector primario
1980-1984	198	124	41
1985-1989	179	147	49
1990-1994	184	186	71
1995-1999	100	387	100
2000-2004	182	854	108
2005	164	1.307	126

Quinquenios 1980-84 a 2000-04 y año 2005	2921. Fabricación de maquinaria agrícola (incluye tractores)	34 Fabricación de vehículos automotores, remolques y semirremolques que genera la demanda del Sector primario	**Total VAB Manufacturas del SAI**
1980-1984	588	97	13.581
1985-1989	554	85	13.994
1990-1994	538	113	15.049
1995-1999	383	120	16.184
2000-2004	294	104	15.463
2005	404	146	18.581

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Suministro de electricidad, gas y agua del sector primario del SAI	VAB Suministro de electricidad, gas y agua del sector manufacturas del SAI	**VAB Total suministro de electricidad, gas y agua del sector primario y manufacturas del SAI**
1980-1984	199	783	982
1985-1989	224	888	1.112
1990-1994	244	988	1.232
1995-1999	234	1.159	1.393
2000-2004	327	1.205	1.532
2005	355	1.393	1.748

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Construcción del sector primario del SAI	VAB Construcción del sector manufacturas del SAI	**VAB Total construcción del SAI**
1980-1984	711	1.032	1.743

1985-1989	778	887	1.664
1990-1994	787	868	1.655
1995-1999	967	1003	1.970

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Transporte almacenamiento y comunicaciones del sector primario del SAI	VAB Transporte, almacenamiento y comunicaciones del sector manufacturas del SAI	**VAB Total de transporte, almacenamiento y comunicaciones de los sectores primario y manufacturas del SAI**
1980-1984	*582*	3.517	4.100
1985-1989	678	4097	4.776
1990-1994	805	4.859	5.664
1995-1999	1.127	6.810	7.937
2000-2004	1.222	7.381	8.603
2005	1.556	9.400	10.957
2000-2004	863	776	1.639
2005	1.196	1.129	2.325

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Comercio al por mayor y al por menor; reparación de vehículos automotores, motocicletas efectos personales y enseres domésticos del sector primario del SAI	VAB Comercio al por mayor y al por menor; reparación de vehículos automotores, motocicletas efectos personales y enseres domésticos del sector manufacturas del SAI	**VAB Comercio al por mayor y al por menor; reparación de vehículos automotores, motocicletas efectos personales y enseres domésticos de los sectores primario y manufacturas del SAI**
1980-1984	439	2.012	2.451
1985-1989	413	1.891	2.304
1990-1994	484	2.220	2.704
1995-1999	575	2.635	3.210
2000-2004	507	2.323	2.830
2005	603	2.763	3.366

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Intermediación financiera del sector primario del SAI	VAB Intermediación financiera del sector manufacturas del SAI	**VAB Intermediación financiera del SAI**
1980-1984	476	742	1.219

1985-1989	474	622	1.096
1990-1994	564	720	1.284
1995-1999	994	1219	2.213
2000-2004	989	1079	2.068
2005	859	974	1.833

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Actividades inmobiliarias, empresariales y alquiler del sector primario del SAI	VAB Actividades inmobiliarias, empresariales y alquiler del sector manufacturas del SAI	**VAB Actividades inmobiliarias, empresariales y alquiler de los sectores primario y manufacturas del SAI**
1980-1984	500	1.205	1.705
1985-1989	527	1.270	1.798
1990-1994	571	1.375	1.945
1995-1999	694	1.672	2.366
2000-2004	704	1.697	2.401
2005	757	1.824	2.581

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Administración pública y defensa, planes de S.S de afiliación obligatoria del manufacturas del SAI	VAB Administración pública y defensa, planes de S.S de afiliación obligatoria del sector primario del SAI	**VAB Administración pública y defensa, planes de S.S de afiliación obligatoria de los sectores primario y manufacturas del SAI**
1980-1984	206	167	373
1985-1989	217	176	393
1990-1994	235	191	426
1995-1999	286	232	518
2000-2004	290	236	525
2005	312	253	565

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Enseñanza, servicios sociales y de salud del manufacturas del SAI	VAB Enseñanza, servicios sociales y de salud del sector primario del SAI	**VAB Enseñanza, servicios sociales y de salud de los sectores primario y manufacturas del** SAI
1980-1984	8	37	45
1985-1989	9	41	50
1990-1994	10	45	55
1995-1999	12	54	66

2000-2004	13	60	74
2005	14	65	80

Quinquenios 1980-84 a 2000-04 y año 2005	VAB Otras actividades de servicios, comunitarios, sociales, personales y hogares privados con servicio doméstico del sector primario del SAI	VAB Otras actividades de servicios, comunitarios, sociales, personales y hogares privados con servicio doméstico del sector manufacturas del SAI	**VAB Otras actividades de servicios, comunitarios, sociales, personales y hogares privados con servicio doméstico de sectores primario y manufacturas del SAI**
1980-1984	7	31	38
1985-1989	8	36	43
1990-1994	9	40	48
1995-1999	10	47	57
2000-2004	10	48	59
2005	12	56	68

Quinquenios 1980-84 a 2000-04 y año 2005	**VAB Total teciario y construcciones del SAI**	**VAB Total del SAI**
1980-1984	13.132	**37.066**
1985-1989	13.710	**38.368**
1990-1994	15.577	**42.358**
1995-1999	20.783	**50.757**
2000-2004	20.721	**50.993**
2005	24.382	**59.930**

Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secretaría de Política Económica. Ministerio de Economía y Producción.2007

Este nuevo SAI en su alcance redefinido presenta características que desde un enfoque sistémico resultan relevantes por su relación con el PIB, el empleo y las exportaciones que genera. Como se puede ver en el cuadro 6.1.2 en el período 1980-2005 la participación promedio del VABSAI de Agricultura, Ganadería, Caza y Silvicultura en el VAB total de la economía fue de 6,1%; la participación promedio atribuida al VABSAI manufacturas fue de 7,4% y la del VABSAI servicios y otros (Electricidad, Gas y Agua, Construcciones y Otros) fue de 8,2%. Por lo tanto el VAB del SAI, representó 22% del promedio del VAB total (ver cuadro 6.1.3).

Por otra parte del 100% VABSAI, en el promedio de los veintiséis años considerados, 28% correspondió al sector primario, 34% al secundario y 38% al definido como terciario (ver cuadro 6.1.4).

El SAI es mucho más que computar su sector primario y algunas de sus manufacturas. A través del tiempo se percibe un importante crecimiento de los servicios que demandan el sector primario y secundario manufacturero. En la medida que la actividad primaria siga creciendo, la cual es el motor del SAI, se puede decir que es posible que aumente la participación de los sectores secundario y terciario dentro del SAI.

Como se puede ver en el cuadro, en relación al promedio de los años 1980-2005, por cada unidad primaria del SAI, se produjo 1,2 de unidad secundaria y 1,4 de la terciaria (ver cuadro 6.1.5.). Estos coeficientes cambiarán de acuerdo a cómo se modificará la estructura del PIB de la actividad primaria.

Cuadro 6.1.2. Participación de cada parte del VAB del SAI en el total del VAB de la economía (a precios de productos básicos y en millones de $ de 1993)

Quinquenios 1980-84 a 2000-04 y año 2005	1.VAB Total Econo-mía	2. VABSAI primario	2 /1 Part. %	3.VABSAI manufac-turas	3/1 Part. %	4.VABSAI terciario y construc-ción	4 /1 Part. %
1980-1984	173.236	10.352	6,0	13.581	7,8	13.132	7,6
1985-1989	176.936	10.665	6,0	13.994	7,9	13.710	7,7
1990-1994	194.459	11.732	6,0	15.049	7,7	15.577	8,0
1995-1999	235.805	13.790	5,8	16.184	6,9	20.783	8,8
2000-2004	233.702	14.809	6,3	15.463	6,6	20.721	8,9
2005	271.168	16.967	6,3	18.581	6,9	24.382	9,0
Promedio de la serie 1980 -2005	**205.456**	**12.450**	**6,1**	**14.997**	**7,4**	**17.077**	**8,2**

Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secretaría de Política Económica. Ministerio de Economía y Producción.2007

Cuadro 6.1.3 Participación del VABSAI en el total del VAB de la economía

Quinquenios 1980-84 a 2000-04 y año 2005	% VABSAI/VAB Total
1980-1984	21,4
1985-1989	21,7
1990-1994	21,8
1995-1999	21,5
2000-2004	21,8
2005	22,1
Promedio 1980-2005	**22,5**

Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secretaría de Política Económica. Ministerio de Economía y Producción.2007

Cuadro 6.1.4. Participación de cada sector de VABSAI en el VABSAI total

Quinquenios 1980-84 a 2000-04 y año 2005	Part.% del VABSAI primario en el total VAB SAI	Part.% del VABSAI manufacturas en el total VAB SAI	Part.% del VABSAI terciario, construcción y otras actividades en el total VAB SAI
1980-1984	27,9	36,6	35,4
1985-1989	27,8	36,5	35,7
1990-1994	27,8	35,6	36,6
1995-1999	27,2	31,9	40,9
2000-2004	29,1	30,3	40,6
2005	28,3	31,0	40,7
Promedio 1980-2005	**28,0**	**33,7**	**38,4**

Fuente: Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secetaría de Política Económ ica. Ministerio de Economía y Producción.2007

Cuadro 6.1.5 Por cada unidad del sector primario cuantas unidades corresponden a los sectores manufacturas y terciario, incluido la construcción, $ de 1993

Quinquenios 1980-84 a 2000-04 y año 2005	VABSAI Primario/VABSAI Primario	VABSAI Secundario/VABSAI Primario	VABSAI Terciario/VABSAI Primario
1980-1984	1,0	1,3	1,3
1985-1989	1,0	1,3	1,3
1990-1994	1,0	1,3	1,3
1995-1999	1,0	1,2	1,5
2000-2004	1,0	1,0	1,4
2005	1,0	1,1	1,4
Promedio 1980-2005	1,0	1,2	1,4

Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secetaría de Política Económica. Ministerio de Economía y Producción.2007

Resulta importante ver la relación del PIBSAI con las exportaciones del sistema que se generó en el período analizado. El cuadro 6.1.6 muestra la evolución que se registró entre los años 1980 al 2005 y se destaca un fuerte proceso de crecimiento relativo que se observa partir de la década del 90 y continúa en los primeros años del 2000. Se puede inferir que refleja el mejor nivel de apertura externa que se logra a partir de la década comentada. Las exportaciones correspondieron a los productos primarios más las manufacturas de origen agropecuario. Por lo tanto puede haber bienes que en el nomenclador aduanero se consideran como manufacturas de origen industrial, cuando en realidad serían del SAI en este nuevo concepto, tal es el caso de herramientas agrícolas y tractores, fertilizantes, pasta celulósica etc. No obstante, se debe mencionar que el monto que no se ha computado no es tan significativo todavía.

También se estimaron las exportaciones sobre los tres sectores que conforman el sistema, por cuanto si la relación se hubiera realizado sobre el primario y secundario solamente el porcentaje obtenido habría sido mayor, pero se habría trabajado con partes del sistema lo cual no es correcto desde un enfoque sistémico.

Cuadro 6.1.6. Las XSAI y el PIBSAI en millones de $ de 1993, años 1980-2005

Quinquenios 1980-84 a 2000-04 y año 2005	PIB SAI	X SAI	% de X SAI/ PIBSAI
1980-1984	30.889	4.704	15,2
1985-1989	38.368	6.276	16,4
1990-1994	42.358	8.671	20,5
1995-1999	50.757	13.401	26,4
2000-2004	50.993	16.707	32,8
2005	59.930	22.584	37,7

Fuente: Elaborado sobre información de la Dirección de Cuentas Nacionales. Secetaría de Política Económica. Ministerio de Economía y Producción.2007

6.2. El Sistema Agroindustrial es un generador de empleo creciente por cuanto a medida que aumentó la producción primaria lo hizo en mayor medida los sectores secundarios y terciarios imputados que demandaron empleo en forma intensiva, en particular cuando la economía estuvo más abierta y no existió un fuerte sesgo discriminatorio. Si se parte del SAI definido en cuanto a las actividades que lo conforman, se puede estimar en base a la matriz 16 sobre generación de ingreso y puestos de trabajo, (MIPAr97), la cantidad de personas empleadas por las partes del sistema o sea por los sectores definidos como primario, secundario y terciario, como también su relación conjunta respecto del total empleado.

Cuadro 6.2.1 Personal ocupado por el sistema agroindustrial y su relación con la población ocupada, año 1997 (miles de personas)

Concepto	Personal ocupado	% del SAI / Total ocupado
Sector primario	**969**	**7,4**
Sector secundario	**765**	**5,9**
sector terciario	**1.042**	**8,0**
Total SAI	**2.775**	**21,3**
Total nacional	**13.020**	**100,0**

Fuente: Elaboración propia sobre la base de la matriz 16 de la matriz de insumo-producto de

De acuerdo con información del Ministerio de Economía y Producción, en el año 2005 la población económicamente activa (PEA) fue de 15,52 millones de personas, equivalente al 44,85% de la población total. De este porcentaje el 88,9% estaba ocupado y el 11,9% restante desocupado. Si se efectúa una proyección sobre la base del comportamiento del VABSAI, debido a la falta de información sobre la distribución según actividades de la población total ocupada, se obtuvo que el SAI en el 2005 demandó 3,2 millones de personas, equivalente al 23% del total ocupado, tal como se puede ver en el siguiente cuadro.

Cuadro 6.2.2. Personal ocupado por el sistema agroindustrial y su relación con la población total ocupada, año 2005 (miles de persona).

Concepto	Personal ocupado	% del SAI / total ocupado
Sector primario	**1.027**	**7,4**
Sector secundario	**966**	**7,0**
Sector terciario	**1.242**	**9,0**
Total SAI	**3.235**	**23,4**
Total nacional	**13.800**	**100,0**

Fuente: Elaboración propia en base a información del Ministerio de Economía y Producción

Es posible que la participación haya sido mayor, debido a que muchos coeficientes empleados quedaron fijos en la MIPAr97 y pueden haber cambiado. Por otra parte se debe recordar que algunas actividades vinculadas a la demanda del sector manufacturas, demandante de productos primarios, no fueron computadas por no tener fuentes más consistentes de información. No obstante con el aumento se estimó que se acercaría a 3,5 millones de personas.

Existen trabajos que consideraron mayor la incidencia del SAI en el empleo, tal es el caso del realizado por Llach, Harriague y O´ Connor (2004) sobre el impacto de los sectores agropecuario y agroindustrial en la creación de empleo que señala que en el año 2003 el total de empleo generado por las cadenas fue de 5,57 millones de puestos (EAT), lo cual representó el 36,5% de total ocupado.

Se puede advertir una diferencia importante entre ambos resultados, lo cual quedará mejor especificado cuando se termine la nueva matriz de Insumo-Producto. No obstante se puede ver el rol relevante del SAI como generador de puestos de trabajo.

7. Conclusiones

Este trabajo contribuye a una estimación más aproximada del Sistema Agroindustrial (SAI), durante el período 1980-2005. Con este propósito se incorporaron en el cálculo algunas actividades de los sectores secundario y terciario hasta ahora no consideradas, con lo cual se destacó que el SAI es más representativo en el nivel de actividad económica y en la generación de empleo.

Se redefinió la estimación del Sistema Agroindustrial (SAI) durante el período 1980-2005, a partir de la información obtenida en la MIP1997 y de las Cuentas Nacionales del MECON. Ahora el PIBSAI contiene, además del sector primario, el secundario como demandante de productos primarios u oferente de insumos y bienes de capital y el terciario como proveedor de servicios al sector primario y al secundario. El PIBSAI se estimó a través del VABSAI a precios de 1993, esta variable representó el 22,5% del VAB total, en promedio, durante el período 1980-2005. La nueva estimación confirma que el sector agropecuario por sus interrelaciones es mucho más de lo que se puede inferir de las estadísticas oficiales. En la medida que el sector primario aumentó su valor agregado bruto, lo hizo en mayor magnitud el sector terciario del sistema. Es relevante mencionar que el VABSAI promedio de los años 1980-2005 presentó una

estructura en la cual el sector terciario más construcciones SAI fue el 38%, seguido por el secundario con el 34% y luego el primario con el 28%. Esto es un aspecto fundamental en cuanto a los efectos sobre el crecimiento y el empleo. La redefinición del SAI significó en el promedio del período, aproximadamente, 8,4 puntos porcentuales de aumento en la participación en el PIB. Las exportaciones del SAI con respecto al PIBSAI crecieron del 15,2% obtenido en el promedio del quinquenio 1980-84 al 32,8% en 2000-04 y 37,7% en el año 2005.

Por lo expuesto se cumplen los objetivos propuestos en este trabajo y se debe destacar que el PIBSAI es un sistema de eslabonamiento de actividades que alcanza su mayor nivel cuando sus partes pueden interactuar armónicamente.

8. Bibliografia

ACKOFF, R. L. 1983 Planificación de la Empresa del Futuro. Ed. Limusa, México, D.F. p. 15-70

DIRECCIÓN NACIONAL DE CUENTAS NACIONALES, INDEC, SECRETARÍA DE POLÍTICA ECONÓMICA, MINISTERIO DE ECONOMÍA Y PRODUCCIÓN. 2007. Producto Interno Bruto a Precios de Marcado, Serie empalmada 1980-2005. Millones de pesos a precios de 1993. Valores Agregados Brutos sectoriales a Precios Básicos. Buenos Aires.

DRUCKER, P. 1999. Los desafíos de la Administración del siglo XXI. Editorial Sudamericana S.A. Buenos Aires. p. 118 - 146.

INDEC. 2005. Anuario Estadístico de la República Argentina. Buenos Aires.

INSTITUTO DE ESTUDIOS ECONÓMICOS DE LA SOCIEDAD RURAL ARGENTINA. 1987. Complejo Agro - Industrial. Indicadores. Sociedad Rural Argentina. Buenos Aires. Cuaderno especial N°1. p. 1 - 21.

LEONTIEF, W. 1973. Análisis Económico Input - Output. Editorial Ariel, S.A Barcelona, España. p. 47 - 82.

LLACH, J. HARRIAGUE, M.M. Y O'CONNOR, E. 2004 La Generación de Empleo en las Cadenas Industriales. Fundación Producir Conservando. Buenos Aires.

PORTER, M. E. 1991. La Ventaja Competitiva de las Naciones. Javier Vergara Editor, Buenos Aires. p. 22 - 185.

SECRETARÍA DE POLÍTICA ECONÓMICA E INSTITUTO NACIONAL DE ESTADÍSTICAS Y CENSOS. 2001. Matriz de Insumo-Producto 1997 (MIPAr97). INDEC. Buenos Aires.

SYSTEM BASED IN FUZZY RULES WITH PARAMETERS STRUCTURED IN NEW INSTITUTIONAL ECONOMICS FOR EVALUATION OF TRANSACTION UNCERTAINTY BETWEEN CASSAVA PRODUCERS AND ITS DEALERS

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Abstract
The fuzzy logic admits infinite intermediate between the logical values false and true. With this principle, we developed in this paper a system based on fuzzy rules that indicates the index level of uncertainty related to transactions between rural growers and its clients. For this research we have analyzed cassava growers and their dealers in a particular region, Tupã and Assis regions located in the West part of São Paulo State, Brazil. The model should be able to identify possible deficiencies in their trade relations, thus being able to offer future public policies to remedy these problems. The fuzzy system was developed as input variables on information sharing between grower and dealers on the following concepts (1) Demand/purchase Forecasting, (2) Production Forecasting and (3) Shared information on production innovations, while the output is the level uncertainty concerning the commercial transaction between buyer and seller agent. The output variable is the level of uncertainty regarding the business transaction between seller and buyer agent, which may serve as a system for detecting defects and also of great transactions, the level being classified qualitatively by linguistic fuzzy sets "very low", " Low, "" Medium 1 "," Medium 2 "," Medium 3 "," High "and" Very High ". For demonstrating the use and application of this system, an analysis of 28 cassava growers registered in the Regional Development Offices and Tupã Assis, São Paulo, Brazil, and 48 of their clients. After using the system, we determined an overall assessment of the producers (and their customers) with a higher degree of relevance to the fuzzy set Medium 1. From this work, you can perform simulations of actions that could be implemented to improve the degree of uncertainty, since in this case the objective is to improve this to a lower degree than today.

Key words: policies, rules-based system fuzzy detection of deficiencies

SYSTEM BASED IN FUZZY RULES WITH PARAMETERS STRUCTURED IN NEW INSTITUTIONAL ECONOMICS FOR EVALUATION OF TRANSACTION UNCERTAINTY BETWEEN CASSAVA PRODUCERS AND ITS DEALERS

1. Introduction

Menard (2000) presents New Institutional Economics (NIE) as a theoretical approach to understand economic relationships that occur as an alternative form of organizing transactions. NIE considers the State and institutions as important factors in market functions, regulating the role of economic agents by developing governance structures that affect the efficiency of transactions. Originally, NIE comprises two levels: the Institutional Environment, that is, the rules of the game, considering both formal and informal rules that govern individual behavior and structure social interactions.

The second level is related to governance structures, under the attention of Transaction Cost Economic (TCE). Governance structures are understood as appropriate choices to govern a transaction. TCE aims at explaining mechanisms and structures that were created to reduce risks and costs incurred in making an economic exchange. TCE focuses on the structures in which organizations are held (hybrid structures, spot market or vertical integration) (WILLIAMSON, 1998). However, Menard (2002) mentions the considerable diversity of agreements between autonomous entities that have business relationships. Such agreements are considered intermediate arrangements established for the purpose of reducing transaction costs.

According to Omta et al. (2002), Transaction Cost Economics (TCE) and agency theory offer a rationale that allows for "make" or "buy" decisions. Such decisions determine whether activities along the chain will be integrated or carried out with other firms. According to Williamson (1998), some variables influence governance choice as opportunism and bounded rationality (characteristics of agents); and asset specificity, frequency and uncertainty (characteristics of the transaction).

Uncertainty related to transaction is the focus of this paper. The uncertainty corresponds to the lack of capacity to predict future events. Thus, the higher the uncertainty, the higher the losses due to opportunistic behavior of the parties involved. Uncertainty can be endogenous or exogenous. The endogenous is related to the difficulty of measuring the characteristics of the product. Exogenous uncertainty is related to the difficulty of predicting future situations related to the instability of demand and supply, or to agents behavior. We also highlight the uncertainties related to macroeconomic and institutional environments. Azevedo (2000) stated that, in agriculture, the uncertainty is manifested through climate changes and the occurrence of pests and diseases. Also noteworthy is the uncertainty regarding the marketing of products, they present a postharvest life and the very short time to complete the transaction contributes to the opportunism of the agents involved.

Evaluation of analytical categories related to the identification of characteristics of transactions between agents producers / consumers can be observed in the work of REYS et al. (2009), REYS et al. (2010) and ARBAGE (2004) studying the costs of the transaction categories focused on opportunism, measured in terms of standards of behavior and measured in terms of confidence, using the fuzzy theory, enabling the

modeling and manipulation of vague and inaccurate information mathematically, natural of human language.

The use of fuzzy logic in problems of assessing land phenomena, biological and administration has become an extremely efficient and effective alternative in the face of recurrent stochastic methods. Applications in management of energy use (CREMASCO, 2008), in estimating the welfare of broiler breeders (PEREIRA et al., 2008), designing fuzzy body mass indexes of cattle to determine the optimal timing of slaughter (GABRIEL FILHO et al., 2011), factors considered by agribusiness in the choice of great agricultural regions (BAIMA et al., 2003) and integrated and interactive system in bid optimization for portfolio management in agribusiness (DUVAL & FEATHERSTONE, 2002) comprise the various applications that this theory, based on mathematical methods and computational intelligence, is able to cover.

Fuzzy logic provides for the creation of genetic algorithms, which are able to mimic part of human reasoning. These methods are synthesized by creating a computer program based on rules created from this logic, we call fuzzy rule-based system (BARROS & BASSANEZI, 2010).

This theory seeks to apply mathematics to diffuse concepts, it was introduced by Lotfi Asker Zadeh in 1965 and seeks to approximate human reasoning by fuzzy sets, also described by linguistic variables (ZADEH, 1965).

The objective of this work is to develop a system based on fuzzy rules that indicates the index level of uncertainty related to transactions between rural growers and its clients. For this research we have analyzed cassava growers and their dealers in a particular region, Tupã and Assis regions located in the West part of São Paulo State, Brazil. The model should be able to identify possible deficiencies in their trade relations.

2. Materials and Methods

Data collection of this experimental work was conducted by interviewing 28 registered cassava growers in the Regional Development Offices of Tupã and Assis, São Paulo, Brazil, and 48 dealers. This number is explained by the analysis of the two main dealers in terms of revenue, for the period from 2008 to 2010. As some growers only sell to one dealer, the number of responses was 48.

The interviews sought to determine characteristics about the information sharing between producer and dealers on the following concepts (1) Demand/purchase Forecasting, (2) Production Forecasting and (3) Shared information on production innovations, being classified as "Low", "Medium" and "High ".

From the interviews we were able to design a profile of transaction based on these three main variables, seeking to further determine the assessment of uncertainty related to the transaction (Figure 1) using quantitative methods.

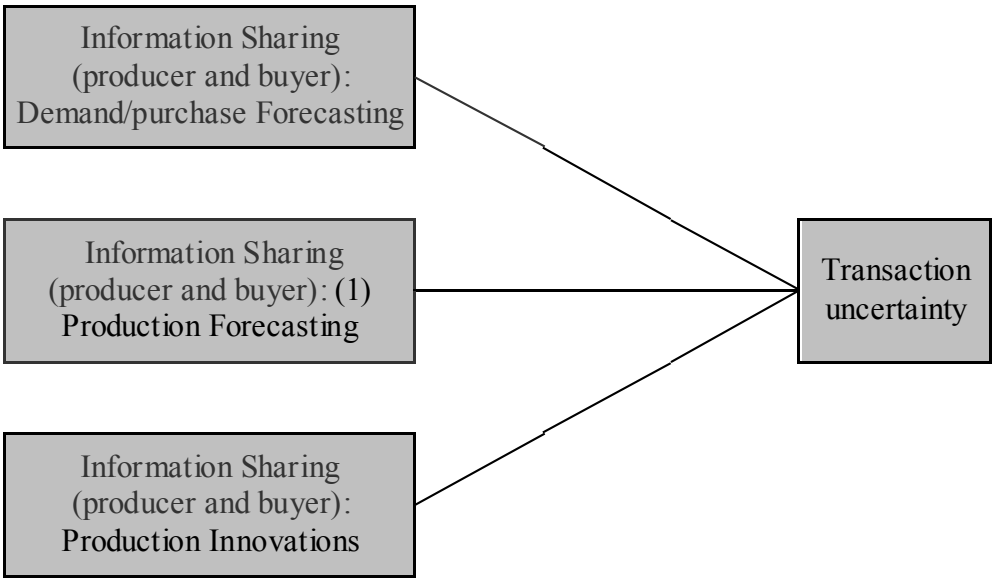

Figure 1. System variables.

To create a fuzzy rule-based system it was necessary to define an input processor, a set of linguistic rules, a fuzzy inference method and an output processor, which generates a real number as exit (CREMASCO, 2008). Figure 2 illustrates the fuzzy rule-based system proposed.

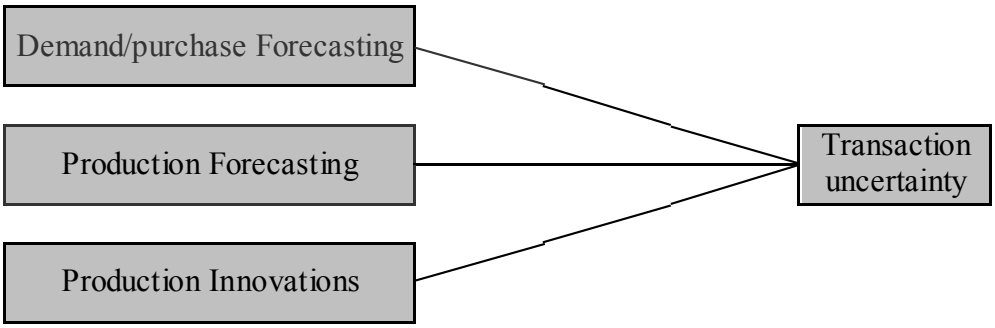

Figure 2. Proposed system based on fuzzy rules for evaluation of uncertainty.

The input variables of the system based on fuzzy rules were proposed then "Demand/purchase Forecasting", “Production Forecasting” and “production innovations”. For each variable, we defined three membership functions called "Low" (L), "Medium" (M) and "High" (H), defined according to Table 1 and Figures 3, 4 and 5, in which the notes 1, 2 and 3 have a degree of relevance 1 to the sets L, M and H, respectively.

Table 1. Definition of membership functions of input variable.

Fuzzy Set	**Type**	**Delimiters**
“Low” (L)	Trapezium shaped	[-0.5, 0.5; 1, 1.5]
“Medium”(M)	Triangle shaped	[1, 1.5; 2]
“High” (H)	Trapezium shaped	[1.5, 2, 3.5, 4.5]

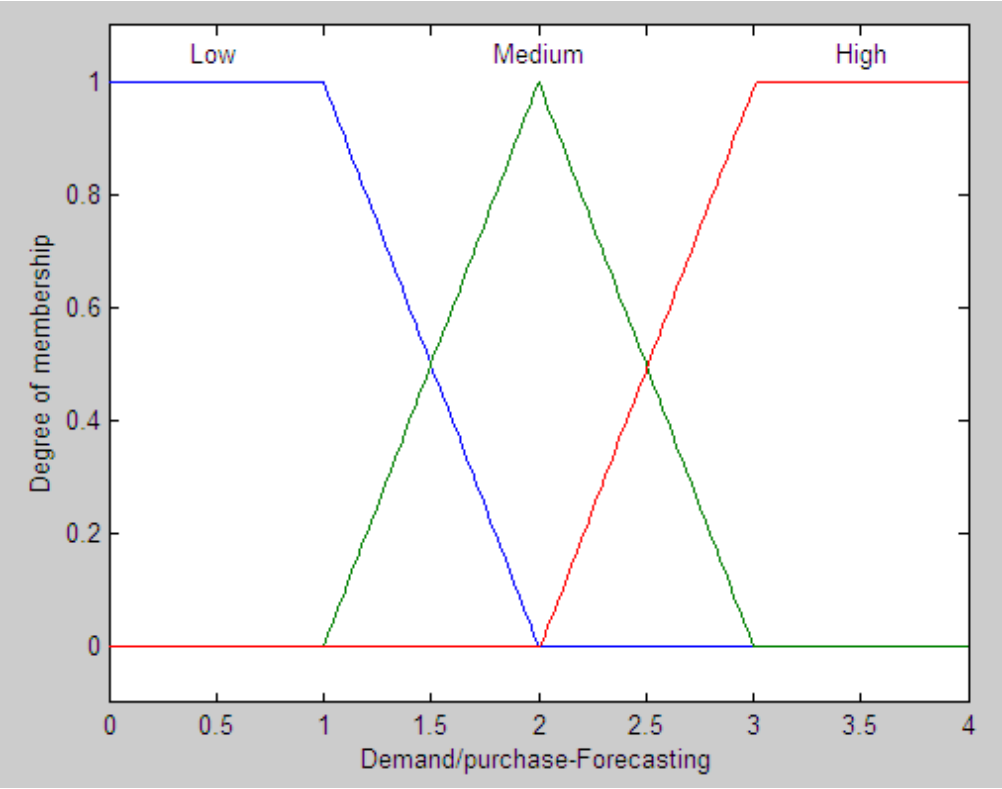

Figure 3. Membership functions defined for fuzzy sets of input variable "Demand/purchase Forecasting".

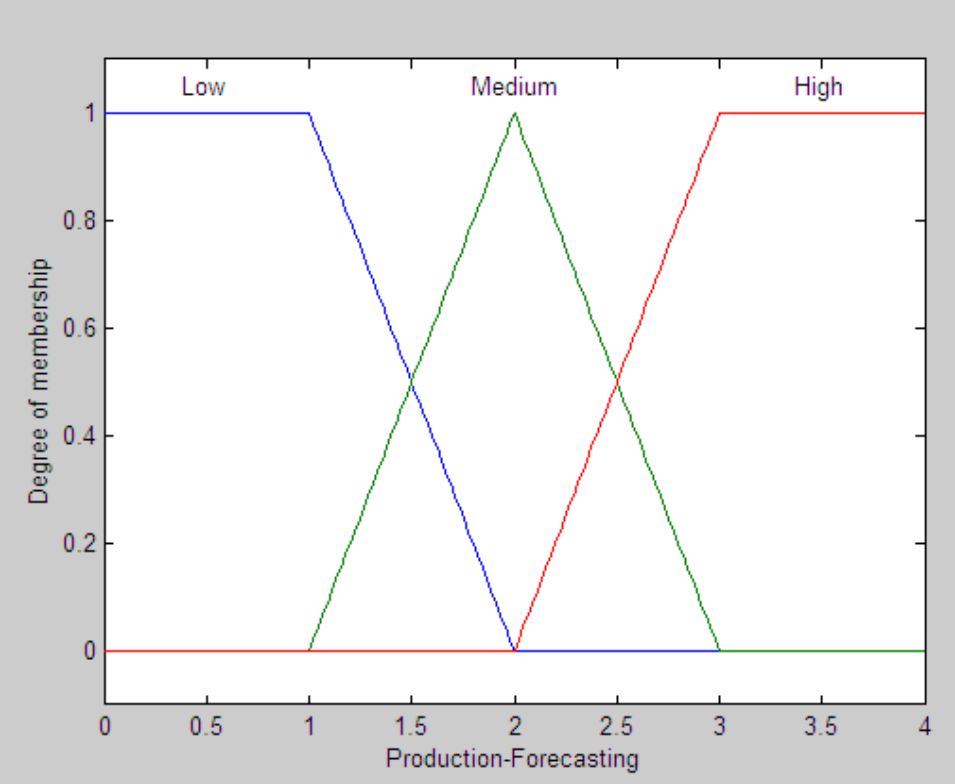

Figure 4. Membership functions defined for fuzzy sets of input variable "Production Forecasting".

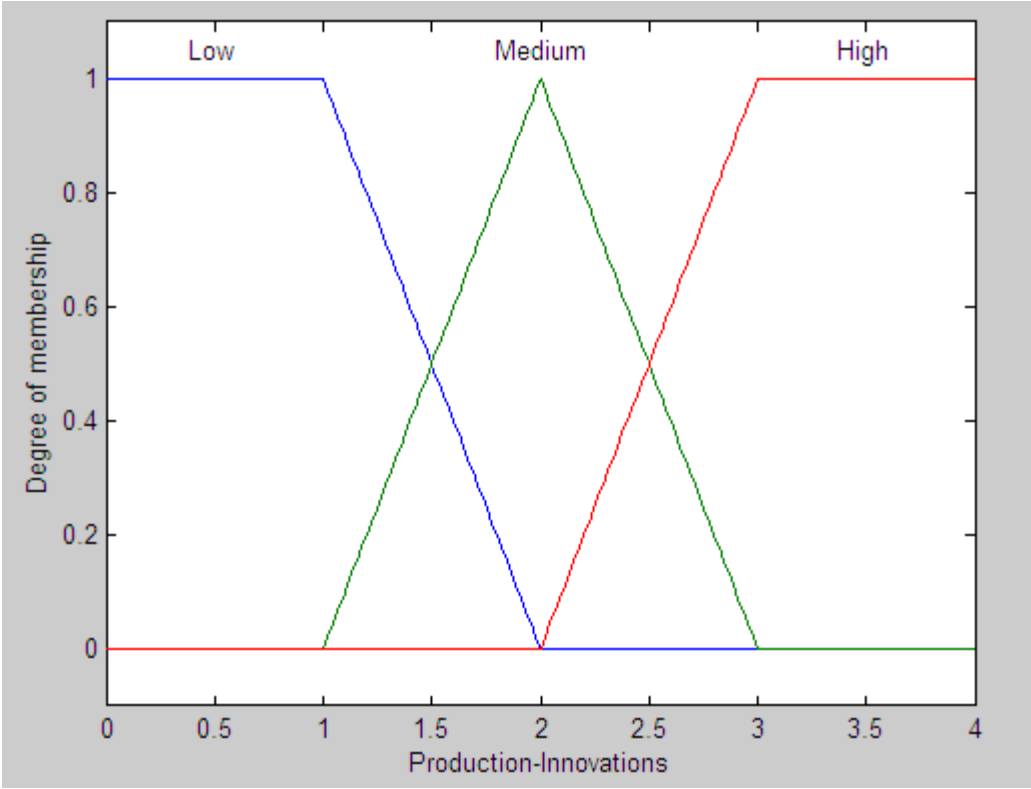

Figure 5. Membership functions defined for fuzzy sets of input variable “Production Innovations”.

The output variable is the level of uncertainty regarding the business transaction between seller and buyer agent, which can serve as a system for detecting defects and also the excellent relations that exist between cassava producers and their dealers with a level qualitatively ranked by linguistic fuzzy sets "Very Low", "Low" "Medium 1", "Medium 2", "Medium 3", "High" and "Very High" (Table 2 and Figure 6).

Table 2. Definition of membership functions of input variable.

Fuzzy Set	**Type**	**Delimiters**
“Very Low” (VL)	Trapezium shaped	[-1, 0, 1, 1.33]
“Low” (L)	Triangle shaped	[1, 1.33, 1.67]
“Medium 1”(M1)	Triangle shaped	[1.33, 1.67, 2]
“Medium 2”(M2)	Triangle shaped	[1.67, 2, 2.33]
“Medium 3”(M3)	Triangle shaped	[2, 2.33, 2.67]
“High”(H)	Triangle shaped	[2.33, 2.67, 3]
“Very High” (VH)	Trapezium shaped	[2.67, 3, 4, 5]

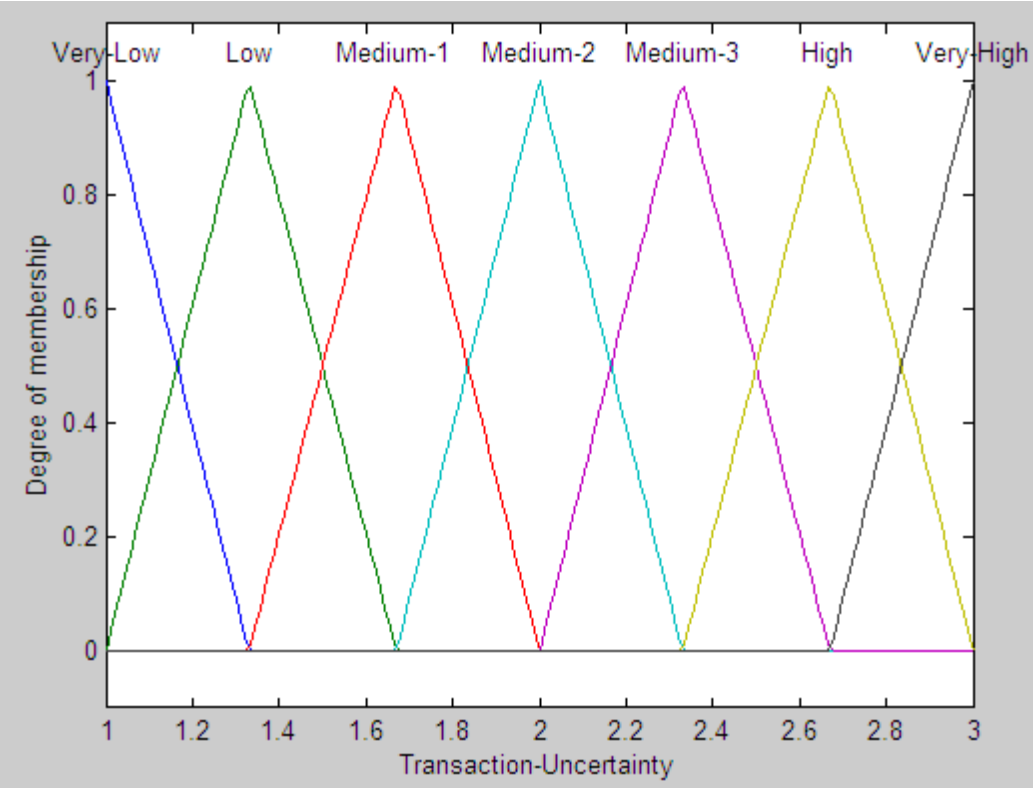

Figure 6. Membership functions defined for fuzzy sets of output variable "Transaction uncertainty".

To create a mathematical model, it was necessary to determine the relationship between input and output variables, which is equivalent to a intelligent system (AI). This rule base fuzzy system, considered the 27 ($3 \times 3 \times 3$) combinations of the three fuzzy sets of input variables. The classification of each combination was then made through interviews with experts.

The inference method used to calculate the numerical value of the output variable according to the rule base was that of the Mamdani (AMENDOLA et al., 2011).

With the tool Fuzzy Logic Toolbox of MATLAB® 7.0 software, Copyright 1984-2004 The MathWorks Inc., it was possible to create a system based on fuzzy rules computationally, and also determined a surface and a contour map representation of the system.

3. Results and Discussion

The interviews allowed the experts to determine the relationships shown in Table 3.

Table 3. Relations between the input and output variables.

Demand/purchase Forecasting	Production Forecasting	Shared information on production innovations	Transaction uncertainty
L	L	L	VH
L	L	M	H

L	L	H	M3
L	M	L	H
L	M	M	M3
L	M	H	M2
L	H	L	M3
L	H	M	M2
L	H	H	M1
M	L	L	H
M	L	M	M3
M	L	H	M2
M	M	L	M3
M	M	M	M2
M	M	H	M1
M	H	L	M2
M	H	M	M1
M	H	H	L
H	L	L	M3
H	L	M	M2
H	L	H	M1
H	M	L	M2
H	M	M	M1
H	M	H	L
H	H	L	M1
H	H	M	L
H	H	H	VL

Legend: L = Low, M = Medium, H = High, VL = Very Low, M1= Medium 1, M2 = Medium 2, M3 = Medium 3, VH = Very High.

Table 3 represents the base of the fuzzy rules. Thus, the character of example, the first line represents the relationship:

- If information sharing between producer and dealers (the "Demand/purchase Forecasting" is Low), (the "Production Forecasting" is Low) and (the " Production Innovations" is Low) then (the "Transaction uncertainty" is "Very High ");

With the implementation of the rule base in Matlab, the fuzzy system is fully determined, as shown in Figure 7.

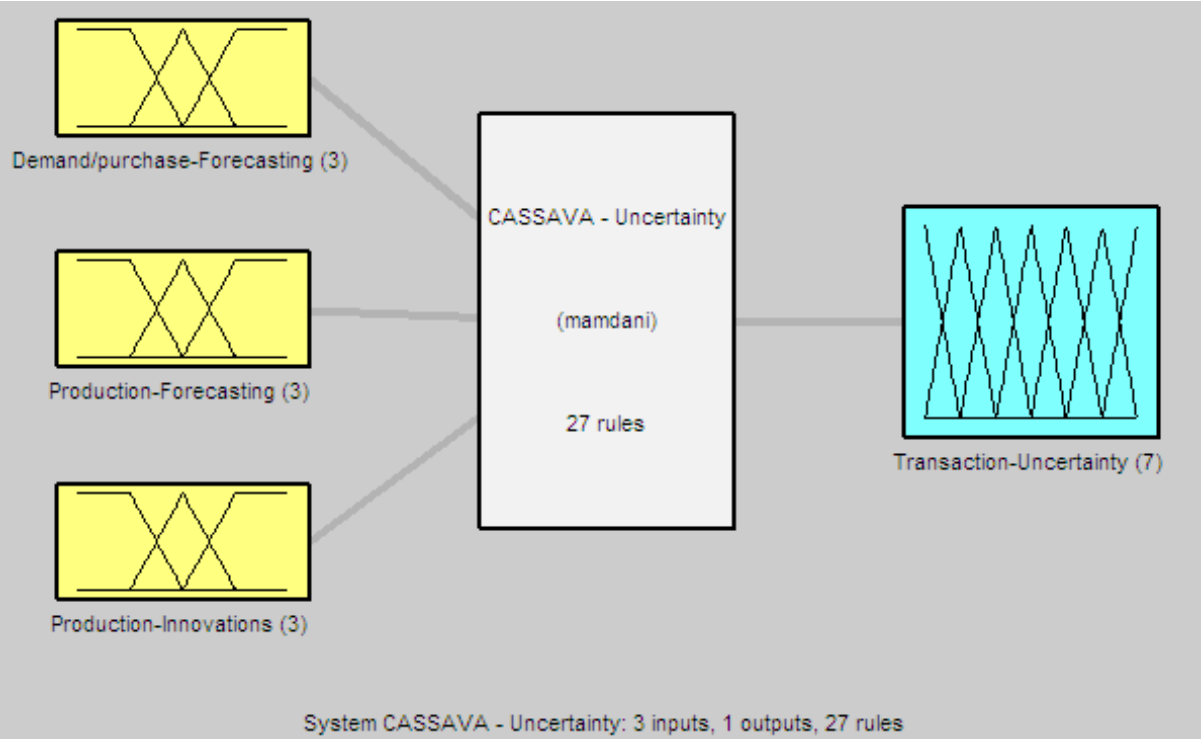

Figure 7. System based in fuzzy rules proposed for assessing the uncertainty related to transactions between merchants and their customers cassava.

Using the Mamdani inference method, we get the surface given in Figure 8 as a solution of the fuzzy system, with contour map given by Figure 9.

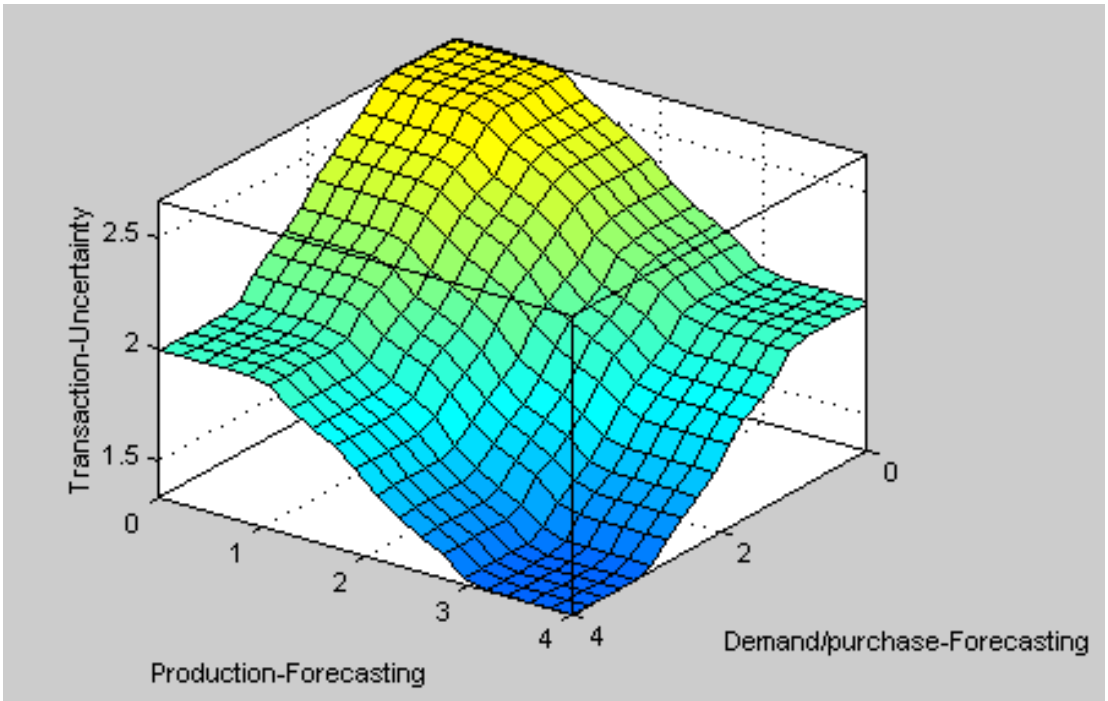

Figure 8. Surface Response of three-dimensional mathematical model represented the possible answers when the variable "Production Innovations" is set to "Medium".

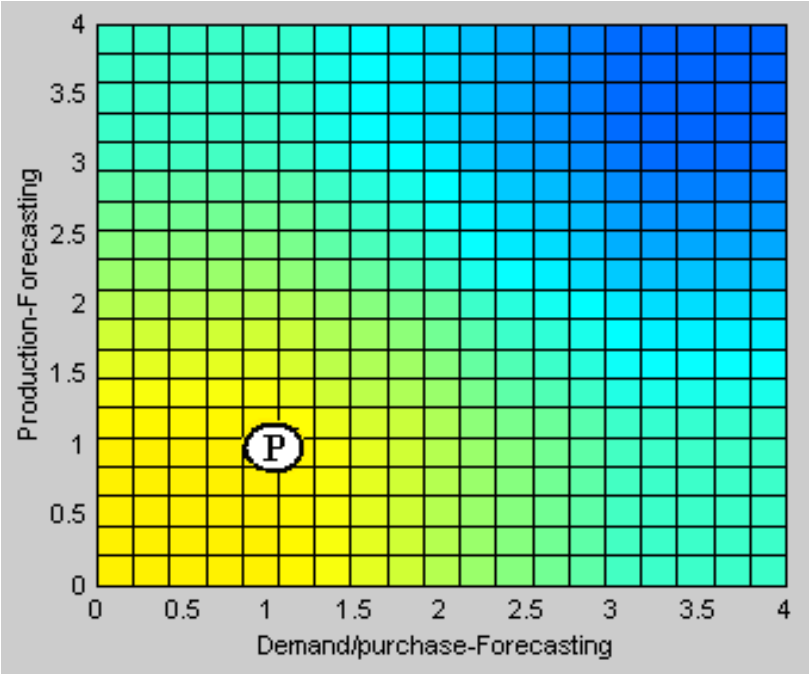

Figure 9. Contour map of the system when the variable "Production Innovations" is set as "Medium".

From Figures 9 and 10, it is possible to identify the region on the “Demand/purchase Forecasting" × "Forecast production" that establishing values for the "Transaction uncertainty", when the "Production Innovations" is set to "Medium", figuring an excellent tool decision making for administrators to create Regional Development Offices of strategies for public policy actions to improve one of three input variables. The other situations can be determined directly in the computer system implemented in Matlab fuzzy.

Figure 10 represents a simulation of system based on fuzzy rules for values of Demand/Purchase Forecasting, Production Forecasting and Production Innovations obtained in the interviews with a group of cassava producers, also indicated in Figure 9 at point P.

Visually, this point is in a low position in relation to other business transactions, and this is also found in calculating their Fuzzy Uncertainty in the transaction, given by 2.67 (Figure 10). Performing an analysis related to membership functions of output variable, you can see that this point has higher degree of membership in fuzzy set "High" (H), namely a degree of relevance 1, as shown in Figure 11.

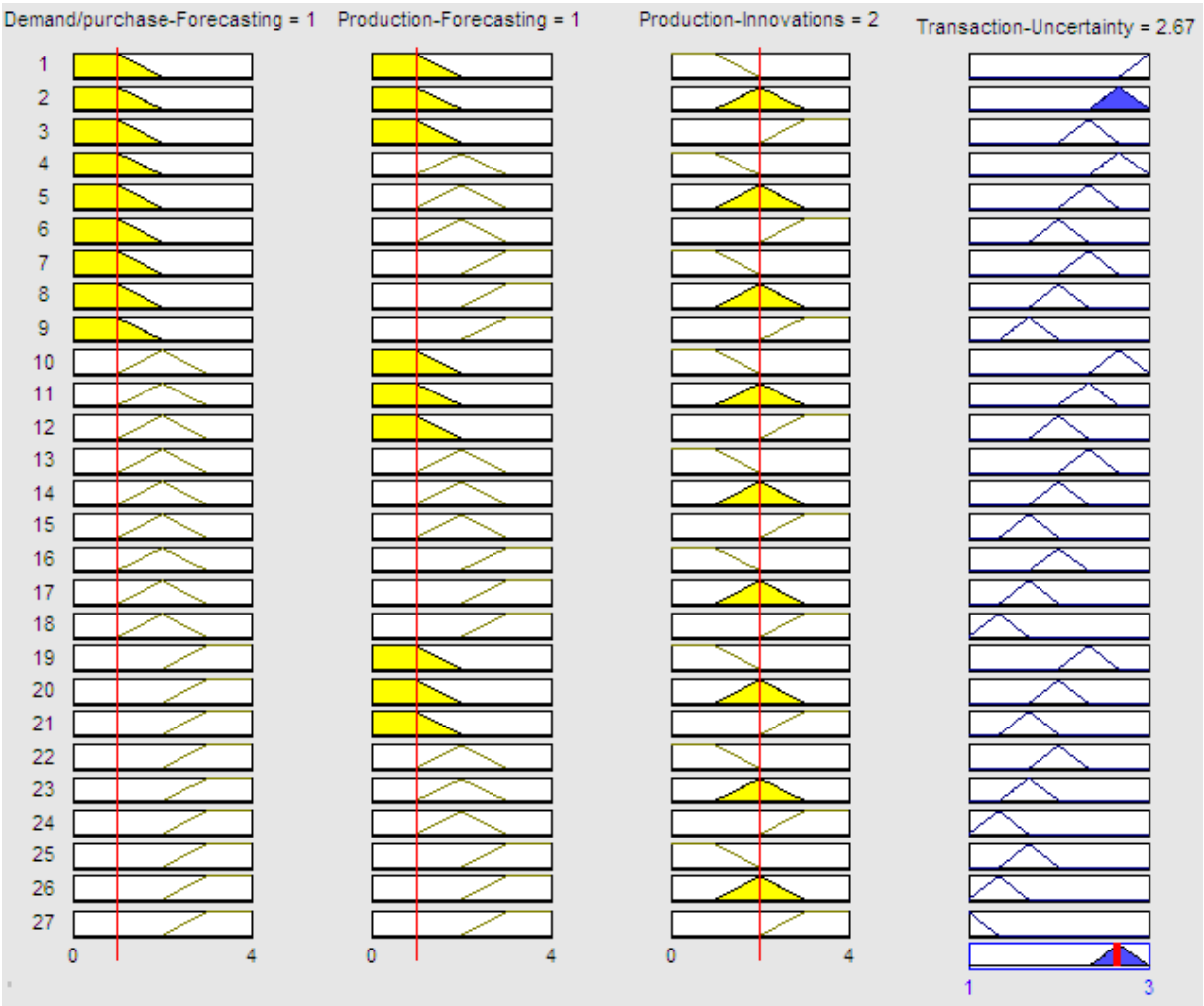

Figure 10. Using the inference method of Mamdani to Low "Demand/purchase Forecasting" =1, Low "Production Forecasting" = 1 and Average "Production Innovations" = 2, resulting in a value of "Transaction uncertainty" = 2.67.

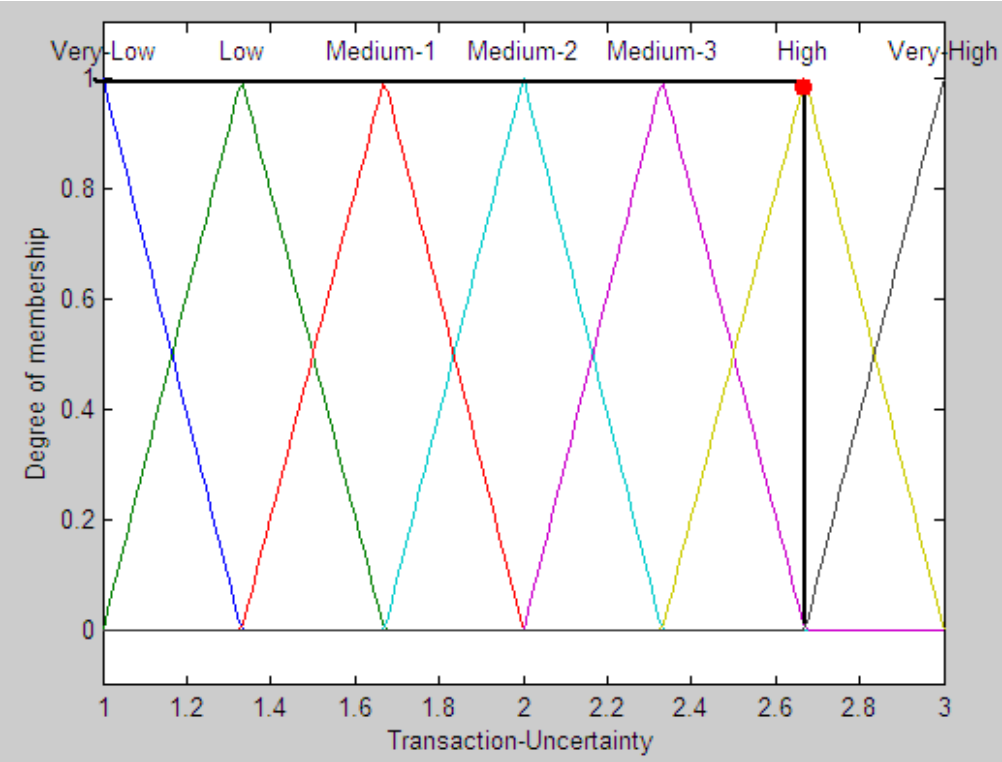

Figure 11. Indication of the greater degree of relevance to the fuzzy set "High" of point "Transaction uncertainty" = 2.67.

After performing this simulation for all herd animals, we found the percentages of first ranking of each question the respondents (Figures 12, 13 and 14). Thus, it is possible to observe that a large share of the relationships analyzed have low sharing of information between producers and their dealers on "Demand/purchase Forecasting", "Production Forecasting " and "Innovations in production", with respective percentages of 73%, 68% and 62% for Down this classification.

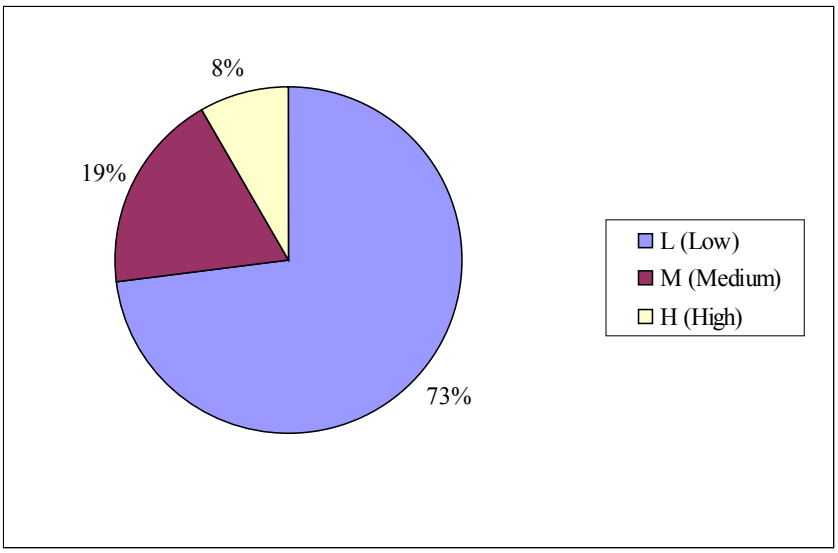

Figure 12. Interviews for sharing information between producers and their customers on "Demand/Purchase Forecasting" (input variable 1).

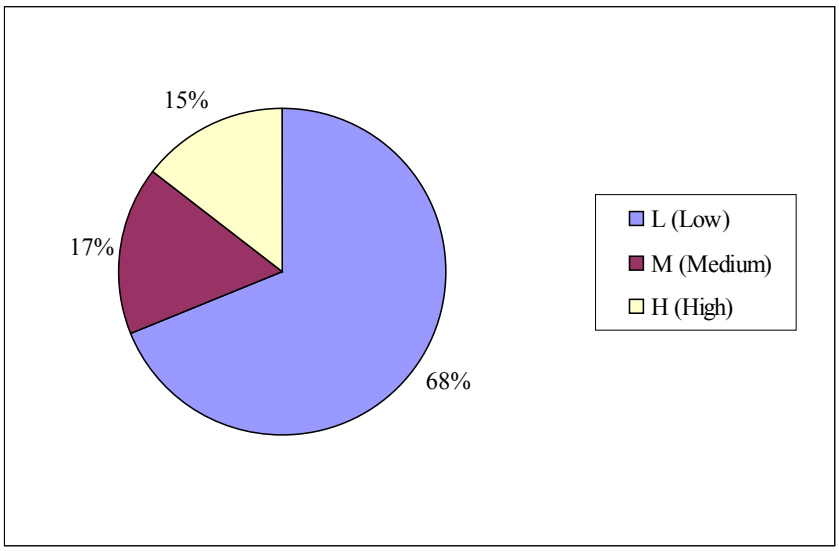

Figure 13. Interviews for sharing information between producers and their customers on "Production Forecasting" (input variable

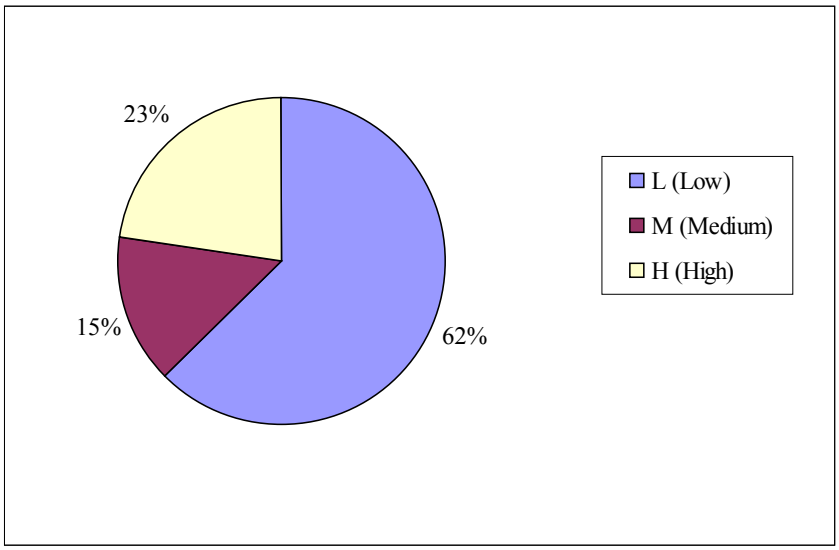

Figure 14. Interviews for sharing information between producers and their customers on "Transaction uncertainty" (input variable 3).

Second, using the system based on artificial intelligence, it was determined the overall assessment of the producers (and their clients) and analyzed by the intelligent classification of commercial transactions (Figure 11), with a greater degree of relevance to the fuzzy set feature Medium 1 (Figure 15), indicating this level for the uncertainty in the commercial transaction between the producers and their customers.

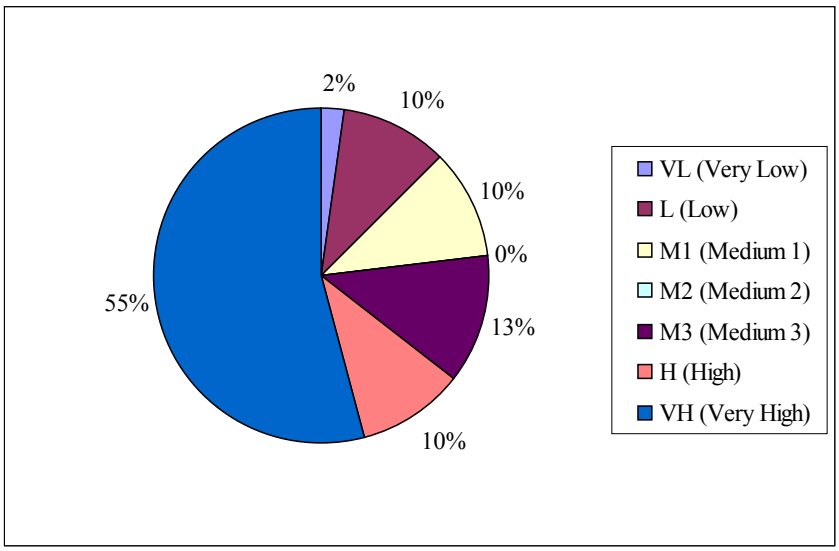

Figure 15. Results of simulations of the system based on fuzzy rules, assessing the degree of uncertainty in commercial transactions between producers and their customers.

The overall assessment of the producers (and their clients) analyzed, was obtained from the average 2.474 for the output variable Transaction uncertainty and verification of fuzzy set equivalent to this overall assessment. In this case, the group was assessed between the High (P2) and Middle Level 3 (P1) Sets, with a greater degree of relevance to the second set, ie, the group has a characteristic Mean (Level 3) for the uncertainty in the commercial transaction between the producers and their customers (Figure 16).

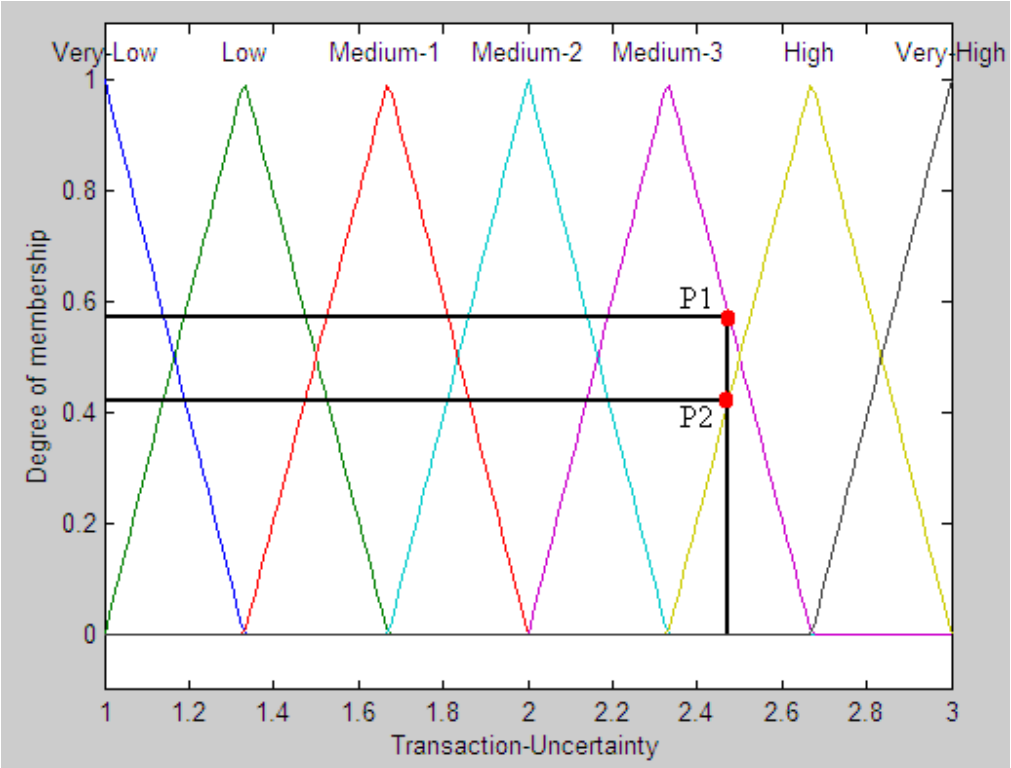

Figure 16. Overall assessment of the producers (and their customers) with average 2.474 for the variable Transaction uncertainty and association with the Hight and Middle Level 3 Sets.

4. Conclusions

After using the system based on artificial intelligence, it was determined an overall assessment of the cassava producers (and their dealers), with the highest degree of membership for the fuzzy feature a Medium, indicating this level for the uncertainty in commercial transactions between producers and their customers.

From this work, you can perform simulations of actions that could be implemented to reduce the degree of uncertainty concerning the transaction between the cassava marketing channel agents, since in this case the objective is to improve this to a lower degree than the Medium 3, allowing for a transaction cost reduction.

The great scientific contribution to the academic community considering the New Institutional Economics is the possibility of proposing changes in the characteristics as demand/purchase forecasting, production forecasting and shared information about production innovations, and predicting outcomes in the degree of uncertainty before their effective implementation.

Thus, if the Regional Development Offices (of Assis and Tupã) want to propose actions to improve, for example, the behavior of information sharing between producer and dealers on the following concepts demand forecasting / purchase, you can have a prediction system based on artificial intelligence fuzzy result of these actions on the degree of uncertainty.

So, if half of the producers / dealers improve this particular aspect (Demand/Purchase Forecasting), you can verify that the improvement in the degree of uncertainty will be really effective.

Still, you can choose to perform other actions (with lowers costs) that will further improve the production forecast. These actions may occasionally lead to a lower degree of transition uncertainty.

These improvements can effectively be proposed since the evaluations of the variables 1, 2 and 3 were mostly classified as Low.

Finally, the mathematical / computational system proposed can be applied to any group of producers / dealers, since the basis of rules of the fuzzy system is also confirmed by experts in the region where the method will be applied.

5. Acknowledgements

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6. References

AMENDOLA, M.; SOUZA, A.; BARROS, L. C. Manual do uso da teoria dos conjuntos fuzzy no MATLAB 6.5. Versão 2005 do manual apresentado no Ciclo de Palestras/2004, realizado na FEAGRI/UNICAMP. Disponível em: http://www.ime.unicamp.br/~laeciocb/manual_fuzzy_matlab.pdf. Acesso em: Julho de 2011.

ARBAGE, A. P. Custos de transação e seu impacto na formação e gestão da cadeia de suprimentos: Estudo de caso em estruturas de governança híbridas do sistema agroalimentar no Rio Grande do Sul. Tese (Doutorado em Administração) – Universidade Federal do Rio Grande do Sul, Porto Alegre, 2004.

BAIMEI, Y.; EUNCHEOL, P.; ZHONG, Q. Fuzzy comprehensive evaluation of industrialized agribusiness selecting agricultural garden district. Journal of China Agricultural University (2003) Vol. 8 No. 6 pp. 77-80
BARROS, L. C. ; BASSANEZI, R. C. Tópicos de Lógica Fuzzy e Biomatemática. 2a ed. Campinas: IMECC, 2010. v. 500. 404 p.

BREITENBACH, R.; SILVA, A. da. Nova Economia Institucional (NEI): estado da arte nas (in) aplicações ao rural. In: XLVIII CONGRESSO DA SOBER "Tecnologias, Desenvolvimento e Integração Social". Anais... Campo Grande, 25 a 28 de Julho de 2010.

CREMASCO, C. P. Aplicação da lógica fuzzy para avaliação do faturamento do consumo de energia elétrica e demanda de uma empresa de avicultura de postura. Botucatu, 1998. 97p. Tese (doutorado em Energia na Agricultura). UNESP/FCA.

DUVAL, Y.; FEATHERSTONE, A. M. Interactivity and Soft Computing in Portfolio Management: Should Farmers Own Food and Agribusiness Stocks? American Journal of Agricultural Economics. vol. 84, n. 1. (2002), pp. 120-133

GABRIEL FILHO, L. R. A.; CREMASCO, C. P. C.; PUTTI, F. F.; CHACUR, M. G. M. Application of fuzzy logic for the evaluation of slaughter cattle flocks. Engenharia Agrícola, v. 31, no. 3, 2011.

PEREIRA, D. F.; BIGHI, C. A.; GABRIEL FILHO, L. R. A.; CREMASCO, C. P. C. Sistema fuzzy para estimativa do bem-estar de matrizes pesadas. Engenharia Agrícola, v. 28, p. 624-634, 2008.

REYS, M. A.; ARBAGE, A. P.; OLIVEIRA, S. V. Identification of sources of transaction costs: a fuzzy approach for the evaluation of analytical categories. VII International PENSA Conference. São Paulo: Brazil, 2009.

REYS, M. A. dos; ARBAGE, A. P.; OLIVEIRA, S. V. de. Identification of sources of transaction costs - a fuzzy approach for the evaluation of analytical categories. Organizações Rurais & Agroindustriais, Lavras, v. 12, n. 1, p. 11-19, 2010

ZADEH, L. A. Fuzzy sets. Informat Control, p.338-353, 1965.

COMO INTERVENIR EN INICIATIVAS CLUSTER AGROALIMENTARIOS EN PAÍSES EN DESARROLLO. EL MÉTODO EPECA.

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Abstract:
Supply chain and network management have been widely studied in many agri-food sectors. Other authors have introduced an alternative method of study and intervention in business: clusters or districts. Today there is evidence that geographical concentration stimulates innovation and economic development. Clusters are concentrations of highly related industries, and generally emerge as historic coincidence. Nowadays, many clusters initiatives are launched in agri-food sectors in Latin-American countries. They are generally extrapolations of framework designs for cluster initiative programs in developed countries. This paper proposes the EPECA method (Study and Strategic Planning Method for Agri-food Clusters), which defines a framework for intervention in cluster initiatives in developing countries, with a high focus on social development and common culture of the cluster and a follow-up of the initiative, both for diagnostic purposes and for strategic planning development, including constraints and limitations to cluster interventions in agri-food sectors. The paper enables researchers and entrepreneurs to identify and analyze systemically an agri-food cluster intervention in developing countries, in this case, two interventions at the horticultural sector in Argentina and Uruguay. The cluster initiatives described did not use the EPECA method to do the intervention; the intervention derived from a methodology proposed by the public organizations that promoted the initiatives.

Key words: Collective action, institutional environment, innovation, competitiveness

COMO INTERVENIR EN INICIATIVAS CLUSTER AGROALIMENTARIOS EN PAÍSES EN DESARROLLO. EL MÉTODO EPECA.

1. Introducción

1.1. Sobre el concepto de cluster

En una economía globalizada, aunque suene a paradoja, muchas de las ventajas competitivas residen en determinados factores locales. El aumento de la productividad no depende sólo de las cantidades empleadas de los factores de producción (trabajo, recursos naturales, capital, tecnología), sino también de la forma como estos factores son organizados o combinados al interior de los procesos de producción y en los diferentes ámbitos territoriales en los que éstos tienen lugar (Alburquerque, 2006). El grado de organización socio-territorial complementa y amplía la eficiencia de la organización al interior de la cadena productiva.

Actualmente el mapa de la economía mundial se caracteriza por lo que Porter (1990) llama "clusters": masas críticas de empresas que actúan en industrias relacionadas, con asiento en una región. *"Los clusters son concentraciones geográficas de empresas interconectadas, suministradores especializados, proveedores de servicios, empresas de sectores afines e instituciones conexas (por ejemplo, universidades, institutos de normalización, asociaciones comerciales) en un campo específico, que compiten pero que también cooperan"* (Porter, 1990).

Los rivales compiten con intensidad para ganar y conservar a sus clientes; sin una competencia vigorosa, un cluster fracasaría. Sin embargo, también hay cooperación, vertical y horizontal, y de ella participan empresas de industrias relacionadas y organismos locales. La competencia puede convivir con la cooperación porque ambas se dan en dimensiones diferentes y entre distintos jugadores.

El hecho de que en las economías nacionales existan los clusters y no empresas aisladas ni sectores aislados, da ideas importantes acerca de la naturaleza de la competencia, la coordinación y el papel de la región en la ventaja competitiva. Los clusters son grupos estratégicos de empresas que compiten entre sí, pero también cooperan en la competencia frente a otros clusters u otras empresas. Son subsistemas estrictamente coordinados con foco en el consumidor final. A decir de Zylbersztajn y Farina (1999) los clusters pueden ser considerados en función del concepto ampliado de la firma de Coase (1937).

En la realidad se presentan condiciones importantes en los resultados de las empresas que forman parte de clusters agroalimentarios. Los resultados en términos competitivos de las empresas que actúan dentro de clusters son mejores que los de las que no lo hacen. Esto da una idea de la importancia de la ubicación. En principio, debe considerarse que la ventaja competitiva está más relacionada a la región que a cada empresa en particular, o sea que ésta está más fuera de la empresa (incluso fuera del sector) que dentro de esta.

Para las empresas del cluster se produce lo que se denomina "economía de aglomeración" que tiene que ver con una serie de ventajas competitivas que se desarrollan a partir de que las empresas interactúan en una región geográfica determinada y que dentro de ella se concentran niveles de especialización. Un ejemplo de esto es la disponibilidad de mano de obra calificada en los trabajos específicos para empresas del cluster. En estos ambientes se desarrollan servicios específicos para ciertas empresas y circunstancias especiales que tienden a facilitar procesos y disminuir costos tanto de transacción como de operación.

En los clusters pueden existir "entes coordinadores", al estilo Comité Gestor del Cluster (CGC), el cual está conformado por distintos participantes. Esta coordinación puede estar relacionada con aspectos comerciales, como así también en mecanismos de solución de disputas y conflictos, agenda de investigación y desarrollo, capacitaciones, etc.

Un cluster está traccionado por un consumidor final, y la coordinación en base a sus requerimientos no se cuestiona. Esta conceptualización parte de que en los clusters los actores económicos se organizan regionalmente para competir en un mundo de altas perturbaciones y altamente globalizado, por un consumidor cada vez más exigente en cantidad y calidad (marcas, denominaciones de origen, sellos de calidad, etc.). Esta organización termina siendo la coordinación del cluster (que a veces se formaliza en un CGC) y por la cual las empresas terminan siendo más competitivas que si trabajaran aisladamente. Pero además, la coordinación del cluster también establece los parámetros de apropiación de valor que el cluster crea, en términos de nuevos mercados, mayor precio por mayor satisfacción del cliente, innovaciones, etc. Por ello, es muy importante el nivel de institucionalidad del cluster y el grado de enforcement a la Ley y los contratos.

Además, en los clusters se generan todo tipo de negocios alrededor del negocio principal. Un cluster, por lo tanto, puede definirse como un sistema de empresas y organizaciones públicas y no gubernamentales interconectadas cuyo valor global es mayor que la suma de sus partes. En estos modelos se establece que la interacción entre los actores minimiza los niveles de costos de transacción a partir de los objetivos comunes y de la confianza generada de la alta frecuencia de transacción. Por tanto, el nivel de incertidumbre es bajo. Además, dada la cercanía, es más fácil obtener una mayor coordinación entre los agentes del cluster, mejorando la capacidad de adaptación a las posibles perturbaciones externas (Ej. cambios en los gustos del consumidor, innovaciones, cambios de la legislación, etc.). Asimismo, el esquema permite la comparación continua entre productores ("benchmarking" interno), elevando la competencia y obligándolos a asumir un proceso de innovación que les entregue ventajas competitivas frente a sus pares.

1.2. Sobre las iniciativas clusters

A partir del éxito de diferentes clusters en muchos países, se desarrollaron iniciativas cluster en distintos sectores. Algunas de estas inicitativas fueron promovidas por los actores del sector propiamente dichos, en conjunto con los gobiernos locales y organizaciones a fin de facilitar la creación del cluster. En otros casos, organizaciones de financiamiento internacional en conjunto con organismos nacionales o provinciales

promueven las iniciativas cluster en sectores que tienen el potencial de desarrollarse como tal.

Las políticas de clusters combinan instrumentos para desarrollar y fortalecer factores de competitividad local y regional –como desarrollo de infraestructura y recursos humanos, centro de competencias tecnológicas, localización de empresas líderes y desarrollo de redes de subcontratación– con instrumentos de promoción de articulación entre los actores del clúster –como construcción de confianza entre las empresas, proyectos asociativos, fortalecimientos de asociaciones y proveedores de servicios–. De hecho, la interacción entre agentes (empresas, consumidores, organismos públicos, asociaciones privadas, instituciones académicas, organizaciones de la comunidad) es objetivo y a la vez instrumento de las políticas. Cuando es bien llevado, el proceso produce una visión estratégica compartida entre todos los actores a partir de la cual se pueden instrumentar todo tipo de acciones conjuntas para mejorar las condiciones que subyacen al aumento de productividad, o sea, un clúster "virtuoso" (Dirven, 2006).

El Gobierno introduce entonces este tipo de iniciativas como políticas para el desarrollo de sectores y regiones, con el objeto de mejorar la competitividad. Sin embargo, este tipo de iniciativas en general son extrapolaciones de marcos para programas de iniciativas cluster en países desarrollados o en sectores totalmente distintos a los que se abordan –sectores con características culturales, institucionales, organizacionales y tecnológicas distintas. Es más, muchas veces este tipo intervenciones no tiene en cuenta las cuestiones sociales y el proceso social que implica el desarrollo de un cluster, los que implican cambios de paradigma culturales.

La calidad de la intervención de la iniciativa cluster y cuán útil será la misma para mejorar la competitividad del sector será directamente proporcional a la calidad de la información del sistema bajo estudio, la calidad de análisis –en términos institucionales, organizacionales, tecnológicos y comerciales-, el nivel de participación y compromiso de los actores locales del sector (tanto actores privados como públicos y asociaciones), y la posibilidad de establecer una visión compartida y estrategias comunes.

Por ello, la construcción de un cluster es un proceso de innovación en los ambientes institucional, organizacional y tecnológico que puede llevar varios años. Es importante entonces que exista confianza y capital social para la construcción del mismo debido a que la heterogeneidad de los actores del cluster (productores, industriales, organismos de apoyo, sector público, etc.) dificulta este proceso por las diferentes necesidades, valores y estrategias, aversión al riesgo, liderazgo e incentivos.

Senesi et al. (2009) proponen el método EPECA (Método de Estudio y Planificación Estratégica en Clusters Agroalimentarios) que define un marco de intervención en iniciativas cluster en países en desarrollo, con un alto foco en lo social y la cultura común del cluster. El EPECA constituye un método para el lanzamiento de iniciativas clusters, pero también para proponer nuevas direcciones o estrategias en clusters que ya están desarrollados. El método se presenta como una alternativa para mejorar los actuales manuales de intervención en clusters agroalimentarios, ya que constituye: "una herramienta de referencia […] que permite entender e identificar las fuerzas que determinan las dinámicas estrategias en los Agronegocios y, al mismo tiempo, propone una metodología para el desarrollo de un plan estratégico" (Senesi et al., 2009).

1.3. Objetivo del trabajo

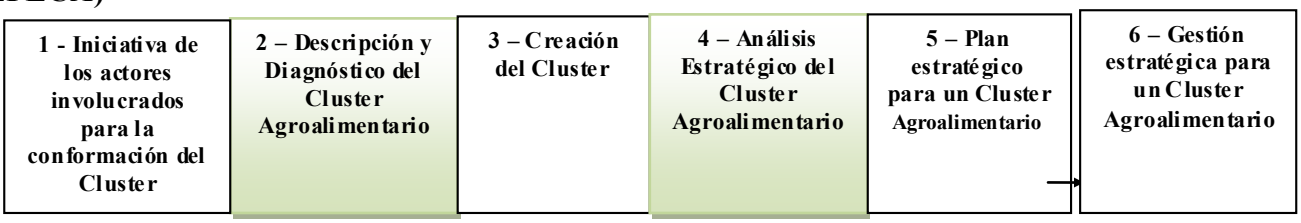
El objetivo de este trabajo es presentar el método EPECA como un método de intervención, diagnóstico y planificación estratégica en clusters agroalimentarios.

A continuación se presenta el método propiamente dicho, para luego aplicarlo a un caso de intervención en una iniciativa cluster en quesería artesanal de San José y Colonia, Uruguay.

2. El método propuesto

El método "EPECA" se resume en la figura 1, a continuación.

Método: Estudio y Planificación Estratégica para Clusters Agroalimentarios (EPECA)



Fuente: Senesi et al., 2009

1. Iniciativa de los actores involucrados para la conformación del cluster

En general, el proceso de conformación del cluster se da a partir de la iniciativa de actores locales a fin de conformar una organización que facilite el desarrollo del mismo. Se busca que ese "grupo promotor" esté incluido no solo por productores/industriales, sino también por representantes de organizaciones de apoyo como universidades, centros de investigación y organismos públicos locales. Este método le confiere mucha importancia a esta etapa, dado que es esencial para el desarrollo de las nuevas actividades que se elaborarán a partir de la iniciativa cluster.

2. Descripción y diagnóstico del cluster

La segunda etapa consiste en una descripción y diagnóstico del cluster el cual debe llevarse a cabo a partir de la siguiente metodología:

Paso 2.1	Relevamiento de estudios o mapeos existentes
Paso 2.2	Descripción y delimitación del sistema agroindustrial en estudio. Nivel de análisis
Paso 2.3	Descripción del cluster. Grupos estratégicos. Determinación del portfolio de productos / servicios ofrecidos
Paso 2.4	Mapeo cuantitativo del cluster

3. Creación del cluster

La creación del cluster requiere empoderar una organización que pertenezca al sector a fin de articular acciones y actividades propuestas para el desarrollo y crecimiento del cluster. Esta organización puede contribuir para alcanzar los siguientes objetivos: a) organización de las informaciones existentes e intercambio de informaciones, b) foro para discusión de las estrategias, c) flexibilidad para captar y usar recursos, d) tener una voz del sistema productivo y representación del sistema junto a las organizaciones del

sector, e) trabajar una agenda positiva al sector, y, finalmente, construir e implementar la gestión estratégica del sistema (etapa 04 de esta propuesta metodológica).

4. Análisis estratégico del cluster

En esta etapa, el método EPECA propone realizar un estudio del cluster usando el siguiente criterio:

Paso 4.1	ANALISIS ESTRUCTURAL DISCRETO. Análisis del ambiente institucional formal. Análisis del ambiente institucional informal. Análisis del ambiente organizacional y relaciones inter-organizacionales. Número de agentes e interacciones competitivas. Análisis del ambiente tecnológico, en procesos y en productos.
Paso 4.2	ANÁLISIS DEL AMBIENTE COMPETITIVO. Estructura, número de compradores y vendedores, poder del mercado, barreras de entrada, estructura de costos, productos substitutos y/o complementarios. Patrones de competencia y paradigma competitivo. Análisis de los mercados objetivos y de los segmentos de clientes. Benchmarking.
Paso 4.3	ANÁLISIS DEL ESPACIO DE LAS TRANSACCIONES Identificar los espacios de transacción, interfaces entre los distintos estamentos. Descripción de las transacciones, atributos de frecuencia, incertidumbre y especificidad de activos. Estructuras de gobernancia más frecuentes: mercado, contratos integración vertical u horizontal. Mapeo los contratos en sentido amplio, situaciones más comunes.
Paso 4.4	ANÁLISIS DE LA COORDINACIÓN. Correspondencia entre las estructuras de gobernancia, las estrategias de negocios y los mecanismos de coordinación (incentivos y controles). Mecanismos de distribución de excedentes. Capacidad de administrar conflictos.
Paso 4.5	HERRAMIENTAS RESUMEN DEL ANÁLISIS. Las cinco fuerzas de Porter. El diamante de Porter. Análisis FODA. Matrices EFE & EFI.

5. Plan estratégico del cluster

La lógica de desarrollar un PE es tener un norte para el desempeño competitivo y las acciones gerenciales de empresas e instituciones, tanto en el corto como en el mediano y largo plazo, ese norte son los objetivos. Estos nos indican qué se pretende lograr para el cluster y sus componentes.

En esta etapa el método EPECA propone las siguientes acciones:

- Establecer (definir y cuantificar) los objetivos del cluster
- Formular posibles escenarios y estrategias, en términos de decisiones sobre la producción, comunicación, logística y distribución, capacitaciones, y coordinación y adaptación al ambiente institucional.
- Establecer un presupuesto del plan estratégico.

6. Gestión estratégica para el cluster

Este último paso establecer cómo gerenciar el plan a fin de cumplir con los objetivos propuestos. Para ello se plantean las siguientes etapas:

Paso 6.1	Consolidación de proyectos estratégicos con acciones ejecutivas, responsables, equipos, presupuestos, cronograma.
Paso 6.2	Composición de un observatorio (comité gestor) de cluster agroalimentario y acompañamiento constante de proyectos.
Paso 6.3	Medición de la Performance Competitiva de los Clusters Agroalimentarios. Construcción de indicadores y tablero de comando.

Un conjunto de indicadores lo suficientemente amplio como para poder hacer un seguimiento general de la performance del cluster se denomina "Observatorio del Cluster Agroalimentario". Cuando a partir del Plan Estratégico se ha podido desarrollar un Mapa Estratégico del cluster que indique cuáles son las variables estratégicas clave, pueden seleccionarse relaciones causa-efecto entre varias de ellas y desarrollar un grupo de indicadores que conformen un "Tablero de Comando del Cluster Agroalimentario".

3. Aplicación práctica del método. El caso de la quesería artesanal de san josé y colonia, uruguay[37]

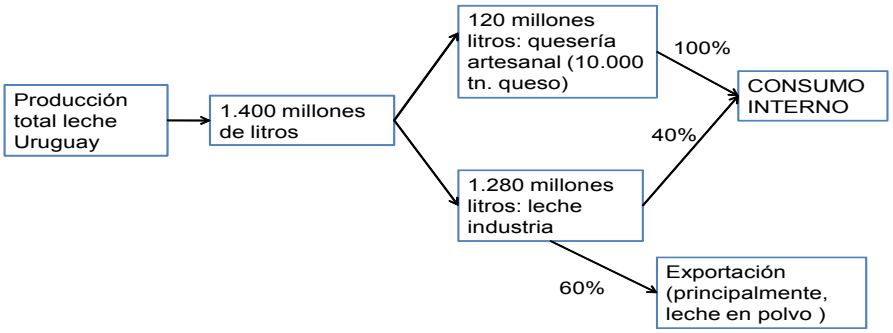
3.1. Introducción

La quesería artesanal en la República Oriental del Uruguay se remonta a la segunda mitad del Siglo XIX. Muchos de los inmigrantes de ese siglo provenían de regiones productivas agrícola-ganaderas de Europa (Ej. Piemonte, Suiza, etc.), trayendo consigo la cultura campesina de los Alpes europeos, y como parte de ella, la cultura quesera (Gilles, 2006). De este modo, ya en 1868 figura en el Censo Departamental de Colonia la quesería del Sr. Juan Teófilo Karlen, considerándose por ese motivo la primera quesería (Borbonet Legnani, 2001).

La principal zona en que se ubicaron estos inmigrantes fue la zona comprendida entre las cuencas del río Rosario y el arroyo Cufré, hoy Departamento de Colonia (ver gráfico). Luego estas colonias extendieron su cultura y tecnología a otras zonas vecinas del Departamento de San José. El uso de mano de obra familiar, más el agregado de valor a la producción de leche mediante el queso, fueron las bases del desarrollo sostenido de éstos establecimientos.

3.2. Descripción y diagnóstico

En el sistema lácteo uruguayo existen dos subsistemas totalmente diferentes: a) leche fluida con destino a la industria, y b) producción de quesos artesanales. La quesería artesanal representa menos del 10% de la producción láctea de Uruguay.



[37] Este caso se ha desarrollado utilizando como base el trabajo: PALAU, H. y MESA MACEDO, A. 2007. "Análisis del cluster quesería artesanal de San José y Colonia". PACPYMES-Ministerio de Industria, Energía y Minería de Uruguay.

Existen 1.400 productores de queso artesanal, con bajos niveles de productividad (promedio 6 lts./leche/vaca/día). A continuación se describe el área de resultados "producción":

- 20% de los productores tienen buenos niveles de tecnología y calidad de queso. Son los que tienen mayor volumen y conocimiento sobre técnicas de elaboración. Estos productores totalizan el 50% de los QA.
- 50% de los productores encuentran en la QA como la única alternativa a la producción láctea, debido a que las exigencias de la industria les imposibilita comercializar leche con la misma. Elabora quesos de mediana a baja calidad. Estos productores totalizan el 30% de los QA.
- 10% de los productores elaboran quesos y remiten leche a la industria en distintos porcentajes, en función de las condiciones de pago y precio de cada mercado. Estos productores totalizan el 10% de los QA.
- 20% de los productores que por su baja calidad de producto, bajos volúmenes y condiciones muy malas en cuanto al ordeñe y elaboración de quesos, producen queso que son destinados a la industria de fundición para la elaboración de queso en barra (queso sándwich). Estos productores totalizan el 10% de los QA.

El siguiente actor del subsistema son los intermediarios y acopiadores. Estos son quienes compran los quesos a los productores, estableciendo relaciones informales y comprando muchas veces la producción bajo una modalidad desventajosa para el productor debido a la baja información de los precios y calidades comercializadas. Los intermediarios y acopiadores distribuyen los quesos a las diferentes ciudades –principalmente Montevideo-, tanto a la distribución mayorista como minorista.

Los quesos vendidos en supermercados tienen las marcas de los intermediarios y acopiadores. En general los precios de los QA en super e hipermercados son menores que los de los quesos industriales. Finalmente, los quesos artesanales son también vendidos en ferias barriales al aire libre, no compitiendo en ese caso con los quesos industriales.

El 100% de los QA se vende en el mercado interno, representando el 50% del total del consumo de quesos del Uruguay.

Se estima que 10.000 personas participan de este sector (Fuente: Bagnato, sin fecha).

3.3. Creación del cluster

Desde el PACPYMES (Programa de Apoyo a la Competitividad de las PYMES) se observó que el subsistema tenía características propias para llevar a cabo una política de intervención en clusters. En junio de 2006 comenzó el proceso de vinculación con productores, comercializadores, proveedores de insumos, acopiadores, Sociedades de Fomento, funcionarios ministeriales y del gobierno departamental del Cluster "Quesería Artesanal de San José y Colonia". El objetivo de esas reuniones era motorizar todo lo relacionado a la iniciativa Cluster que propone PACPYMES, constituyéndose en la base del "Núcleo Tractor del Cluster"[38] conformado por 14 integrantes.

3.4. Análisis estratégico del cluster

[38] Como núcleo tractor se entiende en este caso a un grupo de actores/participantes del cluster que promovieron la iniciativa clustery tenían relación directa con PACPYMES.

3.4.1. Análisis estructural discreto

Para facilitar el análisis, se realizará un cuadro de los ambientes institucional, organizacional y tecnológico. Posteriormente se desarrolla el ambiente comercial.

Ambiente institucional: • Existencia de una cultura productiva (ambiente institucional informal). • Obligatoriedad para la habilitación de tambos (incluidos los "tambos fábrica"). Bajo enforcement en QA, generándose informalidad fiscal y sanitaria. • Leche industria: obligatoriedad de pasteurización. No para la quesería artesanal. • La legislación no permite acopiar leche de varios productores para la fabricación de QA, restringiendo la posibilidad de generar mayor escala de producción. • Ausencia de un marco regulatorio en torno a la inocuidad de los QA.
Ambiente organizacional: • Gran atomización (bajos volúmenes por productor) • Diversidad de productores (por calidad de producto, por nivel de tecnología, por contactos con intermediarios, por volumen comercializado, por infraestructura). • Excesiva intermediación; en general el productor no llega al comercio minorista. • Existen organizaciones de productores, pero con baja capacidad de acción.
Ambiente tecnológico: • En general, baja tecnología. Existencia de un grupo con mejor calidad e infraestructura. • Baja productividad por vaca, alta estacionalidad de la producción (primavera-verano), baja calidad de leche y de queso (por altos niveles de Unidades Formadoras de Colonias), rodeos con enfermedades (mastitis, brucelosis, tuberculosis). • Se producen principalmente dos tipos de queso artesanal: a) Quesos tipo grana (Queso Sbrinz ó Reggianito Uruguayo) en general con 6 meses de maduración, y b) Quesos Suizos con Ojos (Queso Colonia), con 20 a 30 días de maduración. Son quesos tipo europeos, pero de calidad muy dispar entre productores debido a que cada actor establece su propio protocolo de producción de queso (en función de la tradición propia). Además, el agua y las condiciones agroclimáticas también influyen en la confección del queso. • Ausencia de Buenas Prácticas Queseras. • Ausencia de trazabilidad.
Ambiente comercial • El principal consumidor de QA es el consumidor uruguayo, quien no valora la calidad artesanal del producto y por lo tanto no está dispuesto a pagar sobreprecios por información extra que el productor pudiera ofrecer (a través de DO, certificaciones, trazabilidad, etc.). • La lejanía geográfica de los centros de consumo. Dificultad de los productores de llegar hasta los consumidores. • Los supermercados en Uruguay (sobre todo en Montevideo) en general atienden a los segmentos de mayor poder adquisitivo. Mientras tanto, almacenes y ferias barriales son las principales bocas de expendio para sectores de menor poder adquisitivo. Esto lleva a que los quesos artesanales, por ser más baratos, sean comercializados en ferias y almacenes. • La comercialización de quesos del productor al intermediario se realiza muchas veces al contado. La comercialización se da en función de un típico mercado spot.

3.4.2. Análisis del ambiente competitivo

A continuación se realiza un resumen del análisis del ambiente competitivo.

Escenarios competitivos • Escenario formal e informal • Escenario regional y global	➢ La producción de quesos artesanales en Uruguay no ha experimentado grandes variaciones. La producción se destina casi exclusivamente al mercado interno, consumidor que no valora las características diferenciales del producto. ➢ A nivel regional, Brasil y Argentina son grandes productores de lácteos. Existen oportunidades comerciales de exportación a Brasil a grandes centros urbanos, producto de una demanda insatisfecha para este tipo de quesos. La dificultad es contar con los volúmenes que requieren los centros de distribución. ➢ A nivel global, las altas barreras arancelarias dificultan la exportación a estos países.

	➢ Francia, España e Italia tienen un alto posicionamiento de sus quesos, por su carácter artesanal o por contar con denominaciones de origen. Esto genera precios superiores a los precios de los quesos industriales. ➢ Grandes jugadores industriales globales (Nestlé, Danone, Fonterra), con alta escala y con muy buena calidad.
Condiciones básicas del mercado • Número de agentes • Ubicación • Producción y estacionalidad • Rivalidad entre empresas • Interacciones competitivas • Comportamiento estratégico (individual y colectivo) • Información (imperfecta y asimétrica) • Poder de mercado	➢ Productores de queso artesanal: 2.100, concentrados en casi 70% en el Sur de Uruguay (San José y Colonia), atomizados en cuanto a la producción. Compradores (intermediarios y acopiadores): bajo número de agentes (15 a 20), mayor información de los mercados, mayor capacidad financiera, alto poder de negociación. Mayoristas: bajo número de agentes. Minoristas: pocos supermercados, baja llegada. Atomización y gran número de almacenes y ferias barriales. ➢ La producción de leche por productor varía de 3 litros a 12 litros de leche por vaca por día. ➢ Existe una alta rivalidad entre los productores de QA debido a la atomización y a la necesidad (financiera y de perecibilidad de producto) de vender los quesos. ➢ Bajo número de acciones colectivas (existe el "Grupo de los 30/Mesa del Queso", el cual son productores con mayor nivel de tecnología nucleados con el fin de hacer lobby frente al gobierno; bajo impacto). Los intermediarios se agrupan en la Asociación de Acopiadores y Transformadores de Productos Artesanales. ➢ En cuanto a la información, los productores de QA tienen baja información sobre la demanda de los consumidores (no existen mercados de referencia de precios). Por otra parte, existe asimetría de información debido a que los intermediarios aprovecha ese desconocimiento para ofrecer menores precios. ➢ Por lo tanto, se observa que entre los intermediarios y los productores existe una gran diferencia en cuanto al poder de mercado, generándose en los últimos años una menor rentabilidad para el productor.
Estructura del cluster a) Condiciones de los factores b) Sectores conexos y de apoyo c) Innovación d) Diferenciación de producto e) Barreras de entrada y salida f) Estructura de costos y precios g) Integración vertical h) Concentración (producción, acopio, distribución)	a) La producción de QA cuenta con buenos factores básicos de producción, ya que el clima es benigno, los suelos son aptos para la misma, y se cuenta con óptima estructura vial, aunque aquellos factores avanzados (infraestructura, tecnología, capacitación, financiamiento) son deficientes. b) El sector de QA cuenta con algunas organizaciones de apoyo del producto y proceso como el MGAP, la Escuela de Lechería, el LATU, COLAVECO, el INIA, las Sociedades de Fomento y Cooperativas. Se observa una muy baja coordinación de las acciones y estrategias de cada uno de las organizaciones, superponiéndose muchas veces las actividades. c) Baja innovación, debido a las costumbres productivas y comerciales (path dependency). d) El QA no está diferenciado (el consumidor no lo concibe como un producto de calidad). Existen casos de productos diferentes, los cuales son reconocidos por intermediarios para comercializarlos bajo su marca. e) Las barreras de entrada se refieren básicamente al conocimiento de la producción de QA y de los intermediarios. Las barreras de salida están referidas básicamente a una cuestión cultural y el arraigo. f) Producto de la alta competencia entre productores y bajo poder de negociación, la rentabilidad de la actividad quesería artesanal es baja. g) Son pocos los casos de integración vertical (productores de QA que hayan llegado a las bocas de expendio). No hay caso de IV hacia atrás por parte de intermediarios y acopiadores. h) La concentración se da principalmente en los intermediarios.
Estudio de los mercados • Mercado actual • Mercado potencial • Proceso decisión de compra (consumidor final y cliente intermedio) • Ciclo de vida del producto	• El mercado actual de QA está circunscripto solo al consumo interno. • El desarrollo de certificaciones de Buenas Prácticas (inocuidad) y otros tipos de sellos de calidad podrán permitir ingresar en mercados potencialmente más rentables. • El queso tal como se comercializa actualmente con poca información y diferenciación se encuentra en madurez en cuanto al ciclo de vida del producto. Si se realizaran innovaciones y certificaciones cambiaría de fase. • Faltan estudios de mercado, ya sea para identificar los potenciales

• Market share • Benchmarking (participación de mercado) • Barreras arancelarias y para-arancelarias	consumidores en el mercado interno como externo. • Los segmentos de más bajos recursos (clases media-baja y baja) en general consumen quesos artesanales y los de clase alta y media-alta consumen quesos industriales. • Casi no se registran exportaciones. • Para la exportación de lácteos, existen fuertes barreras arancelarias y subsidios a la producción, principalmente en la UE y EE.UU., dificultando el comercio con estos países.

3.4.3. Análisis del espacio de las transacciones

En referencia a los atributos de la transacción, en todas las transacciones se podría decir que (para más información en este punto, ver Senesi et al.; 2009):

i) la incertidumbre es alta en caso que los productores negocien sus precios en un típico mercado spot, debido al desconocimiento de las condiciones de la transacción (precio, volumen, calidad). Sin embargo, la incertidumbre disminuye en tanto que los actores puedan generar algún tipo de contrato formal o informal, aunque no está exento de posibles acciones oportunistas,

ii) la frecuencia de transacción es alta cuando los productores tienen relaciones de larga data con intermediarios, la frecuencia es baja en caso que el productor decida la venta a través de las ferias locales, distribuidores minoristas o exportación (son transacciones esporádicas). La frecuencia de transacción entre intermediarios y comercios minoristas es alta por una cuestión de aseguramiento de venta/provisión,

iii) la especificidad del activo es baja en caso que el queso tenga una calidad regular (ej. el queso que se destina a industria), y es media a alta cuando el productor invierte en mayor tecnología para la producción (sanidad, pasturas, sistema de frío, etc.) o bien el queso presenta cualidades especiales (inversiones en cámaras para maduración, estacionamiento de los quesos, fermentos especiales, etc.).

A nivel de la transacción del productor con los compradores, el productor espera que le vengan a comprar los intermediarios quienes se encargan de comprar quesos a distintos productores de la zona, armar "lotes" de calidades similares y de esa forma tener un mayor volumen para comercializar en los siguientes eslabones de la cadena. El precio que se le paga al productor también depende de la oferta de queso en la región y el grado de maduración que tiene el queso (tipo de queso). Los productores en general no conocen cuánto queso se está produciendo en la zona ni los precios que se están pagando. Esto es aprovechado por los intermediarios.

Otro factor que afecta en la transacción es la informalidad. Aquél productor que no tiene el tambo habilitado por el MGAP tendría problemas si quisiera colocar su producto en los canales minoristas, cayendo en el intermediario quien "formaliza" la comercialización comprando quesos de otros productores que sí están habilitados.

3.4.4. Análisis de la coordinación

El negocio de la quesería artesanal está planteado como un negocio de commoditties, donde el precio es el factor determinante de la toma de decisión de la transacción, en un planteo activos específicos medios-altos y con productos que tienen una calidad diferencial, pero que no es reconocida por el consumidor uruguayo.

Al ser un mercado de commoditties debería tener un precio de referencia donde los productores puedan apalancarse en la negociación. Es importante destacar que no existe en Uruguay un mercado de referencia de los precios de venta de los quesos, tanto a nivel productor como a nivel minorista. Al no existir, se agrava la desinformación por parte del productor, acudiendo a conocer dicha información a partir de charlas con otros queseros (no siempre confiables), a partir de los precios que se pagaron en los remates locales o bien a partir de un posible conocimiento del productor en referencia al precio que se está pagando quesos similares a los de él en los comercios minoristas (menos probable).

Al hacer un relevamiento de los productores del cluster se observa que la mayoría indica que la calidad de su producto es superior a la de un queso industria, que viene de sus ancestros, que el consumidor final cuando prueba su producto queda muy satisfecho, etc. Sin embargo, la estrategia del subsector (y del cluster en particular) no ha sido trabajar por la diferenciación del producto a grandes rasgos o bien enfocarse en un segmento de mercado en base a la colocación de productos de altísima calidad. La estrategia ha sido la de la venta en base al precio, pero con bajos volúmenes por productor, sin capacidad de coordinación horizontal (ventas colectivas, mayores volúmenes, menores costos) y sin capacidad de negociar el precio en función de la calidad de sus productos (coordinación vertical). Esto lleva a que el cluster se encuentra como dice la teoría "atrapado en el medio" en cuanto a su estrategia y las transacciones, y consecuentemente su competitividad es limitada.

3.5. Plan estratégico del cluster

A continuación se presenta el plan estratégico que se estableció para el cluster, a partir de la intervención del gobierno uruguayo. El proceso de plan estratégico incluyó dos talleres de pensamiento colectivo sobre cuál debería ser el futuro del subsistema. Se destaca que estos actores no habían nunca participado de un proceso de este tipo y por consiguiente, fue complicado llegar a una visión compartida y establecer las líneas estratégicas. El trabajo de confección de la visión definitiva constó con la elaboración de varias visiones desarrolladas en grupos individuales. Finalmente se eligió la visión compartida que se formula a continuación:

"reconocidos en mercados exigentes por un queso artesanal de calidad elaborado por familias rurales uruguayas".

A partir de la visión se formularon los siguientes lineamientos estratégicos: **Calidad**, **Posicionamiento** y **Familia** y se realizó una discusión general arribándose a algunos objetivo de interés global para el cluster. A continuación se describen los lineamientos y objetivos estratégicos planteados por los integrantes:

A. <u>Lineamiento estratégico:</u> **Grupo Calidad: "Elaborar y aplicar procedimientos que garanticen un producto confiable".**

<u>Objetivos estratégicos:</u>

1. **Capacitación a implementadores de BPA y BPM**. Coordinación con LATU, Inti, Esc. Lechería, Colaveco, Fac. Veterinaria, Agronomía, Ministerios de Ganadería y Salud Pública. Dirigido a Agrónomos, Veterinarios y Técnicos Lecheros. Inversión el 0,1 % de la facturación total del cluster. Durante 2010.
2. **Implementación de BPA y BPM**. Incentivar la inscripción mediante sistema de descuentos. Los Técnicos ya capacitados, dan charlas informativas, inducción, sensibilización en la temática. Luego asisten en la implementación en

establecimientos. Dirigido a 50 productores por año. Duración 4 años, a partir de 2010. Inversión U$S 80.000/año.

3. **Determinar la importancia de la tipificación de quesos relacionada al proceso de mejora de la calidad.** Contratación de consultoría internacional. Año 2010. U$S 100.000.

4. **Certificación de Calidad (BPA y BPM)**. Consultoría internacional. Año 2011. $200.000.

B. Lineamiento estratégico: Grupo Posicionamiento: "Posicionar el queso artesanal uruguayo en los mercados de alta exigencia".

Objetivos estratégicos:

1. **Desarrollar un estudio de mercado y canales comerciales**, con el foco en el consumidor exigente local, en Montevideo, Colonia y Punta del Este. Año 2010. U$S 200.000.

2. **Organización de eventos promocionales**. Posibilidad además de ser una fuente de información de mercados. Recopilación y análisis de información ya existente. Año 2010 a 2012. U$S 500.000 totales.

3. **Elaborar un spot publicitario** (video corto por ejemplo), imagen de la quesería artesanal para pasar en todos los eventos. Año 2011. U$S 300.000.

4. **Hacer promoción** en shoppings, hoteles, otros varios en los principales centros de consumo en Uruguay. Año 2011. U$S 300.000

C. Lineamiento estratégico: Grupo Familia: "Lograr la participación de la familia quesera para fortalecer el diálogo y la acción coordinada público-privada para mejorar la calidad de vida".

Objetivos estratégicos:

1. **Formalización de los productores**. Trabajar sobre un proceso de formalización fiscal y sanitaria de los productores que pertenecen al Cluster. Lograr un 10% anual de ingreso de productores al sistema formal entre 2010 y 2012.

2. **Captar nuevos asociados**. Buscar nuevos asociados el Cluster mediante proceso de formalización, inclusión, reuniones, capacitaciones, beneficios por participar del cluster, etc. Lograr 5 nuevos por año entre 2010 y 2012.

D. Lineamiento estratégico: Todos los grupos. Productos y mercados. "Mejorar la facturación global del cluster".

Objetivos estratégicos:

1. **Aumento del precio unitario del producto** a causa de la mejora en la percepción por parte de los clientes. 10% de aumento en 2 años (2012).

2. **Aumento de los volúmenes comercializados**, a causa de mejora en la producción y la calidad. 10% en 2 años (2012).

3. **Aumento de la facturación global**, 10% en 3 años (2013).

3.6. Gestión estratégica para el cluster

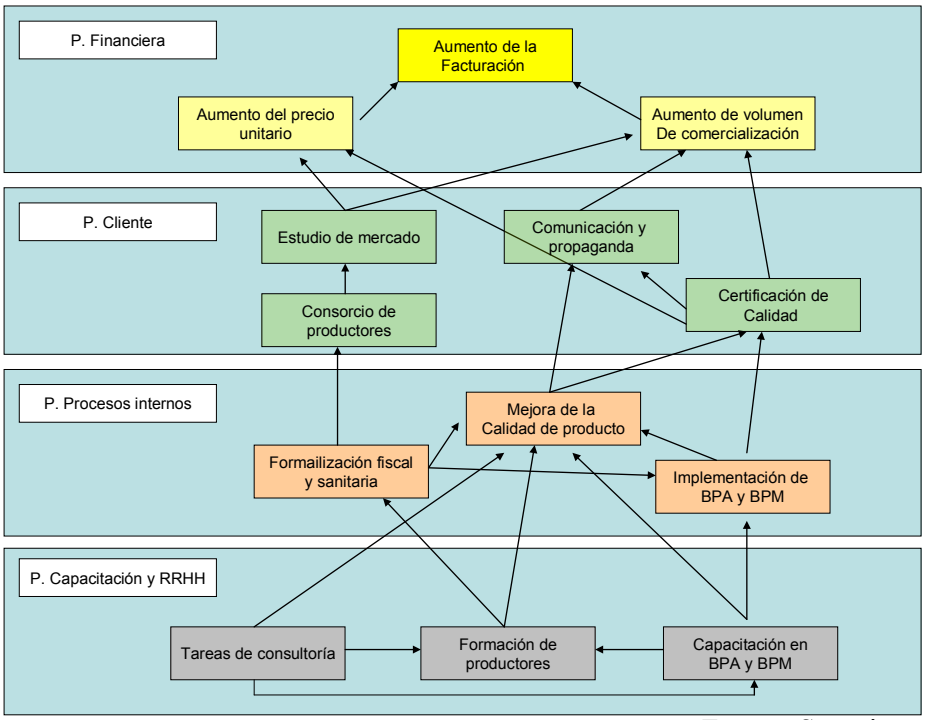
Los indicadores propuestos son los siguientes:

- Mercado global de exportación de quesos (en tons.)
- Mercado global de exportación de quesos (en mill. U$S)
- Mercado global de exportación de quesos artesanales (en tons.)
- Mercado global de exportación de quesos artesanales (en mill. U$S)

- Producción mundial de quesos artesanales (en mill. Tons.)
- Producción Uruguaya de quesos artesanales (en mill. Tons.)
- Mercado de quesos artesanales en Brasil (en mill. U$S)
- Mercado de quesos artesanales en Argentina (en mill. U$S)
- Nuevas regulaciones internacionales para el mercadeo de quesos artesanales (en cantidad y tipo)
- Costo promedio de producción de quesos artesanales en Uruguay (U$S/ton)
- Precio promedio de quesos artesanales en Uruguay (U$S/ton.)
- Número de productores de queso artesanal en Uruguay
- Producción de queso artesanal en Uruguay (miles de tons)
- Producción de queso artesanal en Uruguay (Mill. U$S)
- Demanda de queso artesanal en Uruguay (miles de tons.)
- Demanda de queso artesanal en Uruguay (mill U$S)

Para poder realizar un seguimiento del grado de cumplimiento de los principales objetivos estratégicos se construyó un Mapa Estratégico (ver Fig. 1) relacionando los objetivos entre sí, estas son: Capacitación y RRHH, Procesos internos, Cliente y Financiera. Esta definición de relaciones causa-efecto promueve la base para el desarrollo de los indicadores de gestión estratégica y su posterior interpretación. En la Tabla 2 se presentan los indicadores de gestión seleccionados y sus características.

Fig. 1: Mapa estratégico para construir el Tablero de Comando de la quesería artesanal de San José y Colonia – Uruguay. (Fuente: elaboración propia)



Fuente: Senesi et al. (2009)

4. Consideraciones finales

El trabajo permite a investigadores y emprendedores a identificar y analizar en una forma sistémica la intervención y desarrollo de un cluster agroalimentario en países en

desarrollo. El método EPECA se conforma como un todo apalacándose en el marco teórico de la nueva economía institucional.

El punto central de un proceso de intervención y gestión estratégica en clusters está en la capacitación de la organización para pensar en el futuro, pero actuar en el presente. La GE es mucho más que planear o prever el futuro, es aprender a convivir con un futuro que no se puede prever, siendo un proceso dinámico y direccionado para acciones concretas (Marino, 2005). El proceso de planificación estratégica implica contar con suficiente información para realizar el análisis, pero además las herramientas teóricas para poder realizar dicho análisis. De ahí la importancia del marco teórico que se desarrolla en este manual.

La formulación de un diagnóstico y un plan estratégico consensuado por los actores locales, en el marco de la conformación de un cluster, nos permite observar que puede mejorarse parcialmente la competitividad en los sectores analizados. El método EPECA se presenta como una herramienta útil para poder llevar a cabo la intervención. Además se destaca su ágil aplicación y entendimiento por parte de quienes participan en la intervención (consultores, actores del cluster, funcionarios públicos, expertos sectoriales, etc.).

El método EPECA establece la importancia de lo social en las iniciativas cluster. En el caso analizado de la quesería artesanal de Uruguay, los lineamientos estratégicos y objetivos planteados en general incluyen procesos de acción colectiva.

5. References

Lambert, M.D. & M.C. Cooper. 2000. Issues in supply chain management. Industrial Marketing Management. Vol. 29, pp. 65-83.

Lazzarini, S.G. 1997. Estudos de caso para fins de pesquisa: aplicabilidade e limitaçoes do método. En: Farina, E. et al. (Coor). Estudos de Caso em Agribusiness. São Paulo: ed. Pionera, p. 9-23.

Lazzarini, S.G.; F.R. Chaddad & M.L. Cook. 2001. Integrating supply chain and network analysis: The study of netchains. Journal on Chain and Network Science. 1 (1): 7-22.

Meyer-Stame, J. & U. 2005. Harmes-Liedtke. Cómo promover clusters. BID-Mesopartner.

Porter, M.E. 1990. The Competitive Advantage of Nations. New York: The Free Press.

Powell, W. 1990. Neither market nor hierachy: Network forms of organization. In: Cummings, L. Staw, B. (Eds.). Research in Organizational Behaviour, CT, JAL, Greenwich.

Senesi, S.; G. Napolitano; H. Palau. 2009. Análisis estratégico de agronegocios para el desarrollo de clusters agroalimentarios. PROSAP-Argentina.

Solvell, O. 2008. Clusters. Equilibrando fuerzas evolutivas y constructivas (Red book of clusters). IVORY TOWER PUBLISHERS. Stockholm, Sweden.

Sölvell, O.; G. Lindqvist; C. Ketels. 2003. The cluster initiative greenbook.

Stevens, J. 1989. Integrating the supply chain. International Journal of Physical Distribution & Materials Management, 19 (8), pp. 3-8.

TRAJECTORY OF THE ARGENTINE BIODIESEL AGRIBUSINESS: THE STORY SO FAR AND CHALLENGES TOWARDS THE FUTURE.

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Abstract
Argentina has enormous potential for producing and marketing biofuels in domestic and external markets, based on excellent soybean agricultural and crushing competitiveness, which require a strong institutional environment. The sector has grown steadily over the last 5 years and is currently characterised by the coexistence of different scales of production and governances, which vary from hierarchy to market. Three different models of production search for the solution to issues like lack of energy, reducing pollution and producing food, with large-scale production appearing most competitive and medium-scale production gaining competitiveness when coupled to animal production. Finally, producing biofuels in Argentina could present several challenges that put its future in jeopardy and leadership and entrepreneurship will be the key to overcome them.

Key words: biodiesel, innovation, productive scales, challenges.

TRAJECTORY OF THE ARGENTINE BIODIESEL AGRIBUSINESS: THE STORY SO FAR AND CHALLENGES TOWARDS THE FUTURE.

1. Introduction

Biofuel production is happening all over the world, though mainly in North and South America, Europe and Southeast Asia. These areas have established a global leadership in biofuel production and use.

The Argentinean biodiesel production achieved a 2 million ton production during 2010, out of which approximately 30% is consumed domestically and 70% is exported, making Argentina the number one exporter in the world. The sector is currently characterized by the coexistence of different scales of production and various forms of governance, which vary from hierarchy to market (Daziano et al, 2007), although it is expected to tend towards large scale production. Larger scale production in Argentina based on imported hi-tech machinery is the most competitive type of production in terms of costs. Despite this fact, medium scale production could be viable when integrating it with animal production. Moreover, such a productive model could become a key strategic node in certain areas of the country which are far away from ports and hence, have certain productive disadvantages (i.e.: freight costs and availability, fuel availability, local infrastructure). This model would most likely be the result of a network of producers getting together to gain scale and share risks, but in order for it to succeed there will have to be great leadership and collective action. These are two concepts which are not widely spread among Argentinean farmers, who tend to be individualistic.

The sector is still maturing, though it is expected to grow in the next few years. It has enormous potential for producing and marketing biofuels both in domestic and external markets, based mainly on excellent agricultural and crushing competitiveness and volume, despite some constraints and limitations, which are mainly institutional (Daziano et al, 2006). Leadership and entrepreneurship could be the weapons needed to attempt to overcome these limitations.

2. Objective of the study

Analyzing the current biodiesel business in Argentina, by means of identifying the various characteristics (institutional, organizational, technological) that make it a currently successful and competitive but potentially threatened business, while portraying its development in the short and medium term.

3. Methodology

The research will be descriptive and exploratory as we intended to develop, clarify and/or modify concepts and ideas with the aim of outlining more precise problems or plausible future hypothesis. Thus, the research was based upon qualitative matters and practical applications (Gil, 1994).

The paper has a macro-level and micro-level approach. The study of the sector (macro-level approach) sought to obtain the necessary information in order to characterise the

sector as a whole, including variables such as identification of the players, assessment of the institutional, organisational and technological environments among others. The results provided are based on primary and secondary information sources: Interviews with experts in the sector and bibliographical search, although some of the results will be given out of the experience of the authors in the field of research. Primary information is based on face-to-face interviews that encompassed various topics related to the developments in the biodiesel sector. Subsequent phone calls were made to clear doubts and obtain additional information to contextualise the answers. A total of five people answered the questionnaires. The object of these interviews is to gain knowledge of the actions taken by the companies to align the governance structures with the market and how the leadership and entrepreneurship in the sector and in the companies themselves impact into gaining second order economies.

A micro-level approach, with the aim to arrive at understanding three different scales and models of production of biodiesel will be performed. The paper includes these three scales of production (large, medium and small) as cases to be studied. The case study method is used as it is a suitable method of analysis in situations where a small sample permits in-depth consideration of the complex and interdependent factors entering into a decision (Yin, 1989). Large scale production will be characterised by plants producing over 60,000 tons of biodiesel per year with world-class technology. Medium scale production will be that which ranges between 20,000 and 60,000 tons per year, having an intermediate level of technology. Small scale production is that made up by plants producing less than 20,000 tons and having a low technological level. The variables studied in order to characterise these three models included the level of technology used, the governance structures used for procurement of feedstock and end-product sale, the attributes of the transactions governed by these structures and the identification of the type of leadership that is most common for each case. The necessary information was obtained by interviews and the authors' knowledge due to advisory done since 2005.

Research reports and case studies in research groups (Food and Agribusiness Program (PAA)-School of Agronomy-UBA, PROSAP, PENSA, Global Food Network) were also used, aimed at characterising the key entrepreneurial elements and advance the understanding of the development of the sector, following the new institutional economics theory.

4. Literature review

4.1. New institutional economics

In the analysis of an economic system, the institutional environment and its enforcement are as important as the way in which organisations develop in that environment. Besides, firms that have the function of producing –neo-classical theory– and transacting –neo-institutional theory– require a certain degree of technology and organisational ties to carry out their activities. Organisations buy or produce the goods they need to produce their own goods or services, considering transaction costs (at least for the TCE Theory). Organisations thus appear as organisational structures rather than technological functions. The cost of the price mechanism, the cost of the market –the transaction cost– is what leads to the way of governing the transaction.

Transaction costs depend, among other things, on the institutions governing a country,

system, region or specific sector (North, 1990). Institutions constitute the rules of the game in a society (North, 1990), country, sector, etc. They are the laws, executive orders, National Constitution, regulations, etc. –formal institutions–; they are also the culture, tradition and habits of the sectors analysed –informal institutions. Williamson (1985, 1993) considers institutions from a "micro analytic point of view" as being "Governance Structures or Institutions" –Market, Hybrids and Hierarchies–, that should be used to identify, explain and mitigate any form of contractual risk. The efficiency of the governance structures is the result of the alignment of the transaction costs with the correct governance structures (Zylbersztajn, 1996).

When there are many and important changes in the context and bilateral dependency, transaction cost economics states that there could be higher possibilities of opportunistic behavior, resulting in lower efficiency of the price mechanism. That is why hybrid forms exist (Ménard, 1996); they represent a shift towards cooperation and administrative controls in order to be able to adjust more rapidly and with greater coordination regarding these alterations.

This explanation leads us to investigate what Williamson proposes in different papers about governance structures. Williamson (1993) establishes that there exist three attributes of transactions: frequency, asset specificity and uncertainty. As the frequency increases, contractual relations will also increase through an increase of trust among the parties. As for asset specificity, the author states that as the specificity of an asset rises, the market determined price mechanism becomes less of an option and the contract, and then vertical integration, become better options. This type of structure can be observed clearly in agribusiness systems with a strong focus on customers demanding quality (Zylbersztajn, 1996). Finally, uncertainty is a consequence of the two preceding attributes; the higher the uncertainty, the higher the tendency towards integration will be.

4.2. Entrepreneurship and leadership

Developing entrepreneurship research within economics differs somewhat from that of other social sciences. Entrepreneurship has been and will continue to be studied in virtually all disciplines, from social anthropology to organisational theory to mathematical economics (Henrekson, 2007). Entrepreneurship can be defined first, as a concept which deals with individuals and organisations that actively contribute to renewal and change in the economy. It does not really matter whether the entrepreneur is the person who provokes change or merely adjusts to it. Concordantly, entrepreneurial action can mean either the creation of opportunities or the response to existing circumstances, in the presence of which entrepreneurs have the daring to embrace risks in the face of uncertainty. Second, entrepreneurship is a function, one that is carried out by specific individuals. Given that they choose to do so, the activities may be productive, unproductive, or even destructive from a societal perspective (Baumol, 1990).

Baumol pioneered the role of institutions for entrepreneurial behavior; how "the [social] structure of payoffs" channeled entrepreneurship to different activities. If institutions are such that it is beneficial for the individual to spend entrepreneurial effort on circumventing them, the individual will do so rather than benefiting from given institutions to reduce uncertainty and enhance contract and product quality. The

outcome in this case is expected to be one where corruption and predatory activities prevail over socially productive entrepreneurship. The supply of entrepreneurial effort is also likely to be influenced by the institutional setup. The wealthy world does a good job of directing entrepreneurship toward inherently productive purposes (a large part of the explanation for wealth).

Based on broad historical studies (Rosenberg & Birdzell, North) it is now widely recognised that protection of private property rights is of fundamental importance for economic growth. With secure exclusive private property rights, productive entrepreneurship is likely to thrive. This happens because successful entrepreneurs know that they will retain the entrepreneurial rents they earn and because specialisation and the division of labour are greatly facilitated, which broadens the range of potential entrepreneurial discoveries.

However, how could entrepreneurial attitudes be explained in emerging countries, with high uncertainty –mainly institutional– and a significantly low respect for property rights? In this case, with weak institutions, entrepreneurship could be achieved developing collective actions, with strong influence of leaders and collaborative leadership.

According to Allen (2002, 2005), in many emerging economies, markets are oftentimes imperfect and incomplete. This causes the objectives of firms to switch from being run in benefit of shareholders to being run in benefit of all stakeholders within a chain, thus creating a net of relations which can prove helpful in order to overcome market failures. He also states that it is not necessarily optimal to use the law to ensure good corporate governance, in such economies. Other mechanisms such as competition, trust, and reputation may be preferable.

Literature on leadership deals with the issue of how to achieve collaboration and unity between groups. A collaborative leadership role is process oriented. A collaborative leader identifies relevant stakeholders and brings them to the table –as inclusively as possible–, keeps them at the table and helps them to deal with one another constructively. Huxham and Vangen (2000) define leadership in multiparty situations as "mechanisms that are central to shaping and implementing collaborative agendas" (p.1171). As a result, entrepreneurial attitudes in a "multi-organisational relationship" respond to coordination and development of networks due to uncertainty and weak institutions –unity creates strength.

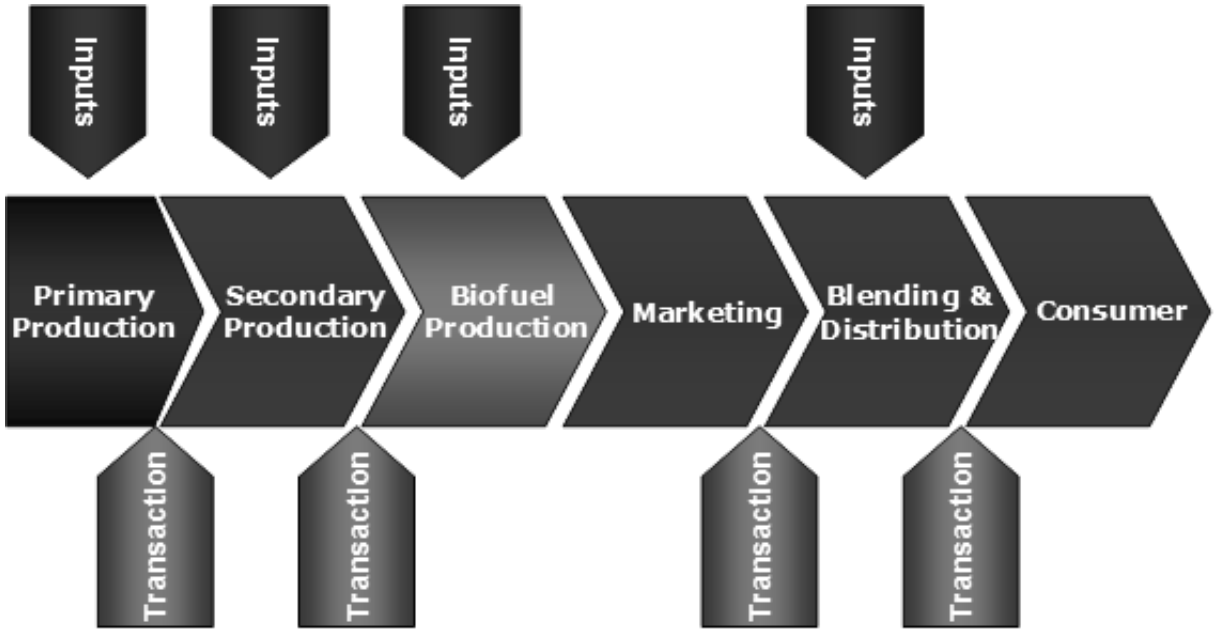
5. Mapping

Globally speaking, the large scale model, based on hi-tech machinery is predominant. It is the most competitive in terms of costs. This scale is mainly covered by two types of companies: oil companies (distribution and logistic know-how and ownership of the distribution channels) and crushers (productive know-how and ownership of the most important raw material, crude vegetable oil). It is also quite common to find joint-ventures of some kind between these two types of companies because of these complementary characteristics. Despite being the large scale model the most widely spread, medium scale production could be viable when combined with animal production of some sort. In fact, this productive model could become a strategic node in certain key areas which are far away from ports and consequently, have certain

productive disadvantages (i.e.: freight cost and availability, fuel availability, local infrastructure). Meanwhile, small scale production is destined to disappear, mainly due to technological and quality problems and the viability of its products and by-products.

The chain is composed firstly by a primary production link, grain production. Secondly, there's the secondary production link, crushing and production of oils and protein concentrates or distillation. Afterwards, there's the biodiesel production link, in which oils are turned into biodiesel. After this process there's the marketing link and finally the blend and distribution link, in which petrol companies blend biofuels with fossil fuels and ship it to their distribution points. It is important to mention that between any two links of this chain there is always a transaction, which can be governed in different ways from the market to the vertical integration, passing through the hybrid forms. In Figure 1 the basic design of the global production and marketing biodiesel chain can be observed.

Figure 1. General design of the global biodiesel chain.



Source: Own elaboration

6. The current Argentine biodiesel scenario

For the past 15 years, agribusiness has been a fundamental sustain towards adding value in argentine food. Within the agricultural sector, Argentina is a key player on a global level, excelling in the four most important productions: soybean, sunflower seed, maize and wheat. Argentina is the 3rd most important producer and exporter of soybeans in the world (USA and Brazil are 1st and 2nd respectively), although it is the number one exporter of soybean oils and pellets. The Argentinean crushing complex is indeed composed by multi-product companies which adapt their output to different markets (e.g.: roughly speaking, beans for China, oils for Asia, pellets and biodiesel for Europe). It is expected to achieve the record production of 63 million tons of oilseeds during the

2010/2011 harvest[39]; Argentina produces around 18% of the world's soybean total production, exporting as much as 94% of this product, 20% as beans and the remainder as derivates. The crushing sector in Argentina is composed by 53 processing plants with a combined crushing capacity of around 156,000 tons per day. This industry employs 7,000 workers directly and generates a large number of indirect jobs as well.

The biodiesel agribusiness in Argentina is growing fast. Total biodiesel supply for 2010 added up to 2 million tons, out of which roughly 700 thousand tons were consumed domestically and 1.3 million tons were exported. By the end of this year, it is expected to achieve the 3 million ton mark. It is primarily located near Rosario along the Parana River, although the Provinces of Buenos Aires and Córdoba have an important participation too.

Despite a sustained growth over the last 5 years, there exists a delay of several years with respect to other agricultural powers, due to some constraints and limitations, and more particularly to those of an institutional matter (Daziano et al, 2006), which, according to North (1990) are of key importance when developing a new sector.

The current uncertainty in Argentina institutionally speaking is due to the National Biofuel Law[40]. It provides an institutional frame which is not encouraging for competitive large-scale production, which is every bit as important as how the firm develops in it. It states tax benefits only for companies composed by at least 50% governmental participation or at least 50% farmer (small producers) ownership, so reading in between the lines, there are no benefits for large-scale producers; there's an implicit encouragement for the development of small and medium scale production, which not always generate a world-class product. It also leaves exports out of its limits, not mentioning them in any part of the law and only focusing on the domestic market. This causes a huge degree of uncertainty because export taxes already exist in Argentina[41] for biodiesel (20%), but the unanswered question ahead is: will this situation remain the same? Or will export taxes increase to 31.5% as it happens with soybean oil, 35% as it happens with soybeans or 50% as it happens with crude oil? Currently, the biodiesel business in Argentina is surviving because of this tax differential and the local government has already made interventions in other markets, and if it were to consider this business strategic (which it is), taking action within it would be nothing out of the ordinary. Currently, and due to the fact that not a single firm has been approved for producing and selling in the domestic market, the Government has issued a temporary permit until December 31 2011 for export companies to produce and sell in the domestic market to cover the 2010 and 2011 mandates.

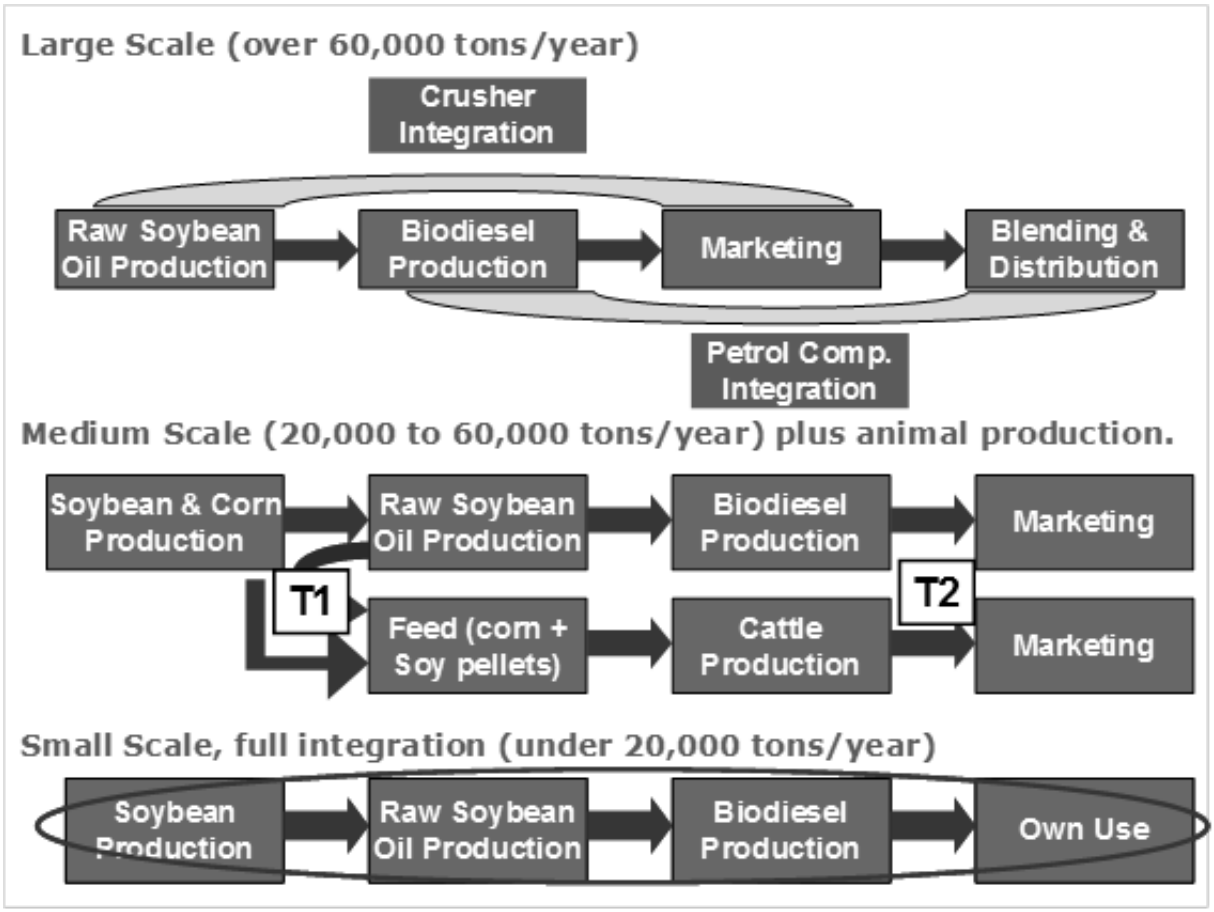
One of the keys towards sustainable, efficient production will definitely be the access to world-class technology which is currently only available through imports. Added to this, no local machinery producer has achieved a world-class product, and hence the machinery market for biodiesel production in Argentina, which started as a highly heterogeneous one, both in quality and price is now highly dominated by world-class export machinery. Another aspect of interest is that imports are becoming increasingly

[39] CIARA: Cámara de la Industria Aceitera de la República Argentina (Argentine Vegetable Oil Industry Chamber).
[40] Argentinean National Law number 26,093, sanctioned April 19th, 2006.
[41] Until April 2009, export taxes affecting the Soybean complex in Argentina were: Soybeans: 35%, Raw Soybean Oil: 31.5%, Biodiesel: 20%. Crude oil: 50%.

difficult as the local government wishes to keep a positive foreign trade balance and has prohibited, delayed and/or increased paperwork for imports. It is interesting to see that although many joint ventures and strategic alliances have happened between petrol and crushing companies around the world in this particular industry, this does not seem to happen in Argentina (Daziano, 2009), and the main cause is, again, the Biofuel Law.

As said before high scale production, based on imported hi-tech, is the most competitive in terms of costs, although, medium scale production could be viable when combining it with animal production of some kind. Small scale production also exists as a full integration, having the least competitiveness in comparison with the other models. Figure 2 shows the organisation of the different chains in accordance with the scale considered.

Figure 2. Design of the chain for three Biodiesel producing scales.



Source: Own elaboration

As observed in figure 4, there could be two types of integration in the large scale, oil companies' integration and crushing companies' integration, which take over different links of the chain, although the petrol companies have not entered the market in Argentina. On the other hand, in the medium scale production it can be observed how this chain interacts with an animal production chain to form an integrated production system. Finally, the articulation of the chain in the case of the small scale production is clearly a vertical integration from the first to the last link.

After studying and observing many different production models, scales and technologies, analysing the interviews, a viability study will be described in the next chapter. Although these facts are very important, given that the biodiesel sector is still at an early stage, the most important variables when establishing this business are the organisational aspects, namely organisational design and practices, leadership and entrepreneurship.

7. Characterisation of three production models: their role and viability

7.1. Large-Scale Production

Globally, this production model is characterised by the existence of mainly two types of players, petrol companies and oilseed crushing companies. Nevertheless, in Argentina it is mainly composed by crushing companies located on the Paraná River (it is the main outlet for agricultural commodities that go towards export markets) through the several ports on it, both public and private (Rosario, San Nicolás, Zárate, San Lorenzo and others). It is these types of players that are already using hi-tech machinery and are ready to cope with the big investments needed to install large capacity, world-class biodiesel plants, which can cost several million dollars (estimates vary from 19 to 22 million US dollars) and represent huge entrance and exit barriers to the business, due to high asset specificity. On the other hand, institutional hazard represents huge transaction costs that are dealt with by these types of producers through the governance structure of integration (North, 1990; Williamson 1985, 1993; Zylbersztajn, 1996).

Oil crushers will tend to integrate forward towards producing biodiesel taking advantage of the production know-how and the ownership of the main primary product, raw vegetable oil. The final product is most likely going to be sold on export markets, although if there should be further intervention from the government on the Biofuel Law an increasing percentage will be sent to the domestic market. Hence, it would appear to be the most risky in terms of institutional hazard.

Large scale producers are not likely to focus on animal production, since the crushers already know how to sell pellets without it and petrol companies will not have to deal with them since they start directly from oil. Given the assumption that the machinery they will use will be world-class, they should not have any problems when marketing glycerol either since it is a highly demanded product by, for example, pharmaceutical companies.

Regarding the role of leadership in this particular scale of production, given the mentioned players involved, it can be observed that it is clearly the sort defined as “by example leadership”. This sort of leadership happens because large firms’ business is mainly exporting and hence, they do not care that much about the constraints given by domestic regulations as medium and small firms do. This leadership is useful to prove that the product works, that there is a market for it and that it can be accessible. These firms are, in effect, the “tip of the arrow” in the sense that they are the ones that are the initiators of the business in the country. This example is what will encourage different other forms of business organisation, forms of governance, etc. to be developed. They are the ones that set the basis for the agribusiness net-chain to be developed, even when it is affected by a severely insecure institutional environment. This is clearly a marketing-type leadership, involving, as stated by Baumol (1990), the creation of opportunity.

7.2. Medium-Scale Production

In this scale of production the model will be different. Here the most common scenario would be that of several farmers getting together to gain scale of production and hence lower costs on both sides, by gaining economies of scale and by sharing costs and risk, reducing transaction costs. This is the main reason why hybrid forms exist according to Ménard (1996); they represent a shift towards cooperation and administrative controls in order to be able to adjust more rapidly and with greater coordination regarding these alterations.

This sort of production has very few examples in Argentina but it could prove to be a successful model. It is this type of players who have made investment after investment in the agricultural phase during the last 20 years (the last green revolution in Argentina), gaining their unique competitiveness in the production of agricultural commodities worldwide. If they join up they may be able to afford using hi-tech machinery, but it is expected that they use an intermediate level of technology. This sort of production should be highly homogeneous in its player composition given that these medium-sized contract farmers work all over the agricultural area in the country, producing agricultural commodities (mainly soybeans) in a range from 15,000 to 100,000 tons.

The probable form of governance is that of the coordination (Daziano et al, 2007) with several farmers "pitching in" with their production and capturing a concordant rent for the sale of the product. In this sort of production, an interesting model appears: that of the integrated system which involves biodiesel and animal production. This model could be very well applied to parts of the country which are far away from ports and hence, have high freight costs and problems with availability of certain inputs, such as fuels.

Moreover, if one takes the case of the Argentinean North West[42] (NOA after its Spanish initials), it is striking to find that this area ships out to other regions of Argentina more than 2 million tons of soybeans, at least 1 million tons of maize and a million calves; and on the other hand, ships in from other parts of the country almost US$ 110 million worth of beef with the consequent in and out freight charges during these operations.

A medium-sized biodiesel plant (40,000 tons/year, around 11-12 million US Dollars) with a high technological level would generate around 40,000 m³ of bio-diesel and roughly 160,000 tons of soybean pellets. Considering a sensible mix for a bovine feed lot, the project would need around 150,000 hectares, which for that area are not an impossible thing to obtain. With this feed, one could be able to produce around 40,000 tons of beef annually (feeding approximately 200,000 heads of cattle annually). These figures clearly show that the main business is that of producing cattle near where the biodiesel plant will be located, hence cutting down enormously on freight costs and using the entire production of protein pellets coming from this factory. To make a long story short, soybeans and maize are closer to processing facilities and feed-lots and steers are nearer the market where they will finally be consumed. The limitation that arises is meat processing and packing facilities that can cope for this increase in local production. Moreover, strategically speaking, biodiesel produced locally could prove itself considerably useful, considering that practically all of the road freight runs on

[42] The Argentinean North West includes the provinces of Jujuy, Salta, Catamarca and Santiago del Estero and has been historically the least developed area of the country with some of the lowest average income levels.

diesel engines, that petrol is produced and refined in the South of the country and that oftentimes important fuel shortages (particularly of diesel) happen in many parts of the country, especially in the inlands. This could be a small step towards some degree of fuel independence. Summarising, this may not be the most cost-efficient structure but it could surely play an extremely important role because of the above mentioned reasons.

Regarding the role of leadership in this particular scale of production, and given the involvement of the type of players mentioned before, it can be observed that it is a more of an entrepreneurial and organisational leadership, or as defined by Huxham and Vangen (2000) a collaborative leadership. In this case the coordinating entity (a firm or an association of producers) is the one that exercises said leadership. It is this coordinating node the one that has the responsibility of making such a complex network function. All of the members of the net have to necessarily rely on the coordinating node, hence the issues of trust and collective action become exceedingly important. It is clearly an attitude-type of leadership, involving, entrepreneurship as defined by Baumol (1990), not necessarily creating the opportunity, but certainly responding to existing circumstances to take advantage of them, but at the same time embracing risks in the face of uncertainty, coming mainly from the institutional environment. A collaborative leadership role is process oriented, the relevant stakeholders must be identified in order to bring them to the table and together, build this multi-organisational relationship that will respond to coordination and development, unity creates strength. Moreover, this model could be afterwards replicated for such other crops as sunflower, rapeseed and maize, producing biodiesel or bioethanol while raising livestock.

Nevertheless, for this model to succeed it will be very important to overcome a natural characteristic of the Argentinean farmer, namely its reluctance to work collectively. Low stocks of social capital in Argentina have historically been a problem whenever a network of farmers is built (Palau, 2005) and overcoming this will be a key issue.

7.3. Small-Scale Production

Small-Scale production is that which is thought for self-consumption. It is based on the availability of primary products (i.e. soybeans) at the direct place of production and the search for some degree of energetic independence following the previously mentioned energetic scenario in the country.

As a consequence, the FAA (Federation of Argentinean Agriculturists) built up a plan for biodiesel production at farm level (from rapeseed in this case). Applying an institutional leadership, they encourage farmers to produce their own biodiesel as a means towards fuel independence, but the outcome has not yet been very satisfactory.

The levels of technology and scale are low, with plants processing around 10 tons of soybeans per day with the use of presses, obtaining 1 ton of biodiesel and around 8.5 tons of expellers. Given that the technological level is low, the price of the machinery is relatively cheap, hence entrance barriers are not high. Of course, when this sort of model fails, selling this highly specific machinery does not become an easy task.

The real issue with this sort of technology is that it does not produce a world-class product. The quality level of the product makes it unfit for marketing. The product itself could be harmful for engines. Not to mention by-product hazard, unrefined glycerol

should be disposed of correctly if it cannot be sold, and since its quality does not allow it to be sold, disposing of it creates another cost in order to do it properly. One positive fact is that in producing biodiesel, the export tax differential is favorable. Clearly the governance here is a vertical integration, since the producer owns the soybeans, the blender and consumes the output himself.

It cannot be clearly stated that such a model would be one that sets an example, since its lifespan does not seem to be very long. Such a model does not seem to be viable in the long run. Even so, many small producers could get together and build a net to produce on a medium scale model, which could prove being a much more successful business.

8. Challenges and uncertainties towards the future

Despite a promissory start to the biodiesel business in Argentina, some factors may affect its success in the future, notably those of an institutional nature. First off, a key constraint is the National Biofuel Law. As previously stated, its shortcomings cause a weak institutional scenario, which is very difficult to foresee and also to adapt to as temporary permits to supply the domestic market have been issued only for 2010 and 2011, and the process by which they were extended is still unclear.

Secondly, Government intervention could wipe out the business as a whole if export duties were to be increased or exports were to be closed because then, the economic equation just would not add up, being the whole business so dependent on export markets.

In third place is the high (not to say extreme) dependence of the argentine biodiesel business on the European market. During 2009, the EU asked for all of its potential suppliers to extend a report on how sustainable their production of biofuels was. Argentina as a country did not prepare said report, a fact that has put its position as supplier for the EU in jeopardy. Luckily, there is still room for private certifications of sustainability (a process which is still under review by the EU), and towards the future, this may be the road the argentine suppliers will have to take to enter this market.

In line with this fact, Aapresid's (Argentinean No-till Farmers Association) no-till farming certification could provide a viable solution. This environmental certification of the no-till farming production process will become a mechanism of summarised, precise information that will constitute the basis for better agricultural management (productive and environmental), and at the same time will allow the consumer to know the characteristics of the productive process, through scientifically based knowledge measured on the field. This is important because Argentinean production has a large percentage of no-till agriculture, almost 90% of the soybean harvested area. Conservation agriculture in general and no-till farming in particular offer a productive alternative that makes it possible to maintain yields, reduce costs and, at the same time, have a less aggressive impact on the environment –mainly on the soil resources. That is, in the present state of knowledge, no-till farming represents a real and concrete alternative, environmentally and productively superior to the tilling system.

Finally, out of all the important biofuel producers, Argentina is the country that is spending the least on the development of new technologies on 2nd and 3rd generation biofuels. This fact puts the country in a clear disadvantage against competitors and also

affects its future as a global supplier.

All of these facts can change the status of competitiveness for the biofuel business in Argentina and they should not be overlooked when planning towards the future. In the end, soybeans and maize will not and cannot be the chosen feedstocks for biofuel production in the future, and so, the evolution of biofuel production in Argentina has to take all of the above cited factors into account.

9. Discussion: leadership and entrepreneurship in the biodiesel industry

As regards leadership in the sector, and as previously stated when reviewing the productive models, one would find two different types of leadership within this sector. Large firms (basically crushing and petrol companies) would have a marketing-type leadership, involving, as stated by Baumol (1990), the creation of opportunity. These firms are, in effect, the "tip of the arrow" in the sense that they are the ones that are the initiators of the business in the country.

On the other hand, the medium scale producers, using hybrid governance, would exercise an entrepreneurial and organisational leadership, or as defined by Huxham and Vangen (2000) a collaborative leadership in order to produce and market competitively. In this case the coordinating entity (a firm or an association of producers) is the one that exercises said leadership. It is this coordinating node that has the responsibility of making such a complex network function. It is an attitude-type of leadership, involving, entrepreneurship as defined by Baumol (1990), not creating the opportunity, but certainly responding to existing circumstances to take advantage of them. Nonetheless, for this model to succeed it will be very important to overcome the low stocks of social capital in Argentina for farmers to work collectively.

Finally, small scale production has an example of institutional leadership, based more on idealistic than purely business reasons. Moreover, it is a strategic solution to help ensuring fuel supply in a situation of repeated shortages.

A comparison between the three models can be observed in Table 1. As previously discussed, large scale producers have a high technological level, whereas medium scale models' is intermediate, with small scale production having thus far low or very low technological level. The sector, as a whole, faces institutional uncertainty, but organisational uncertainty will be low for large and small scale, and medium for medium scale production. Meanwhile, with high asset specificity being common to all models, different governances appear: in large scale production, crushers predominantly show integration for inputs, but market for outputs, while petrol companies' governance is market for inputs and integration for outputs; medium scale production shows a governance structure based on contracts for inputs, although market, contracts and integration appear when considering outputs; small scale production, is clearly an integration on both sides, although some market appears when selling expellers. Target markets are also different, with large scale supplying for both domestic and export markets, medium scale concentrating on the domestic market and small scale producing for self consumption. The biggest challenge for each model is also different, even though they all face institutional constraints.

Table 1. Production Scale Comparison.

Variables	Large Scale	Medium Scale	Small Scale
Technology level	High	Intermediate	Low, Very low
Governance (inputs)	Integration (crushers) Market (petrol companies)	Contracts	Integration
Governance (outputs)	Market (crushers) Integration (petrol companies)	Market, Integration (biodiesel) Contracts, Integration (feed)	Integration Maybe market when marketing expellers
Asset Specificity	High	High	High
Uncertainty	High Institutional Low Organisational	High Institutional Medium Org.	High Institutional Low Organisational
Target Market	Export & Domestic	Domestic (biodiesel) Domestic (Feed)	None, self-consumption
Leadership type	Marketing-type	Attitude-type	Institutional (1 case)
Biggest Challenge	Institutional Hazard	Collective action, social capital	Product & By-product quality

Source: Own production, based on interviews.

10. Conclusions and implications

Argentina is currently going through some crises as regards consumer products availability and inflation. The energetic crisis is heavily affecting not only industrial production, but also transport. These situations could be given a solution if the right decisions were made on certain critic strategic points.

Institutionally speaking, the biofuel sector faces a great deal of uncertainty in many different aspects: the national biofuel law does not encourage competitive production; it is still unclear what role will the oil companies play in the production and blending of fossil fuels and biofuels; the mandatory cut started in January 2010, although the current production of biodiesel is mostly outside of the national law and special permits had to be issued. This same situation happened at the beginning of 2011. Added to this, Argentina is the country that is spending the least amount of resources on research and development. Finally, Argentina has not yet been approved as a sustainable supplier of biodiesel for the European Union, its main market.

The Argentine biodiesel scenario shows the existence of three models. One of them, large-scale production is extremely competitive in terms of costs, mainly as a follow-up of the highly competitive soybean crushing sector, probably to a point where probably no other cluster in the world will be able to produce soybean biodiesel so competitively. In order to provide for export markets, it is necessary to do it with large-scale plants (60,000 tons annually and above) with world-class technology. Meanwhile, a key driver for medium and small scale producers is fuel independence, although their approaches

towards producing are different. Medium scale models will become competitive if they establish themselves in key places of the country where they can become strategic nodes of both animal production and biodiesel (feed-lot right next door to biodiesel) under the paradigm of "Biofuels as animal production's by-product" and not the other way around. Hence, cost efficiency becomes much less important, particularly because freight prices are almost inconsequential. As for the small-scale production, it is highly inefficient in the use of raw materials and its products could carry some quality and environmental hazards. Its only reason for existing would be a strategic one, given the country's energetic scenario. Its best solution is to team up with other small producers to form some sort of medium-scaled venture. Otherwise, this model is destined to disappear.

Organizationally speaking, the sector as a whole tends towards integration and/or contracts in order to reduce uncertainty and mitigate contractual risk. This is mainly due to the highly uncertain institutional environment that rules the biodiesel agribusiness. Three scales of production are identified, which compete with different strategies, with leadership and entrepreneurship of the biodiesel sector being a major driver towards understanding why it keeps on growing.

In technological terms, the sector is at the top technological levels in the world, providing a world-class product for a global business. The introduction of Certified Agriculture into the business will be of key importance not only to demonstrate the sustainability of the processes, but also to add value to the whole chain.

This is one of the highest potential sectors in Argentina and it will only be achieved through great coordination and organisation by the actors. With a more certain institutional environment and continuing with these levels of leadership and entrepreneurship we could definitely be seeing Argentina as a key player in the global bio-fuel business in the near future.

Nevertheless, all of the constraint factors (notably institutional ones) can change the status of competitiveness for the biodiesel business in Argentina and they should not be overlooked when planning towards the future. In the end, soybeans and maize will not and cannot be the chosen feedstocks for biofuel production in the future, and so, the evolution of biofuel production in Argentina has to take all of the above cited factors into account.

As future research agenda, the issues that to be addressed should be: a) the limitations caused by the lack of collective action and low stocks of social capital; b) the elaboration of an Argentinean biodiesel strategic plan, based on providing a world-class product for a global market; c) Regional economic impact of applying the medium-sized model in different areas of the country.

11. References

- Allen, F. 2005. Corporate Governance in Emerging Economies. Oxford Review of Economic Policy 2005 21(2): 164-177.
- Allen, F., Gale, D. 2002. A Comparative Theory of Corporate Governance. Wharton Financial Institutions Center.
- Baumol, W.J. 1990. Entrepreneurship: Productive, unproductive and destructive.

98 J. POL. ECON. 893.
- Cooper, G. 2007. Outlook for U.S. ethanol and DDGS production and disposition. Biofuels: implications for the feed industry, pp. 35-53.
- Daziano, M.F.; A. Radice; H. Palau; H.A. Ordóñez. 2006. Constraints and limitations to the application of Bio-fuel Production: Argentina as a major fuel supplier in the near future? XVI IAMA Conference. Buenos Aires, Argentina. June.
- Daziano, M.F.; S.I. Senesi; C. Guerrero; F. Vilella. 2007. Existing governance structures and their impact on the Biofuel Agribusiness in Argentina. XVII IAMA Conference. Parma, Italy. June.
- Henrekson, M. 2007. Entrepreneurship and institutions. Research Institute of Industrial Economics (IFN).
- Huxham, C. & S. Vangen. 2000. Leadership in the shaping and implementation of collaborative agendas: How things happen in a (not quite) joined-up world. Academy of Management Journal 43, pp. 1159-1175.
- Klein, B.; R.G. Crawford and A. Alchian. 1978. Vertical integration, appropriable rents, and the competitive contracting process. Journal of Law and Economics, 21 (2): 297-326.
- Lazzarini, S.G. 1997. Estudos de caso para fins de pesquisa: aplicabilidade e limitaçoes do método. In: Farina, E. et al. (Coor). Estudos de Caso em Agribusiness. São Paulo: ed. Pionera, p. 9-23.
- Ménard, C. 1996. On Clusters, Hybrid and Other Strange Forms: The Case of the French Poultry Industry. Journal of Institutional and Theoretical Economics. V. 152, p. 154-183.
- North, D.C. 1990. Institutions, institutional change and economic performance. Cambridge: Cambridge University Press.
- Ordóñez, H.A. 2000. New institutional economics and food agribusiness. Food and Agribusiness Program. School of Agronomy, University of Buenos Aires.
- Palau, H. 2005. Agronegocios de ganados y carnes: restricciones y limitaciones al diseño e implementación de sistemas de aseguramiento de origen y calidad. Estudio de caso multiple.
- Williamson, O. 1985. The economic institutions of capitalism. New York, Free Press.
- Williamson, O. and S. Masten. 1999. The Economics of Transactions Costs. Edward Edgar Publishing Ltd. U.K.
- Yin, R.K. 1989. Case study research: Design and methods. Newbery Park: SAGE Publications. Edición Cultural.
- Zylbersztajn, D. 1996. Governance structures and agribusiness coordination: A transaction costs economics based approach. Research in Domestic and International Agribusiness Management. Editor Ray Goldberg. Graduate School of Business Administration. Harvard University. Vol. 12.

SISTEMAS DE ASEGURAMIENTO DE CALIDAD: ALINEACIÓN DE LOS ENTORNOS ORGANIZACIONAL Y TECNOLÓGICO PARA LA CREACIÓN DE VENTAJAS COMPETITIVAS

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Abstract
En los últimos años, los consumidores de países desarrollados han profundizado sus exigencias por alimentos inocuos. Como consecuencia, han surgido una serie de Sistemas de Aseguramiento de Calidad de alimentos, los cuales se han convertido en un requisito comercial excluyente en tales países para muchos productos, de origen local como extranjero.
Por su orientación exportadora, la Argentina enfrenta la necesidad de incorporar generalizadamente estos Sistemas para conservar los mercados internacionales. Las escasas exigencias de los consumidores internos sumadas a controles públicos débiles contribuyeron históricamente a que las empresas alimentarias locales descuidaran la importancia de la inocuidad, configurando un punto de partida desventajoso para adaptarse a las nuevas demandas. El objetivo constituye, luego, un verdadero desafío para el sector agroalimentario nacional. En este marco, el presente Trabajo analiza la relación entre los Sistemas de Aseguramiento de Calidad y la creación de ventajas competitivas, mediante el estudio de caso de dos empresas del sector primario argentino que cuentan con aquéllos, bajo el enfoque teórico de la Nueva Economía Institucional. Se observa que la implementación de una estrategia de calidad basada en estos Sistemas requiere, para ser sustentable, que las empresas se desempeñen en ambientes institucionales de reglas de juego transparentes y niveles de enforcement aceptables, como los asociados a la exportación y las grandes industrias. Asimismo, la adopción de tales Sistemas contribuye por sí misma al fortalecimiento institucional, garantizando el cumplimiento de ciertas leyes, y conduce al establecimiento de estructuras de gobernancia de coordinación superior entre actores.

Key words: Nueva Economía Institucional, Sistemas de Aseguramiento de Calidad, competitividad, enforcement, ambiente institucional, estructuras de gobernancia

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1. Introducción

La preocupación de los consumidores por la inocuidad de los alimentos se ha profundizado en los últimos años, a raíz de las sucesivas crisis alimentarias que sufrieron los países desarrollados durante los años '90 (Grunert, 2005; Rohr *et al.*, 2005). Esto llevó a reforzar los controles públicos de los alimentos, lo cual se tradujo en una mayor presión sobre las empresas agroalimentarias.

Muchas de ellas canalizaron las nuevas exigencias a través de la implementación de Sistemas de Aseguramiento de Calidad (Caswell & Joseph, 2006; Rohr *et al*, op. cit), los cuales se han convertido en un requisito legal en los países desarrollados para muchos productos, tanto para las empresas locales como para los proveedores extranjeros. Si bien para otros productos la adopción es voluntaria, es probable que en el futuro se vuelva asimismo obligatoria.

Esta situación genera para la Argentina un verdadero desafío, si desea conservar los mercados internacionales y poder acceder a otros nuevos. Las escasas exigencias de los consumidores internos, sumadas a políticas y controles públicos muchas veces deficientes, han contribuido históricamente a que las empresas alimentarias locales descuidaran la importancia de la inocuidad, configurando un punto de partida desventajoso para emprender el cambio.

En este marco, el presente trabajo se propone analizar la relación entre los Sistemas de Aseguramiento de Calidad y la creación de ventajas competitivas para las empresas que los adoptan, mediante un estudio de caso múltiple y bajo el enfoque teórico de la Nueva Economía Institucional. La hipótesis general que subyace es que los Sistemas de Aseguramiento de Calidad representan una ventaja competitiva para las empresas cuando existe una estrategia comercial enfocada en los clientes que logra alinearse con los entornos organizacional e institucional.

Los objetivos específicos son 1) identificar el ambiente institucional en el que se desempeña la empresa y las restricciones de aquél, para comprender su incidencia sobre la estrategia comercial basada en la calidad; y 2) identificar la influencia de la estructura de gobernancia de la empresa sobre la estrategia de la calidad.

2. Metodología

El enfoque epistemológico empleado en la presente investigación ha sido el conocimiento fenomenológico, propuesto por Peterson (1997) para el abordaje de estudio de los agronegocios, en virtud del cual los fenómenos de la realidad son esencialmente inseparables del contexto.

En este marco, se recurrió al método de estudio de caso múltiple, uno de los métodos más frecuentemente empleados para llevar a cabo una investigación con enfoque fenomenológico (Yin, 1989; Bonoma, 1985). Las empresas elegidas fueron la Cooperativa Apícola de Rauch LTDA (dedicada a la producción de miel) y Esperanza Sud (dedicada a la producción de papas). El elemento común a ambas es que se

encuentran atravesando procesos de implementación de Sistemas de Aseguramiento de Calidad.

Respecto del estudio de caso como método de investigación, una de sus principales ventajas es la variedad de fuentes a las que acude (Bonoma, op. cit). En este trabajo, se ha recurrido a las entrevistas personales (Taylor & Bogdan, 1987) y la observación directa como las fuentes primarias más importantes de datos. Asimismo, se han utilizado como fuentes internas los documentos internos y registros de las empresas y se ha recurrido a información bibliográfica (fuentes secundarias).

3. Marco Teórico

3.1 Sistemas de Aseguramiento de Calidad en Alimentos: definición

Los Sistemas de Aseguramiento de la Calidad ponen el énfasis en los productos desde su diseño hasta el momento del envío al cliente y concentran sus esfuerzos en la definición de procesos y actividades que permiten la obtención de productos conforme a unas especificaciones (Conti, 1993).

El surgimiento de los Sistemas de Aseguramiento de Calidad supuso un salto cualitativo importante en la evolución de la gestión de la calidad, por dos razones principales. La primera es que se pasó de un enfoque de detección de errores a uno de prevención, estandarizando las soluciones para evitar la repetición de los errores. La segunda es que la calidad pasó de un enfoque limitado al área de producción a un enfoque más amplio, que involucra otras áreas de la firma (Moreno-Luzón et al, 2001).

Para el caso particular de los alimentos, los Sistemas de Aseguramiento de Calidad definen una serie de parámetros técnicos para los procesos de producción, procesamiento y transporte de los mismos, cuyo propósito principal es garantizar la inocuidad de los productos para la salud del consumidor. Adicionalmente, pueden incluir requerimientos acerca de prácticas medioambientales y laborales. Si bien el enfoque es fundamentalmente preventivo, también incluyen actividades de inspección, evaluación y monitoreo del funcionamiento del propio Sistema (Alli, 2003).

En la actualidad, existen numerosos Sistemas de Aseguramiento de Calidad de alimentos y su elección depende de la actividad particular que desarrolla la organización. En la fase de producción agrícola y ganadera, los Sistemas más frecuentes en Argentina[43] son las Buenas Prácticas Agrícolas (en particular, el protocolo internacional de GlobalGap), y en menor medida las Buenas Prácticas Ganaderas y las Buenas Prácticas Apícolas. En la fase de elaboración industrial, los Sistemas más empleados son, en orden de complejidad creciente, las Buenas Prácticas de Manufactura, el HACCP (Hazard Analysis and Critical Control Points) y la norma ISO 22000 (la cual constituye en rigor un sistema de gestión de la inocuidad alimentaria).

3.2 La Nueva Economía Institucional y su relación con la competitividad

La Nueva Economía Institucional es un vasto campo multidisciplinario que busca explicar los factores que determinan las instituciones y su evolución en el tiempo y evalúa la manera en que éstas impactan en el desempeño económico, la eficiencia y la distribución de la renta (Nabli & Nugent, 1989 citado por Kherallah & Kirsten, 2002).

Según Davis & North (1971, en Williamson, 1994) el cuerpo teórico de la Nueva Economía Institucional se desarrolla en dos grandes niveles complementarios. El primer nivel de análisis es el institucional y entraña una mirada macro-analítica del problema, relacionada con las normas políticas y legales bajo las que se desempeñan las

[43] De acuerdo con la información provista por las tres empresas certificadoras más importantes de Argentina (SGS, IRAM y OIA, datos de 2010).

actividades económicas y que proveen el marco para la producción, el intercambio y la distribución de la renta (Williamson, 1994). El segundo nivel de análisis es el organizacional, una perspectiva micro-analítica que aborda la naturaleza de la relación entre la organización de la firma y los costos de transacción[44].

En el primer nivel de análisis, resulta necesario antes que nada definir a las instituciones, las cuales se dividen en formales e informales (Williamson, 2000). Las primeras constituyen las "reglas formales del juego", tales como las leyes y las regulaciones de los derechos de propiedad. Las segundas hacen referencia a las costumbres, las tradiciones, los tabúes y los códigos de conducta (Williamson, 2000). En conjunto, ambas rigen la vida de los hombres y el desarrollo de los negocios (Palau, 2005).

Pero ¿por qué es necesario que existan las instituciones? North (1994) propone que éstas se diseñan para restringir el comportamiento de los individuos en su búsqueda por la maximización de los beneficios, ya que aquéllos proceden con racionalidad limitada y de forma oportunista[45] .

En este marco, las instituciones de un país poseen gran influencia en su grado de competitividad (North, 1990). La vigencia y el cumplimiento de las leyes, al garantizar los derechos de propiedad, contribuyen a la disminución de los costos del intercambio, fomentando la especialización de las economías mediante inversiones específicas para el desarrollo de nuevos productos y servicios. Los menores costos de transacción a nivel macro, sumados a menores costos de producción –por tratarse de economías especializadas- contribuyen a aumentar la competitividad global del sistema. Lekovic (2008) es contundente en este sentido, afirmando que en aquellos países capaces de lograr un ambiente institucional favorable, los actores económicos habrán conquistado una ventaja competitiva muy importante.

Con respecto al segundo nivel de análisis, las organizaciones buscan minimizar los costos de transacción mediante la elección alternativa de la estructura de gobernancia que mejor les permita "identificar, explicar y mitigar todas las formas de riesgo contractual" (Williamson, 1996 en Ordóñez, 2002), sobre la base de los supuestos conductuales mencionados.

Para las estructuras de gobernancia se distinguen tres tipos principales: los mercados, las jerarquías (o integración vertical) y las formas híbridas. Los mercados coordinan las transacciones básicamente a través del mecanismo de precios, con incentivos directos para las partes involucradas en la transacción. Así, en el momento en que el proveedor resulte incapaz de satisfacer los requerimientos de su cliente, ya no podrá participar en futuros intercambios económicos (Arnold, 2000).

Las jerarquías se basan en la centralización de los derechos de propiedad a través de la burocracia. Los mecanismos de control administrativos que ocurren dentro de la firma facilitan la orientación hacia ciertas tareas y objetivos específicos (Arnold, op. cit).

Las formas híbridas, por último, constituyen estructuras de gobernancia que combinan elementos de las dos anteriores (Arnold, op. cit). Las formas híbridas

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[44] Tales costos incluyen, entre otros, los costos de la búsqueda de información, los costos de la negociación, los costos de monitoreo y los costos de hacer cumplir los acuerdos o *enforcement* (Dahlman, 1979).

[45] El supuesto de la racionalidad limitada implica que los individuos disponen de información que es siempre incompleta y además poseen una capacidad mental limitada para interpretarla (North, 1995). El oportunismo, por su parte, es la búsqueda del interés propio con astucia (Williamson, 1985, citado por Parada, 2003).

incluyen a los contratos entre firmas independientes, que buscan mantener una relación comercial de cooperación en plazos más o menos extendidos en el tiempo.

En particular, la elección de la estructura de gobernancia más apropiada para coordinar la transacción ha de realizarse en función de los atributos de tal transacción (Williamson, 1979). Específicamente, las transacciones poseen tres atributos relevantes: la incertidumbre, la frecuencia y la especificidad de los activos involucrados, siendo probablemente este último el atributo más influyente.

La incertidumbre está relacionada con la imposibilidad de conocer los eventos futuros. Aquí se incluyen las alteraciones inesperadas del entorno y el desconocimiento del accionar futuro de la otra parte involucrada, ya sea por falta de comunicación o por el surgimiento de conductas oportunistas (Williamson, 1996). En contextos donde la incertidumbre es alta las transacciones han de coordinarse a través de mecanismos más estrictos, como contratos o integración vertical.

La frecuencia, por su lado, es la regularidad con la cual ocurre la transacción entre las partes involucradas en la misma. Una frecuencia de transacción elevada puede conducir a un conocimiento más profundo entre las partes involucradas, generándose procesos de creación de confianza y prestigio, que en la continuidad plantean los denominados "compromisos creíbles" (Ordóñez, 2002). La consolidación de la reputación de las partes y la voluntad de mantenerla reduce el riesgo de actitudes oportunistas, disminuyendo los costos de transacción.

Por último, un activo específico se define como una inversión especializada que carece de utilizaciones o usuarios alternativos a los de la finalidad original, excepto que se esté dispuesto a sacrificar gran parte de su uso productivo (Ordóñez, 2002). Según Williamson (1996), esta diferencia entre el excedente y el valor residual del activo constituye la "cuasi-renta". En los activos específicos, asociado a contratos incompletos y actitudes oportunistas, el potencial de pérdida de la cuasi-renta puede resultar muy elevado en virtud, justamente, de su utilidad restringida a uno o muy pocos usos. El aumento de los riesgos conduce, por consiguiente, a la toma de mayores precauciones para concretar la transacción.

Williamson (2000) sostiene que las estructuras de gobernancia influyen de manera decisiva en la competitividad de las organizaciones. Cuando las organizaciones logran alinear las transacciones con la estructura de gobernancia (salvaguardando las cuasi rentas generadas por los activos específicos), los costos de transacción se reducen aumentando la eficiencia en la coordinación, y se estimulan nuevas inversiones especializadas, contribuyendo a una mayor competitividad en este plano. Se trata en este caso de las economías de segundo orden. No obstante, la ganancia de competitividad en este nivel está supeditada a las restricciones impuestas por el nivel macro.

Por último, en el marco de las nuevas exigencias de los consumidores y del proceso de des-commoditización de los agroalimentos (Ordóñez, 2002), aquellas empresas que muestren un mayor grado de apertura hacia el exterior y enfoquen sus esfuerzos en la satisfacción de sus clientes estarán en condiciones más ventajosas de avizorar cambios en sus entornos competitivos y, por consiguiente, de adaptarse a ellos (Porter, 1990).

Integrando los conceptos enunciados hasta aquí, el éxito de las firmas para competir en escenarios cambiantes ha de radicar, en sentido amplio, en la elección de la estrategia de negocios más competitiva en el contexto de la estructura de gobernancia que minimice los costos de transacción y ambas, a su vez, deben estar alineadas con el ambiente institucional (Ordóñez, op. cit.), que proporcione el marco de incentivos económicos.

4. Resultados

4.1 Estudio de Caso I: la Cooperativa Apícola de Rauch LTDA

La Cooperativa Apícola de Rauch LTDA es una organización de tipo PYME conformada por 29 socios (productores apícolas) y localizada en el centro de la provincia de Buenos Aires (Argentina).

Su actividad principal es la producción de miel a granel, la cual ronda las 90 toneladas por año. Los clientes principales de la Cooperativa son acopiadores, los cuales se dedican a recolectar miel proveniente de distintos productores y comercializarla luego a exportadores y/o a fraccionadores para el mercado interno.

La estrategia genérica de la Cooperativa se basa en la diferenciación por calidad. A diferencia de la enorme mayoría de la miel comercializada en Argentina, el producto de la Cooperativa es obtenido bajo un sistema de Buenas Prácticas Apícolas conocido como Protocolo 11[46], orientado a asegurar la inocuidad. Actualmente, los socios aplican el Protocolo 11 en la fase de los apiarios, pero no así en la fase de la extracción (por limitaciones que se describen más adelante), aunque manifiestan su voluntad de extenderlo a esta etapa en el corto plazo.

La conformación de la Cooperativa estuvo íntimamente relacionada con la adopción del Protocolo 11. Previo a la formalización jurídica de la misma en el año 2002, cada uno de los socios aplicaba el Protocolo de forma particular en sus apiarios, lo cual permitía controlar las condiciones de producción y así obtener un producto homogéneo entre todos ellos. En consecuencia, los productores que aplicaban este sistema decidieron asociarse, entendiendo que para crecer sustentablemente dentro del negocio resultaba imprescindible ganar en escala y mejorar las condiciones de comercialización de su mercadería.

El Protocolo 11 constituyó entonces el elemento unificador de la organización, estableciendo que la calidad debía ser la meta colectiva a lograr y uniformando los procesos operativos a nivel de cada productor.

Actualmente, la visión de los socios es crecer ofreciendo un producto de valor agregado, que posea características diferenciales y que les permita, con el tiempo, ir accediendo a aquellos mercados que valoran tales diferencias. A corto plazo el objetivo es generar la escala adecuada para evitar los acopiadores y vender directamente a los exportadores. En un futuro, el plan es más ambicioso: vender sin intermediarios a los clientes extranjeros.

4.1.1 El ambiente institucional del agronegocio de la miel en Argentina

En Argentina, existe un doble estándar para la calidad de la miel que se exporta y la que se consume en el mercado interno, resultando más estrictos los controles sobre la primera que sobre la segunda.

Las causas de este fenómeno radican en las diferencias a nivel de la legislación formal y el grado de *enforcement* de la misma (marco institucional formal), y en las tradiciones y costumbres particulares de los consumidores argentinos (marco institucional informal).

Antes de interiorizarnos en ellas, resulta pertinente destacar que el origen de la problemática se remonta al sector de la producción, la cual es llevada a cabo en una

[46] El nombre completo del documento es **Pliego para la Certificacion de Miel Tipificada con Buenas Prácticas de Manejo y Manufactura, Revisión número 11.** (Instituto Nacional de Tecnología Agropecuaria de Argentina, 1998).

gran proporción al margen de controles sanitarios e impositivos. Esto se debe fundamentalmente a que la apicultura requiere bajos niveles de inversión y puede ser realizada con dedicación parcial, propiciando las condiciones para la entrada y salida constante de productores que desarrollan la actividad en condiciones informales y con escasos niveles de profesionalización.

Respecto del marco institucional formal, las diferencias para ambos mercados son evidentes. En lo que refiere a la trazabilidad del producto, mediante la Resolución SENASA 186/03 se fijó la obligatoriedad de contar con un sistema de trazabilidad para la miel argentina en las etapas de extracción, procesamiento y/o fraccionamiento, únicamente para la miel de exportación. Por el contrario, no existe en la actualidad ninguna disposición que regule desde lo formal la trazabilidad de la miel destinada al mercado interno, lo cual habilita la entrada de mieles producidas informalmente.

Otra diferencia radica en la obligatoriedad de realizar los análisis de residuos de sustancias tóxicas y/o no permitidas. Esta reglamentación se aplica en todos los casos en que se exporta miel a granel, con un grado de cumplimiento elevado (Mogni, 2008). Para la miel destinada al consumo interno, en cambio, no hay evidencia de que se realice una fiscalización adecuada con respecto a los residuos (Achával, 2004).

Adicionalmente, toda la miel argentina que se exporta se encuentra sujeta a numerosos trámites: la inscripción como exportador, la habilitación del establecimiento, la autorización de exportación y la solicitud del certificado de exportación, la presentación del cumplido de embarque y la vigencia del sistema de trazabilidad y, fundamentalmente, el pago de "retenciones" a la exportación (entre un 5 y un 10% para miel fraccionada o a granel, respectivamente). En conjunto, estos controles contribuyen a limitar los niveles de evasión fiscal y sanitaria.

Por el contrario, existe un escaso control estatal sobre las transacciones del mercado interno, desconociéndose incluso el número de apicultores existentes. En efecto, la gran mayoría de los apicultores no se inscribe en el RENAPA (Registro Nacional de Productores Apícolas, cuya inscripción es legalmente obligatoria), por temor a los controles impositivos. Así, estiman que en total deben existir unos 90.000 apicultores en el país, tres veces los que figuran en los registros oficiales (Groba, 2009).

La evasión de controles sanitarios y fiscales es implícitamente avalada por un consumidor interno poco informado (Nimo, 2003) y escasamente preocupado por la inocuidad del producto que consume. En efecto, una encuesta realizada en el marco del Programa "Miel 2000" reveló que el 83% de los encuestados adquiría miel sin marca. En tanto la mayoría de las mieles sin marca no cumple con los requisitos de etiquetado, el dato refleja la indiferencia de los consumidores por las especificaciones del producto y las condiciones en las que fue elaborado.

El resultado de las disposiciones más débiles, del bajo *enforcement* de la legislación y de la despreocupación de los consumidores es un serio problema de adulteración de la miel en el mercado interno. El 75% de las mieles que se comercializan en el país no cumplen con las normativas alimentarias ya que contienen elementos tóxicos como mercurio, fenol o plomo en proporciones superiores a las permitidas por la legislación vigente, entre otras irregularidades (Federico, 2009).

En base a la descripción anterior y en el marco de la Nueva Economía Institucional, puede proponerse la existencia de dos sub-ambientes institucionales bien diferenciados en el agronegocio de la miel. Por un lado, el mercado interno se caracteriza por una legislación débil desde lo formal, a la cual se suma un bajo *enforcement*, avalada por un consumidor muy poco exigente. Este circuito se predispone a consumir mieles producidas informalmente, sin controles sanitarios ni impositivos. Esto genera situaciones de competencia desleal entre los apicultores que operan al

margen de la ley y los que cumplen con las disposiciones, en tanto los primeros reducen sus costos evadiendo impuestos, análisis de laboratorio y prácticas productivas más complejas. En conjunto, estos aspectos determinan un canal de venta con ruptura permanente de los compromisos entre los actores y también respecto del Estado y del consumidor, lo que genera altos costos de transacción, commoditiza el producto y, por lo tanto, le resta competitividad a la cadena.

Por el otro lado, la miel destinada a la exportación atraviesa análisis para la detección de residuos y controles impositivos vinculados a la operatoria de comercio exterior y a la legislación extranjera. Esto determina asimetrías de información menos notorias respecto de la inocuidad del producto y un mayor *enforcement* de la legislación sanitaria e impositiva por parte de las empresas exportadoras. En líneas generales, las ineficiencias entre los actores de la cadena se reducen, determinando un canal de menores costos de transacción macro que en el primer caso. En consecuencia, las condiciones de competitividad mejoran y permiten colocarse a la altura de las exigencias de los mercados internacionales.

4.1.2 El ambiente organizacional de la Cooperativa Apícola de Rauch LTDA

A continuación, se describe la estructura de gobernancia de la Cooperativa (esquematizada en la Fig. 1) y se identifica cuáles son las transacciones que pueden impactar directamente en el aseguramiento de la calidad del producto.

La producción de la miel es realizada dentro de la firma. Esto permite que el control de la calidad del producto en esta fase quede circunscripto íntegramente al ámbito interno de la organización, reduciendo la incertidumbre en el producto final y facilitando el mantenimiento de la trazabilidad.

Asimismo, la Cooperativa produce el material vivo (los núcleos de abejas que pueblan las colmenas) que es utilizado como uno de los insumos para la actividad principal. Si bien la integración vertical en este aspecto contribuye a una mayor homogeneidad en el producto final de todos los apicultores y facilita la trazabilidad, se trata de un insumo que no es estratégico y que, por estar certificado, podría adquirirse en el mercado con un bajo nivel de incertidumbre. De esta forma, más que con los costos de transacción, esta estructura de gobernancia se fundamenta en los costos de producción: los márgenes de producir el material vivo son interesantes y constituyen una fuente de ingresos adicional para la Cooperativa.

Por su bajo nivel de especificidad, la gran mayoría de los insumos para la producción pueden adquirirse en el mercado, sin comprometer el aseguramiento de la calidad.

Por otra parte, la estructura de gobernancia que rige la transacción de la extracción de la miel es el mercado, dado que la operación se produce en una sala municipal de Rauch (por la proximidad geográfica).

El problema que aquí se suscita es doble: la sala no se adecua a las especificaciones edilicias del Protocolo 11 y además es compartida con otros productores que no aplican normas de calidad. Esto le impide a la Cooperativa garantizar la inocuidad del producto en esta etapa, resultando una transacción crítica para el aseguramiento de la calidad.

Se trata claramente de una transacción que, por sus atributos particulares, no se encuentra alineada con la estructura de gobernancia. Esto se debe a que, por tratarse de un activo específico, la miel obtenida bajo Protocolo 11 requiere asimismo de activos específicos para producirla. En este caso particular, es excluyente una sala de extracción cuya estructura física se ajuste a las especificaciones del Protocolo 11, en la cual sea posible mantener condiciones de higiene adecuadas y garantizar que no habrá mezcla

con mieles de otros productores, con el objetivo final de asegurar la inocuidad del producto.

Por esta razón, el mercado como estructura de gobernancia no constituye la alternativa que minimiza los costos de transacción para una estrategia basada en la venta de un producto de calidad diferenciada, en tanto esta operación pone en riesgo la cuasi-renta del activo intangible que representa la reputación de la Cooperativa, si se produjeran contaminaciones o si se perdiera la trazabilidad.

Por último, la estructura de gobernancia que rige la transacción de las ventas es el mercado, dado que en la actualidad la Cooperativa vende la mayoría de la producción a acopiadores y fraccionadores. La elección del comprador se basa principalmente en el precio y la seguridad de cobro.

Análogamente, esta estructura de gobernancia atenta contra la estrategia genérica de la Cooperativa basada en la calidad, encontrándose una desalineación entre aquélla y los atributos de la transacción. Los clientes actuales de la Cooperativa no reconocen económicamente una miel de mejor calidad, ni con un precio superior ni con propuestas comerciales de mayor vigencia temporal (como podría ser la posibilidad de establecer contratos) porque se dedican a la comercialización de miel tipo commodity (incluso, en muchas ocasiones las homogeneizan con mieles provenientes de otros productores).

En términos de la Nueva Economía Institucional, esto implica una transferencia de la cuasi-renta desde el eslabón de la producción hacia los acopiadores, que se benefician de una miel de calidad diferenciada al valor de una miel commoditizada.

En consecuencia, para capturar el beneficio de la comercialización de una miel diferenciada y retener la cuasi renta de los activos, resulta necesario pasar de la estructura de gobernancia del mercado a los contratos. Tal como se plantean los socios de la Cooperativa, resulta más factible encontrar compradores interesados en una miel tipo especialidad en el mercado internacional que en el doméstico, y hacia allí desean dirigir su estrategia.

4.2 Estudio de Caso II: Esperanza Sud SA

Esperanza Sud SA es una empresa familiar de tipo PYME integrada por diez empleados permanentes y radicada en la ciudad de Balcarce, en el sudeste de la provincia de Buenos Aires (Argentina).

La empresa se dedica a la producción de papas, con un volumen que ronda las diez mil toneladas anuales. Sus clientes principales son las industrias procesadoras de papa más importantes de Argentina, las cuales fabrican bastones pre-fritos congelados, chips y puré deshidratado. Sólo un pequeño porcentaje se destina a la venta en el mercado en fresco.

Como estrategia genérica, la empresa se propone ser líder en calidad dentro del sector, con una fuerte orientación a los clientes. En el año 2010, Esperanza Sud logró la certificación de un Protocolo internacional de Buenas Prácticas Agrícolas (GlobalGap) para toda su producción. En el 2011, obtuvo además la certificación de una norma internacional de sustentabilidad socio-ambiental (denominada *Rainforest Alliance*), convirtiéndose en la primera empresa de Argentina en conseguir este sello de calidad.

De cara al futuro, la visión de la empresa es convertirse en uno de los proveedores más importantes para la industria de papa procesada, consolidando su propio crecimiento de la mano de las necesidades y el crecimiento de sus clientes industriales. En el corto plazo, sus intenciones son comenzar a producir en otras zonas del país para extender el período temporal de abastecimiento a las fábricas e invertir en instalaciones para almacenar la producción.

4.2.1 El ambiente institucional del agronegocio de la papa en Argentina

Análogamente a lo que ocurre con la miel, para la papa también existen dos circuitos de comercialización con reglas bien diferenciadas: el mercado de papa para consumo en fresco y el de papa destinada a la industria.

Las diferencias principales se detectan en el *enforcement* de la legislación y en las costumbres de los consumidores, ambas más débiles en el mercado de consumo en fresco. Por su parte, el marco legal que regula los requisitos para la producción y la comercialización de papa es el mismo en ambos casos (Resolución 641/2004, que fija las normas técnicas para la identidad y calidad de papa), aunque algunos autores sostienen que resulta obsoleto por presentar normas de tipificación por calidad excesivamente generales (Mosciaro, 2009).

En cuanto al *enforcement* de la legislación, puede decirse que el negocio de la papa en fresco presenta serias falencias. La venta en los mercados concentradores (y de allí, hacia las verdulerías y ferias) registra una gran evasión impositiva (Napolitano, 2005), un bajo cumplimiento de la legislación laboral, de las leyes relacionadas con los agroquímicos y de los requisitos para los establecimientos que almacenan y/o manipulan alimentos.

Adicionalmente, el control de la inocuidad por parte de los organismos responsables es insuficiente (Napolitano, 2005). Únicamente en algunos mercados concentradores se realizan análisis de laboratorio para detectar residuos y contaminación microbiológica, mientras que en el resto los controles de esta naturaleza son inexistentes.

Paralelamente, los consumidores de papa en fresco terminan por avalar implícitamente el débil *enforcement* del marco legal. Los consumidores argentinos carecen de la cultura de utilizar diferentes variedades de papa para los diferentes usos culinarios (Napolitano, comunicación personal, marzo de 2010; Pérez, 1998). Por el contrario, han adquirido tradicionalmente una papa totalmente comoditizada (la variedad Spunta), clasificándola simplemente como blanca o negra, según haya sido o no lavada (Larocca & Bagiani, 2005).

En efecto, algunas estadísticas revelan la indiferencia del consumidor respecto del origen e inocuidad de la papa que adquiere. El 83% de los consumidores argentinos adquiere las papas en verdulerías y ferias-mercados, mientras que sólo el 15% lo hace en los supermercados, que es el único canal de venta que ofrece cierta información de origen, calidad y variedad (encuesta del INTA del año 1994, en Pérez, 1998). Así, la conclusión es que el consumidor no conoce prácticamente ninguna característica de la papa que está adquiriendo más allá de las que puede detectar sensorialmente al momento de la compra.

La falta de controles sanitarios y fiscales y las débiles exigencias de los consumidores fomentan la competencia desleal entre productores y comercializadores, pues proveen de incentivos económicos para desarrollar la actividad por fuera de la ley. En conjunto, esta debilidad genera distorsiones en el mercado e ineficiencias en la cadena.

Cuando la industria es el cliente para el cual se destina la papa, el *enforcement* de la legislación es mayor. Las industrias procesadoras son muy estrictas en cuanto a la formalidad fiscal en las transacciones con los productores, siendo nulo el grado de

evasión impositiva en esta interfase (Napolitano, 2005) y en cuanto al cumplimiento de la legislación laboral.

Asimismo, las industrias son muy cuidadosas en materia sanitaria y de inocuidad. Las tres empresas procesadoras de papa más importantes de Argentina (McCain Argentina SA, Pepsico Argentina SRL y Alimentos Modernos SA) poseen implementado el Sistema HACCP en sus plantas de producción. Una irregularidad en este sentido podría poner en serio riesgo la reputación de la industria, en caso que fuera detectada en el producto que llega al consumidor.

Consideradas como consumidoras, las industrias son muy exigentes con los requisitos de calidad de la papa, pues necesitan materia prima con características especiales para cada uso industrial. Así, sus proveedores ofrecen un amplio portafolio de variedades distintas, adaptadas diferencialmente para la producción de bastones, de chips o para la guarda en cámaras refrigeradas, con un nivel mínimo aceptable de materia seca y un límite máximo de defectos. Además, estos clientes son rigurosos con la inocuidad de la materia prima, de modo que realizan análisis de residuos periódicamente.

En base a lo expuesto, puede decirse que existen dos sub-ambientes institucionales dentro del negocio de la papa: uno característico de la venta al mercado en fresco y el otro de la venta a las industrias. Este último constituye un escenario más transparente para los actores involucrados en la transacción, en tanto se respetan los compromisos fiscales y sanitarios y se ejerce un efectivo control de la inocuidad y la calidad.

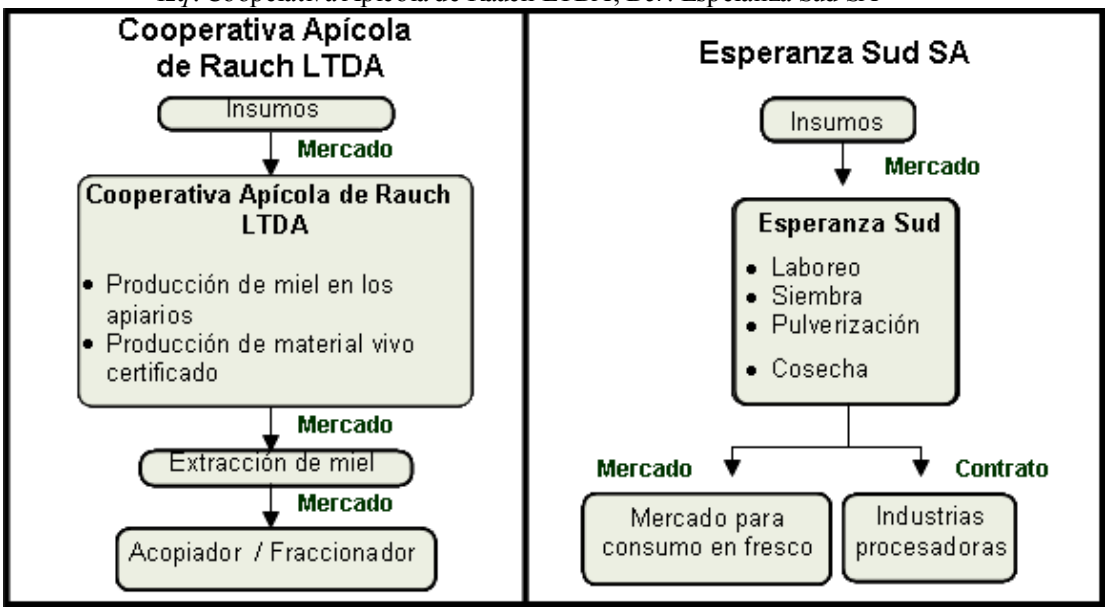
Estas características determinan un canal con menores costos de transacción macro, en el cual la articulación entre los actores se presenta como mucho más eficiente, determinando una mayor competitividad.

Sin embargo, no puede pensarse que estos dos sub-sistemas funcionan estrictamente aislados entre sí y que las características de uno no influyen sobre el otro. Particularmente, el precio al que se vende la papa en el mercado en fresco actúa como valor de referencia y afecta directamente la formación del precio de los contratos de la industria (forzándolo a la baja). Además, establece un umbral de calidad mínimo que acepta el mercado, desmotivando a las empresas en sus esfuerzos por invertir y auto-superarse, debido a la reducción de costos basada en el incumplimiento de la ley.

4.2.2 El ambiente organizacional de Esperanza Sud SA

A continuación se describe la estructura de gobernancia de Esperanza Sud (Fig. 1), con énfasis en las transacciones que pueden afectar el aseguramiento de la calidad.

Fig. 1. Estructura de gobernancia de las empresas del estudio de caso.
Izq: Cooperativa Apícola de Rauch LTDA; *Der*. Esperanza Sud SA



Fuente: elaboración propia en base a entrevistas.

Las actividades de producción (labores culturales, siembra, pulverización y cosecha) son realizadas dentro de la firma. Esto permite que el control de la calidad del producto en esta fase quede circunscripto íntegramente al ámbito interno de la organización, facilitando el mantenimiento de la trazabilidad y reduciendo la incertidumbre en el producto final.

En particular, la estructura de gobernancia de la firma obedece al elevado nivel de activos específicos involucrados en estas actividades. En primer término, la reputación de la empresa como proveedora de papas de calidad asegurada constituye un activo intangible de alta especificidad. Dado que no hay en el mercado contratistas externos certificados (como lo exigen las normas implementadas), no existe la posibilidad de contratar estos servicios críticos por fuera de la empresa sin arriesgar seriamente la calidad del producto y la reputación. En segundo lugar, la obtención de papa acorde con las especificaciones de los clientes requiere la inversión en activos específicos durables (principalmente, maquinaria agrícola especializada en el cultivo de papa) y de recursos humanos (puesto que el cultivo requiere de considerable pericia técnica por parte de los operadores), los cuales puede impactar significativamente en los rendimientos.

Para la adquisición de insumos para la producción, la estructura de gobernancia es el mercado. Se trata de activos de baja especificidad, que son ofrecidos por las agronomías de la zona.

Las operaciones de venta a la industria están gobernadas por medio de contratos. Los contratos que las industrias firman con sus proveedores de papa poseen salvaguardas que explicitan todos los parámetros de calidad de la materia prima requerida, como porcentaje de materia seca, límites de defectos y calibre, entre otros, además de fijar los plazos de entrega y los volúmenes.

Adicionalmente, los parámetros de calidad están asociados a un sistema de descuentos y bonificaciones para los proveedores, que impactan en la formación del precio final que reciben por la mercadería. Este sistema provee fuertes incentivos para que los productores entreguen papa que cumpla con las especificaciones del contrato, estimulando manejos más eficientes de los cultivos, el respeto por la inocuidad (por

ejemplo, el cuidado de los tiempos de carencia y las dosis de aplicación de los agroquímicos) y el cuidado durante la cosecha y la poscosecha, entre otros aspectos.

Esta estructura de gobernancia en esta transacción se explica, nuevamente, por el alto grado de especificidad de los activos y, en consecuencia, por el alto grado de incertidumbre. Por un lado, las industrias requieren de un tipo de papa que es una especialidad: se trata de variedades particulares que no están disponibles en el mercado en fresco, con un determinado porcentaje de materia seca, calibre, estado sanitario, entre otros aspectos, todos los cuales se estipulan por anticipado en los contratos. El ingreso en la línea de procesamiento de papas de baja calidad industrial puede derivar, en efecto, en significativas pérdidas económicas para las compañías, constituyendo la materia prima en sí misma un activo específico. Además, las empresas procesadoras necesitan reducir la incertidumbre de que contarán con los volúmenes adecuados, de la calidad específica y en momentos determinados.

Esperanza Sud, por su parte, necesita asegurarse la colocación de su producto como especialidad; es decir, necesita que su cliente reconozca mediante el precio la identidad varietal y el resto de las características de calidad e inocuidad logradas en el producto. De esta forma, para Esperanza Sud estas variedades de papa son también activos específicos, con un potencial de pérdida de la cuasi-renta elevado, en caso que tuvieran que ser comercializadas en el mercado en fresco como papa commodity.

Por otra parte, para la venta al mercado de consumo en fresco la estructura de gobernancia es el mercado. La razón para ello es que la papa que se destina al mercado en fresco constituye un producto commoditizado y de baja especificidad (sólo variedad Spunta), que se vende al cliente que ofrece mejor precio. No obstante, los directivos destacan que el riesgo de incobrabilidad en este canal es alto y se materializó en algunas ocasiones. Esta incertidumbre genera altos costos de transacción, los cuales la empresa intenta mitigar vendiendo a aquellos clientes con los que ha construido una relación de compromisos creíbles; es decir, aquellos que siempre han afrontado sus compromisos de pago.

5. Discusión

A continuación, se discute la influencia de los ambientes institucionales y organizacionales sobre las estrategias de diferenciación basadas en Sistemas de Aseguramiento de Calidad para las dos empresas analizadas.

El correcto diseño del ambiente institucional posee una relevancia crucial sobre las estrategias de negocios basadas en la diferenciación, pues éstas requieren de inversiones continuas en activos específicos relacionados con la calidad de los productos. Estas inversiones sólo pueden planificarse y ejecutarse adecuadamente cuando las reglas de juego son claras y previsibles y existe seguridad jurídica para garantizar los derechos de propiedad.

En el presente trabajo se ha podido detectar la presencia de "sub-ambientes" institucionales diferenciados dentro de un mismo sector. Por un lado, el negocio de la miel para mercado interno y de la papa para consumo en fresco se han caracterizado tradicionalmente en Argentina por un bajo *enforcement* de la legislación impositiva, sanitaria y laboral. Esto fomenta nichos de oportunismo que conspiran contra las relaciones de largo plazo y anulan la previsibilidad para realizar nuevas inversiones que produzcan mayores niveles de especialización en las actividades. Por otro lado, en el mercado externo de la miel y la venta de papa a las industrias, se verifica un mayor *enforcement* de la legislación debido a la elevada exposición de los participantes. En este último canal, el cumplimiento de las reglas de juego fuerza a las empresas a

superarse continuamente para tener una rentabilidad aceptable cumpliendo con todas las obligaciones legales, acudiendo a estrategias comerciales innovadoras, a reducciones de costos por mayor eficiencia de los procesos y a diseños organizacionales que potencian las interacciones entre los actores.

En este contexto, se observa que las empresas analizadas buscan desarrollar sus negocios en los sub-ambientes institucionales en los que el *enforcement* de las leyes es mayor.

En el caso de la Cooperativa, ésta se desempeña actualmente en un mercado signado por la competencia desleal y el desinterés del consumidor. Este diseño institucional no se encuentra alineado con la estrategia de calidad de la organización, poniendo en riesgo su continuidad y exponiendo el producto a la re-commoditización previa a la implementación del Protocolo 11. En consecuencia, la organización busca salir del negocio de la miel para el mercado interno y acceder al sub-ambiente institucional de la exportación, por medio de la llegada directa a clientes extranjeros interesados en una miel de inocuidad asegurada.

Por su parte, Esperanza Sud se desempeña en el sub-ambiente institucional que enmarca las transacciones con la industria. Este hecho le permite a Esperanza Sud avanzar parcialmente en las economías de primer orden de Williamson (2000), que son las derivadas del correcto diseño institucional. El avance es parcial pues, si bien el desempeño dentro de un sub-ambiente institucional de menores costos de transacción será más eficiente y competitivo, estará necesariamente supeditado a las debilidades del sistema institucional argentino en general, en cuanto a la evasión fiscal, el cumplimiento de las disposiciones alimentarias y las garantías de los derechos de propiedad.

Realizando un análisis en dirección inversa, puede pensarse que la implementación de los Sistemas de Aseguramiento de Calidad analizados en este trabajo contribuye al fortalecimiento institucional. Esto es así pues estos Sistemas (GlobalGAP y Protocolo 11) exigen, como requisito indispensable para su certificación, que las empresas cumplan con la legislación local vigente en cuanto a inocuidad, trazabilidad, utilización de productos fitosanitarios y veterinarios y, en el caso de GlobalGAP, también con legislación laboral. Las auditorías y la necesidad de conservar los clientes favorecen el *enforcement* de los Sistemas y, en consecuencia, del marco legal. Luego, si estos Sistemas se adoptaran de forma masiva en el sector agroalimentario, se avanzaría hacia un mayor *enforcement* de las instituciones a nivel de todo el sector productivo, reduciendo los costos de transacción macro y mejorando la eficiencia y la competitividad globales.

Asimismo, el correcto diseño organizacional posee una importancia decisiva en la competitividad de las empresas (Williamson, 2000). Cuando éstas logran alinear las transacciones con la estructura de gobernancia -salvaguardando las cuasi-rentas generadas por los activos específicos-, los costos de transacción se reducen aumentando la eficiencia en la coordinación y se estimulan nuevas inversiones especializadas.

En las empresas estudiadas, la estrategia de calidad ha requerido inversiones en activos específicos tales como los activos físicos de alta tecnología, el *know-how* del Sistema de Aseguramiento de Calidad (la contratación de asesorías para la implementación, el mantenimiento del sistema documental y la trazabilidad de los productos), las marcas y la reputación de la empresa, cuya máxima expresión es el producto certificado.

En Esperanza Sud, la cuasi-renta generada por estos activos específicos pudo protegerse por intermedio de la firma de contratos con sus clientes. Este tipo de coordinación reduce los costos de transacción, ya que brinda mayor seguridad a la empresa que sus productos diferenciados se colocarán en el mercado para el que fueron

especialmente desarrollados, y no en mercados alternativos que los castigarían con menores precios, propiciando un horizonte de nuevas inversiones especializadas. Este diseño genera economías de segundo orden y aumenta la competitividad del sistema.

Por el contrario, la Cooperativa Apícola realiza una transferencia sistemática de la cuasi-renta hacia los eslabones de la comercialización por vender bajo la estructura de gobernancia del mercado en el mercado interno. Esta falta de alineación de la transacción con la estructuras de gobernancia implica a su vez un quiebre entre la estructura de gobernancia de la empresa y su estrategia de diferenciación por calidad. Esto desmotiva nuevas inversiones para mayor especialización y conspira contra la sustentabilidad de la estrategia de diferenciación.

6. Consideraciones finales

En el presente trabajo se ha analizado la influencia de los entornos institucional y organizacional sobre las estrategias de diferenciación basadas en Sistemas de Aseguramiento de Calidad. En particular, se ha identificado un caso de estudio (Esperanza Sud) en el que tales entornos se encuentran alineados con la estrategia contribuyendo a una mayor competitividad. En el otro caso (Cooperativa Apícola de Rauch), la alineación no se verifica, atentando contra la sustentabilidad de la estrategia de diferenciación y exponiendo al producto a la re-commoditización y, en consecuencia, a la disminución de la competitividad.

En este sentido, queda en manos de las empresas innovar desde el punto de vista organizacional para mantener la estrategia de orientación al cliente, pero es necesario destacar el rol del Estado, ya que debe proveer un marco institucional más sólido que posibilite la inversión e innovación genuina, al avanzar en soluciones integrales, basadas en la reformulación de las reglas formales y, sobre todo, en el *enforcement* de los compromisos y de la ley, impulsado activamente por los organismos estatales de control.

En conjunto, esto determinaría una alianza capaz de satisfacer de forma competitiva las cambiantes demandas de los consumidores lo que, en última instancia, encierra la clave para la sustentabilidad de los negocios.

7. Bibliografía

ABADÍA, B. 2010. **Calidad y Competitividad en Empresas Agroalimentarias Argentinas. *Un enfoque desde la Nueva Economía Institucional.*** Tesis de Máster en Agronegocios y Alimentos. Buenos Aires: Universidad de Buenos Aires, Facultad de Agronomía, Escuela para Graduados "Alberto Soriano".

ACHÁVAL, B. 2004. **Comercialización de la miel.** In: www.culturaapicola.com.ar

ALLI, I. 2003. **Food Quality Assurance: *Principles and Practices.*** Boca Raton: CRC Press.

ARNOLD, U. 2000. **New dimensions of outsorcing: *a combination of transaction cost economics and the core competencies concept.*** *European Journal of Purchasing & Supply Management* (6), 23-29.

BONOMA, T. 1985. **Case research in marketing: *Opportunities, problems, and a process.*** In: *Journal of Marketing Research*, *22*, 199 – 208.

CASWELL, J & JOSEPH, S. 2006. **Consumers' Food Safety, Environmental, and Animal Welfare Concerns: *Major Determinants for Agricultural and Food Trade in the Future?*** Paper presentado en el *IATRC Summer Symposium "Food Regulation and Trade: Institutional Framework, Concepts of Analysis and Empirical Evidence"*. Bonn, Alemania. Mayo 28 - 30.

CONTI, T. 1993. **Building total quality: *a guide for management.*** Londres: Chapman & Hall.

DAHLMAN, C. 1979. **The problem of externality.** *The Journal of Law and Economics* , 141-162.

FEDERICO, M. 2009. **El 75% de las mieles contienen tóxicos**. *Diario Crítica de la Argentina*. 15 de mayo.

GROBA, A. 2009. **La Argentina podría perder el podio de la exportación mundial de miel.** Diario *El Cronista*. 27 de Noviembre.

GRUNERT, K. 2005. **Food quality and safety: *consumer perception and demand.*** In: *European Review of Agricultural Economics, 32* (3), 369-391.

INSTITUTO NACIONAL DE TECNOLOGÍA AGROPECUARIA DE ARGENTINA. 1998. **Pliego para la Certificacion de Miel Tipificada con Buenas Prácticas de Manejo y Manufactura. *Revisión número 11***. In: www.inta.gov.ar

KHERALLAH, M. & KIRSTEN, J. 2002. **The New Institutional Economics: *applications for agricultural policy research in developing countries.*** *Agrekon , 41* (2), 111/134.

LAROCCA, J. & BARAGIANI, D. 2005. **Perfil descriptivo de la cadena de papa y cebolla.** Buenos Aires: Secretaría de Agricultura, Ganadería, Pesca y Alimentos.

LEKOVIC, V. 2008. **Institutional changes in function of competitiveness improvement.** *Economics and Organization , 5* (2), 105-114.

MOGNI, F. 2008. **Restricciones y limitaciones a diseños organizacionales alternativos en apicultura argentina.** Trabajo de intensificación para opción al Título de Licenciado en Economía y Administración Agraria . Buenos Aires: Facultad de Agronomía, Universidad de Buenos Aires.

MORENO-LUZÓN, M.; PERIS, F. & GONZÁLEZ, F . 2001. **Gestión de la Calidad y Diseño de Organizaciones. *Teoría y estudio de casos.*** Madrid: Prentice Hall.

MOSCIARO, M. 2009. **Caracterización de la producción y comercialización de papa en Argentina.** In: www.inta.gov.ar

NAPOLITANO, G. 2005. **Caso Nº1: *rediseño del negocio de la papa en Argentina.*** Material de estudio de la Materia "Gestión y Aseguramiento de la Calidad" de la Maestría en Agronegocios y Alimentos de la Universidad de Buenos Aires .

NIMO, M. 2003. **Cadena de la miel: *análisis del sector.*** In: www.alimentosargentinos.gov.ar

NORTH, D. 1990. **Institutions, institutional change and economic performance.** Cambridge: Cambridge University Press.

NORTH, D. 1994. **Estructura y cambio en la historia economica**. Madrid: Alianza.

ORDÓÑEZ, H. 2002. **La Nueva Economía y Negocios Agroalimentarios.** Material de clases para la Maestría en Agronegocios y Alimentos, PAA. FAUBA. Buenos Aires: Facultad de Agronomía de la Universidad de Buenos Aires.

PALAU, H. 2005. **Agronegocios de ganados y carnes en la Argentina: *restricciones y limitaciones al diseño e implementación de sistemas de aseguramiento de origen y calidad. Estudio de caso múltiple.*** Tesis de Máster en Agronegocios y Alimentos. Buenos Aires: Universidad de Buenos Aires, Facultad de Agronomía, Escuela para Graduados "Alberto Soriano".

PARADA, J. 2003. **Economia Institucional Original y Nueva Economia Institucional: *semejanzas y diferencias.*** *Revista de Economia Institucional , 5* (8), 92-116.

PÉREZ, D. 1998. **Sector hortícola en la provincia de Tucumán: *aspectos para su crecimiento.*** In: www.eeaoc.org.ar

PETERSON, H. C. 1997. **La epistemología de los agronegocios: *pares, métodos y rigor.*** Trabajo presentado en el *Foro de Investigación en Agronegocios.* Missouri, Estados Unidos. Septiembre 26.

PORTER, M. 1990. **New global strategies for competitive advantage.** *Planning Review , 18* (3), 4-14.

ROHR, L. D. 2005. **Food quality and safety - consumer perception and public health concern.** In: *Food control*, *16*, 649-655.

TAYLOR, S. & BOGDAN, R. 1987. **La entrevista en profundidad**. In: Secretaría de Educación y Cultura de Chihuahua. 2008. *Métodos Cuantitativos Aplicados 2, Antología* (págs 194-216). Chihuahua: Secretaría de Educación y Cultura de Chihuahua.

WILLIAMSON, O. 1975. **Markets and hierarchies: Analysis and antitrust implications**. New York: Free Press.

WILLIAMSON, O. 1979. **Transaction-Cost Economics: *The Governance of Contractual Relations.*** *Journal of Law and Economics , 22* (2), 233-261.

WILLIAMSON, O. 1994. **The Institutions and Govemance of Economic Development and Reform.** *Proceedings of the World Bank Annual Conference on Development Economics* , 141-196.

WILLIAMSON, O. 1996. **The mechanisms of governance.** New York: Okford University Press.

WILLIAMSON, O. 2000. **The New Institutional Economics: *Taking stock, looking ahead.*** *Journal of Economic Literature , 38*, 595-613.

YIN, R. 1989. **Case Study Research: *Design and Methods.*** Newbury Park: SAGE Publications.

SCENARIO ANALYSIS OF THE SOYBEAN AGRO-INDUSTRY COMPLEX IN PARAGUAY

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Abstract
Soybean is today the most traded commodity in the global market. Soy is a plant of great importance to human nutrition, animal feed and industries. Based on research efforts conducted in the main soy producing region in Paraguay, the study aimed to characterize the agents involved in the national soy industry and present an overview of the relations between them, particularly between business companies and farmers, with emphasis on small farmers. Emphasis will be given to contractual relations and how they impact the activity. The results indicate that contractual arrangements, formal or not, are tools that contribute to stable relations between the parties, especially in a business so dependent on exogenous factors, as is the case of agriculture. Therefore, it is crucial that the public and/or private organizations encourage the use of contracts to reduce costs and keep the agents in the productive activity.

Key words: Agro-industrial complex, contractual relations, scenario analysis

SCENARIO ANALYSIS OF THE SOYBEAN AGRO-INDUSTRY COMPLEX IN PARAGUAY

1. Introduction

Soybean is the most traded commodity in the global market. Soy is a plant of great importance to human nutrition, animal feed and industries. Nearly 60% of the food products contain ingredients from soy. The main products are soy oil and protein ingredients for multiple uses. Integral soybean is also used for several purposes. Due to its wide range of uses, production has been increasing continuously. In 2010 global production of soy was approximately 250 million tons (USDA, 2010).

In Paraguay, agricultural production is of huge economic and social importance and, in this context, soy is the agricultural product that contributes most to the country's Gross Domestic Product (GDP). Based on data from CAPECO (Cámara Paraguaya de Exportadores de Cereales y Oleaginosas – Paraguayan Chamber of Grains and Oilseeds Exporters) and the World Bank (2010), soy contributes to about 15% of the Paraguayan GDP. The country is the third biggest producer of soybean in South America and the sixth in the world (USDA, 2010), as shown in Table 1.

Table 1 – Ranking of the world's largest producers of soybean - 2008/2009 (million tons)

EUA	Brazil	Argentine	China	India	Paraguay
80.54	57.00	43.80	16.80	10.00	6.50

Source: Own compilation based on information released by USDA (2009).

In 2010, over 2.5 million hectares were cultivated with soybean in Paraguay, which represents an increase of more than 130% over the last ten years (CAPECO, 2010). Average yields have been approximately 2,700 kg/ha. In the last five years average, about 70% of the production was exported in the form of grains (USDA, 2010). It is also worth noting that 45% of the Paraguayan soybean culture is dedicated to the cultivation of genetically modified soybean (INBIO, 2009).

Based on research efforts conducted in the main soy producing region in Paraguay, the study aimed to characterize the agents involved in the national soy industry and present an overview of the relations between them, particularly between business companies and farmers, with emphasis on small farmers. Emphasis will be given to contractual relations and how they impact the activity.

2. Theoretical Framework

2.1. Institutional environment

North (1990) emphasizes the role of the institutional environment as an important variable to reduce transaction costs, e.g. guarantee of property rights. With the purpose of analyzing the role of the institutions, this movement has focused on: a) investigating the impacts of changes in the institutional environment on the economic result: b) theorize about the creation of institutions (FARINA; AZEVEDO; SAES, 1997).

Institutions set the "rules of the game" in a society (NORTH, 1990). Precisely, "institutions consist of informal restrictions (sanctions, taboos, customs, traditions and codes of conduct) and formal rules (constitution, laws, property rights)" (NORTH, 1991, p. 97). Coase (1937) emphasizes that the neoclassic results by efficient markets

can only be achieved when no transaction costs exist. When transaction costs are high, institutions start to have a key role in the process.

The organizations are the players and consist of groups of individuals dedicated to any activity performed with a specific purpose. Limitations imposed by the institutional framework define the opportunities and, therefore, the types of organizations that will be created (NORTH, 1990). The agents of changes are businessmen, politicians or economic agents, the decision-makers in the organizations.

On the other hand, formal rules include, among others, law reforms, passing and enforcement of new laws; legal changes resulting from jurisprudence that changes the law institutions; changes of standards and codes by regulatory agencies; and changes in constitutional provisions, which change the rules that govern the development of other rules (NORTH, 1990).

Moreover, institutional changes resulting from changes in informal restrictions, such as standards, conventions or individual honesty standards, occur much more gradually and sometimes unconsciously, as people develop alternative patterns of behavior consistent with their evaluation of the transaction costs and benefits.

Given a set of institutions in a society, Alston (1998) points out that the person will enter into contracts with raw materials suppliers to minimize the overall costs of transaction and processing. As a result, we have a variety of contracts in which the divergence between the components of costs of the transaction and of production appears. The institutional environment is seen as the *locus* of shift parameters that influence the decision about the organizational form of production to be used (ZYLBERSZTAJN, 1995). Transaction costs arise when the multiple valued dimensions included in the transaction are measured and when executing contracts the information has high costs, and can be imperfect. Efficient institutions and organizations can reduce the costs of every transaction so as to achieve a larger portion of potential gains from every human interaction (NORTH, 1990).

Therefore, institutions may be inefficient when the transaction costs of political and economic markets, together with the actors' subjective model do not cause the economic system to move forward to more efficient results (NORTH, 1990).

2.2. Contractual relations

The use of contracts to govern the sale of products and purchase of inputs guarantees that the price of sale and the goods purchased will be received by the parties. Given this, contracts respond to the transaction dimensions – frequency, uncertainty and specificity of the assets involved – which are influenced by the institutional, technological and organizational environment that surround private businesses (MONDELLI; ZYLBERSZTAJN, 2007).

For Neves (1999), contracts incompleteness is due to five reasons: a) the terms in the contracts are ambiguous due to the faulty design of the contract; b) some possible important aspects are not considered, creating gaps; c) high costs for the preparation of more complex contracts; d) ex-ante asymmetric information; and e) ex-post asymmetric information. Silva and Borges (2010) conducted a study on the contractual relations in the tobacco supply chain. According to the authors, the process begins early in the season when contracts are executed, by which the tobacco processing industries undertake the obligation to provide seedlings, seeds, agrochemicals and other inputs required by the tobacco culture, and technical assistance to the growers, besides submitting financing requests to the banks, endorsing them and undertaking to buy the production at the end of the season. There are also contracts entered into by the processing industries and the foreign market.

In contractual arrangements, the characteristics of the agents and transactions are considered. According to Zylbersztajn (2000), with respect to the agents, there is limited rationality in contrast to the hypothesis of full rationality (neoclassic approach), and opportunism towards actions that promote the achievement of quasi-revenues associated with the transaction, which can affect the institutions accepted by society. On the other hand, transactions identify the frequency of exchanges, uncertainty and specificity of assets, the latter being related to space or capital or human resources.

The Transaction Costs Theory (TCT) uses contracts as key elements of the transactions once the rationality is limited and the agents' behavior is many times opportunistic. According to Zylbersztajn (1995), there are three types of contracts: the classic one, whose nature is discrete or discontinuous with no links with later periods; the neoclassic contract, whose transactions refer to transactions with effects in the long run and, therefore, subject to arbitrations proceedings; and the relational one, whose objective is to maintain a negotiable and continued structure instead of seeking to maintain a complete contract.

3. Methodology and studied area

The study comprised literature review, search and analysis of primary data and field surveys in Alto Paraná District, Paraguay. Firstly, we conducted a literature review on the subject to characterize the agents and processes involved. Next, statistical data on the soybean industry in the region under study were reviewed to characterize the production environment and determine the main issues of the sector. Later, forms were developed and applied to a sample of the participant agents, among them: farmers, agro-input dealers, cooperatives, financial institutions, transport and trading companies. Thus, the research study could be characterized as a multi-case study.

According to the literature consulted, a case study is generally applicable when you wish to obtain analytical generalizations, instead of statistical ones, which can contribute to a certain theoretical model. Research by means of case studies has been considered one of the so-called qualitative methods, characterized by a greater focus on the understanding of the facts rather than the measurements itself. Thus, it contrasts with the quantitative methods, which deal with the measurement of phenomena and are applied to broader samples (LAZZARINI, 1997).

For this work, we opted for the multi-case study analysis because of its advantage of providing evidences inserted in the most diverse contexts, which makes the research as a whole more robust. However, the main limitations of such case studies are the subjectivity of analysis and the inability to generalize conclusions (YIN, 1989).

Gil (2007) distinguishes the most usual data survey tools, such as questionnaire, interview and form. Questionnaire is a series of questions made by the interviewer to the interviewee, who answers the questions (when the interview is totally structured, i.e., with fixed questions, it is mistaken with the form), and form is the technique by which the respondent answers questions previously prepared by the researcher, who records the answers.

According to Gil (2007), "because of being applicable to the most diverse segments of the population and permitting to obtain data that can be easily tabulated and quantified, the form is today the most appropriate technique used in opinion polls and market surveys". Finally, data were tabulated and analyzed with the purpose of outlining a profile of the soybean industry in the studied region.

4. Results and discussions

4.1 Agents characterization

The grains producing region in Paraguay is located in the eastern portion of the country (Figure 1), where climate and soils are appropriate to large scale agricultural production. This region has been colonized recently and most of the resident population settled in the 1970s, when the construction of the Itaipu power plant began and thanks to government agricultural incentives at the time.

In the eastern region of the country is the Alto Paraná District, which, according to data from CAPECO (2010), contributes to about 30% of the national soybean production and has average yields higher than the rest of Paraguay, reaching 2,940 kg/ha. The district is located at the eastern half of the country, where the edaphoclimate characteristics are favorable to the soybean culture, increasing yields and contributing to greater profitability of the business.

It is worth noting that, according to estimates of the Paraguayan Government, 90% to 95% of the soy production is controlled by Brazilian immigrants, most of them coming from the southern region of Brazil.

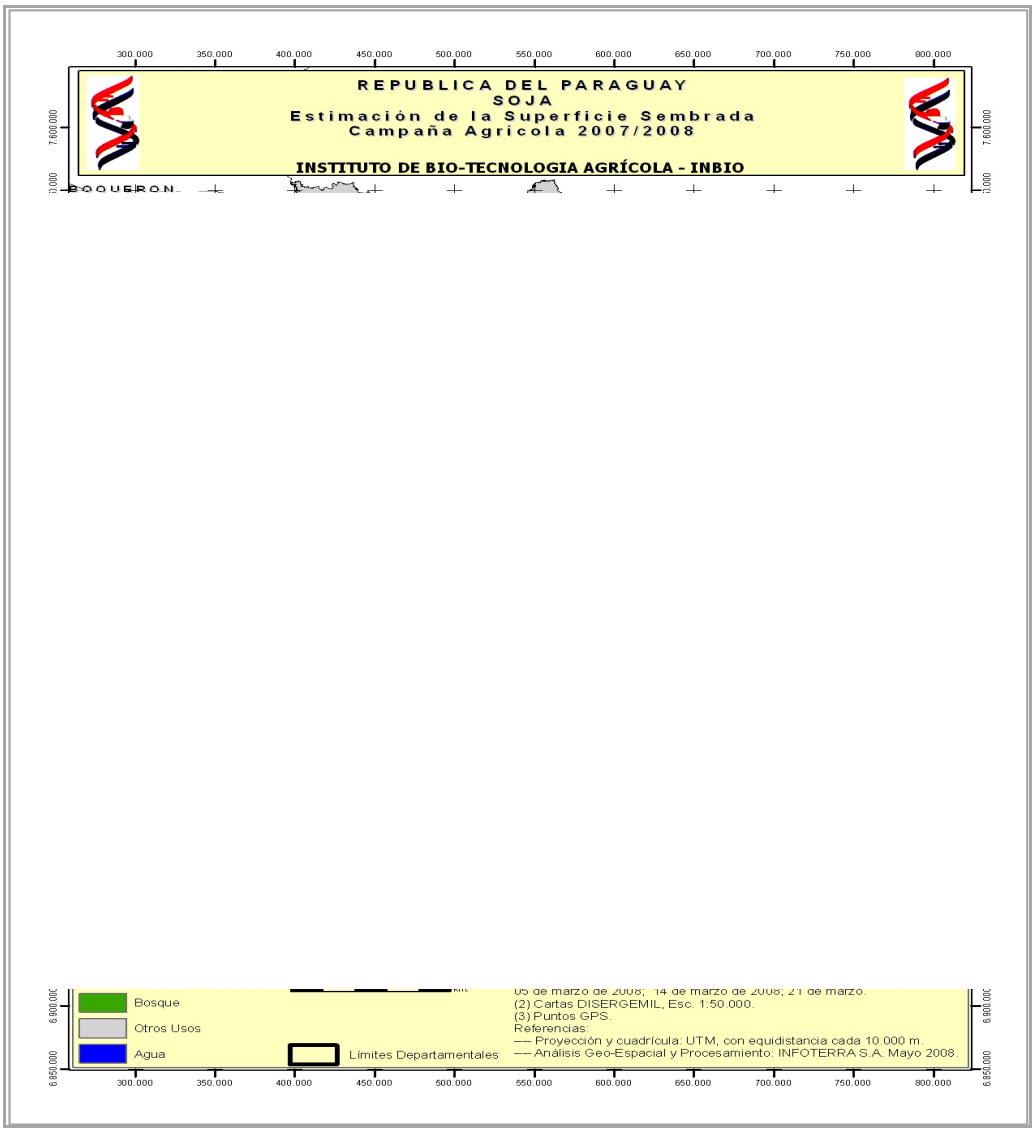

Figure 1 – Distribution of soybean cultivation in Paraguay.
Source: INBIO (2008).

As soybeans are the main export commodity of Paraguay, the fact that Brazilian immigrants control most of the production contributes to frequent conflicts between these producers and the Paraguayan peasants. This fact is aggravated mainly because Paraguay has about 40% of its population established in the rural area, a very high rate considering the increasingly urbanized standard in Latin America.

Therefore, the advance of soy crops into the most traditional peasant areas has had a severe social impact. Rising land prices make small farmers sell their properties to soybean companies. The money they receive is often wasted in unsuccessful attempts to start their own business in the city, because in general they do not have education and experience to conduct such activities and end up in low-skilled jobs in the cities for a living, which aggravates social inequalities and violence.

The production of soybean in the country is concentrated in large properties. According to data from CAPECO, most of the producers own lands in the range of 200 and 1,000 ha, followed by producers with lands over 1,000 ha. The medium and large producers are technically equipped and have appropriate infrastructure for production. They have equipment in good working order, but regarding high-tech techniques like precision agriculture have not been used in large scale yet.

However, small farms are characterized by having areas smaller than 50 hectares, by using low-tech equipment and agro-inputs, and, as a consequence, yields are low and therefore they cannot compete with the big producers. Such handicap contributes to a vicious circle, where, because of the lack of resources, small farmers become marginalized and subject to the power of the big players in the marketplace.

Regarding technical assistance and services, the farms are typically assisted by agronomists and technicians, most of them from cooperatives, traders and agro-input dealers. However, regarding small farms, effective technical assistance is not usual and is sporadic because of the lack of interest of the big companies and traders in serving small farmers.

The agro-inputs market is made up of medium and large size companies. If we subdivide this market, we have two main sectors: agrochemicals, which consists of big multinational companies – in general the same established in Brazil – and Paraguayan companies, mostly controlled by Brazilian immigrants. Another important sector of the inputs market is fertilizer, dominated by trading companies, followed by big companies and co-ops.

Because the small growers are not the main target of these agents, they have to buy inputs from small companies, where quality and prices are not the same as those obtained by the big farmers. This is another factor that contributes to the small farmers' low competitiveness to cope with the big market players. Regarding co-ops, there are 32 farmers' co-ops in Paraguay. Noteworthy is that most of the owners are Brazilian immigrants coming from the southern region of Brazil. In addition, there are cooperatives formed by Japanese immigrants, who have a significant share in the agricultural production in the region under study. This entire context makes the market for agricultural commodities one of the most concentrated sectors in the world, being dominated mostly by family, secular businesses.

To have an idea, grain trade in the world is concentrated in the hands of just five families (PINAZZA, 2007). In Paraguay, this reality is not different. Most of the Paraguayan soy trade is made by a small number of trading companies, which are transnational corporations with a strong presence in Brazil too. The four biggest trading companies operating in Paraguay commercialize more than 90% of the country's production.

4.2. Logistics: inputs, storage and transportation

As mentioned earlier, the agro-inputs market in Paraguay is controlled by a few companies – traders, retailers and co-ops – and some agents play important roles in the market. The traders and some companies with high cash availability import inputs directly (agrochemicals, fertilizers, among others) and resell them to smaller companies, co-ops and farmers. In the case of agrochemicals, part is imported, formulated and then bottled in Paraguay, while another part is bottled abroad. These products come mainly from China and India and reach the American continent through the ports of Montevideo in Uruguay and Buenos Aires in Argentine. Later, these products are transported by river to the port of Concepción, a city located at the left margin of the Paraguay River, one of the most important Paraguayan cities, with good port structure. From Concepción, the products travel by road to the soy-producing regions.

With respect to the storage of the crops, after leaving the farms the grains are transported by trucks to the storage facilities: co-ops, corporate middlemen or directly to the traders. In this matter, it is worth noting that the farms do not have their own silos, mainly due to the high investments required to build them. This is particularly true for small farmers: because they do not have their own storage facilities they are forced to sell their production quickly, especially during the crop peak periods, when prices are lower.

According to the data collected in the survey, lack of silos is the result of lack of resources and credit lines to finance such facilities. Another important issue is that the storage companies and co-ops receive the products and store them at no extra costs to the farmers only until April 30 of the current season, and thereafter they bill $1.5 dollars/ton/month (prices in the 2009/2010 season for storing grains). In addition, they bill between five to six dollars per ton to process the oilseeds.

4.3. Soybean transportation routes from Paraguay

The soybean produced by the big producers leave the farms to the storage facilities, most of them owned by trading companies, and then are exported. Transportation in general is made by roads, which actually are in very inappropriate maintenance conditions. Soybeans produced by small farmers are transported from the rural properties to the corporate middlemen and afterwards to traders, in contrast to the big farmers who deliver their products directly to the traders, thus enjoying lower transaction and freight costs.

Figure 2 shows the transportation flow of the soybean produced by small, medium and large farmers, where the presence of another agent in the small farmers' transaction can be clearly seen: the middlemen. This agent contributes to the higher costs that small farmers have, compared to those of the medium and large producers

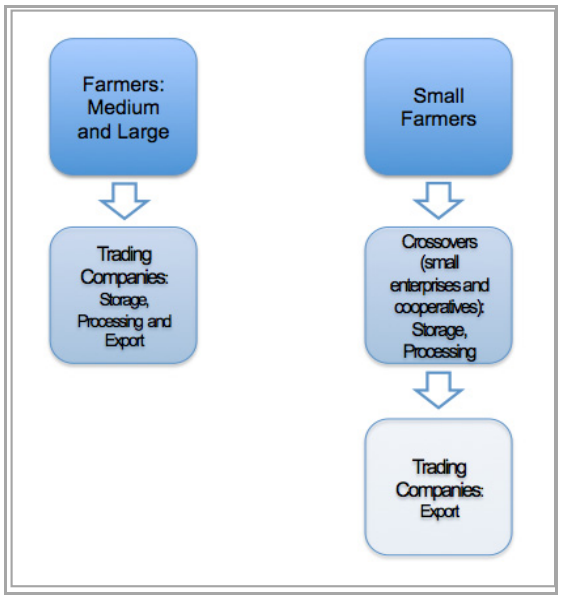

Figure 2 – Transportation flow of the soybean produced by farmers in Paraguay.
Source: Own illustration.

From the exporters – the traders – the oilseed crop is transported by road or rail to the neighboring countries or to the port of Concepción, from which they travel from the Paraguay River to the Uruguayan and Argentine ports. Next, the grains are shipped to Europe or Asia in big vessels. Figure 3 shows the Paraguayan soybeans leaving the country by point of embarkation.

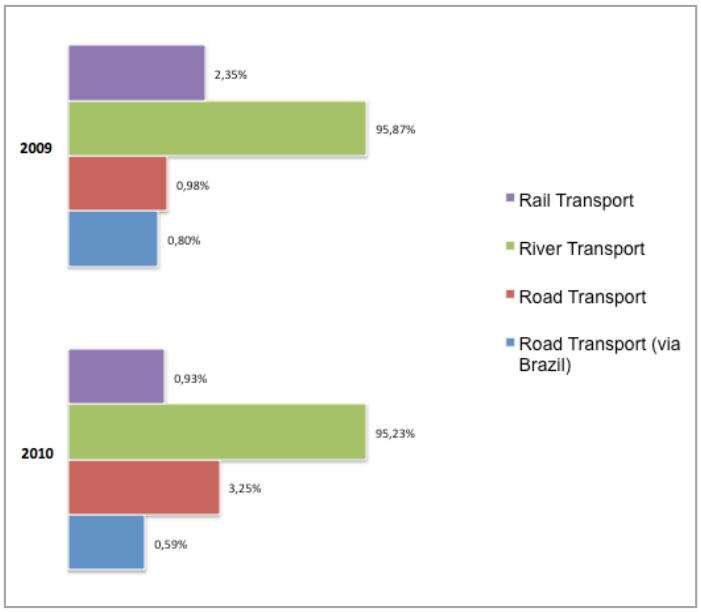

Figure 3 – Percentage of output of soybeans from Paraguay by point of embarkation (logarithmic scale).
Source: Own compilation based on information released by CAPECO (2010).

4.4. Mapping of the soy industry in Paraguay

Based on the analysis of the soy industry in Paraguay, it was possible to map the supply chain and identify the goods and services flow from the moment they enter the country until the commodity is exported. Figure 4 shows the goods and services present in the business and the main agents involved. These data indicate that part of inputs –

goods and services – pass through the trading companies, who have a key role in the current model of soy production in the country. Figure 4 clearly shows that the small farmers buy inputs from small and medium companies and transport their products by small or medium companies or co-ops. Afterwards, the products are shipped to the trading companies which are responsible for the distribution and exportation of the product.

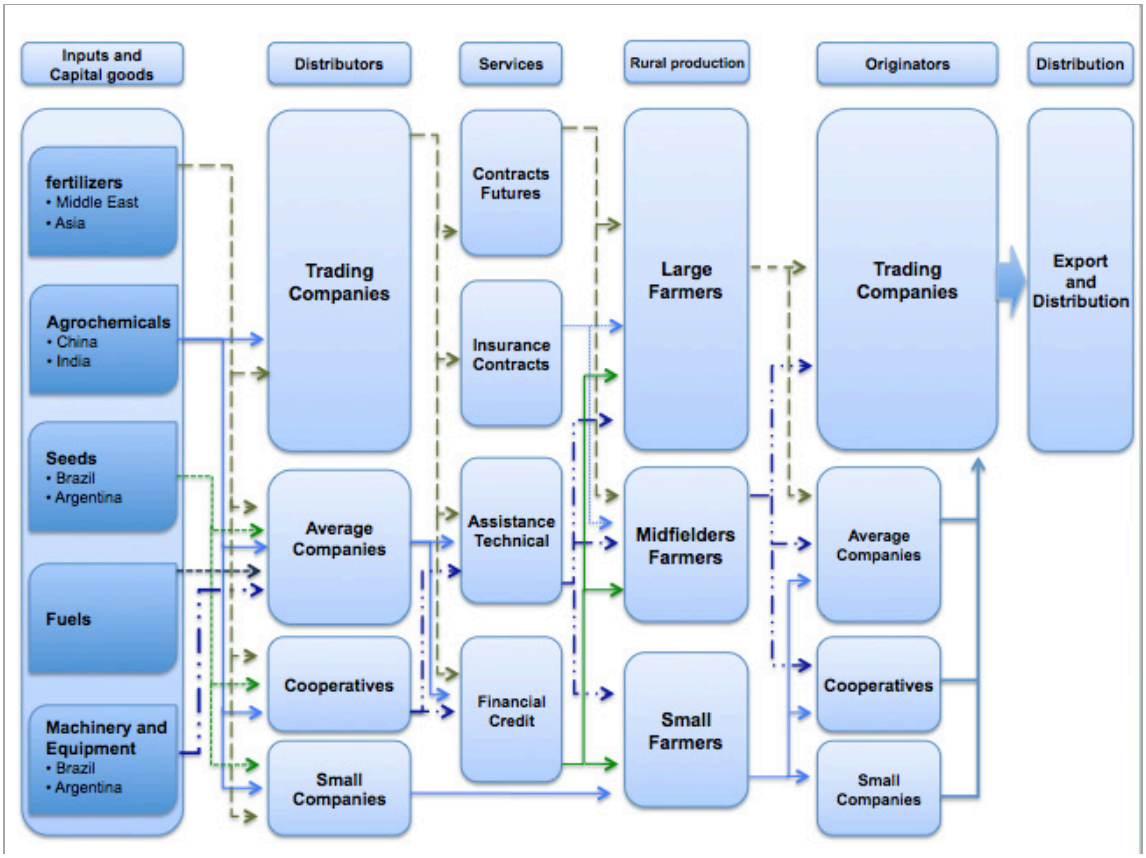

Figure 4 – Conceptual framework of the soybean sector in the eastern side of Paraguay.
Source: Own illustration.

4.5. Analysis of the scenario: contractual and problematic relations

Despite the importance of the agricultural production, mainly soybean, to the sustainable growth of Paraguay, there are problems with severe impacts on the business. Among these problems, it is noteworthy the deregulation of this sector. This scenario contributes to the fact that a few companies control the market and, on the other hand, there are no credit lines available for agricultural production costs, especially for small farmers.

It should be noted that the main problem that the farmers face is the lack of funding, a common fact to small and big producers. However, for small farmers the problem is much more critical. Prices fluctuations in the global market and the heavy dependence on traders are other major obstacles to the sustainable development of the soybean culture in the country. In particular, the small growers claim that credit is the biggest problem, because financing is practically nonexistent, and the private banks have high interest rates, around 11% to 12% per year. In addition, the traders – the main financing agents of the Paraguayan agriculture – are not interested in financing small farmers.

It was also noted that there has been is a serious problem of default on the part of the farmers. This happens mainly due to incomplete contracts between the parties, which contribute to increase the transaction costs. Such problems occur mostly with small corporate middlemen, which, although they now require guarantees to finance the products they still suffer losses as high as 10% a year. In addition, it was also found that there is no loyalty between the parties.

As for the larger companies, they claim that although they might have some debts refinanced, they do not have financial losses. This is because they only grant loans to farmers who hold title of land and enter into contracts where their property is given as collateral for the loan. They also emphasized that they haven't had any loyalty problems with the clients, as mentioned by the smaller companies.

Regarding losses caused by weather conditions, this is one of the threats of the business, because agriculture depends heavily on climate conditions, which, in turn, are considered exogenous variables. Thus, the agents involved seek for strategies that can minimize the losses caused by such events. However, for small farmers the situation is different because they have difficulty in contracting agriculture insurance. This is because their production scale is small, which makes them a less attractive audience to the insurance companies.

Taking into account that the major agents that promote and organize the soy business in Paraguay are the trading companies and larger companies, it is noted that all these organizations only grant credit, in money or inputs, to the producers that contract insurance coverage for the entire crop. Furthermore, public insurance is not available in Paraguay, and all contracts are made with independent insurance companies and/or insurers directly associated with the trading companies. This also contributes to make the access to insurance contracts more difficult to the small farmers.

Regarding the agents' relation issue, the communication between the companies and the farmers is made mostly by the field technicians – agronomists and agricultural technicians – who sell inputs and supplies, provide technical assistance to the crops and purchase the soy production. It is important to emphasize that these services are not billed directly because they are included in the products price sold to the farmers. In the case of small farmers, the contact between the field technicians and the farmers is more distant, because, as mentioned earlier, these farmers are not the primary target of the companies and, as a consequence, of technical assistance.

Additionally, the relations between the business agents – farmers and companies – in some cases come from non-contractual arrangements and in others from formal contracts. Noncompliance to the agreements (formal or not) sometimes occur, which contributes to the increase of the transaction costs, with direct impact on the entire soy sector, particularly on small farmers.

With respect to the contractual relationship between the agents of the soy agribusiness in Paraguay, there are particularities especially related to the size of the farmers business. The business relationship between the big producers and the companies is made by direct purchase/sale agreements. They are formal agreements with safeguards for both parties. The companies and big farmers also use futures contracts to minimize the risk of price fluctuations as well as agriculture insurance contracts.

In contrast, small farmers in general do not have contracts directly with the companies. Purchase and sale transactions are made with middlemen, which causes the transactions costs to increase in all dimensions. Furthermore, they are highly dependent on price fluctuations because they do not have future sale contract, as well as on climate conditions for not having agriculture insurance. All this makes that the agricultural

activity becomes even more unstable for the family farmers, and to make a living becomes much more difficult, contributing to rural exodus.

4.6. Competitive strategies

In modern international competition, the companies compete with global strategies, involving not the international trade only but also management and logistics efficiency, risks control, and the ability to adapt to the economic environment. Competitive advantages include the concepts of segmented markets, differentiated products, technological diversities and economies of scale (PORTER, 1999). Aligned with these variables, the big players of the soybean business in Paraguay are using the most diverse strategies to become more competitive. Some examples are:

- Companies' verticalization. It is the case of some larger companies and traders that already have their own road transporting fleet, barges for river transportation, direct importation and sale of inputs, construction of fertilizer and vegetable oil plants;
- Efforts towards economies of scale to reduce unit costs;
- Control of climate risks by contracting crops insurance, without the need of intermediate agents;
- Control of prices risk by entering soybean futures contracts directly with Chicago Board of Trade. This future sale device is also largely used by big farmers, who sell at future contracts to ensure at least the coverage of production and marketing costs.
- Exchange rate control by means of dollar future contracts.

The strategies adopted by small farmers are quite different. If on the one hand the production and marketing strategies of big companies and farmers are well defined and structured, on the other hand small farmers face a quite different situation. They usually lack financial, human and organizational resources to plan production and sale efficiently.

In addition, they are not able to adopt the technological innovations as fast as the big producers, creating competitive disadvantages that make it much more difficult for them to make a living from the agricultural activity.

5. Conclusions

The agribusiness sector is highly complex: besides depending on production inputs and labor, it is also heavily dependent on environmental factors. These factors influence production and the commodity prices in view of the great speculation that exists in the agricultural market.

The situation of the small farmers is much more complicated. Added to these factors we can mention difficulty in accessing credit lines, dependence in relation to the big players, lack of political power and knowledge, mainly in management techniques. Based on the results, it can be seen that in increasingly competitive and globalized markets, which recurrently increases bureaucracy and transaction costs, small farmers need to adopt well-defined strategies, otherwise they may be forced out of the marketplace. Such strategies should make that these farmers gain in production scale and negotiation power. In this context, two forms of organization may help small farmers succeed in different ways in both these requirements, besides assisting them with the technical and economic management of the business. They are Cooperatives and Associations.

If both these forms of organization are well implemented and managed, all conditions to help small farmers to remain and succeed in the agricultural activities will be provided, and better, with life quality and conditions for a sustainable development.

Finally, it is important to emphasize that the contractual arrangements, formal or not, are tools that contribute to stable relations between the parties, especially in a business so dependent on exogenous factors, as is the case of agriculture. Therefore, it is crucial that the public and/or private organizations encourage the use of contracts to reduce costs and keep the agents in the productive activity.

6. References

ALSTON, L. J. **A framework for understanding the New Institucional Economics**. Illinois: Univerity of Illinois, July 1998. 22p.

CAPECO - **Cámara Paraguaya de Exportadores de Cereales y Oleaginosas**. Available at: <http://www.capeco.org.py>. Accessed on: March 18, 2010.

COASE, R. H. The nature of the firm. **Economica**. London, v. 4, p. 386-405, 1937.

FARINA, E. M. M. Q.; AZEVEDO, P. F. de; SAES, M. S. M. **Competitividade:** mercado, estado e organizações. São Paulo: Singular, 1997.

GIL, A. C. **Métodos e técnicas de pesquisa social**. 5a ed. São Paulo: Atlas, 2007.

INBIO - **Instituto de Biotecnologia Agricola.** Available at: <http://www.inbio-paraguay.org/interna/que_es_inbio_1.html>. Access on: March 18, 2010.

LAZZARINI, S. G. **Estudo de caso para fins de pesquisa: aplicabilidade e aplicações do método.** In: FARINA, M. M. Q. (Coord.). Estudo de caso em agrobusiness. São Paulo: Pioneira, 1997. p.9-23.

MONDELLI, M.; ZYLBERSZTAJN, D. Determinantes dos Arranjos Contratuais: O Caso da Transação Produtor-Processador de Carne Bovina no Uruguai. In: **Seminário "Oficina PENSA",** 2007, São Paulo. Available at: <http://www.pensa.org.br/anexos/biblioteca/1712008145843_DeterminantesdosArranjosContratuaisocasodaTransa%C3%A7%C3%A3oProdutorProcessadordeCarneBovinanoUruguai.pdf>. Accessed on: March 10, 2011.

NEVES, M. F. **Um modelo de planejamento para canis de distribuição no setor de alimentos.** 1999. Tese (Doutorado), Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo, São Paulo, 1999.

NORTH, D.C. Institution. **Jornal of Economic Perspectives**, v. 1, n. 1, p.97-112, 1991.

NORTH, D. C. **Institutions, institutional change and economic peformance**. Cambridge: University Press, 1990. p.3-59.

PINAZZA, L. A. **Cadeia produtiva da soja**. v. 2. Brasília. IICA, MAPA/SPA. 2007.

PORTER, Michael E. **Estratégia competitiva: técnicas para análise de indústrias e da concorrência**. 17 ed. Rio de Janeiro: Elsevier, 1999.

SILVA, L. X. da; BORGES, R. de L. A. Interpretações e análise das relações contratuais e da interdependência na cadeia agroindustrial do Tabaco sul-brasileiro. In: **Encontro de Economia Gaúcha**, 5, 2010, Porto Alegre. Available at: <http://www6.ufrgs.br/pgdr/arquivos/752.pdf>. Acessed on: March 10, 2011.

USDA - Economic Research Service. Available at: <http://www.ers.usda.gov/>. Accessed on: May 20, 2010.

World Bank. Available at: <http://data.worldbank.org/>. Accessed at: May 8, 2010.

YIN, R. K. **Case study research, design and methods**. Newbury Park: Sage Publications. 1989.165p.

ZYLBERSZTAJN, D. Economia das Organizações. In: ZYLBERSZTAJN, D.; NEVES, M. F. (Org.) **Economia e Gestão dos Negócios Agroalimentares**. São Paulo: Pioneira, 2000, p.23-38.

ZYLBERSZTAJN, D. **Estrutura de governança e coordenação do agribusiness:** uma aplicação da Nova Economia das Instituições. 1995. Tese (Livre-Docência), Faculdade de Economia e Administração. São Paulo: Universidade de São Paulo, 1995.

OPPORTUNITIES FOR QUALITY PRODUCTION IN EUROPEAN PORK CHAINS

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Abstract
The paper gives an overview of some of the findings of the EU integrated project Q-Porkchains and future research challenges of the sector. Starting with changing consumer demands it describes major developments and opportunities in chain-wide quality management systems and supporting information systems for the European pork chain. Subsequently the article goes into chain governance systems in relation to quality demands. It ends with discussing major innovations in these pork chains and a summary of research challenges.

Key words: European pork chain, quality systems, information systems, governance, quality variability

OPPORTUNITIES FOR QUALITY PRODUCTION IN EUROPEAN PORK CHAINS

1. Introduction

Consumers in Europe have increasing demands with regards to pork products and pork production. Consumers want a large choice of both fresh and processed pork products, and they want high quality at low cost. Time constraints have also increased the demand for convenience food; and to satisfy health concerns, foods have been developed, for example, with less fat or salt. Moreover, concerns for the environment in terms of air and soil pollution have led to demands for regional food, with limited transportation distances, and organic produce.

Sector-wide crises in the food sector, such as BSE, dioxin, classical swine fever, and Avian Influenza, have also had a great impact on consumer demands in recent decades. These have fuelled to a large extent consumer concerns about quality and safety in agri-food supply chains. Consequently consumers now demand more information about products and production processes, like the origin of the food, safety levels, production means, hygiene, use of genetically modified feed, application of pesticides and other environmental issues such as food miles (Verbeke & Viaene, 2000; Trienekens & Zuurbier, 2008).

Increasing welfare and individualisation in society, leading to mass-customisation to the extent that every single consumer has his or her own set of preferences and (combinations of) consumer products, is another trend currently impacting food businesses. The result is a further segmentation of markets and a widening of product ranges. Together with the globalisation of product flows, it has driven up the number of (food) articles in our supermarkets. Since the early 1990s, Western European supermarkets have seen their product assortments increase from on average 10,000 articles to around 40,000 in current hyper-markets. For the food chain this means that differentiating market demands pull new products into the market. At the same time the food industry reacts to these developments by optimising processes and by developing innovative products that are pushed into the market, leading to system diversification at company, regional and international levels.

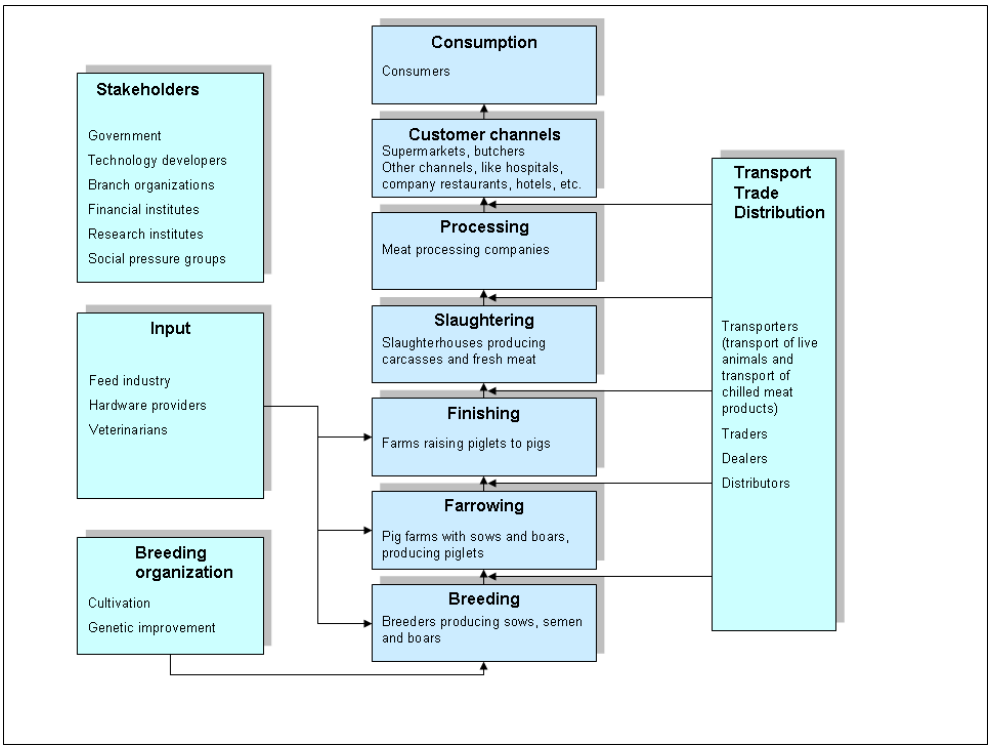
This article is based on research of Q-PorkChains, an integrated five-year project, supported through the 6th EU framework programme (www.q-porkchains.org). The project consists of 62 partners from 20 different countries including EU states, USA, China, Brazil and South Africa. The overall objective of the Q-Pork-Chains project is to ensure long term competitiveness of the European pork sector through exploiting and enhancing diversity of consumer and societal demands on differentiated production chains and pork products, enhancing environmental, societal and economical sustainability and managing and enhancing quality of pig and pork production.

Module IV of the project focused on research into chain management in the European pork sector. In this module research has been performed on integrated chain quality management systems supported by information systems and supporting governance structures, innovation in pork supply chains and logistics and sustainability in these chains. This paper will focus on quality management, governance structures and innovation in European pork chains.

In the remainder of this article, section 2 gives a general description of the pork chain. Section 3 discusses market and consumer demands with regard to pork meat, while section 4 describes developments in integrated quality and safety assurance systems. Section 5 deals with how integrated information systems support chain quality management. Section 6 relates chain quality management and information systems with governance of European pork chains. Section 7 describes some major innovations in the European pork industry. Section 8 defines major challenges for the sector.

2. Short description of the pork chain

The pork chain covers the following processes: Breeding – Farrowing – Finishing – Slaughtering – Processing – Retail (see figure 1). In most European pork chains these processes are performed by separate organisations, although farrowing and finishing are sometimes combined. In addition to these chain actors, figure 1 also shows major input providers, like the feed industry, transporters, etc., and stakeholders such as the government and branch organisations. It pictures the pork chain as a network of interacting organisations aiming at the delivery of pork meat products to consumers.



Pork is a very popular meat product in the European Union with more than 42kg consumption per year per capita (EC, 2008). On a global level the EU is the second largest pork producer behind China (FAPRI, 2010). Production statistics of the FAO (2010) indicate a Chinese pork production of 49.9 million tons and a pig livestock of 451 million in 2009. (Brinkmann et al., 2011).

Table 1 gives an overview of major pork-producing countries in the world (FAO, 2005). China is by far the biggest producer, followed by USA, Germany and Brazil. In the list we also see the largest European producers: Germany, Spain, France, Denmark and Poland. The list also includes some new players on the world market for pork meat,

namely Brazil and Vietnam (in addition to China). Other large producers in Europe are the Netherlands, Italy and Belgium.

Table 1. Output of the world's 10 largest pork-producing countries (FAO, 2005)

Year	2005		2000		1995		1990	
	Output (thousand ton)	Percentage	Output (thousand ton)	Percentage	Output (thousand ton)	Percentage	Output (thousand ton)	Percentage
China	51,202.15	49.08	41,405.63	45.96	33,401.32	42.38	24,015.70	39.45
USA	9,392.00	9.00	8,597.00	9.54	8,097.00	10.27	6,964.00	11.44
Germany	4,499.99	4.31	3,981.90	4.42	3,602.40	4.57	4,457.99	7.32
Brazil	3,140.17	3.01	2,600.01	2.89	2,800.00	3.55	1,050.00	1.72
Spain	3,130.24	3.00	2,904.62	3.22	2,174.82	2.76	1,788.85	2.94
Canada	2,617.57	2.51	2,002.73	2.22	1,416.96	1.80	1,191.92	1.96
Vietnam	2,288.32	2.19	1,409.02	1.56	1,012.48	1.28	728.56	1.20
France	2,277.74	2.18	2,312.00	2.57	2,144.00	2.72	1,726.80	2.84
Denmark	2,014.92	1.93	1,710.98	1.90	1,516.10	1.92	1,208.61	1.99
Poland	1,955.50	1.87	1,923.86	2.14	1,963.20	2.49	1,854.95	3.05
World total	104,333.29	100	90,085.85	100	78,806.12	100	60,871.80	100

3. Market and industry demands with regard to pork meat

Figure 2 shows some specific fields of attention for the pork chain in Europe related to societal concerns and the resulting demands from governments and consumer groups (Trienekens et al., 2009).

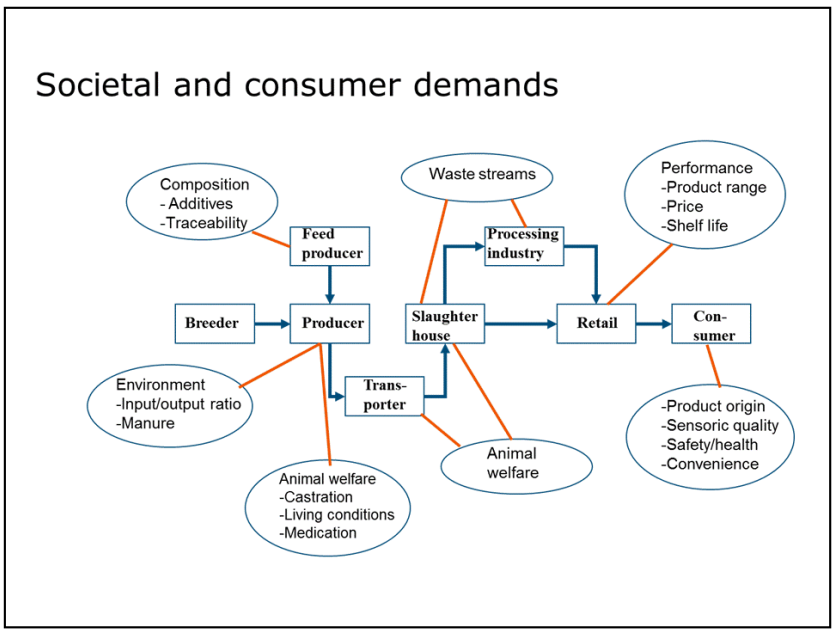


Figure 2: Fields of attention in the pork chain from societal and consumer perspective

As depicted in figure 2, the pork chain has been confronted with a wide range of societal concerns related, for example, to environmental issues (e.g. manure handling and dealing with waste streams), animal welfare issues (e.g. housing and transportation of animals) and ethical working practices (e.g. use of additives in feed, medicine use, and traceability aspects) The design of animal-friendly pork production chains and

chains with low ecological load, such as organic pork chains, is high on the political agenda in many European countries. In line with this growing emphasis from the pork chain environment, many companies have started new initiatives to increase the attention paid to food quality, safety and environmental issues. Many of the recently introduced innovative technologies aim at the introduction of integrated quality, safety and environmental management systems in the pork chain.

Consumer demands can be defined as the consumers' requirements for characteristics of a product, process, or service, which satisfy their needs. Grunert et al. (2005) distinguish four groups of quality attributes for food products: *sensory attributes, health attributes, process attributes,* and *convenience attributes*. *Sensory attributes* are related to sensoric quality, such as taste, tenderness and juiciness. *Health-related quality* is a more subjective category, with often conflicting opinions about claims of the producer. Regulations on health-related labelling of food products have recently been enforced in most Western countries. *Process attributes* refer to the way a food product has been produced. Typical process attributes of interest for the consumer are animal welfare, environmental load, organic production, etc. Finally, *convenience attributes* are defined as 'those aspects of the product that save time or energy for the consumer during shopping, storage, preparation, eating and disposal'.

In general consumers must make trade-offs in their buying decision: for example, increased marbling in a piece of meat may increase juiciness, or tenderness, but it will be considered less healthy than a leaner steak. When these trade-offs are made, there is evidence that intrinsic cues (cues that are part of the physical product) usually carry more weight than extrinsic ones (Steenkamp & van Trijp, 1996). In general consumers first have to be satisfied with the sensory properties of products, before other quality cues become relevant (Verbeke et al*.,* 1999).

Successful chains nowadays are more market-oriented, and operate with the ultimate goal of responding to changing consumer demands. Companies can gain competitive advantages by finding new ways of creating added value based on innovative technological developments. In this way they can respond to consumers' changing increasing interest in pre-packed, convenience, ready-to-eat, healthy, and safe food products.

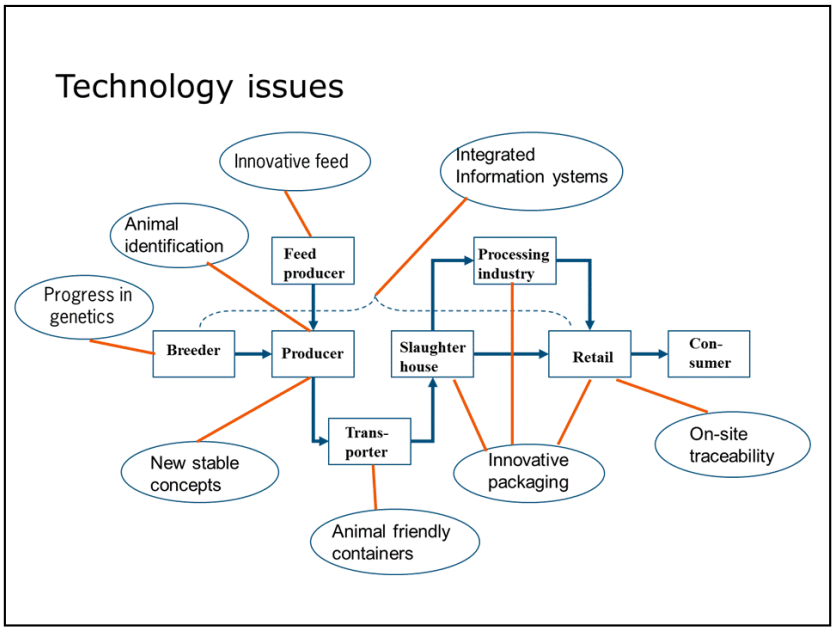


Figure 3: Fields of attention in the pork chain from technological innovation perspective

Figure 3 depicts major "technology'' fields of attention in various stages in the pork chain. Performance measurement, including detailed assessments of consumer requirements, such as origin and sensory quality of the product, have become increasingly important for all stages in the pork chain. At the same time, however, companies must optimise their use of resources to remain economically viable. Optimal use of slaughter capacity at the slaughterhouse stage and stable space at the production stage are examples.

4. Integrated Quality Management Systems

Given the developments in the last few decades, food businesses have to place more emphasis on quality and safety control and, at the same time, must shift towards differentiated production of specialties with high added value. Because of safety and quality considerations, but also because of the speed at which new products are put on the market, coordination of processes with other parties in the chain becomes of utmost importance. Therefore, implementation of chain-wide quality and safety management systems is a strategy now undertaken by many pork-producing companies.

As the basis for quality and safety assurance the European Union has developed a wide range of legislative demands with regard to food safety. These demands are general guidelines that must be satisfied by EU countries. HACCP, for example, has been adopted in almost every chain in Europe. Countries may rely solely on EU legislation, or use it as a baseline upon which to build. This is especially the case in the Northern European countries, where additional public demands for the pork chain have been specified in national legislation.

Box 1. Legislation for the pork chain

The European Union has developed a wide range of legislative demands with regard to food safety. European Union Directive 93/43 on the Hygiene of Foodstuffs states that food business operators shall identify any steps in their activities that are critical to ensuring food safety, and shall further ensure that adequate procedures are identified, implemented, maintained and reviewed on the basis of HACCP. In 2002 the cornerstone of the new European food law was laid through passage of Regulation 178/2002. This regulation is often referred to in English as the 'General Food Law' (GFL). The main objective of the GFL is to secure a high level of protection of public health and consumer interests with regard to food products. It should be noted that the GFL is not a code encompassing all food legislation. It is the foundation of a general part of food law. Aside from the GFL, many other European and national rules and regulations continue to apply. The GFL, implemented in January 2005, gives food (and animal feed) companies primary liability in the event of unsafe products. This necessitates implementation of monitoring systems at company level. Information from these systems should make it possible to determine the source of safety or quality problems and to find out where other items with the same problem are located in the supply chain. With regard to traceability, since 1 January 2005 companies have been obliged to register data on raw material supplies and customer deliveries on a transaction basis. Besides EU legislation in general, additional requirements specific for each country apply.

In addition to the general EU regulation 178/2002, EU hygiene regulations 825/2004, 853/2004 and 854/2004 are particularly important for the pork sector. These demand implementation of self-monitoring systems by food companies. From the beginning of 2009 it has become compulsory for farmers to provide special information about slaughter-pigs to the official veterinarian of the slaughterhouse 24 hours before the pigs are to be slaughtered. So far it has been common for this information to be given to the carrier when he collects the slaughter-pigs at the farm (Reg.(EG) No.853/2005) (Trienekens et al. 2009).

Apart from the general public systems indicated above, official European guidelines have also been developed for organic production (EKO label) and for regional products (Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI)). The latter have been implemented especially in Southern European countries. In France, for example, Jambon de Bayonne (Bayonne Ham) has received the PGI certification. In Spain, there are six PDOs for dry-cured hams.

On top of public regulations, private bodies have taken initiatives to develop standards for assuring quality and safety in food chains. These standards contain comprehensive norms with regard to food safety, product and process management, and hygiene of personnel and the production environment. For example, large retailers in Europe have developed standards that commit their suppliers to strict food quality management systems. While these standards were initially developed to help retailers fulfill legal obligations and protect consumers against potential food hazards, they now include even more stringent demands for food safety and quality than required by law (Havinga, 2006).

Systems that are used in European pork chains, like IKB, QS and Global-Gap, are based on HACCP, GMP (Good Manufacturing Practice) and ISO9004 and ISO22000 rules. Input providers for the pork chain, such as feed companies and veterinarians, have their own systems based on HACCP and Good Practices. The German and Dutch IKB and

QS systems are described in box 2 below. Similar systems can be found in other countries, like QSG (quality assurance guarantee) in Denmark, with a market share of 96% of pigs slaughtered under this scheme, Certus in Belgium (**www.european-meat-alliance.eu**) and VPF in France (Viande de Porc Française - French Pork Meat), with more than 90% of pork production under this scheme (Rakotonandraina & Sauvee, 2009). Farmers' cooperatives have a strong position in chain quality system development in Germany, France and Denmark.

Box 2. IKB and QS systems

Nearly all of the firms in the pork meat chains, in particular primary producers, slaughterhouses and cutters, in the Netherlands and Germany participate in Integraal Keten Beheer (IKB , in English: Integrated Chain Control) and/or Qualität and Sicherheit (QS, in English: Quality and Security). In 2010, 98% of all pigs slaughtered in the Netherlands were IKB pigs (**www.european-meat-alliance.eu**). The market share of QS in Germany is 95% of pigs slaughtered. Systems like IKB and QS encompass strict measures for the reduction of Salmonella and Campylobacter, and also include additional requirements related to traceability, quality and registration. IKB and QS pigs are raised on firms that undergo regular inspections by independent organisations focused on feed, medicine use, hormones, hygiene, as well as animal welfare and transport. The systems also include a range of possible sanctions including warnings, fines, or in the case of repetitive non-compliance, exclusion from the system or even closing of the firm. Depending on their performance, primary producers are inspected one to four times a year and processors are inspected twice a year.

With respect to implementation of national quality management systems, EU countries can be divided into three categories. The Netherlands and Denmark can be considered as 'Trendsetters', as they were the first countries in the EU that developed and implemented national quality management systems. Countries that implemented similar national quality management systems later on can be called 'Trailers': Belgium implemented Certus in 2000 and QS started in Germany in 2001. The third category is made up of 'Tentative' countries, which are in the process of developing integrated quality management systems, like the Agro 3 standard in Greece, as well as countries that do not yet have a national quality management system (e.g. Hungary and Spain) (see figure 5).

Figure 4. Examples of integrated Quality Management Systems in Europe (Ellenbrecht et al., 2009)

In Q-Porkchains a novel chain coordination model for quality management of European pork supply chains has been developed (Brinkmann et al., 2011). Three levels are identified that should/should be part of coordination: a chain quality board to design quality strategies on chain level, a network coordinator (chain party or third party) to specify contracts and exchange of information in the chain and a quality broker (between farmer and processor) for coordination at supply chain interfaces. The proposed concept of a quality broker represents an innovative approach to facilitate the implementation of coordination mechanisms in pork supply chains. In addition, the coordination mechanisms have been defined and classified, basing on contracts, information technology, information sharing and joint decision making. The model is expected to be applicable to a large diversity of pork supply chains and may benefit the definition and execution of quality management strategies. Figure 6 depicts the model.

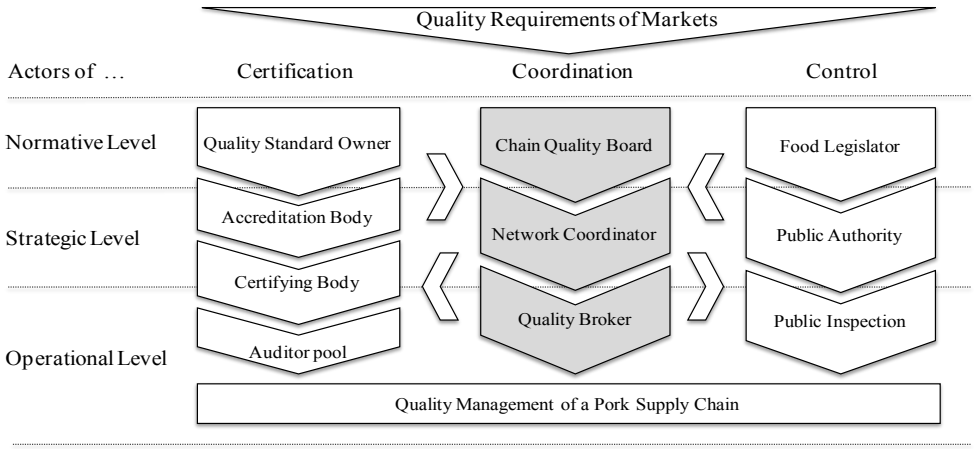


Figure 5: Chain coordination model to encourage quality management strategies of pork supply chains (Brinkmann et al., 2011)

In the Q-Porkchains project in-depth case studies were performed in 6 EU countries (Germany, The Netherlands, France, Spain, Hungary and Greece) and in China and South Africa. In each country two chain were analysed, a mainstream pork product chain and a specific pork product chain, in most cases regional chains or chains aiming

at niche markets. Each case study was analyzed in-depth with respect to the existence of actors on a normative, strategic and operational level (Dubs et al., 2009) who coordinate quality management in the pork supply chains.
The management levels were used to categorize identified actors. Results of this investigation are shown in Table 2:

Table 2: Coordinating actors of pork supply chains investigated in the case studies (Brinkmann et al., 2011)

Country	Case	Normative Level	Strategic Level	Operational level
China	1	Group Corporation (slaughterhouse and distributor)		
	2	Food processing corporation (slaughterhouse and processor)		
Germany	1	Eichenhof Board	EGO Meat Plant Management	EGF – Erzeugergemeinschaft für Ferkel eG
	2	Gutfleisch Board	EDEKA Meat Plant North Management	Vermarktungsgemeinschaft für Zucht- und Nutzvieh eG
Greece	1	n.i.	n.i.	Intermediary company
	2	n.i.	Pig-producing company	n.i.
Hungary	1	n.i.	Pig producers	n.i.
	2	n.i.	n.i.	n.i.
South Af	1	PIC Board	Kanhym Estate	n.i.
	2	TOPIGS Board	ESKORT Bacon Factory	n.i.
Spain	1	n.i.	Integrator Companies	
	2	Control Board PDO Guijuelo	Integrator Companies	
Netherl	1	VION Quality Directorate	VION West Meat plants	Feed industry, producer cooperatives
	2	The Groene Weg (VION Quality Directorate	VION West Meat plants	Operations Supply Manager

(n.i.=not indicated / no equivalent actor)

Table 2 illustrates that in some supply chains actors on the three levels have already been introduced in the chain to coordinate quality management. Pioneers in this respect are supply chains in Germany and The Netherlands, which have implemented QMSs and are coordinated by actors on all three levels. Most of the actors can also be found in Spain, with the additional characteristic that the strategic and operational levels are represented together by the respective integrator companies. In the other chains studied, actors have not been indicated on one or more levels or do not exist in such a way that they can be allocated to a level. Thus, these supply chains have one or two of the actors and lack the others. In one case, in Hungary, no actor was found on any of the levels. These results are not surprising, as many of these chains can be characterized as very traditional, fragmented and not well coordinated. The supply chains in China represent special cases as the chains are fully integrated and hence, the normative, strategic and operational levels are allocated to one actor or organization that owns the whole pork supply chain (Brinckmann et al., 2011).

5. Integrated Information Systems

Transparency of a chain is the extent to which all the chain's stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay or distortion (Hofstede et al., 2004). This definition implies that data must be relevant, accurate, factual, reliable, timely and available in an appropriate quantity. Moreover, quality information must be readable, while information exchange must be reasonable and properly arranged (Hofstede et al., 2004). Apart from well-designed information systems, trust between partners is key to achieving transparent supply chains (Lindgreen et al., 2005), leading to higher levels of loyalty and better formal and informal communication.

Transparency is of utmost importance for the pork chain for a number of reasons:

1. Based on experience gained during the recent crises in the European pork sector, traceability has been shown to be a key capability for companies to find the origin of problems and recall hazardous products quickly.
2. Consumers require more and more information about the origin of products and the way the product is produced.
3. A reliable exchange of quality and health data throughout the chain provides actors with an instrument to better plan their production and sales processes and better match the right quality to the right market.
4. Availability of operational quality and safety data across the chain supports adequate risk management.
5. The increasing complexity of logistics flows caused by product differentiation, market segmentation and internationalisation, demands insight into production and stock data throughout the pork chain, so that companies can make better forecasts and more effectively plan logistics and distribution processes.

Developments towards chain-wide information systems that support chain quality management systems can be recognised in Germany, the Netherlands, Belgium, France and Denmark. In these countries we see systems emerging that provide extensive on-line quality data from slaughterhouse to farmer and vice-versa that enable these actors to decide on the right prices for meat delivered, but also to optimise their processes in the mid- and long-term based on these data. The most modern systems are chain-wide systems that include the breeding, farrowing, finishing and slaughtering stages.

Box 3 gives an example of such a system for upstream actors in the chain.

Box 3. Wicipork

Wicipork is an inter-enterprise information system, set up to support health management in the pork chain. It is designed in collaboration with researchers of Q-Porkchains. It represents currently 1659 pig farms in the Western part of France. The system is a web-based system offering information on pig and carcass results to the farmer, his feed technician and his veterinarian. These results provide them with a global and personalised vision to improve pig management for achieving sustainable quality and performance. The system contains data from different sources:

- Visit protocols of veterinarians
- Visit reports of feed advisors
- History of prescriptions for medicines and medicated feed
- Slaughter data, like weight, quantity, meat percentage, sex, organ findings

- Semi-annual balance of slaughter data
- Salmonella and Aujeszky checks
- Laboratory information from living pigs (e.g. blood samples) and slaughtered pigs
- Technical data (daily growth, feed conversion) provided by farmers cooperatives (*groupements*)
- Farm data, provided by *groupements*. Farm identification is the VAT number.

Box 4 gives an example of an integrated information system for the slaughterhouse-farmer stages in the pork chain.

Box 4. Farmingnet

FarmingNet was launched in 2005 by Vion Food group. It is a web-based information system that provides farmers with on-line access to data about the pigs they have supplied. Analysis of the data is performed by Vion, which shows the farmers the quality level and degree of uniformity of their pigs, both of which influence their net profit. The system not only focuses on better planning and control of operational processes in the pork chain, but also on mid- and long-term optimisation of various production and distribution processes. A recent study (Van den Hazel, 2007) into the economic value of using these kinds of systems found two potential additional advantages for the slaughterhouse-farmer link: 1. An overview of body and carcass deviations per batch/stable may provide better insight into the influence of climate control on growth of the animal, which again may lead to additional returns (increased pig growth and reduced throughput and cycle times), reduced costs (decreased deviations), and increased resource usage (energy). 2. Better use of information on animals to be delivered may also lead to improved accuracy of weight partitioning of pigs at delivery time related to pig pay-off. This information can result in reduced costs (increased optimisation of weight at delivery) and increased harmonisation of market quality concepts.

In Q-Porkchains an information service model has been defined providing insight into existing gaps in information systems at company and supply chain level and support the definition of flexible, cost and time saving solutions for actors in the supply chain for solving information and communication problems. the information service model contains information supply models, information demand models, and gap models. Organizations in pork chains can use it as a reference model to assess their information systems and that of their chain partners in the fields of logistics, traceability, food safety, quality and sustainability, according to their specific needs (Lehman et al., 2011).

6. Integrated chain systems and chain governance

One of the most striking developments in the European pork sector, among other food sectors, is up-scaling and concentration in all links of the chain. In Northern and Western European countries the five largest retailers have market shares of up to 90%, whereas Southern European countries still have more small grocery shops. Also in these and in other (e.g., Eastern European) countries, supermarkets are emerging rapidly, though. In most countries large slaughterhouses have the biggest market share, or are growing rapidly (e.g., the largest slaughterhouse in the Netherlands has more than 70% market share). In the processing stage concentration and up-scaling are also taking

place, although many small, often specialised, companies remain (e.g. in Germany and Spain). In the farrowing/finishing stage we still see many small farms in countries like France, Spain, and Germany; although in other countries we see a strong decrease of the number of farms (like in The Netherlands, where the number of farmers has been halved in the last 10-15 years). Also in the feeding as well as in the breeding stages, there is a strong concentration tendency in all countries.

Different governance structures can be found at different stages in the supply chain, and major differences can also be found between pork chains and between countries. In some chains, such as in Greece, integration between all stages of the chain, from breeding to retail, exist. In the largest Danish chain (Danish Crown) we see integration between the (cooperative) farmer and slaughterhouse stages, just as is the case for some cooperatives in Germany and France.

In most other chains, however, there is no (organizational) integration between different stages. Relations between breeder and farmer are in general ruled by contracts. However, even contracts are relatively rare in the farmer-slaughterhouse stage, although most relationships are long term. Rather than through contracts, vertical coordination is achieved by means of product and process standardisation (where widely accepted, private quality standards, like IKB and QS, implicitly align chain-wide activities) and by means of increasing information exchange between chain parties.

As a result, coordination of activities in these chains is possible without large-scale integration of governance structures. The concentration trend in the European pork industry further enforces these practices. Larger companies are better able to invest in sophisticated information and quality management systems to coordinate with other parties in the chain. Moreover, reduction of the number of players in various countries and in the EU at large may move the sector away from arms-length relationships to relationships based on trust and reputation, implying closer collaboration and less opportunism between trading partners.

Box 5: research on pork chain governance
In Q-Porkchains, a model of quality management systems related to governance forms has been developed that recognises the coordination (governance) needs in different types of supply chains, with different quality management requirements, in the EU. The model identifies major elements of quality management systems: quality signals (to the consumer), quality standards (implemented by a leading party in the chain or a third party) and quality monitoring mechanisms. Governance forms distinguished are: spot market, verbal agreement, formal contract, equity based contract and vertical integration (Wever et al., 2010).

Quality management coordination and integrated information exchange require chain governance structures to facilitate communication, coordination and collaboration. Governance structures in a supply chain are often highly inter-dependent, especially, when risks are high. These risks are higher when large investments need to be made by actors, performance of buyers or suppliers is difficult to measure, or when adaptation problems exist. The model of quality management systems and governance helps to balance coordination of upstream and downstream product and information exchanges.

7. Typical innovations in European pork chains

The previous chapters touch upon a number of important innovations in the pork sector in Europe. Innovations are taking place at various stages of the pork chain. In the breeding stage ongoing research is focusing on stress-free animal breeds and certification for specially bred sows/semen, among other topics, Molecular genetics techniques are increasingly used in these breeding programmes (see box 6).

Box 6. Use of molecular genetics in breeding programmes

Quantitative genetics are used in combination with DNA technology. DNA tests that isolate hair roots of the animals assist in the selection of both breeding traits and breeding animals. This is called gene marker assisted selection: genes are identified that are responsible for particular traits, as well as gene markers that indicate the presence of these traits in the animals. Genes (markers) that can be easily identified, and that are responsible for economically useful traits, are used to modify the breeding programmes. These techniques are useful especially for the identification of traits related to resistance to diseases and meat quality (www.q-porkchains.org)

In the feeding stage new feeding concepts are being developed to reduce piglet mortality. Also new types of dried raw material are being introduced and "functional'' feeds are being developed. For example, in Spain, feed producers are using new raw materials and developing new feeds with high oleic concentrates or Omega-3 fatty acids.

At the farmer stages, stables are being adjusted to meet legislative or private labelling demands. Moreover, computers and PDAs are increasingly used in farm management to track health and weight data of animals and to analyse farm performance. With regard to health aspects, new vaccines and new and more efficient drugs are continuously brought onto the market. Also, health management systems, which enable capture, storage, and analysis of animal and herd health data, are being developed in various countries like the Netherlands, Germany and France. Furthermore, transport methods have improved, both for live animals (e.g. well-ventilated vehicles with automatic drinking water installations) and for meat.

Another innovation has been described in section 5, box 3: a health management system used by veterinarians in France (Group Glon). This system was developed to satisfy the legal requirement that veterinarians check the health status of a pig farm before signing a prescription for medicines or medicated feed.

At the slaughtering and processing stages we see an increase of the application of CO2-stunning instead of electrical discharges at the slaughterhouses, further improvement of the cold chain, new processing technology like automatic dryers for ham (Spain) and development of new health and convenience-related products. Furthermore, inter-organisational information systems between slaughterers and farmers are being developed in various countries. The latter systems are the main enablers for coordination between the various companies of the pork chain (for an example, see section 5, box 4).

Grunert et al. (2005) argue that the extent of heterogeneity and dynamism in end-user markets is a determinant of the degree of market orientation in the chain. The future

market for pork will be more heterogeneous and dynamic, thereby asking for more market oriented activities in this chain, at slaughterhouse, farmer and breeding stages. So far, however, in most food sectors heterogeneity of raw materials upstream in the chain is not exploited for serving market heterogeneity downstream in the chain (Grunert et al., 2005). To be market oriented and efficient at the same time, quality variation (heterogeneity) upstream the chain should be better used to match with differentiated quality demands in the market.

Currently, in most pork chains there is still a mismatch between delivered quality and expected quality, leading to unsatisfied customers and value losses because products are not sold against the best possible price. Differentiation of quality of pork starts already in the breeding stage, depends on feeding and living conditions of the animals at the farmer stage and is also influenced by the way the animals are transported and slaughtered. At the breeding stage a lot of research is being done that will eventually make it possible to use DNA technology to help guide breeding programs. However, because pigs are living creatures with a natural variation, and environmental factors (like feeding, animal handling, etc.) even have a much greater impact on quality of the meat than genetics, a large quality prediction accuracy is not to be expected and slaughterhouses still will have to cope with a large variation in quality characteristics, even within batches that come from the same farmer.

Pork quality can be defined in many different ways, like percentage of leanness, weight, visual aspects, sensory perception and suitability for further processing, and it also varies in different markets. The pork processing industry has until now mainly focused on sorting based on carcass quality: weight, lean meat ratio, fat/meat layer thickness. These are static features and relatively easy to measure. However, these features are not directly related to the quality of the meat that is produced for the consumer. Here factors like microbiological quality, pH value and water holding capacity are important, which are more difficult to measure, are dynamic and are affected by multiple factors.

To be able to better predict meat quality, new measurement methods are currently being developed, for example of water holding capacity of pork meat (box 7).

Box 7. New methods of quality measurement in the slaughterhouse

Water-holding capacity (WHC) is one of the most important pork quality traits as it improves the sensory appreciation of pork by consumers, affects the amount of saleable meat by reducing purge loss, and increases the yield of further processed products. WHC of pork is the result of many management conditions of pig husbandry, animal transport, stunning and killing of pigs and the cooling conditions of carcasses. A higher control of these processes will improve the sustainability of the pork supply chain. Sorting based on WHC has not been achieved mainly due to the lack of rapid on-line non-invasive pork quality measurements. Researchers in Q-Porkchains have identified Near Infra Red (NIR) as a potential measuring technique that could sort primal cuts according to different WHC categories (www.q-porkchains.org).

A successful extension of quality measurements will open up opportunities for further market differentiation because quality prediction of meat products will be far more reliable. Consequently, quality can be better tuned to the specific wishes of market partners throughout the world, thereby maximising value added. The challenges at the marketing side would be to persuade buyers to pay a better price for products with

consistently higher quality (consistent because it is easier to measure) and to find niche markets for special quality products. Moreover, such a development implies the design and implementation of new logistic concepts for storage and handling, as well as more fine-tuned distribution concepts for delivering the right product to the right customer at the right time.

8. Conclusions: challenges for quality production in European pork chains

In the last section some major challenges for quality production in the European pork industry will be pictured.

On the one hand we see a slow trend towards differentiation in the mainstream, mostly fresh, pork products in Europe. On the other hand, there seems to be room for specialty products and regional products, like ham and sausages, in particular aiming at niche markets. Examples are PDO products from Spain, among which Jamon Iberico, Mangalica pork meat from Hungary, and mountain products from France. Moreover, there are many more examples of processed products that have a regional basis or that aim at a high-quality segment of the market, like special sausages in various countries. Besides increasing consumer demands and consumer interest in specialty meat products, better use of quality variation in the pork chain may also lead to a large increase in product diversity.

Quality management systems in Northwestern Europe increasingly cover the whole chain, supported by integrated information systems. Since Northern European countries started the development of integrated chain quality management systems, Southern European countries have been following swiftly, while Eastern European countries have just started to catch up with EU legislative quality demands. In general, the European pork sector is moving away from arms-length relationships and towards a network structure with relationships that are more based on trust and reputation. Governance in this network is supported by these chain-wide quality assurance systems and information systems.
Because of increased product diversity and market segmentation, logistics flows become more complex. Moreover, social and cultural circumstances differ and customers in the different countries ask for specific product characteristics and diversity. Also imports and exports of pig and piglets between countries increase (logistics) uncertainty with respect to quality, quantity and time of pig supply.

Giving the developments and research findings discussed in this paper, main fields of attention to focus future research have been identified:

- Further reduction of the risks in the areas of food safety and animal health by (further) developing and implementing chain-wide quality management and health systems accompanied by integrated information systems and connective governance structures
- New ways of quality management and quality prediction in the pork chain through new measurement technologies and the use of biological markers for meat quality accompanied by the development of new logistics and distribution concepts

- Integration and implementation of sustainable production at the farm and at chain level to arrive at pork supply chains with optimized ecological load and attention for animal welfare aspects
- Design of new logistics and distribution concepts that better support the match between diverse and fragmented supply and increasing differentiated demand
- Implementation and evaluation of regional pork chain concepts for local food in European niche markets or new pork product concepts in production chains that currently have a limited number of products in the market
- Implementation of new production techniques and development of new products and packages to better serve existing and evolving markets inside and outside Europe
- Implementation of new forms of collaboration between companies in the pork chain, horizontally as well as vertically to support sustainable economic development of the sector.

9. References

1. Brinkmann, D., Lang, J., Petersen, B., Wognum, N., Trienekens, J., 2011. Towards a chain coordination model for quality management strategies to strengthen the competition of European pork producers. *Journal on Chain and Network Science*, 11 (2): 137-153
2. Dubs, R., D. Euler, J. Rüegg-Stürm and C.E. Wyss, 2009. Einführung in die Managementlehre, 2. Auflage, Haupt Verlag, Bern Stuttgart Wien.
3. EC, 2008. Pigmeat, Key Figures for the Sector. European Commission Directorate - General for Agriculture and Rural Development, Brussels. Available at: http://ec.europa.eu/agriculture/markets/pig/index_en.htm, Accessed: 12. Nov. 2010.
4. Ellebrecht, S., D. Brinkmann, B. Petersen, 2009, Quality Management in European Pork Chains, in: *Trienekens et al. (eds), European Pork Chains; diversity and challenges in consumer-oriented production and distribution*, Wageningen Academic Publishers: Wageningen, 75-92.
5. FAO, 2010. Production statistics. Avaliable at: http://faostat.fao.org/site/339/default.aspx, Accessed: 03.08.2011.
6. FAPRI, 2010. FAPRI 2010 Agricultural Outlook, World Meat. Food and Agricultural Policy Research Institute, Iowa State University. Available at: http://www.fapri.iastate.edu/outlook/2010/text/16Meat.pdf, Accessed: 30.Dec. 2010.
7. Grunert, K., 2005, Food quality and safety: consumer perception and demand, *European Review of Agricultural Economics*, Vol. 32, No. 3, 369–391.
8. Grunert, K., Fruensgaard Jeppesen, L., Risom Jespersen, K., Sonne, A., 2005, Market orientation of value chains; a conceptual framework based on four case studies from the food industry, *European Journal of Marketing*, Vol.39, No.5/6, 429-455.
9. Havinga, T., 2006, Private regulations of food safety by supermarkets, *Law & Policy*, Vol. 28, No. 4.
10. Hazel, v.d. G., 2007, Economic valuation of information exchange in pork chains, MSc thesis Wageningen University, Management Studies Group, The Netherlands
11. Hofstede, G.J. ,Spaans, L., Schepers, H., Trienekens, J.H., Beulens, A.J.M., 2004, *Hide or confide: the dilemma of transparency*, Netherlands : Reed BusinessInformation, pp248
12. Lindgreen A, R. Palmer, J.H.Trienekens, 2005, Relationships within a Supply Chain, *Journal on Chain and Network Science*, Vol. 5, Nr. 10, 85-101.

13. Lehman, R.J., Hermansen, J.E., Frits, M., Brinkmann, D., Trienekens, J., Schiefer, G., 2011. Information services for European pork chains – closing gaps in information architectures. *Computers and electronics in agriculture*, 79 (2), 125-136.
14. Rakotonandraina, N. and L. Sauvee, 2009, Le Cochon de Bretagne: A brand and producers' organisation, in: *Trienekens et al. (eds), European Pork Chains; diversity and quality challenges in consumer-oriented production and distribution*, Wageningen Academic Publishers: Wageningen, 195-212.
15. Steenkamp J. & van Trijp H., 1996, Quality guidance: A consumer-based approach to food quality improvement using partial least squares, *European Review of Agricultural Economics*, Vol. 23, 195-215.
16. Trienekens Jacques, Brigitte Petersen, Nel Wognum, Detert Brinkmann, 2009, European Pork Chains; diversity and quality challenges in consumer-oriented production and distribution, Wageningen Academic Publishers: Wageningen, pp 288.
17. Trienekens J.H., P.J.P Zuurbier, 2008, Quality and safety standards in the food industry, developments and challenges, *International Journal for Production Economics*, Vol.113, No.1, 107-122.
18. Trienekens Jacques, Nel Wognum, 2009, Introduction to the European pork chain, in: *Trienekens et al. (eds), European Pork Chains; diversity and quality challenges in consumer-oriented production and distribution*, Wageningen Academic Publishers: Wageningen, 19-36.
19. Verbeke, W., and J. Viaene, 2000, Beliefs, attitude and behaviour towards fresh meat consumption in Belgium: empirical evidence from a consumer survey, Food Quality and Preference, Vol. 10, No. 6, 437-445
20. Wever, Mark, Nel Wognum, Jacques Trienekens, Onno Omta, 2010. Allignment between chain governance and chain quality management in EU pork chains; a transaction-costs-economics perspective. Meat Science, 84 (2): 228-237
21. Wognum Nel, Jacques Trienekens, Mark Wever, Jelena Vlajic, Jack van der Vorst, Onno Omta, John Hermansen, Thu Lan T.Nguyen, 2009, Organization, logistics and environmental issues, in: Trienekens et al. (eds), European Pork Chains; diversity and quality challenges in consumer-oriented production and distribution, Wageningen Academic Publishers: Wageningen, 41-71.

CHALLENGES FOR FARM INPUTS COMPANIES IN IMPLEMENTATION OF CUSTOMER RELATIONSHIP MANAGEMENT IN THE SUGARCANE INDUSTRY

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Abstract
This paper examines the performance of crop protection suppliers in practicing customer relationship management in the sugarcane industry. Based on the literature on buying decision process and relationship management in business markets, it develops a method for assessing the perception of agents within the buying decision centers of sugarcane mills and evaluates differences in the opinion of two types of agents. Thus, it is directed to both management scholars and management practitioners who are interested on understanding the variables involved in corporate customer-supplier relationship and how crop protection suppliers have been practicing relationship management in the Brazilian sugarcane industry.

Key words: Customer Relationship Management; Crop Protection Suppliers; Sugarcane Industry

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1. Problem Statement

The Brazilian Sugar and Ethanol Industry has been experiencing a very dynamic period, highlighted by a fast growth and some deep structural changes. In the late 1980's and early 1990's, the industry suffered a major crisis following the failure of the State's ethanol fuel program, the *Pro-Alcool*. The recovery started in 2003, when the first bi-fuel vehicle, also known as flex-fuel, came to market. This novelty allowed ethanol to gradually regain the trust of drivers, which had been lost due to the major shortage in the earlier decade. With the flex-fuel cars, drivers could now decide based on cost/benefit whether to fill up their tanks with ethanol or gasoline. Before that, the owner of ethanol engine vehicles were stuck to a single option and therefore totally dependent on ethanol offer and price. From 2003 to September 2010 approximately 11.5 million flex-fuel vehicles were sold in the country, reaching the share of 38% of the national light vehicle fleet. Currently, the sales of flex-fuel cars account for over 90% of the total sales of new cars (Anfavea, 2010). Meanwhile, the production of ethanol jumped from 12.5 billion liters in 2002 to 25.7 billion liters in 2009 (DCAA/SPAE/MAPA, 2010). At the same time, a global market for the fuel started to develop. At least 40 countries have adopted regulations concerning mandatory ethanol blending into gasoline, including the world's largest fuel markets: the United States, China and the countries that form the European Union.

This scenario has caught the attention of transnational companies and investors from around the globe to the Brazilian Sugar and Ethanol Industry. According to the Brazilian Sugarcane Industry Association (UNICA), in 2007 7% of the country's mills were under control of international capital, in 2010 this figure reached 22%. Most of those foreign companies have entered the market through acquisitions, a growth strategy that has been also adopted by the largest national firms in the business. There are two main reasons that can explain this process. First, with over 430 mills in the hands of some 200 firms, much of them being family owned, this is still a much pulverized industry. Second, the recent global crisis has had a deep impact in the industry, leading many firms to financial difficulties and reducing their production assets substantially. As a result, a consolidation process is taking place. In 2004 the group of the five largest ethanol producers held only 12% of production while in 2010 the top five companies respond to 27% of ethanol production (UNICA, 2011). One of most immediate consequences of this process is the development of a few large players that stand out in terms sugarcane crushing capacity and, consequently, in terms of agricultural input demand as well.

The consequences of this process are not restricted to the concentration within the industry. Competition has intensified with implications to production and managerial processes. Some of the trends, for instance, point to the search for economies of scale, the creation of production clusters and the employment of distinct competitive strategies. All of that, of course, has impacts on the way the mills do business with theirs suppliers and costumers. For the suppliers of the sugarcane industry, this means that there are two processes they must face: the concentration of their market and the changes in their clients' purchasing behavior. Some of those

suppliers have already realized that, and the way they have chosen to address those issues is to strengthen relationship with their clients in order to gain preference over competitors.

Their strategy is in line with what most authors in industrial marketing literature suggest, according to whom customer satisfaction should be understood as relationship-specific rather than a transaction-specific construct. However, are those suppliers being successful in building good quality, value generating relationships with the sugarcane mills? That's the question this research tries to answer.

2. Objectives

The primary objective of this research is **to evaluate the perception of the Brazilian sugarcane industry regarding the relationship with crop protection suppliers.**

To achieve that objective a set of secondary objectives must be addressed. First, satisfying an industrial client means satisfying different members of an organization who, according to their functions within the firm, will have different criteria for judging suppliers. Therefore, the first question this paper must answer is: who in the sugarcane mills are involved in the purchasing of crop protection and will influence the purchasing process?

First secondary objective: to identify the influencers within the crop protection purchasing process and their roles.

Second, researchers in the field of industrial market propose that supplier-customer relationship is based on a combination of different factors. Thus, it's important to understand what makes a good relationship between marketers and buyers in this market, and what crop protection suppliers must do in order to build and maintain a satisfactory relationship.

Second secondary objective: to identify what customer relationship practices crop protection suppliers must follow to satisfy their customers in the sugarcane industry.

Once it is known with whom crop protection suppliers must maintain a satisfactory relationship (what members of mills) and how they should do so, it is possible to evaluate their performance according to the costumers' perception.

Third secondary objective: to evaluate the opinions of the agents involved in the purchasing process about the relationship with crop protection suppliers.

3. Procedures

This paper is the result of an exploratory research that aimed to provide a better understanding of the interactions between crop protection suppliers and sugarcane mills in Brazil, managing to reach a few conclusions from the comparison between the theoretical concepts and the results from primary data collection, which can later help the development of future studies.

Although it uses quantitative methods for some of the analysis, this is, by nature, a qualitative research. It uses numbers and functions only as part of the means to reaching qualitative answers to a qualitative question.

In terms of procedures, this research can be divided into three phases. The first one consisted of a desk research involving the key concepts related to the objectives of the study: buying decision process, buying center and relationship marketing. The conceptual understanding of the issues allowed the designing of the data collection

instrument. From the literature on buying decision process it was possible to understand what drives corporate customers' choices and what the procedures for choosing a supplier and purchasing a product are. Together, the reviews on buying decision process and on buying center gave the necessary support for developing the first part of the questionnaire: a non-structured question in which respondents were asked to identify the firm's members involved in the selection of crop protection suppliers.

The content of the second part of the questionnaire was based on the literature on relationship marketing. The key concepts identified in literature were translated into two sets of statements. The first set contains six statements, each one related to a specific practice of customer relationship management. The second set of statements addresses a more subjective aspect of relationship but that, according to theory, contains the dimensions that are the basis of relationship and, therefore, that should be analyzed for assessing relationship satisfaction. The own development of these statements in both sets answers to the second secondary objective, which was "to identify what customer relationship practices crop protection suppliers must follow to satisfy their customers in the sugarcane industry".

A five-point likert scale was chosen to assessing respondents' opinions and measuring their degree of satisfaction with the relationship with crop protection suppliers. That means that respondents were asked to grade each statement from one to five according to their level of agreement with them (one meaning that the respondent completely disagrees with the statement and five meaning that the respondent completely agrees with the statement).

Data collection was the second phase of the research. It involved 51 interviews through telephone calls which lasted in average fifteen minutes each and were made between May and June 2010. The basic criteria for choosing respondents was that they had to directly participate in the purchasing decision process. The agricultural staff was chosen because, prior to the research, the authors had observed that crop protection suppliers had been focusing most relationship effort on this functional area, commonly offering technical assistance and application training, sharing information through lectures, setting test fields within the mills' agricultural areas, amongst other actions. That way, the analysis excludes any other agents of the purchasing center, such as the personnel in the purchasing departments.

At the end of data collection the sample was formed by 51 employees in 47 mills that belong to 37 organizations. As far the number of mills, the sample represents 11% of the universe of 434 mills operating in the country when the data was collected.

The third and final phase of the research was data analysis. For answering to the first secondary objective and allowing answering to the further two, respondents' answers were gathered according to their responsibility within the purchasing decision process. That resulted into two groups whose further answers on customer relationship practices and relationship dimensions were compared. This comparison was made by assessing the average score for every likert item in the questionnaire from each of those two groups of agents. To identify whether or not the differences between average scores are significantly different in statistical terms, a single-factor analysis of variance (ANOVA) was made for each likert item assuming $\alpha = 0.05$.

4. Literature Review

4.1 The buying decision process in business markets

The literature on consumer behavior aims at explaining how people, groups and organizations select, buy, use and discard goods, services, ideas and experiences, in

order to satisfy their needs and desires (Kotler, 2000). Engel et al (1995) define consumer behavior as the activities directly involved in obtaining, consuming and providing products and services, including the decision making processes which precede and succeed these actions.

Understanding the process of making a purchase decision allows the organization of marketing efforts in order to maximize the gains of all parties involved in the process. The process of making a purchase decision is part of the buyer's behavior which evaluates the following issues: (1) to buy or not; (2) when to buy; (3) what to buy; (4) where to buy and (5) how to pay (Engel, 1995).

Kotler (2000) differentiates the purchasing issues according to the type and characteristics of customers, distinguishing end consumer purchasing behavior from corporate consumer purchasing behavior; each of them showing different purchasing standards. According to Etzel (2001), there are seven main elements that characterize corporate consumer purchasing behavior: direct acquisition, relationship nature, purchase frequency, order size, extension of the negotiation period, service expectation and confidence in the supply.

In business markets, customers most usually buy directly from manufactures, what rarely happens in markets of consumer goods. Also, the role of relationship in both cases is considerably different. In business-to-business, suppliers and customers tend to have a deeper involvement as means to improving the quality of products along the value chain and to lower transaction costs.

In business markets, purchasing frequency tends to be higher as well as order size tends to be bigger, which ends up determining an increased complexity and importance of the purchasing process to corporate customers. Complexity and importance mean longer negotiation periods. Additionally, transactions in business markets usually involve higher sums of financial resources and products/services designed under specific requirements, issues that take time to be agreed upon.

The expectation over services can be explained by several reasons, but mostly it has to do with product complexity, logistics, and payment issues, which for instance may demand technical assistance, specific delivery conditions and financing alternatives.

Finally, trust is an essential element for the corporate customers. Trust in quality standards and the confidence in prompt delivery are factors which have been guiding the purchasing decisions of corporate users.

Kotler (2000) also makes a difference between end consumer and corporate consumer regarding the purchasing decision making process. He describes the buying process in business markets into eight stages: problem recognition, description of the general need, product specification, search for suppliers, proposal request, supplier selection, order routine specification, and performance review.

According to the author, the process starts when a member of the organization notices that the acquisition of a product or service may solve an existing problem or necessity (problem recognition). Next (description of the general need), the customer defines the general attributes the product must have and the necessary quantity. For the purchasing of complex products the buyer usually counts with the support of engineers and users, for instance, to define the general characteristics of product. After that, the buyer describes the technical specifications of the product including demands as quality, size, weight, color, quantities, warranties, service terms and others. This stage is most relevant when negotiating the supply of on-demand products. Once it's clear what features the product must have, buyers can search for eligible suppliers. The members of the purchasing center may look for information on the media or ask for external

advising, but it's up to the supplier to make information available when and where it's requested.

The next stage consists on requesting proposals from the eligible suppliers. The more complex the purchasing is the longer customers take selecting suppliers. After analyzing the different proposals, customers select suppliers usually based on a set of attributes. The relative importance of each attribute may depend on the characteristics of product, the situation (e.g. familiarity with the product) as well as on external and personal factors. Next, the customer has to send the purchasing order to the chosen supplier, what usually includes delivery terms, the product's technical specifications, the required quantities, warranty terms, etc. For goods of regular supply, buyers generally adopt open contracts, establishing a long term relationship with the supplier, as it undertakes to replenish the customer based on pre-set price over a defined period of time.

Finally, customers constantly evaluate the performance of their suppliers through a set of criteria. Depending on the results of those evaluations, customers may choose to continue, modify or even closure the relationship.

4.2 The buying center

The term "buying center" (also known as purchasing center) was first used by Robinson, Faris and Wind (1967) to describe all organizational members who are somehow involved in the decision-making process of a purchase. Thereafter, the notion that purchasing is a complex process involving people at different departments and levels, and not only the purchasing staff, has been one of the most important conceptual contributions of industrial buying behavior (Johnston and Bonoma, 1981).

In any business, the work of the purchasing staff will impact on the task and performance of virtually all other employees in the firm because they're responsible for providing the company with the resources need to perform its activities. Still in the 1970's, Corey (1978) observed that one of the major concerns to upper managers regarding the performance of a purchasing department is how well it facilitates the work of other firm functions. Thus there is a great deal of dependence between the purchasing and other areas of a company. For Patchen (1974), an important factor in determining a person's participation in the purchasing center is the size of his/her stake in the buying decision. The higher the dependence on the purchasing area, the harder the other area will try to influence it as a way to secure the acquisition of goods this other area needs.

The buying center is formed by all agents that influence purchasing processes and purchasing decisions no matter what functions they have in the company or to what areas they belong. The structural dimensions of the buying center are: division of labor, rules and procedures, participation in decision making, and centralization (Spekman, 1978). Webster and Wind (1972) classified the main roles in the purchase center as buyers, users, influencers, deciders and gatekeepers. Although one individual may occupy multiple roles or more than one individual may occupy the same role, most studies assume that different organizational functions correspond to different roles. The range of functional unities involved in the buying center may also vary according to the firm's organizational design, the product's complexity, the firm's familiarity to the product, etc. However, purchasing, engineering, and manufacturing are usually the most acting organizational functions in buying centers (Homburg and Rudolph, 2001).

Identifying buying center participants is a relatively easy task when compared to understanding its dynamics and power relationships (Johnston and Bonoma, 1981). Complex social variables such as power and politics may play an important role in defining the degree to which participants influence the process, and not only formal but

also informal interactions affect the agents' work behavior (Spekman and Stern, 1979). According to Johnston and Bonoma (1981) "no two buying decisions in any given company are likely to be exactly alike, nor will any two companies follow exactly the same procedures in even highly similar purchase situations".

The unique interests of each function or agent within the buying center results in different criteria for choosing and judging suppliers. As a consequence, every buying center invariably holds a mixture of different expectations towards supplier performance. Some studies have already examined how individuals' roles within purchasing centers affect the importance of supplier evaluation criteria. For instance, while purchasing managers are typically more focused on commercial factors, engineers tend to be more concerned with technical attributes (Mast and Hawes, 1986).

Because business-to-business purchasing operations frequently involve complex goods, information on the product being sold/bought is often as important as the characteristics of the product itself (Spreng and Olshavsky, 1992). Information is typically provided through extensive technical documentations, but it's also passed through directly between salespersons and clients (Homburg and Rudolph, 2001). A good communication process between the parties allows the proper understanding of the product's characteristics, handling and use.

Depending on the complexity of good's application, service becomes another critical attribute for determining industrial customers' satisfaction (Homburg and Grabe, 2001). When compared to consumer services, industrial services tend to be technically more complex, often involving activities that are crucial for the client's capacity to run its operations, such as maintenance and repair; regulation, adjustment and calibration; monitoring; order handling; and user training (Cohen and Lee, 1990; Jackson et al., 1995).

The importance of the services that accompany industrial goods brings upon another area that influences satisfaction: the relationship between customers and supplier's personnel (which may include internal staff, field sales force or a combination of both). Homburg and Grabe (2001) identified two relationship domains. The first one refers to the buyer's perception about the seller's technical capabilities in addressing his/her needs and expectations. In other words, it covers the sales force's knowledge on the product and its usage as well as the support in problem solving. The other domain refers to the interaction with the client's personnel, and includes the wiliness to provide solutions and the quality of the supplier's reactions to the customer's requests.

4.3 Relationship marketing in industrial markets

Relationship marketing is defined by Morgan and Hunt (1994) as "all activities directed towards establishing, developing and maintaining successful relational exchanges".

In industrial markets, customer-supplier relationships are mostly long-term oriented, enduring, and complex. As a result, the negotiations between both parties may have more to do with maintaining the relationship than with making a straightforward sale or purchase (Hakansson, 1982).

For Ganesan and Hess (1997), trust is the basis of relationship. They argue that credibility and benevolence are the key variables of trust for building long-term relationships. Credibility refers to the belief that the other party is capable of and will meet his/her obligations. Benevolence means that one believes that the other party won't deliberately jeopardize the relationship. Thus, trust is closely related to commitment.

Further on, as marketing relationship occurs not only at the individual level, but also at the organizational level, trust can as well take place at these different levels and combinations amongst them. Ganesan and Hess (1997), identity four levels of trust: interpersonal trust (amongst individuals from different organizations, such as buyer trusting seller); organizational trust (amongst individual and organization, such as buyer trusting client organization); intra-organizational trust (amongst individuals within the same organization, such as boss trusting employee); and inter-organizational trust (amongst two organizations).

A solid relationship based on trust tends to reduce transaction costs between supplier and client, as transparency and information exchange diminish uncertainty and risk. In fact, cost reduction is one of two ways suppliers can create value to clients based on relationship - the other way is by offering benefits. Value creation is in the core of Customer Relationship Management (CRM), a framework within relationship marketing that assumes quasi-individualized market segmentation for planning and executing specific value creation actions (Peppers and Rogers, 2001).

According to Ulaga and Eggert (2006), suppliers may follow many "value vectors" for assuming a status of preferential supplier by working on three sources of value creation: the central offer, the purchasing process and the client's operations. In any of these, suppliers can either enhance benefits or reduce costs.

Relationship is a key element in any of those cases as it allows identifying the client's specific needs and being flexible for attending special demands. However, close-kind relationship may be especially important for adding value on client's operations since some actions could demand the presence of the supplier in the client's firm and the participation on some of its operations. For instance, with the sharing of tacit knowledge suppliers can develop know-how oriented to the client's needs, allowing the development of new products or supplying alternatives. It also helps reducing the time for launching new products in cases where supplier and client run joint tests and design new solutions. Furthermore, it's likely to reduce the client's operational costs, such as product and production costs (Ulaga and Eggert, 2006).

After noticing a lack of clear definition on how CRM should be implemented under a strategic perspective, Payne and Frow (2005) developed a method in which CRM assumes a three level perspective: an operational level, that deals with implementing specific technology; an integration level, where a set of client-oriented technologies are integrated; and a strategic level, whit the adoption of a holistic approach for managing relationship with customers and creating value for shareholders.

The method proposed by Payne and Frow (2005) is composed by a stage of strategic development on customer relationship. Second, the method suggests a value creation process where the customer receives value from the supplier and the supplier captures value from the customer as it (the supplier) analysis different customers and customer segments to define the customers with the most value. The third process the authors suggest is the translation of these two previous stages into processes of integrating multiple channels. Meanwhile, client information management interacts with the process. The last process is the CRM strategy performance analysis in its different levels.

5. Results

5.1 Crop protection purchasing process and purchasing center structure

According to Spekman (1978), the structure of a purchasing center has four dimensions: division of labor, rules and procedures, participation in decision making,

and centralization. Because such centers present highly informal and complex characteristics, identifying and describing the structure of the center of a single firm is already a quiet challenging task. Therefore, pointing out structural patterns within a whole industry demands a high degree of generalization and simplification. With that in mind, this section focuses on identifying similarities across the 51 units that form the sample as far as individuals' functions within the center (division of labor) and their related responsibility (participation in decision making).

When asked to name the organizational functions that take part in the purchasing decisions regarding crop protection products, the majority of the interviewees identified three functions. Two of them are part of the agriculture area, which in a regular non-agricultural related industry is comparable to the manufacturing area (it's responsible for using and transforming the input good into a higher-value product). One is hereby called "agricultural technician", whose main function is to coordinate seeding, product application and harvesting activities. In the mills, the "agricultural technician" is often referred to as "cultivation coordinator" or "cultivation supervisor", which are mostly different terms to the same function. His main responsibility within the purchasing center is to identify the necessary products according to the observed or foreseen problem with the crop and to request the purchasing to the "agricultural manager". Therefore, he plays the role of a gatekeeper, generating and passing information through. All further decisions will be influenced by the information he provides on the crop conditions and profile, soil and climate conditions, as well as his perception about the best products to address specific problems. Also, he is the one who is directly interacting with the application staff, which gives him clear information on the use and performance of products and related services. Since he holds all those kinds of information and is responsible for the application of the products, he's also an important influencer on the decision makers.

The "agricultural manager" is the direct superior of the "agricultural technician". Within the purchasing center, his role is to analyze the technician's request taking into consideration the broader context of the firm's activities. His concerns include, for instance, economies of scale and the quality the crop that the industrial unity requires. According to those concerns, he might make changes in the technician's requirements before sending them to the purchasing department. He usually has a closer interaction with the purchasing manager than the technician does and, unlike the technician, is often involved in the price issue – not negotiating price with suppliers, but evaluating price-value relationship. Depending on the firm, his decisions are reviewed by or discussed with an agricultural director. In this case, both functions overlap and the center has two individuals occupying the same role.

The third function pointed out by the respondents aggregates the role of the whole purchasing staff. Although it's known that most purchasing departments within the mills hold different functions (typically purchasing analysis, purchasing supervision and purchasing managing), respondents have referred to the department's responsibility as a whole, which is: comparing prices from different eligible suppliers, negotiating payment and delivery terms, choosing the supplier and sending the purchasing order. Thus, the purchasing manager has the role of both buyer and decider. Nevertheless, this last task is in fact a shared decision. Oftentimes the agricultural manager has the autonomy of indicating his preferred supplier for a specific product. When he does so, the purchasing area will most likely agree with his indication. If the purchasing manager is inclined towards another supplier, they will discuss the issue and look for a cooperative output. Moreover, the purchasing manager's option range is usually limited within a certain group of suppliers, which are previously selected by the agricultural

area according to previous performance of their products/services on solving specific problems on the field.

Thus, a typical purchasing decision center of a mill for buying crop protection products is formed by three organization functions, each one with their related role and responsibility within the center, as shown in the following table.

Function	Role	Responsibility
• Agricultural technician	• Gatekeeper, user and influencer	• Identifying the necessities and recommending the products.
• Agricultural Manager	• Gatekeeper and decider	• Reviewing recommendations taking into consideration the broader context of the firm. • Reviewing performance.
• Purchasing Department	• Buyer and decider	• Comparing prices, negotiating conditions and sending orders.

Figure 1. Structure of a typical crop protection purchasing center of sugarcane mills
Source: elaborated by the authors based on interviews

Both, agricultural technicians and agricultural mangers are deeply impacted by the purchasing of crop protection, what explains their direct participation in the purchasing center (Patchen, 1974).

5.2 Analysis of the relationship between crop protection suppliers and sugarcane mills

If literature and empirical evidences suggest that differences in the role of the agents within the purchasing centers result in different evaluation criteria, one could assume that there could also be differences on the opinion of these agents regarding the current performance of crop protection suppliers; in other words, their current satisfaction.

As Homburg and Rudolph (2001, p. 16) state, since in industrial marketing the task of sellers and buyer has more to do with maintaining healthy and long-term relationship than with making a straight forward sale/purchase, customer satisfaction should be understood as relationship-specific rather than a transaction-specific construct. Therefore, the first set of questions asked to the respondents was based on conceptual aspects of customer relationship management. Its goal was to identify the perception about the performance of the crop protection supplying industry as a whole. Thus, respondents were asked to evaluate not one or more specific suppliers, but the ones that attend them as a group.

According to Peppers and Rogers (2001), CRM is a framework that assumes quasi-individualized market segmentation for planning and executing specific value creation actions. As explained before, creating value on customers' operations demands an especially close kind relationship, coordination and joint work (Ulaga and Eggert, 2006). Therefore, we assume that one of the bases for implementing CRM is the existence of shared objectives that must be clear for both parties. Thus, the first statement used for assessing CRM practices is: the objectives of the supplier-mill relationship are clear.

Second, any quasi-individualized marketing action plan requires a deep understand of customers' specific characteristics and challenges. Therefore, the second likert item states that: the suppliers understand the specific needs of the mill.

Third, Payne and Frow (2005) highlight the importance managing client information for adopting truly value adding actions in regular basis. Thus, the third statement says: "the suppliers organize the necessary information on the mill".

Fourth, assuming a strategic approach implies on proactive action planning rather than simply reacting when requested. Thus, the fourth likert item states that: there's a short-term action plan to be implemented in the mill with the leadership of the suppliers.

Fifth, assuming a strategic approach also implies in long-term planning. Therefore, the fifth statement is: there's a long-term strategic plan to be implemented in the mill with the leadership of the suppliers.

Sixth, according to Payne and Frow (2005) the last phase of a CRM program should be consisted of performance analysis. Therefore, the sixth and last statement regarding CRM practices says: there's a satisfactory execution of those activities.

The following table shows the results. It brings the average score observed within the two groups. In the one to five scale, score one means the respondent disagrees completely with the statement and score five means that he/she agrees completely with it. The *P-value* column returns the results from the analysis of variance (ANOVA), indicating the probability value for rejection of the null hypothesis that averages are equal. In other words, the smaller the P-value, the less equal averages are.

Customer relationship practices	**Managers' average score**	**Technicians' average score**	**P-value**
The objectives of the supplier-mill relationship are clear	3.74	3.82	0.7653
The suppliers understand the specific needs of the mill	3.78	4.07	0.2601
The suppliers organize the necessary information on the mill	3.78	4.11	0.2884
There's a short-term action plan to be implemented in the mill with the leadership of the suppliers	3.02	3.93	0.0181*
There's a long-term strategic plan to be implemented in the mill with the leadership of the suppliers	2.17	2.93	0.0549*
There's a satisfactory execution of those activities	3.22	3.57	0.3490

Table 1. Mills' evaluation of crop protection suppliers' customer relationship practices

*Significantly differences in average scores between groups

Source: elaborated by the authors based on interviews

Managers' averages are lower than technicians' for all customer relationship practices. Overall, technicians have a better opinion about suppliers' performance. The average scores given to the first practice were considerably similar. Although they were

not relatively low, they were also not relatively high. As transparency and good communication are basic conditions for such close kind relationship, it's reasonable to assume that the average scores for this first statement are indications that most crop protection suppliers had not yet adopted efficient CRM strategies or had just recently done so.

For all other four practices the opinion on the suppliers' performance are less alike. Although differences in average on the second, third and sixth statements seem to indicate that managers are less satisfied than technicians regarding those practices, the *P-Values* show that the differences in averages are not statistically significant at $\alpha = 0.05$.

The highest average scores were observed in statements two and three, indicating that suppliers probably have constant interaction with customers. However, the low scores on the next two practices indicate that such interaction might be more directed towards commercial issues and/or reactive responses to customers' requests.

The most significant differences between averages from the two groups were also in opinions regarding the suppliers planning activities for short and long term actions within the mills. Compared to technicians, managers have a worse opinion on the performance of crop protection suppliers regarding both of those activities. That could be another indication that suppliers' services are more oriented towards palliative cultivation issues, such as technical assistance to cultivation personnel, than to broader strategic planning for the agricultural area as a whole, that could include, for instance, joint product design through test fields. The relatively good scores that technicians gave to the existence of short-term action planning would also support this theory. Anyhow, the low scores might express a desire for stronger interactions, especially for long-term cooperation.

Besides the management practices discussed previously, it's important to analyze the social aspects of the relationship between marketer and buyer in order to have a deeper understanding of the influences on purchasing center agents and how they evaluate suppliers.

Therefore, for measuring the social dimension of the relationship between mills and crop protection suppliers, a set of statements were formulated based on the variables and levels that would most likely affect this particular relationship, except for the first statement, which is a direct assessment of the perception over quality of relationship: relationship with crop protection suppliers is good.

The second, fourth and fifth statements mix two concepts about relationship. The first one is the notion that relationship is based on trust and that trust is closely related to commitment. The second concept is that relationship occurs at different levels (Ganesan and Hess, 1997). These three statements summarize commitment as "being concerned with" and contemplates each a different level: individual, functional area and organizational (see following table).

The third statement assesses another concept regarding relationship: credibility. Thus, the third statement is: crop protection suppliers have the proper technical skills and capabilities to help with your challenges in the firm.

The following table shows the results comparing the answers of agricultural managers and agricultural technicians.

Relationship dimensions	Managers' average score	Technicians' average score	P-Value
Relationship with crop protection suppliers is good	3.43	4.04	0.0648
Crop protection suppliers are concerned with the performance of your area	4.17	4.39	0.3547
Crop protection suppliers have the proper technical skills and capabilities to help with your challenges in the firm	2.87	3.97	0.0029*
Crop protection suppliers are concerned with the performance of the firm as a whole	3.63	4.21	0.0117*
Crop protection suppliers are concerned with your personal performance in the firm	4.65	4.64	0.9535

Table 2. Mills' evaluation of relationship with crop protections suppliers
*Significantly differences in average scores between groups
Source: elaborated by the authors based on interviews

Just like table 1, this one brings the average of the scores given to the crop protection industry as a whole. The first statement is a direct approach that points to a general opinion on the relationship between the parties. The *P-value* indicates that there's a 6.48% error chance in affirming that managers and technicians' opinion on the quality of relationship with crop protection supplier are not the same. That is an indication that managers' trust on suppliers might be lower.

The results on the second and fifth statements show that both managers and technicians believe that suppliers are concerned with the performance of mills' agriculture units as well as with their personal professional performance. To some extent, the differences between managers' scores on the first and fifth statements may indicate that being concerned with the other persons does not necessarily imply on a good relationship.

A highly significant difference is observed between the averages on the fourth statement. Technicians have a better opinion regarding suppliers' concerns with the firms as a whole than managers do. In theory, the concerns of mills' agricultural technicians and of suppliers' salesmen tend to be alike. Basically, in spite of their specific objectives, their overall task is to provide the means for efficient sugarcane growing. Meanwhile, mills' agricultural managers usually share other concerns regarding the firm as a whole, such as the supply of raw material that will allow the proper functioning of the industrial unity. Apparently, crop protection suppliers' concerns of those broader issues are limited.

Furthermore, an even higher significant difference amongst groups' opinions is observed on the third statement. Thus, it seems that not only managers think that suppliers are not so concerned with the managers' tasks, but also think that they don't have the necessary skills and capabilities to help with those tasks.

6. Conclusions

In business market, commercial negotiations has often more to do with establishing, developing and maintaining successful relational than with making straightforward sale-purchase operations. Amongst the benefits of building strong supplier-customer relationship in industrial markets, the most important for both parties is the opportunity of generating value to their businesses. In one side, customers can have committed partners that are able to meet their needs, may them bee high-quality, on-demand solutions or specially designed purchasing alternatives; in the other side, sellers can reach a status of preferential supplier and gain competitive advantage.

The sugarcane milling industry is already one of the most important markets for crop protection suppliers in Brazil, and it is likely to soon become the largest one as demand for sugar and ethanol grows. Adding that to the fact that the industry is going through a rapid consolidation process, crop protection suppliers are facing a concentrating market where the number of clients is diminishing while demand from the remaining organizations is increasing. In this context, strengthening the relationship with mills is becoming critical to crop protection supplier for competing at high level.

This research has interviewed 51 employees in 47 mills that are involved in the purchasing of crop protection to assess their opinion on the performance of their suppliers as far as relationship is concerned. The results give some general indications to a few possible conclusions. First, regarding the relationship parties, there are two types of agents within the mills' purchasing centers who have a large influence on the decision making process and to whom relationship is closely related to interaction in operations: the agricultural technician and the agricultural manager. For agricultural technicians, the relationship is an important means of adding value on cultivation operations, which can mostly be done through technical assistance services, personnel training and rapid delivery responses. For agricultural managers, cultivation operations are important as well, but for adding value to their activities it is necessary to consider a more strategic and holist vision, which may include offering a wide portfolio range, supporting outsourced sugarcane suppliers, assisting long-term planning and help measuring performance.

The results show that, overall, agricultural technicians have better opinions than managers. That means that either crop protection supplier strategically focuses more efforts on relating with products users, or their relationship efforts towards managers have not yet produced apparent results. There were other evidences that support this assumption. Both technicians and managers gave better scores to short-term actions and to long-term planning, indicating an orientation towards palliative action over planning. Additionally, managers opinion reflect a considerable perception that crop protection suppliers neither are much committed to the overall performance of mills (not only at the agricultural area) nor have the proper capabilities to help with strategic issues. From this point of view, implementing efficient customer relationship management would take more than a "simple" mindset change but also the development of new competencies.

Finally, this research carries some limitations that could be addressed in future studies. First, all analysis exclude an important group of agents within the buying center: the purchasing staff. Although this has no negative impact on the analysis at the operational level, which was the goal of this study, including their opinion would certainly add a more complete perspective of customer-supplier relationship. Second, relationship satisfaction has to do with attending expectations. Literature shows that expectations of each member of the purchasing center will concern different attributes. Thus, a deeper analysis on relationship satisfaction could include a more detailed

identification of those attributes. Nonetheless, this paper is a first contribution to understanding the issues involved in the matter and should be seen as a starting point for further studies that could improve the methodology and assess the evolution of the perception of mills about the relationship with crop protection suppliers.

References

Anfavea – Associação Nacional dos Fabricantes de Veículos Automotores. **Estatísticas,** 2010. < http://www.anfavea.com.br/tabelas.html>.

Corey, E. R. **Procurement Management: Strategy, Organization, and Decision-Making**. Boston, MA: CBI, Inc., 1978.

Engels, J.F.; Blackwell, R.D.; Miniard, P.W. **Consumer behavior.** New York: Dryden, 1995.

Etzel, M. J.; Walker R, B. J.; Stanton, W. J. **Marketing**. São Paulo: Makron Books, 2001.

Ganesan, S. Hess, R. Dimensions and leves of trust: implications for commitment to a relationship. **Marketing Letters,** 8: 4. 1997, pag 439-448.

Hakansson H. **International Marketing and Purchasing of Industrial Goods - An Interaction Approach**. London: John Wiley and Sons, 1982.

Homburg, C., Rudolph, B. Customer satisfaction in industrial markets: dimensional and multiple role issues. **Journal of Business Research**, 52 (2001) 15-33.

Johnston WJ, Bonoma TV. The buying center: structure and interaction patterns. **Journal of Marketing**, 1981; 45 (Summer):143-56.

Kotler, P. **Administração de Marketing.** São Paulo: Prentice Hall, 2000.

Mast KE, Hawes JM. Perceptual differences between buyers and engineers. **Journal of Purchasing and Materials Management**, 1986; 22(Spring):2 - 6.

Morgan, R.M., Hunt, S.D. The commitment-trust theory of relationship marketing. **Journal of Marketing,** 58, 3 (1994), 20-38.

Patchen, M. The Locus and Basis of Influence in Organizational Decisions. **Organizational Behavior and Human Performance**, 1974, 11 (April), 195-211.

Peppers, D. and Rogers, M. **One to one B2B: Customer Development Strategies for the Business-to-business.** New York: World, Doubleday, 2001.

Robinson P, Faris C, Wind Y. **Industrial Buying and Creative Marketing**. Boston, MA: Allyn and Bacon, 1967.

Spekman RE, Stern LW. Environmental uncertainty and buying group structure: an empirical investigation. **Journal of Marketing**, 1979; 43(Spring):54-64

Spekman, R.E. A Macro-Sociological Examination of the Industrial Buying Center: Promise or Problems? in **Research Frontiers in Marketing: Dialogues and Directions.** Subhash C. Jain, ed., Chicago: American Marketing Association, 111-115, 1978.

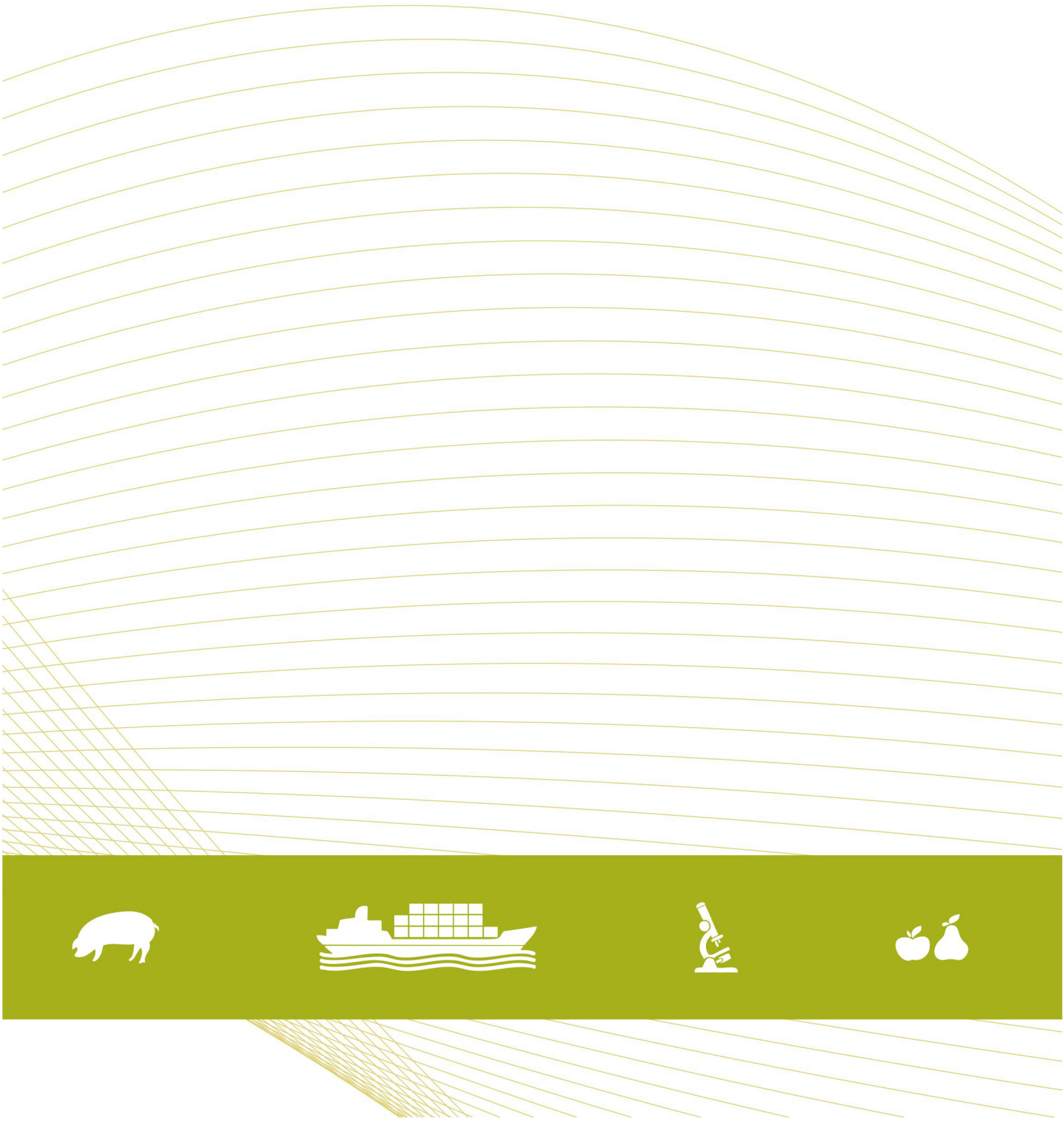
Spreng RA, Olshavsky RW. A desires-as-standard model of consumer satisfaction: implications for measuring satisfaction. **Journal of Consumer Satisfaction, Dissatisfaction Complaining Behavior** 1992;5:45 – 54

Ulaga, W., Eggert, A. Value based differentiation in business relationship: gaining and sustaining key supplier status. **Journal of Marketing**, 70 (2006), 119-136.

UNICA – União da Indústria de Cana-de-açúcar. **Dinâmica e perspectivas do setor sucroenergético brasileiro**. Sertãozinho, SP: Uniceise, 2011.

Webster, F. E., Jr. and Yoram Wind. **Organizational Buying Behavior**. Englewood Cliffs, NJ: Prentice-Hall, 1972.

Institutional environment



SHOULD I GO TO COURT? AN ASSESSMENT ON THE ROLE OF THE JUDICIARY IN DISPUTES BETWEEN CATTLE RAISERS AND MEATPACKERS IN BRAZIL

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Abstract
Applying the concepts of the New Institutional Economics, the main objective of this perspective paper is to analyze the role of the Judiciary in resolving conflicts between cattle raisers and meatpacking firms in Brazil. The article specifically seeks to: (i) analyze the characteristics of the transaction between cattle raisers and meatpacking firms, (ii) assess the pattern of conflicts brought before the courts, and (iii) investigate the degree of farmers' confidence in the judiciary. The empirical analysis focuses on the producers' confidence on court in the face of non-payment for the animal delivered to slaughter. A logit model is estimated to validate some hypotheses: the low confidence in Justice is enhanced in the presence of past conflicts (H1), in the recurrence of non-payment events (H2) and in the presence of recent defaulting (H3). The results show that producers have low confidence in court and this assessment is enhanced by recent problems faced by farmers, the number of times non-payment events occurred and personal non-payment historical.

Key words: Institutions, Judiciary, guarantees, beef chain

SHOULD I GO TO COURT? AN ASSESSMENT ON THE ROLE OF THE JUDICIARY IN DISPUTES BETWEEN CATTLE RAISERS AND MEATPACKERS IN BRAZIL

1. Introduction

In the early 2000s, the Brazilian meatpacking industry went through a huge expansion process. During this period, the largest Brazilian meatpackers have issued shares in the stock market, internationalized their activities and diversified their business by incorporating other activities besides slaughtering and beef processing. In 2008, due to a severe economic crisis, part of the meatpacking industry collapsed. Because they were highly leveraged and with a significant portion of their debts listed in U.S. dollars, many Brazilian meatpackers went bankrupt. Consequently, a number of cattle raisers have not been paid for the animals delivered to the slaughterhouses in 2008.

It is worth noting, however, that the problem of non-payment in the meatpacking industry is not new. Regardless of the 2008 crisis, the history of fraudulent bankruptcy in the meatpacking industry is always vivid in the memory of economic agents that operate within the industry (CALEMAN, 2010). The relationship between cattle raisers and meatpackers in Brazil is thus characterized by a traditional rivalry. Considering spot market transactions, the main conflict concerns the producer's risk of not receiving payment of the animal sold for the slaughterhouse. Accordingly, the lack of guarantees for the supply of cattle for slaughter is a latent problem in the agribusiness sector in Brazil. The bankruptcy of meatpackers generates a mass of farmers who become creditors and may eventually go to court in order to get paid for the animal delivered to the slaughterhouse. In this regard, the Judiciary may, once again, play a major role in reducing transaction costs in the agribusiness sector.

The main objective of this perspective paper is to analyze the role of the Judiciary in resolving conflicts between cattle raisers and meatpacking firms. Looking at the transaction for the acquisition of cattle for slaughter in the state of Mato Grosso do Sul (central-western region of Brazil)[47], the present study focuses on the role of formal institutions (i.e., the courts) to resolve conflicts in the beef agribusiness system. Specifically, the article seeks to: (i) analyze the characteristics of the transaction between cattle raisers and meatpacking firms, (ii) assess the pattern of conflicts brought before the courts, and (iii) investigate the degree of farmers' confidence in the judiciary.

The paper is structured as follows: 1. Introduction; 2. Theoretical background; 3. Description of the transaction pattern; 4. Assessment of legal disputes; 5. Econometric evidence, and 6. Conclusions.

2. Theoretical background

The institutional economic analysis offers the theoretical bases to addressing this research. Coase (1991) is the seminal author to understand the importance of institutions and transaction costs. He argues that, in opposition to common sense, there are costs to operate on the market and those are called *transaction costs*. Thus, cooperation and transaction costs are related. The concept of transaction cost was further operationalized

[47] Mato Grosso do Sul is a state located at Midwest of Brazil which shows great importance to the Brazilian beef production and exportation.

by Williamson (1985). The author considers that the problems of economic relations are contractual problems. Therefore, the functioning of the economy is not free from frictions which account for the costs of operating the market. They occur both *ex ante*, including the costs of drafting, negotiation and establishing contract safeguards and *ex post* as a result of necessary adjustments in order to attend environment contingencies, the governance structures cost and the disputes that arise after the hiring. Thus, the efficiency of economic relations is related to the necessary reduction of transaction costs.

Based on North (1991), institutions and cooperation are integral parts of the same model and both are fundamental to promote a cooperative environment. Institutions are the rules of a game, setting limits to human interactions formally through laws, property rights and regulations, for instance, and informally through traditions, taboos and customs. Institutions provide incentives for human relations, being those political, social or economic. According to the author, the role of institutions is to organize the business environment, to reduce uncertainty and, together with other economic instruments, to define a set of choices, creating a favorable environment for the decision-making process. Thus, institutions provide a structure of incentives, contributing to the economy's performance. Applying the reasoning of game theory, North (1991) states that cooperation becomes difficult when the relationship or the *game* is not repeated over time, when there is asymmetry of information and also in the presence of a large number of players. Thus, institutions play an important role in promoting cooperation as they contribute to the reduction of transaction and production costs, making the potential gains from an economic transaction feasible. Moreover, to understand the role of institutions, it is crucial to discuss some concepts related to property rights and Barzel (1997) gives a good path to connect rights and transaction costs.

According to Barzel (1997), the study of property rights is the starting point for the understanding of transaction costs, which are closely related to the cost of information. The point is that the process of transaction requires an exchange of information, but it has a cost. Barzel (1982) states that transaction costs should be defined as the resources used to establish and maintain property rights, including the costs involved with the protection and the capture of such rights. In other words, transaction costs are the costs of ensuring property rights and the choice of institutional arrangements is directly related to the need to provide protection to the exchanged rights. Barzel (2001) argues that the degree of difficulty in measuring the information determines the types of relationships between agents. For the author, property rights must be considered from two dimensions: the legal right and the economic right. Legal rights are those which the state recognizes, guarantees and protects, but complete protection is prohibitively expensive. The economic rights can be defined as the value of the exchange after the deduction of capture and protection costs of the good or service transacted. Individuals seek to maximize their economic rights.

From property rights lenses, the analysis of economic efficiency could be done based on two basic approaches: i) one which is strictly related to economic argument and; ii) other one which also includes social and political arguments. In accordance to economic approach, Demsetz (1967) argues that the transaction value is not due to the product or to the service itself, but to the value of the set of the rights that are transacted. The delimitation and the guarantee of property rights are fundamental to promote economic efficiency, because the failures in protecting the rights generate externalities opening room for value capture in the exchange process. For the author, the property rights generate incentives to internalize externalities. Since the externalities, positive or

negative, are related to economic inefficiency, the greater the delineation and the security of property rights more efficient is the exchange. Moreover, the incentive for the definition of property rights increases as the resources become more valuable.

Thus, from Demsetz's perspective (1967) the structuring of a legal property right system is strongly rooted in economic arguments and the "internalization of externalities" is a result of a comparative analysis of marginal gains and costs of the property rights allocation. According to Eggerstsson (1990), the State doesn't has a passive role, as proposed by Demsetz, as it has a clear role of generating economic efficiency. In face of high transaction costs, the state maximizes the wealth when it allocates and ensures the rights of ownership directly to individuals or through the redefinition of a legal framework. By setting specific regulations, standards and norms the transaction costs are reduced and as a consequence the wealth increases. Williamson (1996) enhances the importance of contracts as a way of reducing transactions costs by adding safeguards that could be guaranteed by courts.

For Williamson (1996), the existence of incomplete contracts accounts for a significant part of the problems faced by the economy of organizations. On the assumption of opportunistic behavior and bounded rationality, the presence of contractual safeguards becomes an important factor in understanding how to go on trading in a long-term perspective. Once the agents are limited in their cognitive skills, contracts are necessarily incomplete. The opportunistic behavior of agents implies the possibility of *ex post* contract disruptions, making room for the occurrence of moral hazard and hold-up[48] events, hence the need to provide *ex ante* contract safeguards.

It is worth noting that the problem of safeguards, or its absence, is treated by Williamson (1996) in the "simple contracting schema". This model proposes that the role of contractual safeguards (s) should be understood from three possible solutions, depending on the existence of specific assets (k). In transactions where k>0 and s=0, or in other words, there are quasi rents to be captured and there aren't contractual safeguards to protect the rents, the agents face contractual instability. In this situation, there is room to contractual breaches and value capture. According to Williamson (1985) this situation can't last for a long time and the option might be not adopting specific technologies (k=0), being the market and formal institutions (courts) the guarantees or the agents might adopt safeguards (s>0) as contracts and private mechanisms (reputations or firms) as guarantees for the transactions.

Moreover, Williamson (2000) proposes four stages for the investigation of institutional environment, considering that they are all interrelated and interdependent. At the first level there are informal institutions characterized by the social, cultural and religious relations. The formal institutional environment, represented by the rules and laws, including property rights and political rights, is the second level whose purpose is to shape the economic environment in order to reduce costs. The third and fourth stages involve, respectively, the governance structures (contracts and other coordination mechanisms) and the microeconomic environment in which resources are allocated through prices, quantities and incentives. Each stage is characterized by its duration which is defined as the time required for the occurrence of changes in the economic and organizations pattern.

In sum, the institutional analysis is a key variable to be considered in the understanding of efficient economic transactions.

[48] Situation where one party has advantages forcing the other to renegotiate the terms.

3. The supplying of cattle to the meatpacking industry

The present paper investigates the transaction carried out between cattle raisers and meatpacking firms in the spot market in Brazil.[49] In the majority of Brazilian states, the animal price to be paid to cattle raisers is established for each 15 kilograms of the animal.[50] The price is related to animals' dead weight – i.e., the price depends on the weight of the carcass (flesh and bones) after slaughtering the animal.

In general, cattle for slaughter are traded through direct sales or through brokers. In the case of direct sales, the cattle raiser comes in contact with meatpacking employees to get information on prices and to negotiate the amount of animals to be slaughtered as well as the price and payment terms. Spot prices are usually paid within 2 to 3 days after the slaughtering and it usually incorporates a discount rate of 3% to 5%, depending on previous negotiation. After the agreement, the animal is loaded on the farm. The transport of the animals is typically performed by the meatpacking's own truck or by private contractors hired by the company.

Meatpacking firms can also outsource the purchasing of animals to independent brokers. In some situations the brokers not only mediate the purchase of livestock, but also escort the shipment and watch over the animal slaughter. There are four types of animal intermediation.

The broker may be a buyer's representative with exclusive relationship with the meatpacking firm. Under this condition, the representative's commission is usually paid by the company. In another case, the broker may work as an independent professional who represents different meatpacking companies. In this case, the producer trusts the broker as they have a long term relationship. The broker brings information on market conditions and he may eventually supervise the animal slaughtering process. The commission of independent brokers is typically paid by the cattle raiser (in this case, the intermediation occurs without guaranteeing the transaction, i.e., the broker does not guarantee the payment of the animal sold neither the carcass yield).

A third type of animal intermediation involves the establishment of guarantees. The broker may ensure part of the transaction (e.g., the carcass yield) or the whole transaction (e.g., payment in advance). In the case of guaranteeing carcass yield, the broker assumes the risk of the variation in the carcass performance when comparing the animal weight at farm and at the slaughterhouse. The broker assumes a risk position because his payment only occurs if the carcass yield at slaughterhouse is higher than at farm.

In the case of guaranteeing the whole transaction, the broker advances the payment to cattle raisers based on the animal weighting at farm and sells the animal to the slaughterhouse. The broker's remuneration results from the positive difference achieved on buying and selling the animals. This type of intermediation is usually performed by specialized brokerage firms. Because this intermediation mode involves assuming the total risk of the transaction it is not very usual.

Finally, the broker may work as a dealer (*marchand*). He buys the animals from cattle ranchers, slaughters them in an outsourced manufacturing plant and sells the meat to retail. Figure 1 illustrates the main types of intermediation described above. The dashed arrows represent the flow of funds and the filled arrows represent the flow of product.

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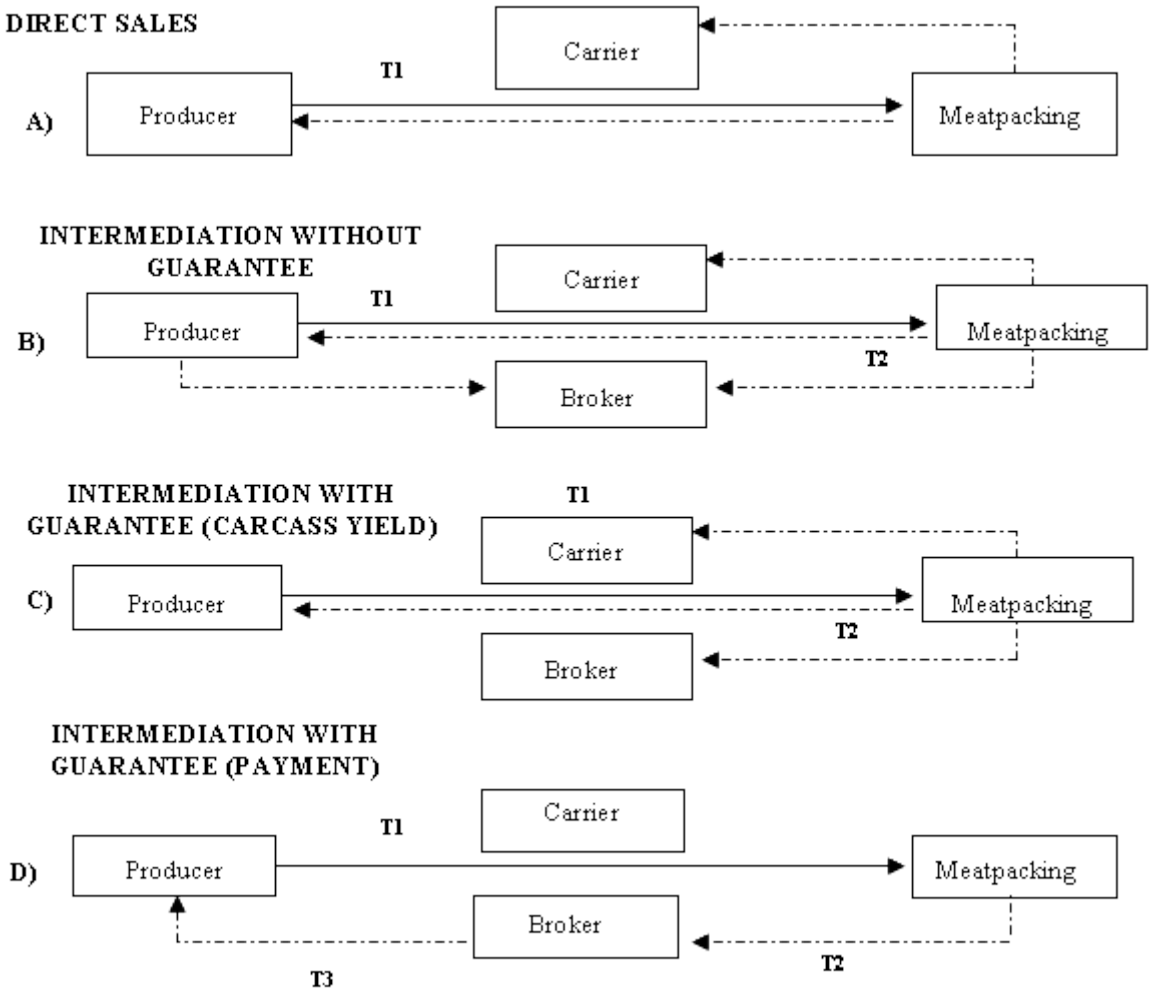
[49] This study does not investigate transactions involving quality contracts in which specific investments are made.

[50] 15 kilograms of cattle is called *arroba*.

Figure 1- - The mode of supply of cattle to meatpacking firms



Considering payment term, generally it occurs 30 days after the animals' slaughter and carcass verification. To guarantee the payment, the slaughterhouse issues a Rural Promissory Note (RPN) on behalf of the farmer. The RPN provides a collateral security, which is usually signed and guaranteed by an employee of the commercial department of the firm who does not hold legal liability. Following the timetable, the company makes the payment in the farmers' bank account. In case one needs to advance the payment, the producer may discount the RPN in the accredited bank.

There are two types of RPN discount: i) RPN guaranteed by law decree 167/1967 and ii) NPR discounted in the parallel, *i.e.* without the support of a Brazilian decree law that deals with rural credit. The discount under Decree Law is under the bank's responsibility because the appeal is granted on a credit line that the slaughterhouse has with the bank. Thus, the bank assumes the operation risk. In the case of parallel discount, the bank enables a triangle operation to discount the RPN. Actually, it is a personal credit transaction which responsibility rests with the producer and not with the RPN issuer - the meatpacking industry. This method is called *discount in parallel* and in this operation the risk is assumed by the producer.

In any case, there are no formal guarantees for the payment due by the industry because the animal is delivered to the slaughtering house before the issuing of the RPN receipt. Moreover, producers deliver the animal without even a guarantee of the effective weight of the animals since that the weight carried at the farm balance is just a reference that will be further validated in the balance at the slaughterhouse. The

accurate information about the animals' yield and the amount owed by the slaughterhouse will be defined only after the slaughter and carcass evaluation. It is only at this stage that the producer receives a formal document, the Rural Promissory Note, which qualifies him as a creditor of the company. We identify, therefore, an important gap regarding a lack of guarantee in the Brazilian Beef Chain.

Although formal data about the share of each type of intermediation is absent, one can say that the most observed type is the intermediation without guarantee and the least representative is the intermediation with payment guarantee. It is worth emphasizing that the problem analyzed in this paper – i.e., the conflicts between cattle raisers and meatpacking firms – is more acute in the case of direct sale, when the broker is a representative of the meatpacker and when the broker is an independent agent. In either case, farmers are at risk of not receiving payment from the meatpacker. If this does occur, the farmer may file a lawsuit against the meatpacker. The next section examines this issue in the state of Mato Grosso do Sul (Central-Western region of Brazil).

4. Legal disputes: an overview

The examination of legal disputes in the state of Mato Grosso do Sul is based on a survey of lawsuits filed from November, 2002 to December, 2010. The survey was developed with the explicit purpose of identifying the conflict pattern that comes to court regarding cattle producers and meatpacking companies.

As shown in table 1, the highest number of court trials occurred in 2003 when 11 cases were brought to court. Throughout the period there were a total of 50 trials at the Court of Mato Grosso do Sul. According to data, the main reason for conflict between cattle raisers and slaughterhouses involves the claim of non-payment of the animals sold to slaughter. Based on the survey, one may note that 78% of the legal claims are related to the general situation in which the producer does not receive payment of the animal sold for the slaughterhouse. Therefore, the lack of guarantees seems to be the conflict pattern in the beef chain in Mato Grosso do Sul. Considering that the transaction pattern in the beef chain is almost the same within the country, the conflict is of great relevance for the efficiency of the Brazilian beef sector.

Table 1 – Lawsuits brought to court (cattle raisers and meatpackers): Mato Grosso do Sul, 2002 – 2010

Legal claim	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Producers request the bankruptcy of the meatpacker		4								**4**
Meatpacker claims that animals were not delivered according to specifications agreed between the parties					1					**1**
Producers request a revision on discount applied to contract price		1	1							**2**
Discussion between the parties on the amount paid								1	3	**4**
Farmers claim non-payment of the animals delivered to the meatpacker	4	6	3	5		5	7	4	5	**39**
Total	**4**	**11**	**4**	**5**	**1**	**5**	**7**	**5**	**8**	**50**

Source: Court of Justice of Mato Grosso do Sul/Brazil – Elaborated by the authors.

Specifically in the case of non-payment of the animals, the authors investigated the allegations underlying this litigation (table 2). Based on the judge notes in each litigation, the predominant reason for the lack of payment is the bankruptcy of the meatpacking firm or the evidence of potential bankruptcy, which represents 62% of legal claims regarding non payment. Another important cause of conflict is the debt payment made to third parties which has not been formally accredited as a creditor – e.g., cattle auctions and cattle brokers, represented by 38% of these same legal claims

Table 2 – Legal claims brought to court under the claim of non-payment of the animals delivered to the meatpacker

Description	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Discussions about formal aspects of documents and the guarantor liability	1		1	1		1	2			**6**
Producers request the attachment of a property as collateral for payment	3	1								**4**
Payment was made to a 3rd person who is not accredited by the creditor/farmer		1	2	3		2	3	1	3	**15**
Producers request the blocking of beef stock		1								**1**
Producers request the property confiscation		3				1	1	3		**8**
Company is under bankruptcy				1		1	1			**3**
Questions about responsibility on outsourcing slaughter									1	**1**
Questions about payment prescription									1	**1**
Total										**39**

Source: Court of Justice of Mato Grosso do Sul/Brazil – Elaborated by the authors.

It is interesting to note that bankruptcy in the meatpacking industry may be related to a fraudulent initiative. According to a lawsuit filed by State General Attorney[51], one is able to identify complex ownership relations among different slaughterhouses, featuring a practice by which the legal title of the meatpacking firm (*de jure* property) does not correspond to actual possession (*de facto* property). Under this practice, it becomes difficult to apply penalties to the company and in the case of bankruptcy the creditors are prevented from receiving the debts. The explanation is that the *de facto* owner is usually a low income person who does not have any property to give as a guarantee to the transaction. If this is the case, the producer may not receive any financial amount even if the judge confirms the producer's right in receiving the debt.

There seems to be an important relationship between the number of lawsuits in court and the occurrence of bankruptcy, as shown in table 3. The table presents a list of meatpacking companies in Mato Grosso do Sul that went bankrupt, asked for bankruptcy protection, or are under judicial recover between 2003 and 2010.

Table 3 – Meatpackers under bankruptcy or insolvency, Mato Grosso do Sul

Meatpacking firms	Status	Year	Municipality/MS
Frigorífico Pedra Bonita Ltda	Bankruptcy	2003	Itaporã

[51] Litigations 2007.006092-8/0001.00 and 2003.012226-5 – www.tjms.jus.br

	protection		
Frigorífico Ponta Porá Ltda	bankruptcy	2003	Ponta Porã
Torlim Produtos Alimentícios Ltda	Verge of bankruptcy, but currently in operation	2008	Amambaí Itaporã
Frigorífico Bonifácio Ltda/Frigorífico Boi Verde Alimentos Ltda/ Frigorífico Boi do Centro Oeste (*)	Bankruptcy in industrial plants lease		Rio Verde
Frigorífico Garantia	Plant closing	2008	Amambai
Campo Oeste Carne Indústria, Com., Imp. e Exp. Ltda	Bankruptcy	2008	Campo Grande
Frigorífico Margem Ltda	Judicial recovery	2008	Paranaíba/ Três Lagoas/ Coxim
Frigoestrela S.A	Judicial recovery	2008	Ribas do Rio Pardo
Independência Alimentos S.A	Judicial recovery	2009	Nova Andradina/ Anastácio/Campo Grande
Frialto	Judicial recovery	2010	Iguatemi
Fribrasil Alimentos Ltda	Judicial recovery	2010	Caarapó/Eldorado

(*)The litigation 2007.006092-8/0001.00 (April, 16th, 2007) presents a full description of the fraudulent relationship between the three meatpacking firms (Frigorífico Bonifácio Ltda, Frigorífico Boi Verde Alimentos Ltda and Frigorífico Boi do Centro Oeste) where owners make use of partners "oranges firms" to cover up tax debts and commit acts which harm farmers.

In order to further examine the role of the judiciary in resolving conflicts between cattle raisers and meatpacking firms, the next section presents a quantitative analysis. The purpose is to investigate producers' confidence in the Judiciary and its role in arbitrating the conflict of non-payment of the cattle sold to slaughter.

5. The confidence in Judiciary

This empirical section starts with a description of the survey which serves as a basis for the examination of the producers' confidence in the Judiciary regarding the conflict of non-payment of the cattle sold to slaughter. The data was collected through 107 questionnaires applied on March, 2010. This is a non-probabilistic sample since part of it is characterized as a self-generated sample (52% of the questionnaires). The random composition of the sample (48% of the questionnaires) is composed of farmers from a list of producers that sold animals for slaughter during January and February, 2010. The list was made available by the State Bureau of Animal and Plant Health Protection (IAGRO/MS). The interviews were conducted with the farmers in charge of making decisions about the animal trade.[52]

Table 4 summarizes the profiles of the interviewed producers. More than half of respondents have a high degree of education and has worked in the production of cattle for over 20 years. In addition, producers present a strong income dependence on the cattle production and the average producer is characterized by an intermediary technological level (slaughtered steers between 20 and 36 months of age, the use of feed supplementation in the dry season and the use of artificial insemination for breeding animals).

[52] The questionnaires were performed preferably by phone (67.29%) or through personal interviews (27.10%). Also, interviews were conducted via e-mail (5.61%).

Table 4 – Respondents' profile

	Number of producers	%		Number of producers	%
Time in cattle production activity			**Level of education**		
1 to 10 years	11	10.3	Basic education	17	16.2
11 to 20 years	26	24.3	High School	15	14.3
21 to 30 years	40	37.4	College (or more)	73	69.5
More than 30 years	30	28.0			
Family tradition in cattle production			**Production capacity (slaughter/year)**		
1rst generation	22	20.5	Less than 500	35	34.0
2nd generation	37	34.6	501 to 2,000	46	44.7
3rd generation	22	20.6	2,001 to 5,000	14	13.6
4rd generation or more	26	24.3	More than 5,000	8	7.7
Percentage of income related to cattle production			**Production Technology**		
Less than 50%	17	16.0	Pasture	48	45.3
51% to 99%	24	22.6	Supplementation (dry season)	35	34.0
100%	65	61.4	Feed lot	22	20.7
Slaughter age			**Use of artificial insemination**		
Up to 20 months	1	1.0	Yes	53	50
20 to 36 months	78	73.6	No	53	50
More than 36 months	27	25.4			

Source: Research survey

Table 5 summarizes the conflict's pattern in the transaction between producers and the meatpacking industries. More than half of the interviewed producers reported problems of not being paid for the animals sold to slaughterhouses, and of these, nearly half reported that the problem occurred more than once and half farmers reported that it happened in the last five years. It is noteworthy that among those respondents who reported problems of non payment less than half turned to justice as a way to review their rights and less than 20% of them said that the judicial mechanisms were effective to solve the problem. Overall, 63% of respondents say they have low confidence in justice. The main reasons for the low confidence are: i) the justice slowness; ii) the current legislation does not prioritize the payment of cattle suppliers; iii) the low effectiveness of the justice results; iv) the existence of legal but not *de facto* shareholders; and v) the attorneys' fees.

Table 5 – Conflict's pattern

	Number of producers	%		Number of producers	%
Level of confidence in justice			**Non payment historical?**		
High	12	11.21	Yes	64	59.81
Average	27	25.23	No	43	40.19
Low	68	63.55			
Number of times / non payment			**Last non payment**		
Once	35	54.69	< 5 years	31	48.44
2 times	11	17.19	5 to 10 years	14	21.88
3 times	12	18.75	> 10 years	19	29.69
> 3 times	6	9.38			
Judicial mechanisms?			**Is the judicial mechanism effective?**		
Yes	30	46.88	Yes	5	15.63
No	34	53.13	No	27	84.38

Source: Research survey

The empirical analysis will focus on the producers' confidence on the Justice in the face of non-payment for the animal delivered to slaughter. The survey was

conducted based on three main hypotheses: the low confidence in Justice is enhanced in the presence of past conflicts (H1), in the recurrence of non-payment events (H2) and in the presence of recent defaulting (H3).

Table 6 shows the variables included in the econometric model, their relationship with the research hypotheses and the expected sign to explain the phenomenon of confidence in Justice to solve the problem of non payment.

Table 6 – Econometric variables description and research hypotheses

General hypotheses/	**Variable Description**	**Detailed hypothesis**	**Variable type**	**Sign**
	[conf_just] - Level of Confidence in Justice (high/ low)	Dependable variable	Dummy	
H1 - The role of past conflicts (*path dependence)*	**[probl]** - The occurrence of the event of "non payment for the cattle sold to slaughterhouses	H1: the low confidence in Justice is enhanced in the presence of past conflicts.	Dummy	-
	[probl_jud] - To have had problem of not being paid for the animal sold to abattoir and to have gone to Court.	H1: the low confidence in Justice is enhanced in the presence of past conflicts.	Dummy	-
H2 - The role of the number of non payment events	**[probl_vez]** – the number of time the event occurred	H2: the low confidence in Justice is enhanced in the recurrence of non-payment events (*frequency*)	Continuous	-
H3 – The role of recent event defaults	**[probl_temp]** – the last time the event ("non payment") occurred	H3: the low confidence in Justice is enhanced in the presence of recent events default (*path dependence*)	Continuous	+

Source: Research survey

Considering the estimation of a logit model, the dependent variable takes two values: ***0*** in case of producers' low confidence in Justice and ***1*** for high confidence in Justice. The results encompass two regressions: ***Regression 1*** (Table 7) relates to the sample of 107 producers and ***Regression 2*** (Table 8) relates only to those producers who faced the problem of non payment, representing a total of 64 producers.

Table 7– The Producers' confidence in Justice – Regression 1

Dependable variable	*Confidence in Justice (0 = low; 1 = high)*				
[standard error in blankets]	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**
Prob_vez	0,1	0,1			
	[0,17]	[0,17]			
Probl_temp	0	0	0,04	0,05	0,05
	[0,03]	[0,03]	[0,04]	[0,04]	[0,04]
Probl_jud	-0,57	-0,63	-0,03	0,09	0,08
	[0,56]	[0,58]	[0,56]	[0,59]	[0,59]
Probl_jud_sol		0,44	0,45	0,55	0,6
		[0,98]	[0,98]	[1,006]	[1,01]
Problem			-1,02	-1,16	-1,15
			[0,57]***	[0,59]***	[0,60]***
Number of properties				-0,1	-0,1
				[0,17]	[0,17]
Slaughter capacity				0	0
				[0.00]	[0.00]
College degree					-0,18

					[0,49]
Constant	-0,52	-0,52	-0,13	0,07	0,177
	[0,28]***	[0,27]***	[0,30]	[0,43]	[0,52]
Log likelihood	-69,63	-69,53	-68,03	-64,44	-64,37
LR chi2	1,11	1,31	4,31	5,62	5,75
Prob > chi2	0,77	0,86	0,36	0,46	0,57
Pseudo R2	0,0079	0,0093	0,0307	0,0418	0,0428
* significance 1%; ** significance 5%; *** significance 10%;					

Source: Research survey

Regression 1 suggests that the non payment for the cattle sold to slaughterhouses (variable Problem) is the fundamental aspect which shapes the producers' confidence in the Judiciary. The existence of the problem itself indicates a negative relationship with the confidence in courts, even considering elements of scale (number of properties and slaughter capacity) and education (college degree).

Table 8– The Producers' confidence in Justice – Regression 2

Dependable variable	*Confidence in Justice (0 = low; 1 = high)*			
[standard error in brakets]	**[1]**	**[2]**	**[3]**	**[4]**
Prob_vez	0,48	0,5	0,41	0,39
	[0,23]**	[0,24]**	[0,24]***	[0,25]
Probl_temp	0,07	0,07	0,08	0,08
	[0,04]	[0,04]	[0,04]***	[0,05]***
Probl_jud	-0,42	-0,53	-0,63	-0,63
	[0,61]	[0,64]	[0,70]	[0,70]
Probl_jud_sol		0,72	0,41	0,45
		[1,00]	[1,03]	[1,05]
number of properties			0,31	0,33
			[0,25]	[0,26]
slaughter capacity			0	0
			[0,00]	[0,00]
college				-0,18
				[0,88]
constant	-2,14	-2,2	-2,78	-2,64
	[0,71]*	[0,72]*	[0,89]*	[1,10]*
Log likelihood	-36,13	-35,88	-33,95	-33,93
LR chi2	5,58	6,07	6,79	6,83
Prob > chi2	0,13	0,19	0,34	0,44
Pseudo R2	0,0717	0,078	0,0909	0,915
* significance 1%; ** significance 5%; *** significance 10%;				

Source: Research survey

Regression 2 suggests that the number of times that the non payment has occurred is an important aspect which shapes the producers' confidence in the Judiciary. If the problem of non payment is recurrent in time, the producer tends to be more confident in the outcome of the legal process. Moreover, the more the problem is in the past, the higher the confidence of the producer in the judiciary.

6. Conclusions

The main objective of this paper is to analyze the role of the Judiciary in resolving conflicts between cattle raisers and meatpacking firms. Looking at the transaction for the acquisition of cattle for slaughter in the state of Mato Grosso do Sul, this essay focuses on the role of formal institutions (i.e., the courts) to resolve conflicts in the beef agribusiness system. Specifically, the article: (i) describes the characteristics of the transaction between cattle raisers and meatpacking firms, (ii) examines the pattern of conflicts brought before the courts, and (iii) investigates the degree of farmers' confidence in the judiciary.

The results show that in average producers have low confidence in court and this assessment is enhanced by recent problems faced by farmers, the number of times non-payment events occurred and personal non-payment historical.

7. References

BARZEL, Y. Measurement cost and the organization of markets. *The Journal of Law and Economics*, v. XXV. apr., 1982. p. 27-48.

BARZEL, Y. Economic analysis of property right. Cambridge University Press, 2nd edition, 1997, 175 p.

BARZEL, Y. A theory of Organizations to supersede the theory of the firm, set. 2001. Available at: <http// www. econ.washington.edu/people/detail.asp?uid=yoramb > Accessed on September, 2007

COASE, Ronald H. *The nature of the firm.* In: WILLIAMSON, O. E.; WINTER, S.G. (Org), **The nature of the firm**. New York: Oxford University Press, 1991.

DEMSETZ, H. Toward a theory of property rights. The American Economic Journal, v.57, n. 2, May 1967, p. 347-359

EGGERSTSSON, T. Economic behavior and institutions. Cambridge surveys of economic literature. Cambridge University Press, 1990, 385 p.

GREENE, W.H. Econometric Analysis. Upper Saddle River, NJ: Prentice Hall, 5th Ed., 2003

NORTH, D. C. Institutions. The journal of economic perspectives, v.5, n.1, 1991. p. 97-112.

WILLIAMSON, O. E. The Economic Institutions of Capitalism: Firms, Markets, Relational Contracts. New York: The Free Press, 1985. 450 p.

WILLIAMSON, Oliver E. ***The Mechanisms of Governance***. New York: Oxford University Press, 1996.

WILLIAMSON, O. E. The new institutional economics: taking stock, looking ahead. Journal of economic literature, v. 38, set. 2000, p. 595-613.

BOUNDED RATIONALITY: SOYBEAN CONTRACT REVIEW IN THE STATE OF GOIÁS (BRAZIL).

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Abstract
The present article analyzed fifty-one appeal decisions emanated by the Court of Justice of the State of Goiás (Brazil) in which the Court was favorable to the termination or renegotiation of soybean sale contracts. The obligational relation between soybean producers and industries is made by means of future sale contracts, with the anticipation of credit to the producer. The accomplishment of the obligation is thus transferred to the future, fact that brings to the sale the element of risk. The analysis of the decisions was based in the New Institutional Economics principles, mainly those related to the opportunism of the agents and to bounded rationality. The opportunism of the agents was demonstrated by the elaboration of unequal contractual clauses that attributed the risks of contracting only to soybean producers. Bounded rationality was noted when natural hazards, as the Asian rust, affected the soybean production, causing excessive burden for one of the parties and bringing advantages for the other. Considering the change of opinion presented by one of the Court's Chambers, a tendency towards a higher coherence of the judgments emanated by the Court is expected. The repetition of the game and the increase of information on the past performances will help to optimize the cooperation among the agents, which will permit to reduce the transaction costs and to increase the potential gains of the players.

Key words: Bounded rationality; soybean contracts; Theory of Unpredictability.

BOUNDED RATIONALITY: SOYBEAN CONTRACT REVIEW IN GOIÁS.

1. Introduction

The obligational relation between soybean producers and industry is made by means of future sale contracts. In this sense, it is demonstrated the importance represented by the contractual relationship, observed as a nexus regulated by legal institutions, connecting the parties in the production chain. That said, it becomes more evident the need to interpret the contractual relation in order to preserve the economic balance between the parties, taking into account the good faith of the contractors and the economic role of the contract.

There are fields of study in which the dialogue between Law and Economics is more noticeable (STAJN, 2005). Among these, the contractual field can be mentioned, since it brings to evidence market operations, showing the existence of common interests, involving social and legal institutions.

With regard to future crop sale contracts, the most frequent causes of contract termination refer to the oscillation of the exchange rate and the occurrence of diseases in soybean growing areas, with notable cases of the Asian soybean rust. The variation in soybean prices poses a risk to both contracting parties. Insofar as contracts are the base of many transactions in the market, they play a central role in the organization of the economic activity. Contract breaches are the result of the elaboration of unbalanced or incomplete contracts.

The present study aims to analyze the factors of bounded rationality of the agents from which is derived the incompleteness of soybean contracts. The theoretical contribution of the New Institutional Economics will be used for this objective. Regarding to the legal aspect, the analysis will be based on how the judges of the Goiás Court of Justice applied the Theory of Unpredictability as an instrument of exonerating allegations of total lack of predictability of events claimed as unpredictable by the contractors.

The choice of soybean was made because of the fact that Brazil is the second greatest producer of this crop. In the 2008/09 harvest, the grain production reached 57.17 million tons. According to a survey by Conab, in June 2010, the estimate for the 2009/10 harvest was an increase in production of 20.2%, which represents the amount of 68.71 million tons (CONAB, 2010). The area planted with soybeans grew by 7.4%, representing a gain of 1.6 million hectares over the previous harvest, reaching 23.36 million hectares. In the first half of 2010, exports reached $ 9.56 billion, representing 10.7% of total exports. These numbers express the economic importance of the product to the country (MDIC, 2010).

The choice of the state of Goiás is due to the fact that this is one of the major soybean producing states in Brazil and, in previous research, the State Court presented a greater number of contrasting decisions in relation to the matter proposed. The decisions examined were issued between the years of 2003 and 2011.

The present article is divided into five parts, being the first this introduction. The first subdivision of section 2 presents the theoretical contribution concerning the issue, proposing an examination of the institutes of the law according to the principles of the New Institutional Economy. In the second part of the item, soybean future sale contracts are studied, in accordance to the Brazilian legislation.

Third item starts with the explanation of the method used for the analysis of judicial decisions. In its second subdivision, the characteristics observed in the selected sample

are detailed. The study of the decisions in which the Court of Goiás was favorable to the termination or renegotiation of the contracts is presented in Section 4. Item 5 presents the conclusions derived from the survey and item 6 brings a few final considerations.

2. Theoretical contribution

2.1. The New Institutional Economics

The analysis of the selected judicial decisions will take into account the fact that contractors, which are in this case soybean producers and industries, are economic agents, as defined by the Theory of the Firm. According to Coase (1937), specialized agents sign contracts to exchange information, goods and services, in order to produce a final good.

The firm, as taught by Coase (1937), is understood as a nexus of contracts, with the scope of reducing final production and transaction costs. This reduction occurs insofar as the costs of the price system are replaced by a system of coordination that allows agents to direct resources and avoid expenses.

However, it must be observed that economic relations are shaped by institutions, which are, as described by North (1991), man-made constraints that structure political, economic and social interactions. Williamson (2000) notes that institutions are relevant and susceptible to analysis by the tools of the economic theory.

In this regard, Williamson (2000) proposes a social analysis considering four levels, according to the restrictions imposed by the institutions observed. At the first level (top level), there are customs, traditions, moral norms. These are institutions that take a long time to change. They are characterized for being informal rules, of spontaneous origin.

The second level, also called *institutional environment*, is consisted of formal rules - constitutions, laws, property rights. Here we present the *formal rules of the game*, which form the legal system itself, created by the State to define property rights and to allow arbitration of disputes.

Although property rights are extremely important, they do not contemplate a legal system that sets contracts and ensures compliance. It is thus reached the third level, the level of contract governances, which is characterized by dealing with transactions, private relations, under the direct performance of economic agents. The fourth level is where the neoclassical analysis works. It is used to optimize the apparatus, which occurs often by marginal analysis and describes the firm as a production function.

The interaction of the agents under this institutional apparatus, that is, as constraints imposed by institutions, will only be observed when the cooperation between them becomes feasible. In the view of North (1991), the means that enable cooperation among agents are the repetition of the game, information on the past agents' performances and a small number of players. Cooperation becomes difficult, however, when the game is taken to the other extreme: delete repetition, minimize the information, increase the number of players and the result will be a lack of cooperation.

In this sense, cooperation between agents is a reflection of effective institutions, which help to reduce transaction and production costs at every exchange, making potential gains achievable (NORTH, 1991). Transaction costs are defined as operational costs of the market. These costs include, for example, the negotiation and securing of an agreement, and may be reduced through a coordinated activity performed by the agent (COASE, 1937).

On the other hand, adverse conditions increase transactional costs, even if the agents have the same goal – which is to increase the profitability of the firm. The selfishness of the agent and the asymmetry of information about transactions determine transaction

costs. The role of institutions is to reduce transaction and production costs, in order to increase the potential profit made in each exchange.

The study of the judicial decisions will consider that contractors, for being economic agents, have a peculiar way of acting. Williamson (1985) considers that agents are conducted by two behavioral assumptions: bounded rationality and opportunism. The basic concept of the Transaction Cost Economics is that contracts bring potential future problems. Agents, when performing institutional arrangements in the present, cannot predict all possible future problems. Thus, agents cannot comply with promises, motivated by opportunism and by the possibility to appropriate the value of investment in specific assets.

Regarding the above mentioned concept of bounded rationality, it is based on the assertion that agents reach the rationality only partially, although they wish to have full rationality (WILLIAMSON, 1985). In practice, this is evidenced by the inability of the agents to formulate complete contracts. Instead, there would be no contract termination or the need to review contracts.

Opportunism is a behavioral characteristic defined by the agent self-interest and selfishness. Opportunism creates situations of contract breaches, based on the agent's intention to appropriate incomes associated with the transaction. Zylbersztajn (1995) lists three reasons why individuals do not break contracts, even if inserted in the opportunistic logic of the agents. They are: reputation, legal guarantees and ethical safeguards.

Reputation is a pecuniary motivation, since the non-termination of the contract occurs to maintain the flow of future income. In this case, when computing the value of future income, the cost of terminating will eventually exceed the benefits of maintaining the agreement.

Legal guarantees arise as a way to ensure a punitive mechanism established by the society. The legislation serves as instrument to discourage opportunistic action insofar as the system is able to identify, prosecute and, when appropriate, to punish the agents who break the contract.

Ethical principles, in turn, are created in accordance to the code of conduct of a particular group. It is very difficult to monitor the code of conduct, since it derives from a tacit agreement among agents. In the event of a contract breach, ethical principles may be contrary to pre-established principles.

There are also other factors that affect the dynamics of agents and, consequently, the fulfillment of what was stated in the contract. According to Williamson (1985), transactions performed by agents can be distinguished for their three main dimensions: asset specificity, uncertainty and frequency.

Asset specificity is the characteristic related to the loss of value of the assets involved in a particular transaction in case it does not materialize. If the assets are highly specific and the transaction does not materialize, one of the parties will lose the investment made, since they will be unable to find a substitute to keep the value of the asset. On the other hand, if both parties make investments in specific assets, this will encourage them to maintain the contract, since there is a bilateral dependence.

Uncertainty is related to unpredictable events that cannot be measured by probability. As external impacts are not known before, it is not possible for the agents to create contractual clauses involving these impacts to the distribution of results. Bounded rationality makes irreparable transaction costs possible to arise, leading to non-opportunistic breaches of the contract.

Frequency is related to the number of times that agents perform certain transactions. As transactions become repetitive, reputation can appear and it becomes

more frequent as the opportunistic breaking of contracts becomes rarer. Specialized governance structures are more sensitive to the needs of governance then the non-specialized structures.

Based on the theory of bounded rationality, the Theory of Incomplete Contracts considers it inevitable that the agents do not leave contractual gaps to be fulfilled in the future (ZYLBERSZTAJN, 2005). It is also possible to change contracts clauses during its execution or even by the change of the agents' will, because they ignored some data at the time of contracting or because new facts that prevent the realization of what had previously been agreed happened (PINHEIRO, 2006).

Contracts are always incomplete, imperfect, subject to change by the events of nature and weather (PINHEIRO, 2006). The Brazilian legal system has three institutes for completing incomplete contracts: the unpredictability (art. 317), the excessive burden (art. 478) and contractual injury (art. 157), all dependent on the existence of objective good faith.

Instruments used to deal with incomplete contracts are contractual hermeneutics, the law and customs and usage. These instruments do not, however, satisfactorily resolve contractual risks. The harmonization of doctrines that have been already tested by Higher Courts would be beneficial to increase the predictability of the solutions when filling in incomplete contracts (PINHEIRO, 2006), thus reducing uncertainty and lowering transaction costs.

2.2. Soybean future sale contracts

Insofar as the issues here discussed are related not only to economic, but also to legal aspects, it must be outlined the juridical treatment given to the problem, according to the logic of the law. The Brazilian Civil Code, in article 483, enables the purchase and sale of future goods, as follows: *the purchase and sale contract may have as object a presently existing or future good. In the last case, the contract shall be with no effect if the good does not come to exist, unless the parties intended to execute an aleatory contract* (BRAZIL, 2002).

In relation to the future sale, two situations can be distinguished. First, the *conditional sale* can be mentioned. This type of sale depends on the future existence of the good sold. The sale is subject to the offering of the good. If it does not become existent, the contract is ineffective due to the lack of object or, more appropriately, because a precedent condition was not effected (RIZZARDO, 2008).

The second hypothesis of future sale contract occurs in those cases when the price is still considered, even though the good does not become existent, as long as there was an express provision of this possibility. This is called *venditio spei*: even if the good will not exist, the buyer must pay the price. In this case, what prevails is the hope nurtured by the buyer to earn a profit on the occurrence of the good. This contract is essentially aleatory (RIZZARDO, 2008).

According to Gonçalves (2010), there are contracts that are typically commutative, but due to certain circumstances, become aleatory[53]. This is the case of the sale contract, which can be classified as *accidentally aleatory* in two hypotheses: future sales and sales of existing goods exposed to risk.

With regard to the *venditio spei*, the object of the obligation is the *hope of existence of a good*. In case the good does not turn to exist, the contract is still valid and the buyer

[53] Commutative contracts are those where the benefits of both parties are known in advance, each one keeping an equivalence of values. Aleatory contracts are those in which the performance of a party is not precisely known and susceptible of previous estimates, not existing equivalence to the other party's performance, being dependent on uncertain event occurrence (PEREIRA, 2009).

must comply with the agreed price. The fact that the future harvest does not produce the result or become null is indifferent: the price is always due.

Instead, in the *rei venditio speratae* (sale of expected good), the pact is conditioned to the existence of a future production. If the good becomes existent, the agreement is perfect. If the good perishes because of a natural disaster, the contract is not considered completed because of the lack of object.

In the case of soybean, a common practice for the obtainment of credit are contracts in which the advance sale of future soybean harvest is negotiated. This practice has become common to face the challenge of obtaining government funding for farmers (REZENDE, 2008). In order to compensate the lack of State resources, alternative financing arrangements were created within the private sphere (ALMEIDA, 2008).

As explained by Rezende (2008), the anticipation of resources by means of future sale contracts, since the 90's, made it possible the commercialization of inputs and the provision of credit for the costs of producing and marketing the crop. In exchange for the loan, the lender received the grain harvested in the next crop.

Aiming to reduce the impact of price fluctuation in the harvest season, the cases of future sale decreased, therefore being the sale price negotiated previously (REZENDE, 2003). It can be observed that there are two main goals of the parties to negotiate the future sale of soybean: the obtainment of financing or the allocation of the risk of price fluctuation.

The anticipated sale of the crop to the industry allows the producer to create conditions for obtaining the resources needed for planting and cultivating the grain at competitive costs. The transaction allows the producer to eliminate the price risk - which is diluted among the agents – being the profit margin already guaranteed during the planting (REZENDE, 2008).

Problems in the effectiveness of these contracts can occur when there is incompatibility between the previously stipulated price and the market price during the contract accomplishment (ALMEIDA, 2006). This incompatibility is the cause for review claims made by the farmer (borrower) in the occasion of the soybean price increase. These claims are commonly based on the allegation of the occurrence of unjust enrichment or unpredictability of certain events. The objective of the farmer's conduct is to avoid the accomplishment of the contractual obligation, which would be completed in the act of the crop delivery (TIMM, 2006).

It must be noted that the law provides for the parties the possibility to request the supervision of the State in face of the excessive burden resultant of an imbalance caused by unexpected factors (ROCHA; TRENTINI, 2010). In relation to this, the T*heory of Unpredictability* can be mentioned. According to the doctrine, this Theory is treated in articles 478 to 480 of the Brazilian Civil Code.

Article 317 of the Civil Code provides another possibility for correction of the contract, which can be done when there is a manifest disproportion between the previously stipulated and the currently due price caused by unforeseen events (BRAZIL, 2002).

The review or termination of contracts need to be understood in the context of the good faith, a social context that aims to give a sense of fairness and balance to the parties (ROCHA; TRENTINI, 2010). Rocha and Trentini explain that the application of the Theory of Unpredictability should follow, rather than the predictability of the event, the very conduct of agents, which should be guided by good faith and probity.

As observed by Timm (2006), the practice of contract review by judges on the grounds of political protection of the weak against the strong causes uncertainty in the

economic environment, increasing transaction costs for the parties, by distributing the risk or loss of interference to the community.

To support this argument, Timm (2006) mentions a survey conducted by the PENSA-USP institute, as published in the Institute Seminar PENSA, on December 5th of 2005, regarding the case of future soybean contracts, which proved that the judicial review of agrarian contracts in the State of Goiás made the obtainment of credit to finance the next crop more difficult, since it created an environment of uncertainty and risk to private lenders.

The very fact that the Judiciary is unpredictable in relation to its decisions - sometimes giving reason to the borrower, sometimes to the lender-, signals negatively to the agents, indicating the fragility of the agreement in the aspect of the reduction of uncertainties and of the Judiciary regarding the guarantee of creditors' rights (AMARAL, 2008).

On those cases when the party anticipates the fulfillment of the obligation by paying in advance, it is common the demand for warranties. The practice shows that, in general, the security of contracts can be given through the issue of Rural Product Note (CPR), which can be endorsed by the Bank of Brazil (REZENDE, 2008).

3. Research Method and Sampling

3.1. Method

The present research is predominantly qualitative, of the documentary type. The qualitative method is characterized for being descriptive and having the aim to understand a determined phenomenon (GODOY, 1995). In this sense, this research was developed from the study of decisions in order to comprehend the factors of bounded rationality of litigant agents.

As explained by Arilda Shchmidt Godoy (1995), the documentary research enables the analysis of documents that have not received an analytic treatment or that can be re-examined with the intention of seeking new or additional information.

It is, therefore, a documentary research, because the sampling corresponds to all the decisions issued by the Court of Goiás, containing the words *contract, purchase, sale, soybean* and *unpredictability*, altogether, between the years of 2003 and 2011. The initial date corresponds to the promulgation of the New Brazilian Civil Code, and the final corresponds to the current year.

The sampling is non-probabilistic, since no random selection forms were used. It is also intentional, because it express the opinion of population members - in this case, judges (LAKARTOS; MARCONI, 2008).

The decisions analyzed were only those emitted in final judgments. The selection of the decisions aimed to analyze only the merits regarding the application of the Theory of Unpredictability by the Court. For this reason, interlocutory appeals and references to procedural issues were excluded.

In previous research conducted in January of 2011, 140 decisions were considered suitable for analysis, according to the criteria described above. In the selected decisions, the words *review*, *termination*, *rescission* and *resolution* were not used in their technical accuracy by the judges, because of what in the present study the term *review* will be used in a broad sense, referring to any changes to the pact originally set up by agents, formalized by means of sale contracts.

The decisions were separated into two groups, in accordance with the Court grant or refusal regarding the contract review. They were then divided according to the Court Chamber that issued the decision. Finally, the judgments in which the contract review

was granted were analyzed, being listed the arguments accepted by the Court and the rationale used by the judge to grant the review.

The immediate objective pursued by the separation of the decisions was to find out which arguments used by the agents were mostly taken in consideration by the Court when deciding for granting the contract review. The economic analysis of the arguments made was fulfilled by relating them to the principles of the New Institutional Economics, being observed the behavioral assumptions of the agents, in particular the bounded rationality. The mediate objective was to comprehend which factors are considered *unpredictable* by the Court, as long as the judges consider certain factors as crucial for the application of the Theory of Unpredictability, in order to justify the contract breaches.

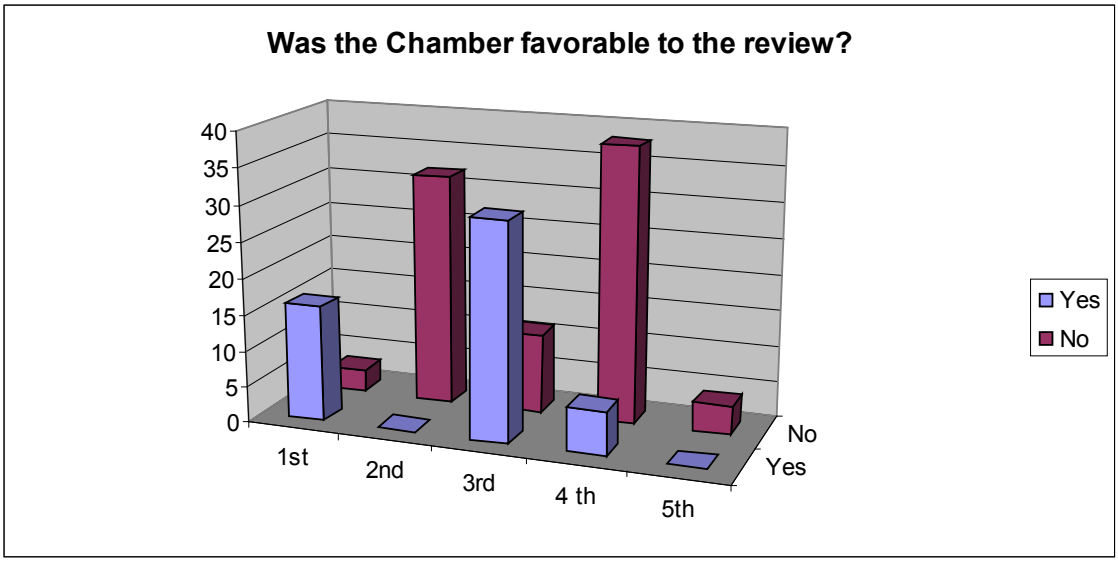
3.2. Characteristics of the sample

The distribution of the sample collected permits to infer that the year of 2006 was the one that presented the biggest number of decisions through the period analyzed. Moreover, it can be observed that the 4th Chamber was the one that emitted, in total, the greatest number of decisions according to the criteria established.

	Year								
Chamber	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
1st	-	2	2	6	3	4	-	2	19
2nd	-	3	1	11	6	7	3	1	32
3rd	2	7	12	11	3	2	1	3	41
4 th	-	5	17	17	2	1	2	-	44
5th	-	-	-	-	-	-	-	4	4
Total	**2**	**17**	**32**	**45**	**14**	**14**	**6**	**10**	**140**

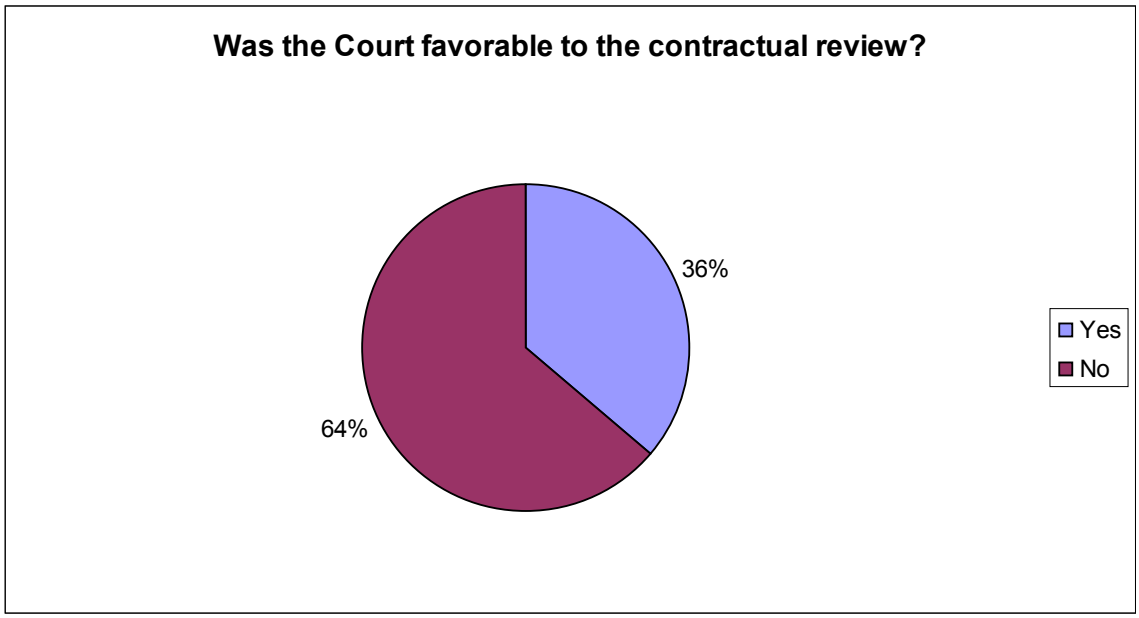
Table 2 - Distribution of the decision by year and Chmber.

Among those cases in which the judicial review was permitted, it was possible to observe that the 1st and 3rd Chambers were more likely to grant the contractual review, while in the 2nd, 4th and 5th Chambers the tendency existent was for the maintenance of the contracts:



Graphic 1 – Distribution of reviews granted or denied by each Chamber.

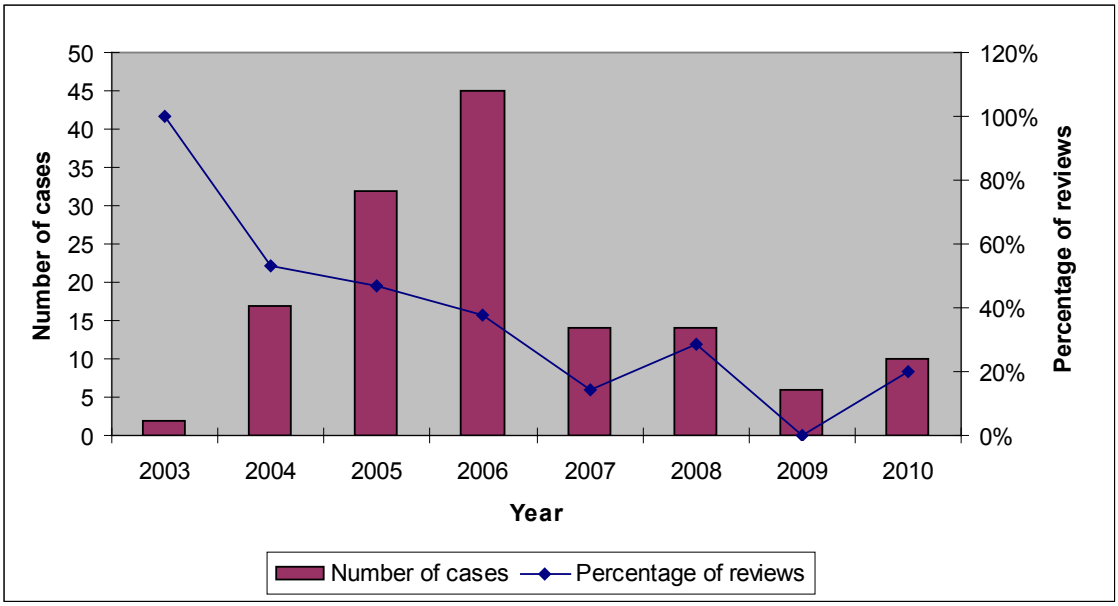
The Court of Goiás was favorable to the contract review in 36% of the cases analyzed, what totalizes fifty-one decisions.



Graphic 2 – Percentage of total decisions between the years of 2003 and 2011.

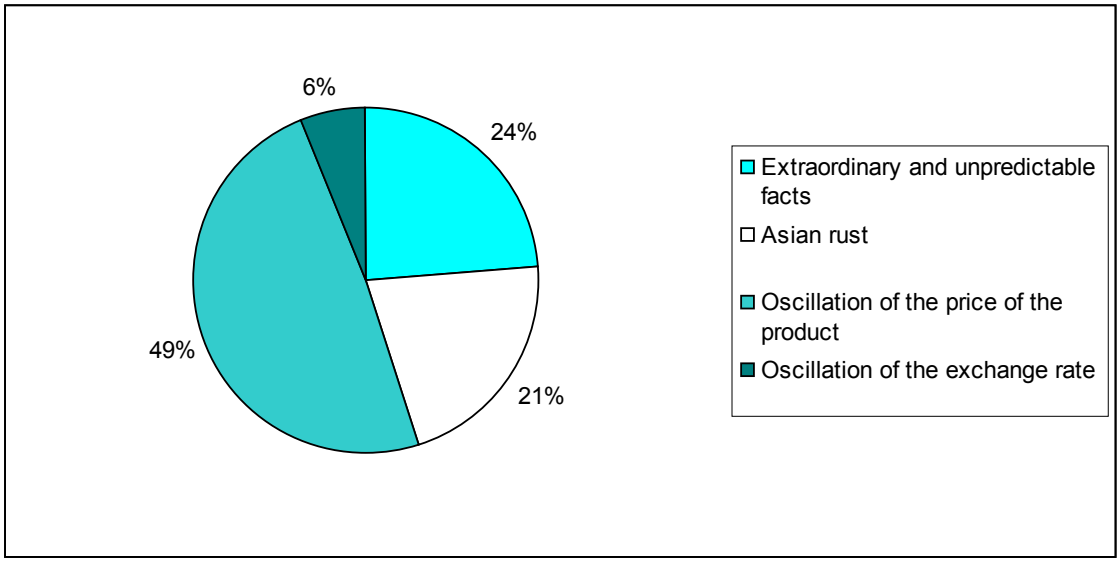
The largest number of contractual review occurred in 2006, when seventeen decisions issued by the Court of Goiás allowed the contractual breach. The year of 2009 was the only one in which there was no permission to review any contract.

Graphic 3 shows that from 2003 until 2007, the number of cases in which the Court permitted the contract review decreased. Despite the increase in 2008, the percentage obtained is far below from those observed in previous years, being nil in 2009 and closing the year of 2010 by 20%.



Graphic 3 – Distribution of decisions in which the judicial review was granted through the analyzed period.

In the decisions examined, the most currently used arguments to justify the contract review through the application of the Theory of Unpredictability were *the product price fluctuation in the stock market*, *the occurrence of Asian Rust*, *the oscillation of the exchange rate* and *the occurrence of extraordinary and unpredictable events*. These arguments were found either isolated or in combination. When taken into account the decisions in which the arguments appeared isolated (thirty-four cases), the following ratio of incidence was obtained:



Graphic 4 – Distribution of the arguments used.

In next item, the reasons why the Court considered each of these arguments as factors that should allow the application of the Theory of Unpredictability will be analyzed.

4. Analysis of the judicial decisions

All the analyzed decisions have certain degree of similarity in their structure of argumentation and it is not possible to indicate any that detracts from the rest. Initially, the judges demonstrate the need to mitigate the absoluteness of the *pacta sunt servanda*[54] principle. There is, therefore, the understanding that contracts are incomplete, and the relativization of the presumption that the contract clauses are law between the parts.

The judges explain that the advent of the Consumer Code and of the New Civil Code limited the possibility of contractual modification only by the will of the parties, giving strength to the Theory of Injury. For this reason, even though they had willingly agreed, the occurrence of circumstances unforeseen and external to the their will would be a permissive factor to allow the contract review.

For this reason, it is justified the application of the already transcribed article 478 of the Civil Code to these contracts, since, in the opinion of the judges, the soybean sale contract is anticipated in time, making it possible to apply the Theory of Unpredictability. The Theory of Unpredictability serves, in this sense, as a tool that allows legally the analysis of gaps due to the bounded rationality of agents, who were not able to predict the future events that would modify the contractual relationship.

So, the evidence of subsequent events, unforeseeable and external to the contractors will, which alter the circumstances under which the contract was signed and make its execution too burdensome for one of the parties make the contract review possible.

Until this point, the judicial interpretation does not consider the fact that bounded rationality is related to opportunism, self-centered orientation of the agent. The uncertainty of the relations would not bring behavioral problems to the contractual relationship only if the agents were sure that transactions are free of exogenous misfit (WILLIAMSON, 1985).

Each case is considered separately, as follows:

• Oscillation of the price of the product on the stock market:

Although oscillations in the prices of agricultural products on the market are considered trivial, the price variation that goes beyond the limits of the ponderable disrupts the enforcement of the pact. This can be said about oscillations that eliminate the productive capacity of a producer, for making the obligation excessively burdensome for a party and for giving extreme advantages to the other.

It should be taken into account that the oscillation of the stock market is a recurrent fact that should had been considered by the parties during the agreement occasion. Although abrupt, the possibility of variations is known and mismatches that can occur in the future cannot be attributed to the bounded rationality of the agents.

Agents must be aware to the fact that an oscillation that *goes beyond the limits of ponderable* is likely to occur and use this information in order to elaborate a more complete contract. The contractual breach, in this sense, reflects the opportunism of the agent.

• Asian Rust:

The plague is considered unpredictable by the judges for the fact that it startles both producers and traders of agricultural products. If there is neither overstock nor specific products to combat the plague, there is an increase in the price of fungicides

[54] Latin for *agreements must be kept*.

available. According to the understanding of judges, if the Asian Rust could be considered predictable, it would certainly not cause as much damage nor would be the object of such discussions in the agribusiness. It also should be taken into account the difficulty of identifying the disease in the crop at the beginning of its occurrence.

It cannot be ignored, however, the fact that the soybean is an agricultural input subject to losses due to weather and the occurrence of pests in agriculture. In this sense, contract clauses should consider the possibility of loss of the crop by the producer and the increase of the prices due to product shortages. Opportunism, in this case, can be found in the stipulation of the terms which charge the burden of contracting just to one agent, in the cases that harvest will be lost.

• Dollar Exchange Rate Variation:

The exchange rate is a factor of unpredictability insofar as the oscillation of the value of the dollar seems likely to cause greater risk to the producer. This occurs mainly in cases where the contracting industries have international operations, which gives them more knowledge of dealing with foreign markets, what makes it possible for them to have a higher prediction about the price of the product index-linked to a foreign currency[55].

If there really is a better control of risk by the industry and contract terms are deemed favorable to the producer, the opportunistic behavior is clearly observed. In this case, the information asymmetry impairs the producer, who becomes the target of opportunism of the industry. It is noted, however, that the industry's opportunistic action is only possible given the producer's bounded rationality.

• Extraordinary and unpredictable events

Sometimes the occurrence of extraordinary and unpredictable events arises as argument of the agents for claiming contract breach. Even though the expression *extraordinary and unpredictable events* is far-reaching, this term repeatedly figured in the decisions analyzed, in some referring to the facts above mentioned and in others, without further specification. However, the opinion of the Court, when granting the review, is clear in stating that the burdened parties of a contract may be released from their obligations in the case of the occurrence of extraordinary events which are beyond any prediction on the time the contract was concluded, and that profoundly alter the economy. The logic used by the Court is that parties would not have taken the burden if they could have previously foreseen the events that led to profound changes[56].

The contract review is currently granted when no amount of money is given in advance to the producer and when contractual terms are clearly abusive, debiting to the producer responsibility all risks of production. In other words, the judges favorable to review of those contracts often consider them one-sided contracts, since their provision imposes excessive burden to farmers.

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[55] GOIÁS. Tribunal de Justiça de Goiás. Apelação Cível 109958-0/18. Apelante: Carlos Alberto Machado. Apelado: Cargill Agrícola S/A. Relator: Desembargador João Ubaldo Ferreira. Goiânia, 4 de dezembro de 2007. Disponível em: <http://www.tjgo.jus.br/jurisprudencia/showacord.php?nmfile=TJ_1099580188_20071204_20080123_133307.PDF>, Acesso em: 24 fev. 2011.

[56] GOIÁS. Tribunal de Justiça de Goiás. Apelação Cível 100290-3/188. Apelante: Ernane Rodrigues Kikumori. Apelado: ABC Indústria e Comércio S/A ABC INCO. Relator: Desembargador Walter Carlos Lemes. Goiânia, 5 de dezembro de 2006. Disponível em: <http://www.tjgo.jus.br/jurisprudencia/showacord.php?nmfile=TJ_1002903188_20060919_20061027_102024.PDF>, Acesso em: 24 fev. 2011.

If the emergence of future changes did not happen, the pact would become perfect, consolidating with the fulfillment of the obligation. If, on the one hand, there is the bounded rationality of the agent during the elaboration of contractual clauses, on the other hand, the emergence of future events, exogenous to the elaboration of the contract, creates the possibility for the opportunistic behavior of the contractor.

This behavior can be verified in two situations. First, when only one agent holds information and draws up clauses that, at the time of the agreement were balanced, but with the occurrence of unforeseen events, they became advantageous for only this agent. The second situation is when the agreement is balanced, but on the verge of contractual imbalances, the agent acts opportunistically.

5. Final analysis

The above presented arguments are supported by the application of the contractual principles of *the social function of contract*, *good faith* and *economic equilibrium*. The application of these principles aims at making the contracts and the obligations of the parties more balanced and profitable for the contractors. The interpretation according to the New Contractual Theory is observed in all the decisions favorable to the contract review.

According to Judge John Waldeck Felix de Sousa[57], the duty of the Judiciary is to repel abusive market practices. The objective sought by this is to curb excessive profits and high loss of each of the parties regarding the contract agreement. In this sense, the role of the Judiciary becomes complete as the justices allow review or rescission of contractual clauses that make the relationship between contractors incontestably unbalanced.

Bounded rationality is a factor present during the elaboration of any contract. Opportunistic behavior, on the other hand, is certainly higher while drawing soybean future sale contracts up. This happens because soybean is a non-specific asset. Reputation, in soybean contracts, is not a relevant factor in order to reduce the opportunistic behavior of the agents. Nor will the reputation serve in order to encourage the maintenance of contracts. For this reason, it also can be expected a decrease in the frequency of contracting between soybean agents. In this sense, it becomes difficult the occurrence of vertical integration in the contracting of soybean future sale, making the arrangement susceptible of market changes.

The analyzed data allows observing, finally, that 90% of decisions favorable to the contract review (forty-six decisions) were issued by the 1st and the 3rd Chambers of the Court. There was, however, a change of argumentation of the 3rd Chamber in the year of 2007, when the 3rd Chamber Justices started to understand that those facts claimed by the parties in order to achieve the contract review, such as the Asian Rust or the exchange change variation, are predictable facts.

The 3rd Chamber interpretation was that the profit of the contractors is already included in the price agreed upon initially, being the risks inherent in the business,

[57] GOIÁS. Tribunal de Justiça de Goiás. Apelação Cível 107.113-1/118. Apelante: Marcio Roberto Jorge. Apelado: ADM do Brasil Ltda. Relator: Des. João Waldeck Felix de Sousa. Goiânia, 22 de maio de 2007. Disponível em:<http://www.tjgo.jus.br/jurisprudencia/showacord.php?nmfile=TJ_1071131188_20070522_20070618_142711.PDF>, Acesso em: 24 fev. 2011.

which may be incurred by both parties and, at worst, that the loss experienced by producers should be recovered in the next harvest[58].

The major consequence resulting from the non-repetition of the decisions of the Court is the increase of the uncertainty of the contractors, which has as result the increase of the transaction costs. This fact majors the business risk, which must be taken into account on the values of contracting, since contractors already anticipated the possibility of future problems. For this reason, transaction costs become higher, because the expenses with lawyers and court costs are to be considered by the agents.

6. Final Considerations

The analysis of the law from an economic perspective is important insofar it is understood that institutions impact directly in the economy and in the behavior of economic agents. In the same way, unpredictable events associated with the bounded rationality of the contracting parties make it impossible the perfect elaboration of contractual clauses by the parties, which gives rise to the occurrence of contract breaches.

As discussed throughout the present article, the role of the judiciary through contract review may be a factor of insecurity in the economic environment, as it may represent a negative signal to contractors, who expect to observe the repetition of the "rules of the game".

The study of the judicial decisions concerning the application of the Theory of Unpredictability by the Court of Goiás allowed inferring that the contract review was permitted in only 36% of the cases examined.

The posture adopted by the judges when allowing the contract review was towards the implementation of the New Contractual Theory, seeking to uphold the principles of good faith, social function of the contract and economic equilibrium. Thus, the larger goal sought by the judges was to avoid the occurrence of excessive burden to one of the parties, often caused by unbalanced clauses that attribute contractual risks just to one of the contractors.

It was finally observed that the decision related to the acceptance or rejection of the contractual breach is closely related to the Court Chamber responsible for issuing the decision, since the vast majority of decisions that allowed the contract review was provided by the 1st and the 3rd Chambers, having the latter changed its opinion in 2007.

The analysis of the facts in accordance to the principles of the New Institutional Economics shows that the contract breaches held by the agents is related to the behavioral assumptions indicated by Williamson, which are the bounded rationality and the opportunism.

These behavioral assumptions are more evident insofar as the agents fail to draw up perfect contracts. This way, they are likely to claim for the contract break based on factors considered unpredictable, in association to the inconstancy of institutions. For this reason, there has been an increase in the production costs and a potential decrease in the effective gain of each transaction.

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[58] GOIÁS. Tribunal de Justiça de Goiás. Apelação Cível 110600-5/188. Apelante: Caramuru Alimentos Ltda. Apelado: Rinaldo Fernandes de Oliveira. Relator: Desembargadora Sandra Regina Teodoro Reis. Goiânia, 23 de agosto de 2007. Disponível em: <http://www.tjgo.jus.br/jurisprudencia/showacord.php?nmfile=TJ_1106005188_20070823_20070920_111540.PDF>, Acesso em: 24 fev. 2011.

The decrease of decisions favorable to the contract review over the years, and the change of opinion in one of the Chambers, indicate both the economic reflection that previous decisions caused - a decrease of investments - and the maturing of the Court in order to harmonize its decisions.

As a result, there would be the reduction of transaction costs and the increasing of potential profits. What is expected, therefore, is a trend in the homogenization of the opinion of the Court, so that the repetition of the game and information about the past performance of agents will serve to optimize the cooperation between them.

7. References

ALMEIDA, Luciana Florêncio de. *Ambiente institucional e contratos de crédito agrícola: três estudos críticos*, São Paulo, 2008. Tese (Doutorado em Administração) - Programa de Pós-Graduação em Administração, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo.

BRASIL. Lei n. 8.929, 22/08/1994. 1994. **Leis**. Casa Civil, Subchefia para assuntos jurídicos. Disponível em: <http://www.planalto.gov.br/ccivil/LEIS/L8929.htm>. Acesso em: 04/01/2011.

BRASIL. Lei n. 5.869, 11/01/1973. 1973. **Leis**. Casa Civil, Subchefia para assuntos jurídicos. Disponível em: < http://www.planalto.gov.br/ccivil/leis/L5869.htm>. Acesso em: 23/02/2011.

COASE, Ronald. The nature of the firm in *Economica*, New Series, Vol. 4, No. 16. (Nov., 1937), pp. 386-405.

COMPANHIA NACIONAL DE ABASTECIMENTO. *Acompanhamento da Safra Brasileira*. Disponível em: <http://www.agronegocio.goias.gov.br/admin/arq_doc/arquivos/seagro_28_536.pdf> Acesso em: 26 de Set. de 2010.

GONÇALVES, Carlos Roberto. *Direito civil brasileiro, volume 3: contratos e atos unilaterais*, 7 ed., São Paulo, Saraiva: 2010.

GODOY, Arilda Shcmidt. Introdução à pesquisa qualitativa e suas possibilidades. In: Revista de Administração de empresas, v. 35, n. 2, mar/abr. 1995, p.57-63.

_____. Pesquisa qualitativa: tipos fundamentais. In: Revista de Administração de empresas, v. 35, n. 3, mai/jun. 1995, p.20-29.

MARCONI, Marina de Andrade; LAKATOS, Eva Maria. *Técnicas de pesquisa: planejamento e execução de pesquisas, amostragens e técnicas de pesquisa, elaboração, análise e interpretação de dados*, 7 ed., São Paulo: Atlas, 2008.

MINISTÉRIO DO DESENVOLVIMENTO, INDÚSTRIA E COMÉRCIO EXTERIOR. *Balança Comercial Brasileira: Dados consolidados*. Disponível em: <http://www.mdic.gov.br//arquivos/dwnl_1281725749.pdf> Acesso em: 7 de Nov. de 2010.

NORTH, Douglass. Institutions. In: *The Journal of Economic Perspectives*, Vol. 5, No. 1. (Winter, 1991), pp. 97-112.

PEREIRA, Caio Mário da Silva. *Instituições de direito civil*, 13 ed., Rio de Janeiro: Forense, 2009.

PINHEIRO, Armando Castelar. SADDI, Jairo. *Direito, Economia e* Mercados, Rio de Janeiro, Elsevier: 2005

REZENDE, Christiane Leles. *Pacta sunt servanda? Quebra dos contratos de soja verde*, São Paulo, 2008. Tese (Doutorado em Administração) – Programa de Pós-Graduação em Administração, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo.

RIZZARDO, Arnaldo. *Contratos lei nº 10.406, de 10.01.2002*, 8 ed., Rio de Janeiro: Forense, 2008.

ROCHA, Flávia Baldotto da; TRENTINI, Flávia. A possibilidade de revisão judicial das obrigações: art. 317 do Código Civil e o impacto da teoria da imprevisão no direito brasileiro in *Revista Forense*, vol. 407 (janeiro/fevereiro de 2010), Rio de Janeiro: Forense, 2010, pp. 547-557.

TIMM, Luciano Benetti. Direito, economia e a função social do contrato: em busca dos verdadeiros interesses coletivos protegíveis no mercado do crédito. In: **Revista de Direito Bancário e do Mercado de Capitais**, 33 (2006), pp. 15-31.

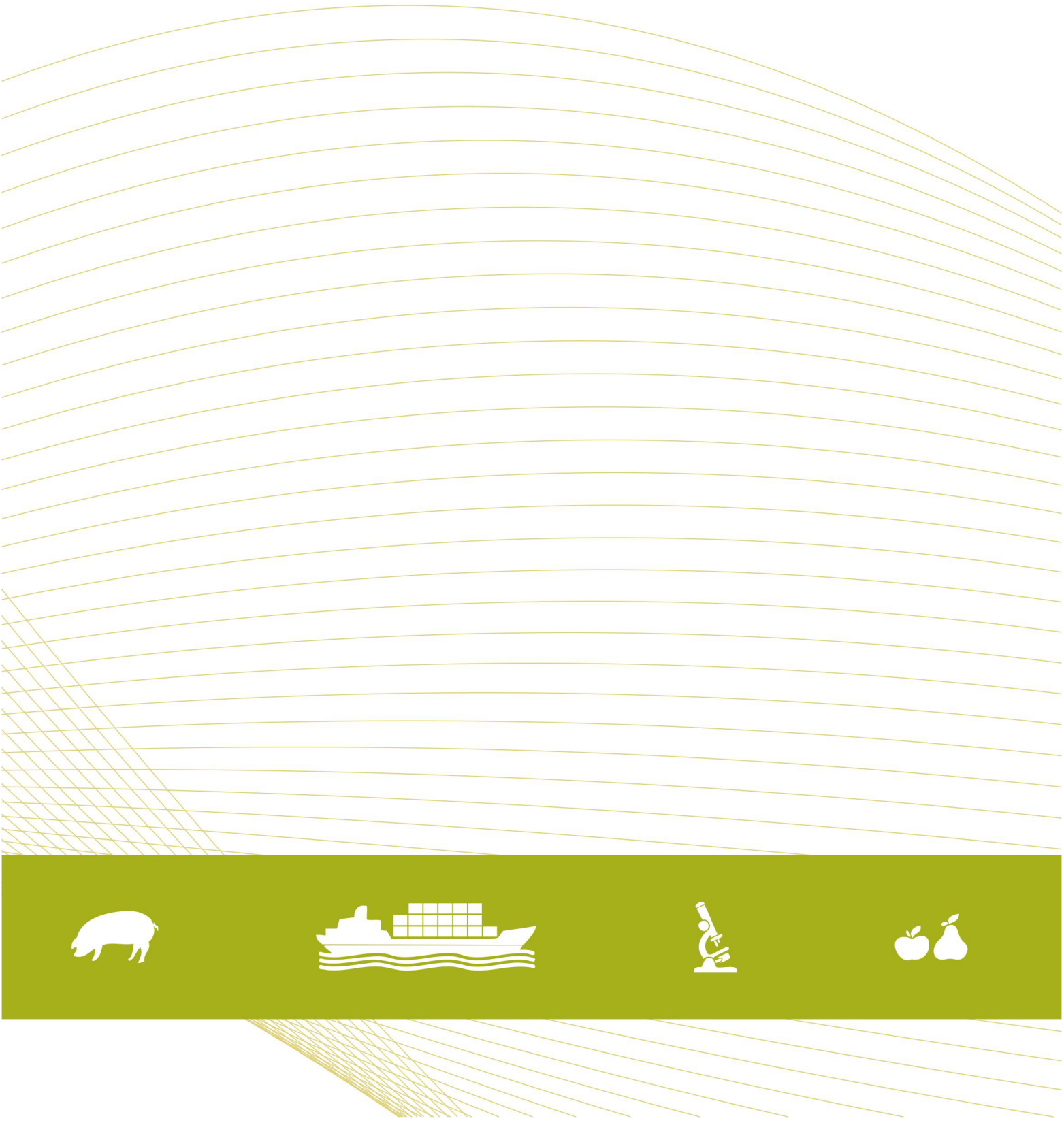
WILLIAMSON, Oliver. *The Economic Institutions of Capitalism*, New York: The Free Press, 1985.

_____; The New Institutional Economics: Taking Stock, Looking Ahead in *Journal of Economic Literature*, Vol. 38, No. 3. (Sep., 2000), pp. 595-613.

_____; MASTEN, Scott. *The economics of transaction costs*, Cheltenham: Edward Elgar, 1999.

ZYLBERSZTAJN, Decio; STAJN, Rachel. *Direito e Economia*, Rio de Janeiro: Elsevier, 2005

Public Policy and Regulatory Aspects



THE SOCIAL DIMENSION OF ETHANOL AND BIODIESEL IN THE BRAZILIAN PUBLIC POLICIES

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Abstract
Biodiesel, as a promising source of renewable energy, has received incentives of public policies in different countries. While some countries have adopted policies based on economic incentives for production and consumption, political discourse in Brazil has placed emphasis on the social role that biodiesel can play. The main goal of this paper is to do an analysis of public policies in Brazil to identify whether there is indeed a social bias associated with biodiesel or both ethanol and biodiesel, has had its macro-environment configured from the same footprint. The methodology uses text mining techniques to extract information in texts from the content of textual documents policies and programs of the Brazilian government involving these liquid biofuels. Following the steps of collecting and preparing the documents, the textual basis used contained 624 official documents published between 1997 and 2006. The results indicate some similarities have been compared with the configuration of the macro-environment for ethanol and biodiesel. However, it is clear that biodiesel is closer to the social dimension. In conclusion, this study suggests that public policy in Brazil has, in fact, characterized biodiesel as a social fuel.

Key-words: Biodiesel, Ethanol, Macro-environmental Analysis, Public Policy, Text Mining

THE SOCIAL DIMENSION OF ETHANOL AND BIODIESEL IN THE BRAZILIAN PUBLIC POLICIES

1. Introduction

The growing supply and demand for liquid biofuels as alternative and renewable energy is a relatively recent phenomenon. The macro-environment in which the industries of ethanol and biodiesel are located is undergoing intense transformation for more than a decade. According to the theoretical approaches, can be many drivers and many reasons for changes in macro-environment of a particular industry or sector of economic activity. However, no other factor has had greater influence in guiding the future directions and strategies in this new moment of the liquid biofuels industry than the public policies of governments in larger producers countries. (TYNER and TAHERIPOUR, 2007; TYNER, 2008).

In Brazil, this condition is similar. That is, the Brazilian government's policies directly influence the strategies and decisions of economic agents involved in the production and consumption of ethanol and biodiesel. From various governmental interferences, the liquid biofuels sector in Brazil has evolved considerably. Public policies to encourage ethanol production that began in 1970 with the launch of National Alcohol Program (Proalcool), and public and financial institutional support for the maintenance of production reflected both in the formation of a solid economic sector as technological advances in the auto industry. (BIODIESEL-BR, 2010). After periods of questioning, ethanol, commonly known as alcohol, has gained new strength with the world trend of seeking renewable energy sources in response to ongoing climate change (IPCC, 1990). With this new approach, public policies supporting ethanol production have consolidated and the ethanol production grown considerably, as can be proven by the statistics of the Union of Sugarcane Industry (UNICA, 2010).

With global discussions about the inclusion of new sources of renewable energy, the biodiesel has emerged as a potential alternative for some countries. In Europe, for instance, climate and soil conditions become biodiesel the main alternative among liquid biofuels. Public policies in European countries, like Germany, for instance, supported the outcrop in the biodiesel industry from the setting of targets to include renewable energy source, according to the targets set by the Renewable Energy Act (GERMANY, 2000); compulsory warranty to its growing use blended with fossil fuels (EC, 2006); and, tax incentives and subsidies that facilitate the reduction of the price of biodiesel to consumers (FRONDEL and PETERS, 2007).

In Brazil, the inclusion of biodiesel in the agenda of public policy-makers is a relatively recent event. Policy Directives on Agroenergy established by the Brazilian government in 2005, predicted for the "implementation of the biodiesel production chain", demonstrating that this sector was incipient and lacked structure and better organization among the different productive agents (BRAZIL, 2005). This and other guidelines were observed and included in the National Plan of Agroenergy, which defines the actions for the four main sources of bioenergy: ethanol, biodiesel, and biogas and forests (OLIVEIRA and RAMALHO, 2006). Although the National Plan of Agroenergy defines objectives related to economic, social and environmental matters

for all bioenergy chains, public policies for biodiesel chain seem to have a social bias more prominent than for others. This can be illustrated by the creation of the National Program for Production and Use of Biodiesel and by the launch of the Social Fuel Seal to be provided for industries which meet certain social requirements (PNPB, 2005). As for the ethanol production chain the focus seems to have been more of an economic and technological, once it is "recognized as the world's most efficient, which is driven by dynamic entrepreneurial class, accustomed to innovate and take risks" (OLIVEIRA and RAMALHO, 2006).

In a context in which public policies play a central role in consolidating the liquid biofuels sectors and social matters are relevant topics in political discourse as an argument to convince policy-makers and society to support government actions, the following questions must be done: Is the macro-environment for ethanol and biodiesel configured in the same way by Brazilian Government? To what extent the social dimension co-occurs with ethanol and biodiesel? It is, in fact, correct to say that biodiesel is a "social fuel"? The main goals of this paper are: to analyze the macro-environment configuration for ethanol and biodiesel from content analysis and textual documents of public policies; and, to compare the macro-environment configuration for ethanol and biodiesel deepening the analysis on social dimension.

2. Public policies for liquid biofuels in Brazil

The strategic actions and decisions of economic agents that operate on liquid biofuels sector are also influenced by public policies adopted by government. Thus, this section is intended to review aspects of public policies related to liquid biofuels in Brazil.

2.1. Public policies for alcohol (ethanol)[59]

Alcohol (fuel product extracted from sugarcane) has emerged in Brazil basically for two reasons: mitigate the crisis of the sugar industry and reduce the inside dependence on imported oil. However, despite these reasons of recent origin, the product has longstanding in Brazil. It appears that since the 1930's the government intervenes in the market, the actions of economic agents in the industry, because at that time the state was responsible, among other things, by production, and marketing products throughout the export of sugar and alcohol (MORAES, 2007). As a result of 1929's crisis there was a reduction in sugar exports and in 1933 was created the Institute of Sugar and Alcohol (IAA), whose purpose was to centralize the operations of sugar export inside the country.

The year 1973 there was the first major oil crisis and, in light of this, in 1975, a state intervention has been made by the National Program of Alcohol (PROÁLCOOL, Decree No. 76593/75), whose objective was to reduce dependence on foreign country's imported oil. After that Proalcool was launched can be observed five major phases in the sector (PAULILLO et al., 2007; LEITE and CORTEZ, 2008; MORAES, 2008; VIEIRA et al., 2008):

First, 1975-1979: the oil crisis and the reduction of sugar prices have influenced the emergence of the Proalcool. The goal was to encourage the production of anhydrous ethanol for use as a fuel blended with gasoline. At the time, the state intervened heavily in the sector;

[59] Although the term "ethanol" will be frequently used to define the biofuel before known as "alcohol", we chose to keep the name "alcohol" in this topic by the term historical link with public policies, for instance, Proalcool.

Second, 1980-1985: apogee of Proalcool, characterized by the structure of tax and financial public incentives. In the years 1981 to 1985 there was a concern of the Government with technological development in the sugarcane industry;
Third, 1986-1995: In the second half of the 1980s, the Brazilian economy went through a thorough process of deregulation that has been reinforced since the 1990s, years that the IAA was removed. Since then, the sugar and ethanol market was deregulated continually being complete with the release price of cane sugar, hydrated alcohol and crystal sugar (PAULILLO et al., 2008). Responsibility for policies for the sector were handled by the Ministry of Agriculture, Livestock and Supply, which incorporated a specific department for sugar and alcohol, called Secretary of Production and Marketing (OLIVEIRA and RAMALHO, 2006). In 1989 there was a scarcity of hydrated alcohol due to the substantial reduction in the share of public investment in the Brazilian ethanol industry, creating an imbalance between supply and demand for ethanol fuel, which has affect the confidence of the final consumer. In 1993, through the Federal Law No. 8.723/93, the government determined the blend of anhydrous ethanol in gasoline in a proportion ranging from 20% to 25% (UNICA, 2007);
Fourth, 1996-2000: in 1996 due to the worldwide concern with greenhouse gas emissions and increase the greenhouse effect, 55 countries signed the Kyoto Protocol, and ratified it in 1999. In the same year, according to Moraes (2007), there was the effective sugar and ethanol market liberalization when the State moved away from the sector. In 2000 was established the Inter-ministerial Council for Sugar and Ethanol (CIMA) through Decree No. 3546 of July, 17, 2000. In that same year the Federal Government has also encouraged agricultural production through the National Bank of Economic and Social Development – BNDES, in Portuguese (FAVERET FILHO et al., 2000); and,
Fifth, 2001 onwards: the Kyoto Protocol became effective since 2004 and outlined the policy for the countries on the environment through control goals for CO2 emissions from 2008 (PAULILLO et al., 2007). Because of this and other aspects of macroeconomic policy, alcohol was again the target of public policies. Law No. 9478 of August 6, 1997 and Constitutional Amendment No. 33, December 11, 2001[60], later supplemented by Law No. 10336 of December 19, 2001 and Law No. 10453 of May 13, 2002[61], were the pillars of the sector regulatory framework. These laws drove the deployment of free-market environment (end of state monopoly in the oil industry) and the definition of fuel tax model (OLIVEIRA and RAMALHO, 2006). However, the government still intervenes in the market through two mechanisms: setting the levels of anhydrous alcohol blended with gasoline and reduces the tax burden on the vehicles, which are set at lower rates of tax industrialized products (IPI) for ethanol-fueled vehicles, except for those until to a thousand cubic centimeters. Finally, the Incentive Program for Alternative Sources of Electric Energy (PROINFA - Decree 5.025/2004) is another important aspect which aims to diversify sources of energy by increasing the participation of renewable sources of energy (OLIVEIRA and RAMALHO, 2006).

2.2. Public policies for biodiesel

In 1975, the PROÓLEO (Production Program of Vegetable Oils for Energetic Purposes) has begun encouraging the production of biodiesel in Brazil, generating surpluses of vegetable oil with production costs competitive compared to petroleum. However, at that time, due to counter-shock oil, investments were not sufficient for

[60] This law regulates the incidence of CIDE - Contribution on Economic Activities - on import and marketing of oil, natural gas and its derivatives.
[61] This Law sets out the government intervention in production and marketing of ethanol fuel.

sustaining the biodiesel production, since there wasn't government incentive to create a biodiesel program in Brazil. Only In 2004, nearly 30 years after the PROÓLEO, tax incentives for biodiesel production and use emerged again through the National Program for Production and Use of Biodiesel (PNPB, in Portuguese), regulatory cornerstone of the introduction of biodiesel in the Brazilian energy matrix (SINISCALCHI, 2010).

Biodiesel can be blended in various proportions with petroleum diesel or can be used neat. As an example, it has to be a mixture of 2% biodiesel to petroleum diesel is considered as B2, and so continuously, until you get to pure biodiesel, B100 considered. The biodiesel market is recent and is certified by the publication of Law No. 11097 of January 13, 2005, with a perspective of eight years. This Law established that from January 2008, would add a mandatory minimum percentage of biodiesel with diesel in Brazilian territory and that it would start using the B2 mixture. Soon, all diesel oil fuel sold in Brazil would have 2% biodiesel. It was also defined a B3 fuel for 2009 and prospects an increase in the percentage of biodiesel to 5% for the beginning of 2013. It is worth to notice that this law considers that with the increase in productive capacity and the availability of raw materials, the timing could be anticipated by a resolution of the National Council of Energy Policy (CNPE).

In accordance with CNPE Resolution N. 03 of September 23, 2005, was anticipated for January 2006 using the B2 mixture, whose obligation was restricted to the volume of biodiesel produced by holders of the Social Fuel Seal (SFS), which was created so that a generation of jobs and income, through social inclusion (BRAZIL, 2005). In July 2008 came into effect mandatory the use of the B3. For the second half of 2009 established the requirement of B4, and in January 2010, became mandatory use of B5. In other words, there was an anticipation of scheduling the blend of biodiesel to diesel, according to Law No 11.097/2005, showing that productive agents have responded satisfactorily to public policies aimed at the introduction of biodiesel in the Brazilian energy matrix.

The PNPB aims to implement the production and use of biodiesel in a sustainable way, both technically and economically, with a special focus on social inclusion and regional development by generating employment and income (BIODIESEL, 2010; BIODIESEL-BR, 2010). In this context, the Federal Government created the SFS which is a set of specific goals and procedures, seeking to encourage the social inclusion of small farmers and creating opportunity for farmers' family to provide raw material for biodiesel production. The SFS was created by Decree No 5297 of December 06, 2004, to identify biodiesel producers who promote social inclusion, generating jobs and income for that farmers participating in the National Program to Strengthen Small Farmers Agriculture (PRONAF, in Portuguese). Moreover, the organizations (biorefineries) involved in projects with SFS have a better access to financing conditions from the BNDES credit lines and other financial institutions; rights to participate in auctions to sell biodiesel to the National Petroleum Agency (ANP, in Portuguese); and, some tributaries benefits. On the other hand, biorefineries should assure the purchase of raw materials paying a pre-set price and providing market security to small farmers (BIODIESEL, 2010). To this end, public policies for biodiesel have considered that it is a setting product in Brazil due to country economic attractiveness and large-scale oilseeds production with a low cost, higher productivity and superior yield oil/soybeans (BIODIESEL, 2010).

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Anyway, in the current scenario, it is observed that both ethanol and biodiesel have become part of the agenda of public policy-makers, especially in light of challenges set by the Kyoto Protocol and the growing demand for renewable fuels. In the case of ethanol, we could verify that the product has longstanding in Brazil, compared to biodiesel. Until the 1990s the government plays a central role in the sugar and ethanol market. Today, the Brazilian public policies seek only to stimulate the competitiveness of ethanol by influencing the actions of economic agents in a most liberalized market.

For biodiesel, unlike ethanol, there is a concern of the government regarding the need to encourage producers, especially small ones, to produce oilseeds. In this sense, much of public policy deals with tax exemptions, reducing taxes, lending facilities and funding to expand job positions, income generation, and look for a deeper social inclusion. For this, we should emphasize that Brazil is the world's second larger producer of ethanol, possessing advanced production technology and an extensive knowhow in producing ethanol from sugarcane. Biodiesel, on the other hand, must receive stimuli that enable its production on a large scale. Moreover, there is a core concern of the government with social issues, and a large number of public policies that favor the social inclusion of small farmers in the biodiesel chain can be found.

3. Methodological Procedures

After following its particular course, the final contents of public policies is published in documents in the form of laws, decrees, instructions, regulations, official documents of government programs aimed at specific areas, among others. Public policies on bioenergy follow the same path. Therefore, to analyze the content of public policy on liquid biofuels (ethanol and biodiesel) for the Brazilian Government it is necessary to do a documental analysis taking into account the textual content of a set of official documents.

Reinforcing the importance of analyzing textual content of documents Karanikas and Theodoulidis (2002) and Hale (2005) stated that 80% of information is present in different types of written documents. Transforming the high volume of information presented in thousands of documents in a manageable knowledge requires the use of modern tools of information technology. In this context, the concept of Knowledge Discovery in Texts (KDT) and technique of Text Mining (HALLIMAN, 2001) were used for the analysis of textual documents of public policies focused on liquid biofuels in Brazil. The procedures adopted for Text Mining followed a hybrid structure, based on

studies of Liddy (2000), Karanikas and Theodoulidis (2002), El Wakil (2002), Silva *et al.* (2004), and Hippner and Rentzmann (2006).

Searching and gathering of textual documents of public policies were made from a list of keywords that represent the research topic "liquid biofuels", given the frequency with which they have occurred in the literature addressing issues related to bioenergy, bioeconomy (Bio-based economy), and biofuels. The selected keywords were: BIOFUEL, BIOFUELS, ETHANOL, ETHANOL, BIOETHANOL, ALCOHOL, BIOFUEL, BIOFUELS BIO-FUEL, BIO-FUELS, BIODIESEL, and BIO-DIESEL. Any documents on which the keyword "ALCOHOL" appeared and was related to alcoholic beverage and/or to alcoholism were discarded. From the set of key-words, textual documents were searched in different government agencies using as a starting point the Brazilian government's official portal on the World Wide Web (http://www.brazil.gov.br).

In the next step, the websites from all Federal Ministries, Departments, and Agencies were accessed and by using searching engines available on their own websites, it was made the search for documents containing the keywords listed above. Important highlights that the information available in the "Press Room" of the various federal entities accessed were not collected.

The search, selection and collection of textual documents of public policies and the construction of the primary text-base began in February 2007 and were completed in June 2007. Moreover, given the proposed analysis of this longitudinal study, which sought to examine a ten-year period, we collected electronic text documents covering annually the period from 1997 to 2006. At the end of this step had been collected 673 textual documents of official public policy of the Brazilian Federal Government related to liquid biofuels.

Once collected the documents, their contents were transferred to an electronic text-base built using the software QDA Miner®, preparing documents for further implementation of the mining process (Text Mining). Because the QDA Miner® software uses *RTF (Rich Text Format) as file extension for the construction of text-bases, 49 documents were lost because blocked access to their contents. Therefore, the final composition of the text-base consisted of 624 government documents.

Once there is no a single methodology specific to extract the knowledge from textual content was necessary to build an analytical framework capable of extracting the desired information. The use of a list of keywords is often suggested and used, as can be seen in Vincent (2006), Crawley (2007), and Singh et al. (2007). The first step towards building our specific analytical framework was related to the definition of macro-environmental dimensions to be used in our analysis. According to the management literature on macro-environment analysis, the dimensions most frequently used are those relating to the acronym "PESTEL", in other words, Political, Economic, Socio-cultural, Technological, Environmental, and Legal (WALSH, 2005; JOHNSON et al., 2008). The number of dimensions and its label vary from one study to another, depending on the specific interest of each case, the environment studied and/or activity, allowing some flexibility. For this study, we used nine dimensions: Agronomical, Environmental, Cultural, Economical, Geopolitical, Legal, Political, Social, and Technological.

Macro-environmental dimensions defined, the challenge was to define how to capture the presence of these dimensions in the textual content of public policy documents. We decided then to use a set of discriminating terms of each dimension, but how to reach them? The next steps were to identify the key words representing each dimension, which will be treated here as "dimension-word" or just "d-word." The "d-

words" are those relevant terms that best discriminate a certain macro-environmental dimension. Thus, nine different lists of "d-words" were defined. The set of "d-words" for each dimension was defined from TF*IDF[62] index of relevance of the words in the content of scientific papers published in journals in the areas of knowledge closed related to the macro-environmental dimensions (JING *et al.*, 2002; AIZAWA, 2003). To identify the "d-words" that better discriminate the economical dimension, for instance, was selected the some scientific journals in the field with high Impact Factor[63]: *Quarterly Journal of Economics* (IF = 3,938), *Review of Economic Studies* (IF = 2,000), *Oxford Economic Papers* (IF = 1,132), *Journal of Economic Theory* (IF = 1,046), and *Cambridge Journal of Economics* (IF = 0,571). Each journal volume was randomly selected for the following years: 1998, 2000, 2002, 2004, and 2006. These years cover the same period proposed for the study (1997-2006). The same criteria and procedures were adopted for the other dimensions.

The amount of "d-words" assigned to each dimension was defined by using percentile measures, selecting the amount of terms that best discriminated each dimension. On average, we used 14 "d-words" for each dimension. Because some "d-words" were common to two or more dimensions, some rules were associated to them in each specific dimension. The rules took into account the co-occurrence of terms in the same document. Jaccard's coefficient was used to define the rules (CHUNG and LEE, 2001).

The Text Mining was performed using the text-basis of written textual documents in electronic format and the analytical structure for knowledge extraction built from the macro-environmental dimensions and their respective "d-words". Using the WordStat module from SIMStat® software, it was possible to count the frequency with which each "d-word" occurred in the aggregate set of documents and over the ten years searched and studied. The frequency revealed under which macro-environmental dimension Brazilian Government had framed the liquid biofuels along the time.

The low observed frequency of Social dimension in the first set of results deposed in a contrary way to empirical evidences of public policies, especially related to biodiesel. For this reason, a new dimension, called "Social 2", was developed. To this new "Social 2" dimension was assigned "d-words" extracted from the documents: Policy Guidelines for Agroenergy, National Plan of Agroenergy and the National Program for Production and Use of Biodiesel. We tried to identify "d-words" that would appeal or be related to social issues. The list of "d-words" for "Social 2" dimension can be viewed in the Figures 4 and 5 which are presented in the Section 4.2.

For the analysis of the results the absolute and relative frequencies of occurrence of each of the frameworks under macro-environmental dimensions were used. From the frequencies, the homogeneity test was used to evaluate the existence of similarities between the macro-environmental configuration for ethanol and biodiesel. Finally, it is worth noting that for some outcomes, data were analyzed in increasing level of closeness. In other words, the first set of results of the macro-environmental configuration for liquid biofuels in general. In a second block of results the co-occurrence of both ethanol and biodiesel with macro-environmental dimensions taking into account the "documents" as unit of analysis (more extended comprehensive analysis) are presented. Finally, advancing to the "paragraphs" as unit of analysis where the co-occurrence between liquid biofuels and macro-environmental dimensions is more expressive.

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[62] TF*IDF = Term Frequency (TF) multiplied by the Inverse Document Frequency (IDF)

[63] The values for Impact Factor were obtained from the CAPES Periodicals Portal in 2007.

4. Results

In this section results obtained from the analysis of public policies documents for liquid bio-fuels in Brazil are presented. The section is organized into two distinct topics: at first, a comparative analysis is performed between the configuration of the macro-environment for ethanol and biodiesel; and, second, results regarding the co-occurrence of the Social dimension (Social2) with ethanol and biodiesel are especially emphasized.

4.1. Comparing the macro-environmental configuration for Ethanol and Biodiesel

The first aspect to be analyzed concerns the volume of public policies documents dealing with different types of liquid biofuels. The results presented in Figure 1 show how recent are public policies for biodiesel in Brazil. Between 1997 and 2002 there was a predominance of documents discussing public policy for ethanol. During that period, the percentage of documents on biodiesel did not exceed 15%. However, since 2003 onwards biodiesel, in fact, takes part of the agenda of Brazilian public policy-makers. From 2003 the number of documents dealing with public policies for biodiesel is increasing and, from 2005, has a relatively greater share in relation to documents of ethanol. Possibly, this fact has been strongly motivated and driven by government policy proposed by President Lula and by the opportunities envisioned by economic agents, who have also requested for regulation in biodiesel market.

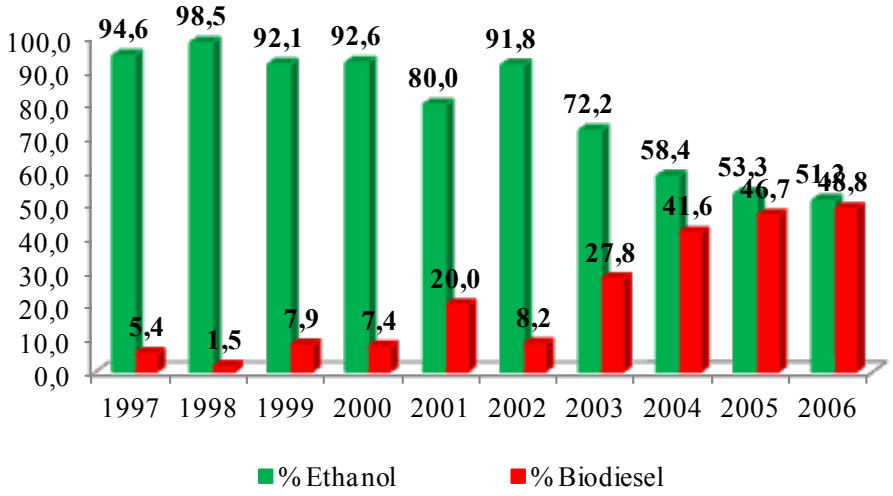

Figure 1 - Documents addressing "Ethanol "or "Biodiesel" (Percent)
Source: Research data

For comparative analysis of the macro-environmental configuration for ethanol and biodiesel have been identified the co-occurrence of them with macro-environmental dimensions into two levels: documents and paragraphs. The analysis of co-occurrence in each of these levels shows how often each biofuel has co-occurred with each dimension in the content of documents of public policy as a whole and in the content of its paragraphs. Thus, one can suppose that the more often a biofuel and a dimension occur in the same document, the greater the importance of this dimension in configuring the macro-environment for that biofuel. Otherwise, the smaller the unit of analysis (paragraph instead document), this relationship is more significant. In Figure 2 are plotted the frequencies of co-occurrence between ethanol and biodiesel and the macro-environmental dimensions.

According to results of co-occurrence in the same document can be verified that the configuration of the macro-environment presents some differences between the two types of liquid biofuels. The documents of public policies that, at some point discuss ethanol, deal mainly with issues related to technological, legal, political, economical, geopolitical, and environmental aspects, whose co-occurrences with ethanol were observed in range from 309 to 378 documents. That is, in 49.5% and 60.6% of the documents of public policies on ethanol are linked to those macro-environmental dimensions. The other dimensions are also present in the configuration of the macro-environment for ethanol, but at lower levels of prominence.

On the other hand, the macro-environmental configuration for biodiesel has a distinct pattern in some aspects. The first observation is that there are a greater number of dimensions close to biodiesel and whose co-occurrences present lower frequency amplitude. In other words, the cultural dimension, which occurred less frequently, co-occurs with biodiesel in 109 (17.5%) documents, while the most frequent, technological dimension, occurred in 229 (36.7%) documents (amplitude inferior than 20 percentage points). Therefore, in the case of biodiesel, excluding the social and cultural dimensions, the macro-environment for biodiesel has been set up under a broader range of dimensions and therefore different from the macro-environment configured for ethanol. The dimensions that have most frequently co-occurred with the biodiesel were the technological, political, legal, environmental, geopolitical, and agronomical. This order of frequency with which the macro-environmental dimensions co-occur with the biodiesel also shows differences with respect to ethanol.

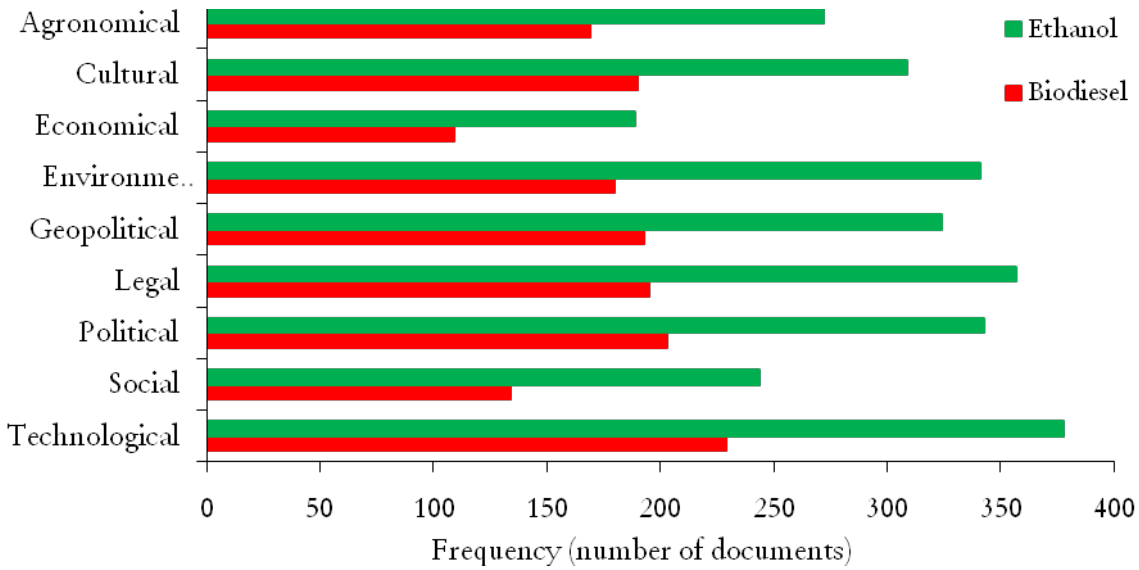

Figure 2 - Co-occurrence between ethanol and biodiesel with macro-environmental dimensions – "Document" as the unit of analysis
Source: Research data

However, despite the differences pointed out earlier, we find a relatively common order among dimensions which co-occur more frequently with ethanol compared to those that co-occur with biodiesel. This similarity is also supported by the results obtained in the homogeneity test between ethanol and biodiesel using the Chi-square statistic. Test results for the configuration of the macro-environment at a "document" level shows that the hypothesis of homogeneity between the macro-environment configuration for ethanol and biodiesel must be accepted at a significance level of $\alpha = 0.001$ ($\chi^2 = 3.0598$; p-value = 0.9305, df = 8). That is, although there are

differences in the frequency with which the dimensions co-occur with the two bio-fuels, the proportion with which each dimension is used together with that biofuels does not differ statistically.

The second level of analysis compared the macro-environmental configuration for ethanol and biodiesel in the content of the paragraphs of public policy documents. Figure 3 shows the frequency with which each macro-environmental dimension co-occurred with ethanol and biodiesel in the same paragraph.

The analysis of the macro-environment configuration from the contents of paragraphs reveals a largest divergence between the two biofuels than that observed at the document level. Besides the number of paragraphs dealing with the ethanol to be more frequent than those that deal with biodiesel, the use of dimensions for the configuration of the macro-environment is less consistent between the two biofuels. The most significant difference is that the main issues coming towards to ethanol are the technological, geopolitical, legal, and political ones, while for biodiesel are the technological, agronomical, environmental, and economical issues. Among the four dimensions that co-occur more frequently between the two biofuels only the technological dimension is common to both. Still, this dimension presents a large domain scale in public policies related to ethanol.

In general lines and for the meaning that the co-occurrence has, given that the biofuel and dimensions occur together in the contents of paragraphs whose idea expressed there is unified, these results show the configuration of the macro-environment for ethanol and biodiesel from public policies follows a distinct pattern. In other words, public policies for ethanol are defined on different bases from those proposed for biodiesel, with another focus, other constraints, and other priorities. Except for a few similarities to the co-occurrence of the technological dimension, this conclusion finds support in the homogeneity test between ethanol and biodiesel using statistical Chi-square test. The test results show that the hypothesis of homogeneity between the macro-environment configuration for ethanol and biodiesel should be rejected at a significance level of $\alpha = 0.001$ ($\chi 2 = 1030.89$, p-value = 0.00000, df = 8). That is, although there is little similarity in order of importance of a dimension as its co-occurrence with the two bio-fuels, the proportion with which each dimension is used together with biofuels for the configuration of the macro-environment differ statistically.

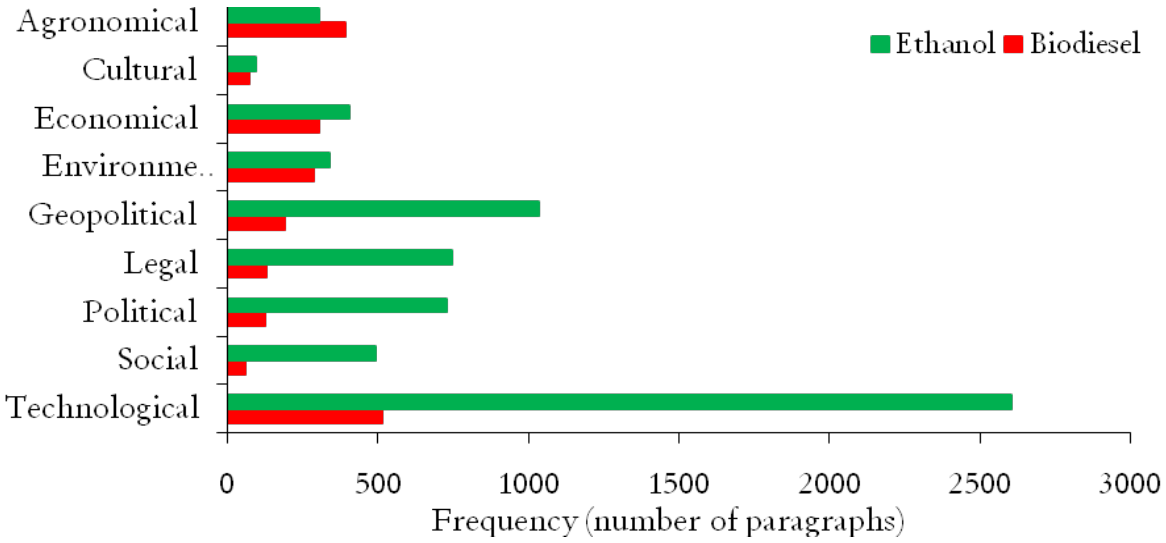

Figure 3 - Co-occurrence between ethanol and biodiesel with the macro-environmental dimension – "Paragraph" as the unit of analysis
Source: Research data

Analyzing the results extract from the documents and paragraphs can be concluded that the documents as a whole appear to be objects of broader public policies, addressing a broad range of themes and dimensions that are relatively common to both biofuels. However, when analyzing the content becomes more detailed and more specific standards are hunted for each of the biofuels, which is observed is that the Brazilian public policies configure the macro-environment for ethanol and biodiesel in a distinct way or differently.

4.2. The Social Dimension compared

A particularly surprising result was the closest proximity of the social dimension with ethanol than with biodiesel (see Figure 3). The public discourse of the Brazilian government has assigned more biodiesel than ethanol with social issues. However, the results of this study show the opposite. Aiming to deepen the comparative analysis of ethanol and biodiesel was constructed another set of "d-words" for a second social dimension (Social2) as considerations made in Section 3. The results of co-occurrence of "d-word" in the Social2 dimension with ethanol and biodiesel in the documents of public policies in Brazil can be visualized in Figure 4.

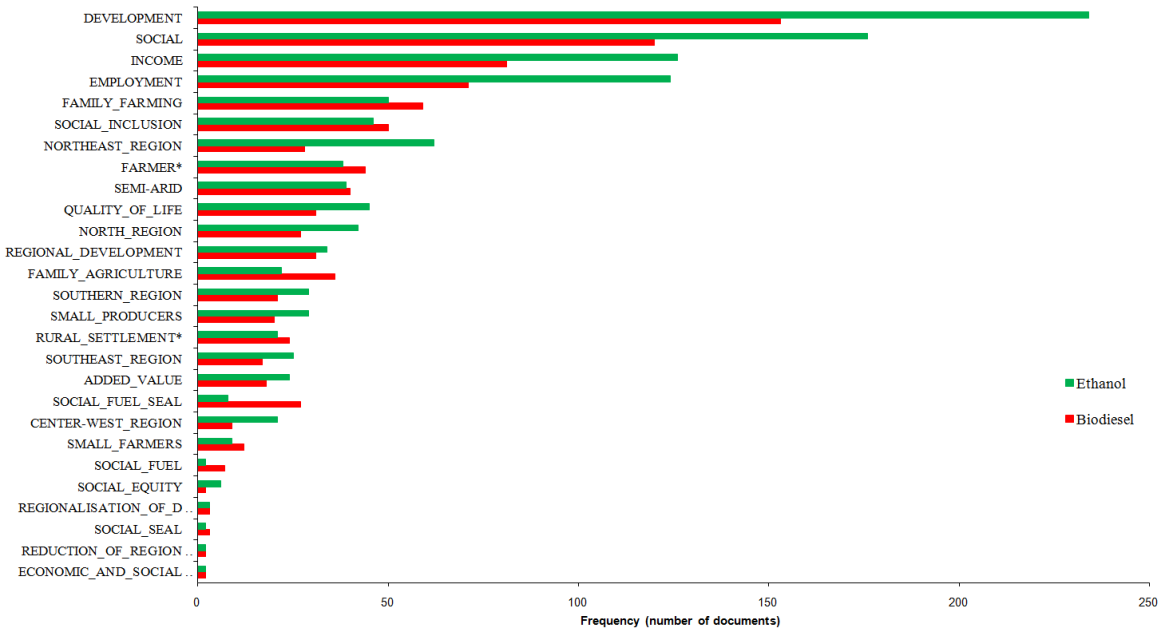

Figure 4 - Co-occurrence between ethanol/biodiesel and Social2 dimension - "Document" as the unit of analysis
Source: Research data

Out of the twenty-seven "d-words" that discriminate the Social2 dimension only ten co-occur more frequently with biodiesel than with ethanol. They are: family_farming, social_inclusion, farmer*, semi_arid, family_agricuture, rural_settlement*, social_fuel_seal, small_farmers, social_fuel, and social_seal. For both the biofuels "d-words" that co-occurred with most frequency are: development, social, income, and employment. Again, the main differences are the frequencies with which the "d-words" co-occurred with biofuels; there were no significant differences in

ranking of importance of these “words-d” to the ethanol or biodiesel. Thus, one can deduce that the documents of public policies are broad and include both biofuels and different aspects of social dimension.

Results derived from analysis of co-occurrence of “d-words” associated with the Social2 dimension with ethanol and biodiesel in the same paragraph were obtained to refine the analysis. These significant findings are shown in Figure 5.

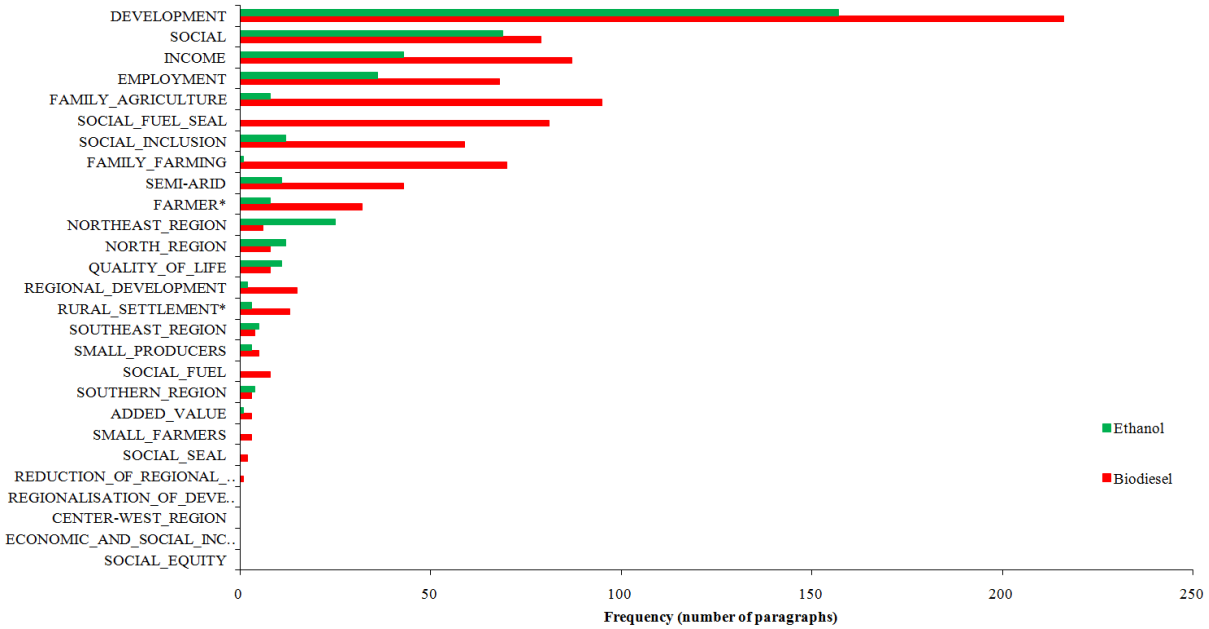

Figure 5 - Co-occurrence between ethanol/biodiesel and Social2 dimension - "Paragraph” as the unit of analysis
Source: Research data

As previously mentioned, the co-occurrence of terms in the same paragraph is more representative that some kind of direct relation between them exists than the co-occurrence in the same document. So, observing Figure 10, it is clear that public policies for biodiesel in Brazil reveal a bias to be more social than policies for ethanol. Out of the twenty-seven “d-words” that compose Social2 dimension only five co-occurs more frequently with ethanol. All other twenty-two “d-words” present a predominant relationship with biodiesel. It is also worth noting that the analytical structure built for the Social2 dimension has proven reliable, since the “d-word” formed by "Social_Fuel_Seal", which belongs to the National Program of Production and Use of Biodiesel (PNPB), co-occurred only with the biodiesel, as was expected. In short, observing these results we can say that biodiesel fuel is a more social than ethanol, at least analyzing the content of public policies in Brazil.

5. Concluding Remarks

This study was developed in order to analyze the macro-environmental configuration for ethanol and biodiesel in a comparative way, and to further investigate the social perspective of public policy for both liquid biofuels. To achieve these objectives, an analysis of documents from official written documents of the Federal Government’s public policies related to liquid biofuels published over ten years was accomplished. The concept of Knowledge Discovery in Text and a set of Text mining techniques were used to extract the necessary information.

Comparatively, the macro-environmental configuration for ethanol and biodiesel follows a similar pattern when the units of analysis are the documents as a whole. Although there is some difference in the relative relevance of each dimension as its co-occurrence with ethanol and biodiesel, the fact is that the order of frequency with which the dimensions co-occur with these biofuels is not significantly changed. The conclusion is that the content of public policies documents on liquid biofuels is broad and covers a variety of similar aspects in their full content. On the other hand, when the paragraphs are taken as units of analysis, some differences can be observed. Exception from the technological dimension, which occupies a prominent position in the joint occurrence for both biofuels, there is difference among the set of dimensions that most co-occur with each biofuel. While the technological, geopolitical, legal, and political dimensions are the most co-occur with ethanol, the technological, agronomical, economical, and environmental dimensions are the ones that more co-occur with biodiesel. Regarding the particularities from the analysis presented in paragraphs, we can conclude that, in fact, the context in which the macro-environment for ethanol and biodiesel is set varies or be different. Thus, one can assume that there are specific public policies for each liquid biofuel (ethanol and biodiesel), highlighting aspects inherent to their peculiarities.

The results from a methodology used revealed a macro-environment in which the social dimension had low salience. Comparative analysis of Social dimension from the use of "d-words" extracted from certain documents of public policy, which have social appeal, revealed significant differences between ethanol and biodiesel. The difference between them was more prominent when the units of analysis were the paragraphs instead of documents. In this case, the results showed a wide prevalence of co-occurrence of biodiesel with a social dimension. In short, the conclusion is that while the social dimension has not been in wide use for configuring the macro-environment for ethanol and biodiesel, the social aspects of the introduction of biodiesel in the matrix of energy could be captured. These results have been aligned with the public discourse of the federal government to use biodiesel as generator of regional development, employment and income, through social inclusion, especially through farmer's settlements and support for small farmers, although these are not the most important issues in content of federal public policies.

The goal to scan the macro-environment for liquid biofuels is not for a strategic planning purpose, but to analyze the content of public policies based on the logic of macro-environmental analysis. However, the macro-environmental configuration could be obtained from different stakeholders and used for specific needs. Therefore, it behooves to public policy-makers consistently and coherently aligns its public discourse with the content of public policy proposed.

6. Acknowledges

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6. References

AIZAWA, A. An information-theoretic perspective of tf-idf measures. 2003. p.45-65.
BIODIESEL. Programa Nacional de Produção e Uso de Biodiesel: o Programa. Disponível em: http://www.biodiesel.gov.br. Acesso em: 02 de agosto de 2010.

BIODIESELBR. ProÁlcool - Programa Brasileiro do Álcool. v. 2010. Disponível em: http://www.biodieselbr.com. Acesso em 2 de agosto de 2010.
BRAZIL. Diretrizes de Política de Agroenergia, 2006-2011. Brasília, DF. 2005. p. 1-34.
CHUNG, Y. M.; LEE, J. Y. A corpus-based approach to comparative evaluation of statistical term association measures. *Journal of the American Society for Information Science and Technology*, v. 52, n. 4, p. 283-296, Feb 2001.
CRAWLEY, C. E. Localized debates of agricultural biotechnology in community newspapers - A quantitative content analysis of media frames and sources. *Science Communication*, v. 28, n. 3, p. 314-346, Mar 2007.
EC - EUROPEAN COMMISSION. Third National Report on the Implementation of Directive 2003/30/ECof May 2003 on the Promotion of the Use of Biofuels or Other Renewable fuels for Transport for 2005. In: European Commission, 2006.
EL WAKIL, M. M. *Introducing Text Mining*. Cairo: Cairo University, 2002. Unpublished Work.
FAVERET FILHO, P. *et al.* O plano do BNDES no financiamento ao investimento agropecuário. *Revista de Política Agrícola*, v. 3, n. 3, p. 54-60, 2000.
FRONDEL, M.; PETERS, J. Biodiesel: a new oildorado? *Energy Policy*, v. 35, p. 10, 2007.
GERMANY. Act on Granting Priority to Reneable Energy Sources. In: FEDERAL MINISTRY FOR THE ENVIRONMENT (Ed.). *(Renewable Energy Sources Act)*. Berlim, 2000.
HALE, R. Text mining: getting more value from literature resources. *Drug Discovery Today*, v. 10, n. 6, p. 377-379, Mar 2005.
HALLIMAN, C. *Business Intelligence Using Smart Techniques: environmental scanning using text mining*. Houston: Information Uncover, 2001.
HIPPNER, H.; RENTZMANN, R. Text Mining. *Informatik-Spektrum*, v. 29, n. 4, p. 4, 2006.
IPCC. *Scientific Assessment of Climate Change*. Intergovernmental Panel on Climate Change. United Kingdom, p.1-365. 1990
JING, L. P. *et al.* Improved Feature Selection Approach TF-IDF in Text Mining. In: First International Conference on Machine Learning and Cybernetics, Beijing, China. 2002. p.944-946.
JOHNSON, G. *et al. Explorating Corporate Strategy: Text and Cases*. 8th. ed. Harlow: Pearson, 2008.
KARANIKAS, H.; THEODOULIDIS, B. *Knowledge Discovery in Text and Text Mining Software*. Manchester: Centre for Research in Information Management, Department of Computation, UMIST, 2002. Unpublished Work.
LEITE, R. C.; CORTEZ, L. A. B. O etanol combustível no Brasil. Disponível em: http://www. mre.gov.br. Acesso em 02 de agosto de 2008.
LIDDY, E. D. Text Mining. *Bulletin of the American Society for Information Science and Technology*, v. 27, n. 1, p. 2, 2000.
MORAES, M. A. F. D. As profundas mudanças institucionais ao longo da história da agroindústria canavieira e os desafios atuais. *Economia Aplicada*, v. 11, n. 4, p. 555-557, 2007.
MORAES, M. A. F. D. Considerações sobre a indústria do etanol no Brasil. Disponível em: http://www.mre.gov.br. Acesse em 02 de agosto de 2008.
OLIVEIRA, A. J.; RAMALHO, J. Plano Nacional de Agroenergia, 2006-2011. In: MAPA (Ed.). v. 1. Brasília, DF: Embrapa Informação Tecnológica, 2006. p. 1-114.

PAULILLO, L. F. *et al.* Autogestão, governança setorial e sustentabilidade no complexo agroindustrial canavieiro no século 21. *Revista Política Agrícola*, v. 1, n. 1, p. 41-63, 2008.
PAULILLO, L. F. *et al*. Álcool combustível e biodiesel no Brasil: quo vadis? *Revista de Economia e Sociologia Rural*, v. 45, n. 3, p. 531-565, 2007.
PNPB. Programa Nacional de Produção e Uso de Biodiesel. Brasília, DF: Governo Federal do Brasil, 2005.
PROVALIS, R. *WordStat: Content Analysis Module for SIMSTAT & QDA Miner – User´s Guide*. Montreal: Provalis Research, 2005.
SILVA, C. *et al.* Mining Linguistically Interpreted Texts. In: 5th International Workshop on Linguistically Interpreted Corpora, Geneva. 2004. p.4. Disponível em:<www.coli.uni-saarland.de/conf/linc-04/silva.pdf>. Acesso em: 26 de abril de 2006.
SINGH, N. *et al.* Text mining a decade of progress in hospitality human resource management research: Identifying emerging thematic development. *International Journal of Hospitality Management*, v. 26, n. 1, p. 17, 2007.
SINISCALCHI, C. R. *Análise da viabilidade da inserção da agricultura familiar do semiárido no Programa Nacional de Produção e uso de Biodiesel: o caso do Ceará*. (2010). (Mestrado em Planejamento Energético) - Programa de Pós-Graduação em Planejamento Energético, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2010.
TRIOLA, M. F. *Introdução à Estatística*. 9. ed. Rio de Janeiro: LTC, 2005.
TYNER, W. E. The US ethanol and biofuels boom: its origins, current status, and future prospects. *BioScience*, v. 58, n. 7, p. 646-653, 2008.
TYNER, W. E.; TAHERIPOUR, F. Renewable energy policy alternatives for the future. *American Journal of Agricultural Economics*, v. 89, n. 5, p. 1303-1310, 2007.
UNICA. Produção e uso de etanol combustível no Brasil: respostas as questões mais freqüentes. In: União da Indústria de Cana-de-açúcar (Ed.). São Paulo: Unica, 2007. Cap. 70.
UNICA. Dados e Cotações. *Anual*: União da Indústria de Cana-de-Açúcar, 2010.
VIEIRA, M. C. A. *et al.* Setor sucroalcooleira brasileiro: evolução e perspectivas. Disponível em: http://www.mre.gov.br. Acesso em 02 de agosto de 2008.
VINCENT, R. C. A Comparative Study of Wsis News Coverage in North American and European Broadcast/Satellite, Newspaper and Wire Service Sources, 2001-2005. *International Association for Mass Communication Research*. The American University in Cairo2006. p. 23-29.
WALSH, P. R. Dealing with the uncertainties of environmental change by adding scenario planning to the strategy reformulation equation. *Management Decision*, v. 43, n. 1, p. 10, 2005.

NATIONAL IRRIGATION POLICY AND SOCIOECONOMIC DEVELOPMENT IN THE NORTH OF MINAS GERAIS

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Abstract
This article aims to analyze the impacts of the National Irrigation Policy on the socioeconomic development of Janaúba, Manga, Pirapora and Porteirinha municipalities, which are located in the northern region of Minas Gerais state. Furthermore, it was highlighted the differences in relation to the socioeconomic status in the population of these cities by considering a set of variables as well as rank them according to the factors constructed. It was selected 17 socioeconomic variables of the year 1970 (before the implementation of the actions of the policy) and the year 2000 (after implementation) for the 44 municipalities which comprised the region in 1970. This study used, as an analytical model, an approach to multivariate data. The results showed that municipalities that were benefited by the policy presented different levels of socioeconomic development in relation to the factors analyzed. Moreover, the results highlighted the difficulty to evaluate the impact of politics on the development level of a given municipality.

Key words: multivariate analysis, public irrigation project, socioeconomic development, North of Minas Gerais.

NATIONAL IRRIGATION POLICY AND SOCIOECONOMIC DEVELOPMENT IN THE NORTH OF MINAS GERAIS

1. Introduction

The implementation of public irrigation program in Brazil aimed to stimulate the development of regional economy by creating jobs, combating the rural exodus and migration and poverty reduction. In order to guide the implementation of the Brazilian program of public irrigation, the Federal Government, by Decree-Law No. 6662 of June 25th, 1979, established the National Irrigation Policy.

The construction of Public Irrigation Projects was one of the main actions of the National Irrigation Policy. In general, the public irrigation projects present three phases until its full implementation. In the first phase, the project is under study, i.e., when the technical feasibility studies and implementation are still under analysis and detail. In the second phase, we have the implementation, which corresponds to the start of works of infrastructure construction for the project operation. The third and final phase, the project enters the production stage and receives the name of the irrigation district

According to the Companhia de Desenvolvimento do Vale do São Francisco e Parnaíba - Codevasf (2010), there are twenty-three irrigation districts in Brazil in production, six projects under deployment phase and three in study phase. It should be noted a concentration of public irrigation projects in the North of Minas Gerais, sheltering four (Gorutuba, Jaíba, Lagoa Grande and Pirapora) of twenty-three irrigation districts existing in the country, and a project in study phase, the Jequitaí Project. Also stands out, have been and continue being applied large amounts of resources in the projects. According to a survey of the Department of Water Infrastructure (2005), the three main public irrigation perimeters of Minas Gerais - Gorutuba Project, Jaíba Project and Pirapora Project, consumed an amount of capital higher than 1.5 billion dollars.

However, the number of assessment studies of impact of public irrigation projects in this region is still incipient. Since there is no consensus on the results of the National Irrigation Policy able to manage the actions of public authority and to deliver accountability to society of the resources applied in public irrigation projects, much has been asked about the need to analyze the socioeconomic development of regions and municipalities benefited by the deployment of public irrigation projects.

Thus, we tried to present to the four municipalities of the northern region of Minas Gerais, which have benefited from the deployment of public irrigation projects its position in terms of an indicator of socioeconomic development, either in absolute values or in terms of placement in ranking of the region. It is expected that the implementation of a public irrigation project does not contribute towards the promotion of development, and then the cities surveyed will not show good indicators that characterize this stage, similarly, if the presence of an irrigation project contributes to the development, then the cities surveyed will present a good indicator. In this sense, it was also sought analyze comparatively the levels of development achieved by these municipalities and the region before and after the implementation of public irrigation projects through a number of indicators.

In addition to this introductory section, this article is divided into five sections. The second section highlights synthetically the objectives and guidelines of the National Irrigation Policy. In the third section are presented the irrigation districts of northern region of Minas Gerais. In the fourth section, the methodological procedures are specified and the database used. Results and discussion derived from analysis of data are in the fifth section. In the sixth and final section, the final considerations are presented.

2. National Irrigation Policy

Because of the potentiality of irrigated agriculture and climatic and socioeconomic characteristics of the Vale do São Francisco and Parnaíba, and based on the premise of the theory of economic growth, the public authority during the decades from 1950 to 1980, began the implementation of National Irrigation Policy, performing investments in economic infrastructure of the region.

The National Irrigation Policy was established by Law No. 6662 of June 25th, 1979[64], and aimed to the rational use of water and soil resources for the implementation and development of irrigated agriculture, in accordance with the following basic postulates: (i) pre-eminence of social function and public utility of water use and irrigated soils, (ii) stimulation and greater security to agricultural activities, primarily in areas subject to adverse weather conditions, (iii) promotion of conditions that can increase the production and agricultural productivity, and (iv) main or supplementary participation of public authority in the elaboration, funding, implementation, operation, supervision and monitoring of irrigation projects.

Although the Law that established the National Irrigation Policy has been approved in 1979, only in 1986 it was established the National Irrigation Program (Proni), presenting goals and objectives for the irrigation policy. The basic premises of the program would increase the supply of basic foods, raise levels of agricultural production, and reduce food prices and aid in the control of inflation, creating a balanced development of the economy, favoring the peoples from the less favored classes (PRONI, 1986).

Besides Proni, the other units of the federation could also elaborate their irrigation programs. The State of Minas Gerais established the Plano Mineiro de Irrigação e Drenagem (PMID), which aimed to contribute to socioeconomic growth of the State, fostering creation of jobs, income distribution, increased agricultural production, improving the internal supply and the formation of exportable surplus (PMID, 1986).

3. Irrigation districts in the north of Minas Gerais

Among the twenty-three irrigation districts in operation in the country, four are located in the North of Minas Gerais. The four irrigation districts implanted in the region present different characteristics one another. Table 1 presents the main characteristics from each of the irrigation districts implanted in the region since 1970.

Table 1 - Main public irrigation perimeters located in Northern Minas Gerais

[64] It is in process in Federal Senate, Bill No. 6381, 2005, which provides for the National Irrigation Policy and makes other provisions by repealing Law No. 6662 of July 25, 1979.

	Gorutuba	Jaíba	Lagoa Grande	Pirapora
Beggining of the operation	1978	1975	1988	1979
Irrigable Area (ha)	5286	44,021	1,538	1,236
Production - Familiar Area - 2008/ (R$)	9,903,528.00	53,504,973.00	-	-
Production - Business Area - 2008/ (R$)	13,071,534.00	54,070,898.00	7,135,430.00	28,398,802.00
Total Production Value	22,975,062.00	107,575,871.00	7,135,430.00	28,398,802.00
Implantation Cost (R$)	412,685,438.46	1,060,466,841.14	Sem informação	53,383,795.33

Source: Department of Water Infrastructure (2005) and Codevasf (2010).

The first public irrigation project implanted in the region was Project Jaíba largest irrigation project in Latin America and second largest in the world. The irrigation perimeter of Jaíba was implanted in the municipality of Manga[65], in 1975, and had a cost of deployment higher than R$ 1 billion.

The conception of Jaíba Project began in the 1960s, through feasibility studies for irrigated agriculture in the region. In the 1970s, the Ruralminas elaborated the first work plan for the Jaíba, which included the implantation of the irrigation project of Mocambinho. After, the government of Minas Gerais put forward an integrated plan of infrastructure (electricity, roads and centers of colonization). The "Integrated Development Plan of the Northeast of Minas Gerais', which was approved by the Union, was funded the Inter-American Development Bank (IADB). The objective of the plan was the occupation of economic and demographic blank represented by the region, with about 110,000 km², increasing therefore the agricultural frontier.

Since 1975, the irrigation project of Jaíba has now participation of the Federal Government, through Codevasf, in order to irrigate an area of 100,000 ha, becoming the greatest irrigation project in Latin America. At present, steps I and II of the Project (Jaíba I and II) are in operation, with an area occupied of 44,782 ha (9,120 ha - family lots, 35,382 ha - business lots), and 44,021 ha are irrigated.

According to Codevasf (2010), in 2008, the Jaíba Project presented a production about R$ 107,575,871, with family farming responsible for about 50% of total production. The irrigated fruit farming is the main crop of the project, representing 36% of the total area planted in 2005. In addition, among the main fruit plants, the banana stands out with 44.4%, the mango, with 23%, and lemon, with 19%. Among the temporary crops, stand out maize, beans, watermelon, onion and seed production.

The second Irrigation Perimeter implanted in the region was the Gorutuba, which was brought into operation by 1978 in the city of Porteirinha[66], located on the banks of the Gorutuba River. Codevasf assumed the conduction and deployment of infrastructure of the project. The Irrigation Perimeter of Gorutuba covers an area of 7,172 ha, whereof 5,286 ha are irrigable, divided into two areas: a business (52 lots), and other of small producers (391 lots).

Perimeter stands out in family farming, since 426 families are working in areas of 50 to 10 ha, producing mainly banana, mango, Barbados cherry, citrus, guava, grapes, corn, passion fruit, rice, beans, vegetables and seeds. The volume of perimeter production in 2008, generated gross revenue of R$ 22,975,062, and small producers had a stake of 43.1% versus 56.9% of entrepreneurs (CODEVASF, 2010).

The other two irrigation perimeters in the region present smaller size, with business lots. Pirapora Project, third irrigation perimeter deployed in the region, is located in the city of Pirapora on the right bank of the São Francisco River. The

[65] Because the process of municipal emancipation occurred in the country since 1988, currently the project is located in the municipalities of Jaíba and Matias Cardoso in the Middle São Francisco (North of Minas Gerais).

[66] As in the case of the Jaíba Project, due to the process of municipal emancipation, currently located in Nova Porteirinha, which dismembered of Porteirinha in 1996.

construction of the Pirapora Irrigation Perimeter started in 1975 by the Superintendence of the Vale do São Francisco (Suvale) as the first experience of irrigated agriculture in northern Minas Gerais. In 1976, Codevasf took the deployment of the perimeter, inaugurated in November 24th, 1978.

According to Codevasf (2010), the volume of perimeter production in 2008, generated gross revenue of R$ 28,398,802. It is noteworthy that, although it is the smallest project in extension, the Pirapora Irrigation Perimeter presented the second highest production value in 2008. The fruit farming is the main activity of the perimeter, especially banana, citrus and grapes. The area cultivated with these crops in 2008 was 39%, 30% and 22% respectively. The temporary crops occupied an unimpressive area of 0.4%.

The last project implemented in the region was the Lagoa Grande Irrigation Perimeter, located in the city of Janaúba on the left bank of the Gorutuba River near the Gorutuba Irrigation Perimeter, located on the left bank of that river.

According to Codevasf (2010), in 2008, the Lagoa Grande Irrigation Perimeter recorded a production worth R$7.1 million, the lowest value of production from the irrigation perimeters of the region. The fruit farming was the main activity of the project, especially banana, present in more than 80% of the cultivated area of the perimeter, then the cultivation of mango, lemon and cashew. The temporary crops occupied a small area, less than 1%.

The information presented in this section suggests the importance and representativeness of the public irrigation projects implemented in the municipalities of Janaúba, Manga, Pirapora and Porteirinha in the Northern Minas Gerais. In this sense, considering that these projects were implemented with public resources, it becomes necessary to assess whether they contributed to the socioeconomic development of municipalities and the region.

4. Methodology

The northern region of Minas Gerais, object of this study, is embedded in Brazilian semi-arid, one of the poorest regions of the country. Due to its characteristics, mainly climatic and socioeconomic, from the 1970s, with the implementation of the National Irrigation Policy, the region began to be benefited with the implementation of four of twenty-three public irrigation projects in production in the country. Municipalities benefited by the construction of irrigation perimeters were Janaúba (Lagoa Grande Irrigation Perimeter), Manga (Jaíba Irrigation Perimeter) Pirapora (Pirapora Irrigation Perimeter) and Porteirinha, which received the implantation of the Gorutuba Irrigation Perimeter.

In the 1970s, preceding period to the implementation of public irrigation projects, the northern region of Minas Gerais was formed by 44 cities. After the Constitution of 1988, there was an intense process of municipal emancipation throughout the country because of this process, the number of cities in the region rose from 44 in 1970 to 89 cities in 2000. Because of this change, for the treatment of data, it was decided to regroup the emancipated municipalities to the counties of origin, i.e., data of emancipated municipalities (2000) were aggregated to those from which they originated, so that the analysis was performed under the same conditions prior to implementation of irrigation perimeters (1970), that is, with only 44 municipalities. Thus, in the case of the Gorutuba Project67, the benefited municipality was originally

[67] Currently, the Gorutuba Irrigation Perimeter is located in the municipality of Nova Porteirinha.

the city of Porteirinha, in which the project was initially implanted. In the case of Jaíba Project68, the municipality originally benefited was Manga.

In order to represent the socioeconomic conditions and level of development of municipalities in Northern Minas Gerais before and after the implementation of public irrigation projects, it was considered that the development achieved by a particular municipality or region has a multidimensional character. It is necessary to analyze a large number of variables representing the economic dimensions, social, demographic and infrastructure, among others, to characterize it in a comprehensive way (ROSADO, ROSSATO, LIMA, 2009).

In this sense, it was selected 17 variables regarding the years of 1970 (before the projects implementation) and 2000 (with the projects already in production). The variables used were selected from variables suggested in similar studies, such as that of Rosado, Rossato and Lima (2009) and Shikida (2010). The selected variables include seven dimensions that involve demographic conditions *(X1:* Population density - inhabitants/km^2; *X2:* Urbanization rate - urban population / total population), living conditions *(X3:* Number of domiciles with electricity - units, *X4:* Number of domiciles with sanitary facilities, general network - units, *X5:* Number of domiciles with running water general network - units), conditions of employment *(X6:* Number of persons employed in rural area, *X7:* Number of persons employed in the urban area), human development levels *(X8:* Human Development Index - HDI Education, *X9:* Human Development Index - HDI Longevity, *X10:* Human Development Index - HDI Income), health conditions *(X11:* Life expectancy at birth - Year, *X12:* Infant Mortality - per thousand live births), poverty and income conditions *(X13:* Percentage of poverty - poor people (%), *X14:* Income - Inequality - Index L of Theil), **and** economic conditions *(X15:* Agricultural GDP *per capita* - one thousand Real, *X16:* Industry GDP *per capita* - *one* thousand Real and *X17:* Service GDP *per capita* - one thousand Real). All variables were collected at the Institute of Applied Economic Research (Ipeadata).

It was applied the multivariate approach of data for analysis and data processing, more specifically, the factor analysis, which is a set of statistical techniques that attempt to explain the correlation between the observed variables, simplifying the data by reducing the number of variables needed to describe them (PESTANA; GAGEIRO, 2005). According to Hair et al. (2005), the factor analysis is used to synthesize information of a large number of variables in a reduced number of variables or factors.

According to Mingoti (2005), the purpose of factor analysis is to describe the behavior of a given set of variables from the dependence structure between them through a smaller number of variables called factors. The variables most correlated are combined on the same factor, and are independent those that make up the other factor, i.e., the factors are not correlated one another.

For the factor analysis, it was used the factors extraction method called Main Components Method (with orthogonal rotation, in such a way as to be independent of each other), and the rotation method chosen was the *Varimax*. The main components method makes the first factor contains the highest percentage of total variance explanation, the second factor has the second highest percentage, and so on.

The factor model obtained after factor analysis explains theoretically the structure of latent factors responsible for the observed correlations between the original variables. Naturally, the model assumes that there are a number of factors lower than the number of original variables that are able to explain a high percentage of the total variance of the original variables. The *eigenvalue* rules (characteristic root) greater than

[68] Currently, the Jaíba Irrigation Perimeter is located in the municipalities of Jaíba and Matias Cardoso.

a *Scree-plot,* are usually used to decide the minimum number of factors needed to explain a considerable proportion of the total variance of the original data. However, these rules only help to select the factors needed to explain the variance-covariance observed and say nothing about the quality of the factorial model deduced (MAROCO, 2007).

In order to assess the validity of factor analysis, it was used the criterion *Kaiser-Meyer-Olkin* (KMO), the *Bartlett* test and the percentage of total variance explained by the factors. The KMO and *Bartlett* test are two statistical procedures, which allow measure the quality of the correlations between variables in order to proceed with factor analysis. The KMO close to 1 indicates small partial correlation coefficients, while values near zero indicate that factor analysis is an unacceptable option because there is a weak correlation between variables.

After obtaining, identification of the factors and determination of the respective factor scores is possible to study the stage of socioeconomic development of the municipalities analyzed. Thus, the factor analysis contributes to a vision of socioeconomic development, using the values of the factors to obtain the measures of development, and subsequent ranking of municipalities in terms of the degree of socioeconomic development.

For the construction of an index for identify the location of each municipality regarding the concept expressed by the factor, noting that the factor scores present a normal distribution with zero mean and unit variance (CUNHA *et al.,* 2008). The Gross Index of Socioeconomic Development can be obtained by the following expression:

$$IBDS = \sum_{j=1}^{p} \frac{\omega_j}{\sum \omega_j} F_{ji}$$

Where IBDS is the index of the ith municipality, ω_j is the jth characteristic root, p is the number of factors extracted in the analysis, F_{ji} is the jth factor score of the ith municipality and $\Sigma\omega_j$ is the sum of characteristic roots referring to p factors extracted. The relative participation of factor j in the explanation of total variance captured by p factors extracted is indicated by $\frac{\omega_j}{\Sigma\omega_j}$.

Also according to Cunha *et al. al* (2008), to make all values of the factor scores (F_{ji}), greater than or equal to zero, they must all be placed in the first quadrant, before the construction of IBDS, using the algebraic expression:

$$F_{ji} = \frac{F_j - F_j^{min}}{F_j^{max} - F_j^{min}}$$

Where, F_j^{min} is the lowest score observed for the jth factor, and F_j^{max} is the highest score observed for the jth factor.

After obtaining the IBDS, and by weighting, where is considered the greatest value as 100, the IDS is obtained for each municipality in the northern region of Minas Gerais, allowing its hierarchy. All calculations were performed using the program SPSS 15.0 *(Statistical Package of Social Science)* in the licensed version.

5. Results and discussion

This section was divided into three sections. The first aimed to highlight the differences in socioeconomic conditions and levels of development of the 44 municipalities in the Northern Minas Gerais, through a set of indicators for the year 1970, preceding period to the implementation of public irrigation projects. It was also sought make a ranking of these municipalities in the general context of the region,

emphasizing mainly on the socioeconomic characteristics of the municipalities of Janaúba, Manga, Pirapora and Porteirinha, which were directly benefited with the implementation of public irrigation projects.

In the second section, it was repeated the procedures adopted in the first, but with the data for the year 2000, i.e. after project implementation, in order to determine their socioeconomic impacts on the region. In addition, it was sought to analyze the changes occurred in the municipalities benefited by irrigation perimeters, as well as investigate whether they can be associated with implementation of public irrigation projects.

In the third and final section it was presents the Gross Index of Socioeconomic Development (IBDS) and the Index of Socioeconomic Development (IDS), which allowed classifying more appropriately the municipalities analyzed. Nevertheless, it should be noted the difficulties to identify the causality relationship between the presence of public irrigation projects and a high level of socioeconomic development, in this way the study does not aspire to "need" the fact to have or not a good level of development is necessarily linked to the existence of a public irrigation project.

5.1 Before the public irrigation projects

Factor analysis for the variables regarding the year 1970 resulted in the extraction of four factors with characteristic root greater than one and that are responsible together for 84.85% of the total variance of the data. In the Table 2 are presented the factor loadings with a value greater than 0.50, seeking to highlight the variables most strongly associated with a particular factor, the characteristic roots greater than one, the percentage of variance explained by each factor and the percentage of cumulative variance. The variables utilized showed good adjustment, represented by the KMO test result, with a coefficient of 0.756 and statistical consistency represented by the *Bartlett's* sphericity test, significant at 1% probability.

Table 2 - Factor loadings after orthogonal rotation (1970)

Variables	Factor			
	F1	F2	F3	F4
Number of persons employed (Urban)	0.975			
Number of domiciles with electric lighting	0.973			
Number of domiciles with piped water system	0.965			
Municipal GDB - industry - per capita	0.930			
Number of domiciles with general sanitation	0.919			
Municipal GDB - per capita services	0.625			
Population density	0.605			
Life expectancy at birth - Year		0.990		
HDI - Longevity		0.990		
Infant mortality (per thousand live births)		-0.988		
HDI - Education			0.831	
Percentage of Poverty - poor people (%)			-0.736	
HDI - Income			0.707	
Urbanization rate			0.695	
Number of persons employed (Rural)			-0.658	
Income - inequality - Theil Index				0.788
Municipal GDB- per capita agro-pasture				0.743
Characteristic Roots	8.02	3.40	1.77	1.24
Variance Explained by each factor (%)	47.18	20.00	10.39	7.29
Cumulative Variance (%)	47.18	67.18	77.57	84.86

Source: Search result.

It can be seen that Factor 1 (F1) has positive and high correlation with the variables number of persons employed in the urban area, number of domiciles with electricity, number of domiciles with running water, general network, Industry GDP per capita (one thousand Real), number of domiciles with sanitary facilities, general network, Service GDP per capita (one thousand Real) and population density (inhabitants /km^2). This suggests that Factor 1 is more closely related to all variables that capture the living conditions of the population of the municipalities of Northern Minas Gerais and the ability to generate wealth and employment in the activities developed in the urban area of these municipalities, in addition to population density, which measures the occupation of the municipality. It is important to note that if the F1 of a particular municipality is positive and high, it means that it has a large population, has good living conditions and high economic capacity in activities developed in urban areas.

The second factor (F2), predominated the variables that capture the level of health and living conditions in municipalities of the Northern Minas Gerais, which was formed by the variables of life expectancy at birth (year) HDI - longevity, which showed high positive correlation. The factor F2 is also composed by variable Infant mortality (per thousand live births), which showed high and negative correlation. Thus, the higher this factor, the better will be the health conditions and more longevity will have the population of the municipalities.

The third factor (F3) presented high and negative correlation with HDI education, HDI income, urbanization rate and high negative correlation with the variables percentage of poor people and number of persons employed in rural area. Because of this, it follows that the higher this factor, the greater the proportion of people living in urban areas of the municipality and the better the conditions of education and income of the population.

The last factor considered (F4) presents high positive correlation with index L of *Theil* and agricultural GDP *per capita*. Thus, the higher this indicator, the greater will be the importance of agricultural activity to the economy of the municipalities, however, the greater will be the inequality in income distribution.

Based on the results obtained by factor analysis, it was perceived that the level of development of the northern Minas Gerais in the preceding period to the implementation of public irrigation projects (1970) was characterized by four factors, which represented the economic conditions and housing of municipalities (F1), health conditions (F2), access to education and income in urban and rural areas (F3) and the ratio between agricultural GDP and inequality in income distribution.

Based on the factor scores obtained in the factor analysis, it was promoted the ranking of the 44 municipalities in the Northern Minas Gerais in 1970, since they explain 39.07%, 18.80%, 18.69% and 8.30, respectively, of total variance. Table 3 presents the scores of each municipality in order of best performance on the factors F1, F2, F3 and F4. It is noteworthy that the calculated scores are always measured on an ordinal scale and, therefore, they can only indicate the relative position of the municipalities.

From the data in Table 3, it was observed that among the municipalities benefited with the implementation of public irrigation projects, Pirapora was the municipality with best performing in factor F1, taking the second place in the *ranking*. It was also identified that the aspects related to population density and the ability to generate wealth and employment were those who contributed most to Pirapora present good performance in factor F1. The municipality of Porteirinha presented the second best performance on this factor, among the municipalities benefited, occupying the

eighth position, Janaúba occupied the twelfth position and Manga, the nineteenth classification.

It is noteworthy that among the four municipalities benefited with the implementation of irrigation perimeters, only Manga presented negative score on factor F1, indicating that this municipality presented the lowest population density, the less developed urban economy and the worst living conditions.

In the factor F2, stands out the poor performance presented by the municipalities investigated mainly Pirapora, which presented the worst health conditions and lowest level of longevity among the municipalities. The municipalities of Janaúba, Porteirinha and Manga occupied the forty-second, thirty-seventh and thirty-fourth position, respectively.

Concerning the rate of urbanization and levels of education and income (F3), has been observed several classifications, with the municipality of Pirapora presenting the highest rate of urbanization in the region and the best indicators of education and income among the municipalities of Northern Minas Gerais. The municipality of Porteirinha presented the worst performance among the four municipalities that would receive investments of the National Irrigation Policy, taking the thirty-seventh position. The municipalities of Janaúba and Manga occupied the twenty-fourth and twenty-seventh position, respectively.

In the Factor F4, which allows analyzing the importance of agricultural activity to the economy of the municipalities and its relationship with inequality in income distribution, it is noted that only the municipality of Pirapora, among those that received irrigation perimeters, presented a negative performance in this factor, taking position of twenty-third. The municipalities of Porteirinha, Janaúba and Manga occupied the sixteenth, seventh and third position respectively.

Table 3 - Classification of municipalities by the factors F1, F2, F3 and F4 before the implementation of public irrigation projects (1970)

City	F1	Ranking	F2	Ranking	F3	Ranking	F4	Ranking
Águas Vermelhas	-0.363	28º	0.517	15º	0.001	20º	-0.678	34º
Bocaiúva	0.518	4º	1.523	5º	0.406	13º	0.039	18º
Botumirim	-0.529	39º	1.164	7º	-0.050	23º	-1.537	43º
Brasília de Minas	0.311	7º	1.919	1º	-0.350	28º	0.321	12º
Buritizeiro	-0.417	32º	-0.967	36º	0.948	5º	-0.803	35º
Capitão Enéas	-0.524	38º	-0.449	28º	0.836	8º	2.555	2º
Claro dos Poções	-0.466	34º	-1.096	38º	0.281	15º	0.516	9º
Coração de Jesus	-0.006	17º	0.973	9º	-0.353	29º	0.222	15º
Cristália	-0.445	33º	0.636	13º	-0.463	30º	-1.729	44º
Engenheiro Navarro	-0.368	29º	-0.360	27º	0.737	9º	-0.025	19º
Espinosa	0.180	10º	1.155	8º	-0.581	32º	-0.255	26º
Francisco Dumont	-0.791	44º	1.614	3º	1.940	2º	-1.071	39º
Francisco Sá	0.112	11º	0.788	10º	-0.118	25º	1.339	4º
Grão Mogol	-0.161	21º	-0.285	23º	-1.009	38º	-1.082	40º
Ibiaí	-0.600	41º	-0.290	24º	0.028	19º	-0.030	20º
Itacambira	-0.497	37º	1.766	2º	-0.199	26º	0.272	13º
Itacarambi	-0.240	24º	-0.869	35º	-0.664	34º	-1.155	42º
Janaúba	**0.096**	**12º**	**-1.366**	**42º**	**-0.063**	**24º**	**1.202**	**7º**
Januária	0.857	3º	-0.501	31º	-0.713	35º	-0.056	21º
Jequitaí	-0.377	30º	-1.171	40º	0.855	7º	-0.375	29º
Juramento	-0.536	40º	1.410	6º	0.689	10º	1.243	6º
Lagoa dos Patos	-0.495	36º	0.087	19º	0.664	11º	-0.875	37º
Lassance	-0.758	43º	0.583	14º	1.161	4º	0.095	17º
Manga	**-0.067**	**19º**	**-0.772**	**34º**	**-0.231**	**27º**	**1.429**	**3º**
Mato Verde	-0.175	22º	0.039	21º	0.305	14º	-0.211	24º
Mirabela	-0.417	31º	0.694	12º	0.277	16º	3.136	1º
Montalvânia	0.090	13º	-0.771	33º	-0.539	31º	0.507	10º
Monte Azul	-0.006	16º	-1.237	41º	-0.606	33º	-0.659	33º
Montes Claros	5.910	1º	0.701	11º	0.568	12º	-0.368	28º
Pirapora	**1.065**	**2º**	**-1.928**	**44º**	**3.664**	**1º**	**-0.159**	**23º**
Porteirinha	**0.266**	**8º**	**-1.089**	**37º**	**-0.944**	**37º**	**0.111**	**16º**
Riacho dos Machados	-0.336	27º	-1.161	39º	-0.789	36º	-0.511	31º
Rio Pardo de Minas	0.235	9º	0.375	18º	-1.859	44º	-0.514	32º
Rubelita	-0.215	23º	0.439	17º	-0.040	21º	0.434	11º
Salinas	0.488	5º	-0.322	25º	-1.072	40º	1.180	8º
Santa Fé de Minas	-0.655	42º	1.578	4º	0.937	6º	-1.154	41º
São Francisco	0.479	6º	-0.461	29º	-1.301	42º	-0.079	22º
São João da Ponte	-0.006	15º	-0.147	22º	-1.236	41º	1.318	5º
São João do Paraíso	-0.028	18º	-0.468	30º	-1.723	43º	-0.224	25º
São Romão	-0.476	35º	-1.692	43º	0.115	17º	-0.859	36º
Taiobeiras	-0.271	25º	0.480	16º	0.110	18º	0.248	14º
Ubaí	-0.302	26º	0.068	20º	-0.047	22º	-0.442	30º
Várzea da Palma	-0.116	20º	-0.771	32º	1.458	3º	-0.326	27º
Varzelândia	0.034	14º	-0.333	26º	-1.028	39º	-0.991	38º

Source: Search result.

5.2. Post public irrigation projects

As well as performed with the data for the year 1970, it was performed factor analysis for the variables for the year 2000. The results led to the extraction of four factors that are responsible together for 85.02% of the total variance of the data. The KMO test presented a coefficient of 0.744 and statistical consistency represented by the

Bartlett's sphericity test, significant at 1% probability. In the Table 4 are presented the factor loadings with a value greater than 0.50.

Table 4 - Factor loadings after orthogonal rotation (2000)

Variables	Factors			
	1	2	3	4
Human Development Index - Income	0.844			
Percentage of Poverty - poor people (%)	-0.838			
Industry GDB *per capita* (thousand Reais)	0.825			
Urbanization rate (urban population/overall population)	0.803			
Services GDB *per capita* (thousand Reais)	0.795			
Human Development Index - Education	0.754			
Population density (habitants/km2)	0.590			
Number of domiciles with general sanitation		0.937		
Number of domiciles with electric lighting		0.937		
Number of domiciles with piped water system		0.932		
Number of persons employed (Urban)		0.931		
Infant mortality (per thousand live births)			-0.971	
Human Development Index - Longevity			0.969	
Life expectancy (Year)			0.969	
Municipal GDB- per capita agro-pasture				-0.883
Number of persons employed (Rural)				0.523
Characteristic Roots	8.13	3.11	2.16	1.06
Variance Explained by each factor (%)	29.08	27.41	18.34	10.19
Cumulative Variance (%)	29.08	56.49	74.83	85.03

Source: Search result.

The factor F1 allows dimensioning the aspects such as industrialization, and access to education and income in the municipalities of the Northern Minas Gerais. This factor is related to the variables HDI education, HDI income, industry GDP *per capita,* urbanization rate and population density, all these variables showing high positive correlation with factor F1. In addition, the factor F1 presents a high negative correlation with the variables percentage of poverty, i.e., the higher the other variables that make up F1, the smaller the percentage of poor people in municipalities.

The factor F2, which characterizes the living conditions of the municipalities and job generation in urban area of municipalities, is positively correlated with the variables number of domiciles with sanitary facilities, general network, the number of domiciles with electricity, number of domiciles with running water general network and number of persons employed in the urban area.

Regarding the factor F3, one realizes that equals to the factor F2 obtained in 1970, that is, the F3 is composed of the same variables that formed the factor F2 in 1970. Thus, the factor F3 marks the level of health and longevity of the population of the municipalities of Northern Minas Gerais.

The fourth and last factor, F4, presents high negative correlation with agricultural GDP *per capita*, and positive correlation with the number of persons employed in rural areas. Thus, the lower is the agricultural GDP *per capita, the higher* the number of people working in the rural area.

It is noteworthy that the factor F4 legitimates important characteristics of agricultural activity developed in the region studied. In most municipalities in the Northern Minas Gerais, predominates the non-irrigated family farming, which is characterized by dependence on climatic conditions, and livestock in large territorial extensions. In general, the Northern Minas Gerais present low-intensive agricultural activity in capital, with low level of technology and low productivity.

The ranking/classification of municipalities in the northern region of Minas Gerais for the preceding period to the implementation of public irrigation projects followed the same procedures adopted for the year 1970. In the Table 5 are presented the scores of four factors for the municipalities surveyed.

The results of factor analysis show changes in the factors that show the level of socioeconomic development of municipalities in the northern region of Minas Gerais. According to the data presented in Table 5 it is clear that the municipality of Pirapora showed the best indices of industrialization and the better education and income conditions (F1 and F4) in the region. The municipality of Janaúba presented the second best performance among municipalities benefited by the implementation of irrigation perimeters, taking the eleventh position in the region. The municipalities of Porteirinha and Manga showed negative scores on this factor, taking the thirty-first and thirty-third position. This indicates that these municipalities have unsatisfactory levels of industrialization, education and income.

Regarding the living conditions and job generation in urban areas, stands out the performance achieved by the municipalities of Porteirinha, Manga and Janaúba, which occupied the third, sixth and ninth, respectively. On the other hand, the municipality of Pirapora presented one of the worst living conditions in Northern Minas Gerais. This fact may be related to the concentration of population in the urban area of this municipality. People search in the cities, opportunities that are generated by industrial expansion, however, the result is an overpopulation that cities cannot absorb in a desirable way, resulting in problems of housing, sanitation, among others.

The factor F3, the unique that was repeated, kept the same characteristics in both periods analyzed. Stands out the evolution of municipality of Pirapora, which presented worst health conditions and lowest rate of longevity in the region in 1970, and in 2000 achieved the best performance among the four municipalities analyzed, taking the fourteenth position. The municipality of Janaúba also showed a significant improvement on this factor, leaving the forty-second position in 1970 to nineteenth position in 2000. The rankings of the municipalities of Manga and Porteirinha showed no significant change from 1970 to 2000.

Among the factors investigated, F4 is certainly a factor which enables more easily analyze the direct impacts of the implementation of irrigation perimeters in the region, since the project would directly affect the agricultural activities of the municipalities benefited. Due to the characteristics of the region, this factor presented high and negative correlation with agricultural GDP *per capita*, and positive correlation with the number of persons employed in rural areas. Thus, municipalities with the more developed agricultural activities are those that presented highest rates for the factor F4, and municipalities with agricultural activities of low productivity, low intensive in capital and technology and limited in relation to the other economic activities, presented the lowest index in the factor.

In this sense, stands out the municipality of Pirapora, which showed the highest value for the factor, although the municipality of Pirapora present the lowest territorial extension of the region, and an urbanization rate close to 100%. When facing the characteristics of the municipality of Pirapora, one realizes the importance of the irrigation project for the municipality, and the activities developed in the irrigation perimeter the main responsible for the agricultural GDP and using rural labor in the municipality.

Regarding the municipalities of Manga, Janaúba and Porteirinha, it is perceived that they had intermediate performance, with positive indices, although low in factor F4. Except for Janaúba, that has only enterprise area, the municipalities of Manga and

Porteirinha presented a large number of people working in rural area. This result can be explained by the fact that the irrigation perimeters have a large number of lots of settlers, where family farming is practiced.

Table 5 - Ranking of municipalities by the factors F1, F2, F3 and F4 after the implementation of public irrigation projects (2000)

City	F1	Ranking	F2	Ranking	F3	Ranking	F4	Ranking
Águas Vermelhas	0.545	8º	-0.128	24º	-1.618	42º	-0.419	32º
Bocaiúva	0.349	12º	0.106	12º	1.506	4º	-0.087	25º
Botumirim	-0.443	29º	-0.459	36º	0.825	10º	-0.346	30º
Brasília de Minas	-0.792	37º	0.146	11º	0.346	17º	1.064	8º
Buritizeiro	0.911	5º	0.027	14º	-1.459	40º	-1.380	40º
Capitão Enéas	1.132	4º	-0.724	42º	-0.064	26º	-0.049	24º
Claro dos Poções	0.619	6º	-0.162	25º	-0.218	29º	-1.538	41º
Coração de Jesus	-0.445	30º	0.038	13º	0.374	16º	0.081	21º
Cristália	-0.670	34º	-0.531	37º	1.274	6º	-0.181	26º
Engenheiro Navarro	0.178	17º	-0.634	41º	1.795	1º	-0.387	31º
Espinosa	-0.238	25º	-0.071	19º	-0.398	30º	1.095	7º
Francisco Dumont	0.571	7º	-0.287	31º	-1.253	39º	-0.651	36º
Francisco Sá	-0.038	22º	-0.036	18º	0.578	12º	-0.715	37º
Grão Mogol	-0.974	39º	-0.127	23º	0.879	8º	-0.330	29º
Ibiaí	0.078	18º	-0.570	39º	1.732	2º	-0.516	35º
Itacambira	-1.037	41º	0.004	15º	1.179	7º	-2.113	43º
Itacarambi	-0.406	28º	-0.122	22º	-1.152	37º	0.555	15º
Janaúba	**0.401**	**11º**	**0.279**	**9º**	**0.236**	**19º**	**0.359**	**17º**
Januária	-1.364	43º	0.619	2º	0.260	18º	1.333	3º
Jequitaí	0.419	10º	-0.562	38º	1.631	3º	-0.300	28º
Juramento	0.282	15º	-0.025	16º	0.144	21º	-1.800	42º
Lagoa dos Patos	0.186	16º	-0.306	32º	-0.006	24º	-1.289	39º
Lassance	0.320	13º	0.188	10º	0.028	23º	-2.803	44º
Manga	**-0.627**	**33º**	**0.369**	**6º**	**-1.000**	**36º**	**0.185**	**19º**
Mato Verde	-0.027	20º	-0.322	35º	-0.178	28º	0.575	14º
Mirabela	-0.036	21º	-0.315	33º	-0.638	33º	0.283	18º
Montalvânia	-0.067	23º	-0.322	34º	-0.738	34º	0.639	13º
Monte Azul	-0.467	32º	0.386	4º	-1.182	38º	0.086	20º
Montes Claros	1.442	3º	6.031	1º	0.857	9º	0.070	22º
Pirapora	**3.907**	**1º**	**-0.775**	**43º**	**0.405**	**14º**	**1.909**	**1º**
Porteirinha	**-0.447**	**31º**	**0.462**	**3º**	**-0.928**	**35º**	**0.392**	**16º**
Riacho dos Machados	-0.386	27º	-0.090	20º	-2.114	44º	-0.424	33º
Rio Pardo de Minas	-1.124	42º	0.312	7º	-1.673	43º	1.230	4º
Rubelita	-0.688	35º	-0.606	40º	0.819	11º	1.381	2º
Salinas	-0.366	26º	0.312	8º	-0.535	31º	0.886	10º
Santa Fé de Minas	0.003	19º	-0.216	26º	-1.569	41º	-0.907	38º
São Francisco	-0.934	38º	0.374	5º	0.500	13º	1.209	5º
São João da Ponte	-0.789	36º	-0.119	21º	0.205	20º	0.874	11º
São João do Paraíso	-1.411	44º	-0.222	28º	1.472	5º	0.980	9º
São Romão	0.297	14º	-0.268	30º	-0.053	25º	-0.458	34º
Taiobeiras	0.487	9º	-0.217	27º	-0.594	32º	0.675	12º
Ubaí	-0.235	24º	-0.225	29º	-0.093	27º	-0.284	27º
Várzea da Palma	2.912	2º	-1.178	44º	0.377	15º	1.123	6º
Varzelândia	-1.029	40º	-0.034	17º	0.042	22º	-0.007	23º

Source: Search result.

Considering the results achieved, one can see the complexity in establishing a measure that characterizes the magnitude of the socioeconomic conditions of the

population, as well as make some differentiation between the municipalities investigated as regards the intensity of development. Furthermore, it is identified in the same municipality the existence of a high F1 with a low value to F2, intermediate F3, and high F4 - this is the case, for example, of Pirapora. This shows that besides the heterogeneity of reality experienced among municipalities surveyed, there are also internal differences among the municipalities, from their explanatory factors.

Because the difficulties found in the classification of municipalities in terms of socioeconomic development using only the values of the factor scores (F1, F2, F3 and F4), we chose to use the Gross Index of Socioeconomic Development (IBDS) and the Index of Socioeconomic Development (IDS). By aggregating the four factors, the IBDS and IDS allowed to classify the municipalities with higher propriety. In the Table 6 are presented the IBDS and IDS and their ranking for 44 municipalities in the northern region of Minas Gerais.

Table 6 - IBDS, IDS and ranking for the municipalities of the North of Minas Gerais (1970 - 2000)

City	IBDS_1970	IDS_1970	Ranking	IBDS_2000	IDS_2000	Ranking
Águas Vermelhas	0.245	0.308	22º	0.294	0.395	20º
Bocaiúva	0.401	0.504	2º	0.405	0.544	4º
Botumirim	0.255	0.320	18º	0.274	0.369	24º
Brasília de Minas	0.397	0.499	3º	0.259	0.348	30º
Buritizeiro	0.168	0.212	38º	0.329	0.442	12º
Capitão Enéas	0.248	0.312	19º	0.404	0.542	5º
Claro dos Poções	0.165	0.207	39º	0.337	0.453	11º
Coração de Jesus	0.311	0.390	10º	0.278	0.374	22º
Cristália	0.217	0.272	30º	0.268	0.360	29º
Engenheiro Navarro	0.219	0.275	29º	0.371	0.499	8º
Espinosa	0.324	0.407	7º	0.283	0.381	21º
Francisco Dumont	0.313	0.393	9º	0.302	0.407	17º
Francisco Sá	0.334	0.420	5º	0.315	0.423	15º
Grão Mogol	0.183	0.230	36º	0.230	0.310	34º
Ibiaí	0.188	0.236	35º	0.358	0.481	9º
Itacambira	0.323	0.406	8º	0.211	0.284	41º
Itacarambi	0.147	0.185	42º	0.227	0.305	37º
Janaúba	**0.200**	**0.251**	**32º**	**0.374**	**0.503**	**7º**
Januária	0.279	0.351	13º	0.214	0.287	40º
Jequitaí	0.165	0.207	40º	0.394	0.529	6º
Juramento	0.335	0.420	4º	0.315	0.424	14º
Lagoa dos Patos	0.219	0.275	28º	0.299	0.402	18º
Lassance	0.256	0.321	17º	0.306	0.411	16º
Manga	**0.223**	**0.280**	**27º**	**0.218**	**0.293**	**39º**
Mato Verde	0.246	0.310	21º	0.298	0.401	19º
Mirabela	0.325	0.408	6º	0.276	0.370	23º
Montalvânia	0.213	0.267	31º	0.274	0.368	25º
Monte Azul	0.154	0.194	41º	0.227	0.305	36º
Montes Claros	0.795	0.999	1º	0.675	0.907	2º
Pirapora	**0.304**	**0.382**	**11º**	**0.744**	**1.000**	**1º**
Porteirinha	**0.192**	**0.241**	**34º**	**0.246**	**0.330**	**32º**
Riacho dos Machados	0.130	0.163	43º	0.178	0.239	43º
Rio Pardo de Minas	0.248	0.311	20º	0.154	0.207	44º
Rubelita	0.271	0.341	15º	0.271	0.364	27º
Salinas	0.273	0.343	14º	0.273	0.366	26º
Santa Fé de Minas	0.298	0.375	12º	0.228	0.307	35º
São Francisco	0.237	0.298	24º	0.259	0.348	31º
São João da Ponte	0.242	0.304	23º	0.243	0.327	33º
São João do Paraíso	0.182	0.229	37º	0.224	0.302	38º
São Romão	0.100	0.125	44º	0.323	0.434	13º
Taiobeiras	0.269	0.338	16º	0.341	0.459	10º
Ubaí	0.226	0.284	25º	0.269	0.362	28º
Várzea da Palma	0.225	0.283	26º	0.613	0.824	3º
Varzelândia	0.198	0.248	33º	0.200	0.269	42º

Source: Search result.

The values obtained for IBDS and IDS for the preceding period to implementation of public irrigation projects demonstrate the municipalities of Janaúba, Manga, and Porteirinha, which presented an intermediate level of development, while Pirapora presented a higher level of development. After the implementation of the projects one can perceive an evolution in the stage of development of the municipalities of Porteirinha, Janaúba and Pirapora, while in the municipality of Manga was identified a reduction in the level of development.

In general, it is confirmed what was observed for the four factors presented in Tables 3 and 5. Between the municipalities benefited by the implementation of public irrigation projects are highlighted those that presented a prominent classification inside the region amongst the 10 best index of the region (Janaúba and Pirapora). The municipalities of Manga and Porteirinha presented a precarious situation in terms of socioeconomic development, and are above the 30th position.

From the above, one can infer that the analysis of the level of socioeconomic development reflected the presence of heterogeneity among municipalities and even inside the same municipality from its explanatory factors. As an example, it can be observed the municipality of Pirapora that presented high values for F1 and F4, intermediate value for F3, and low for F2; this means that a municipality may present a high performance in an issue, and low in another one. Thus, it is perceived the importance of IDS that allows including the limits and potentialities of variables received, and thus point to a more conclusive position on the existing development stage in a municipality where a public irrigation project is located.

6. Final Considerations

Considering the scope of the National Irrigation Policy, it is clear their goal in search of regional growth in disadvantaged areas. Thus, it was sought in this paper to analyze the level of socioeconomic development of the northern region of Minas Gerais, especially in the municipalities of Janaúba, Manga, Pirapora and Porteirinha, directly benefited by the implementation of public irrigation projects.

For this purpose, it was considered that to analyze the socioeconomic development of a given region one must consider the territory as a system that suffers influence of several variables and which is related with other territorial systems of the same and larger scale. From seventeen selected socioeconomic variables, four factors were generated for periods of 1970 (before the project implementation) and 2000 (after deployment). In this sense, the analysis enabled identified the existence of factors that permit discrimination of the socioeconomic development of municipalities in the northern region of Minas Gerais.

The results showed, as proposed by the public authority, significant changes occurred in the socioeconomic conditions of the region, highlighting the level of industrialization of Pirapora and Janaúba; the improvement in the conditions of Janaúba, Manga and Porteirinha, the advance of the municipalities of Pirapora and Janaúba in relation to health conditions and longevity.

However, it should be noted that, although have sought carefully to analyze the socioeconomic changes occurring in the northern Minas Gerais, one sees the complexity to associate these changes to the implementation of irrigation perimeters in the region, since in addition to these policies, many others, both public and private, have been and are being developed in the region. In this sense, one of the limitations of this research is to identify which policies have contributed to the socioeconomic changes occurring in the region.

7 References

BRASIL. LEI Nº 6.662, DE 25 DE JUNHO DE 1979, **Dispõe sobre a Política Nacional de Irrigação**. Disponível em: <http://www.codevasf.gov.br/principal/legislacao/leis/lei-no-6-662-de-25-de-junho-de-1979>. Acesso em: 20 abr. 2010.

CODEVASF – **Companhia de Desenvolvimento dos Vales do São Francisco e do Parnaíba.** Elenco de Projetos. Disponível em: <http://www.codevasf.gov.br/principal/perimetros-irrigados/elenco-de-projetos>. Acesso em: 15 mai. 2010.

CUNHA *et al.* A Intensidade da Exploração Agropecuária como Indicador da Degradação Ambiental na Região dos Cerrados, Brasil. **Revista de Economia e Sociologia Rural**, Piracicaba, SP, v. 46, n 2, p. 291-323, 2008.

HAIR, J. F. *et. al*. **Análise multivariada de dados.** 5. ed. Porto Alegre: Bookman, 2005.

IPEADATA – **Banco de dados do Instituto de Pesquisa Econômica Aplicada**. Disponível em: <http://www.ipeadata.gov.br>. Acesso em: 20 nov. 2010.

MAROCO, J. **Análise Estatística – Com Utilização do SPSS**. 3. ed. Lisboa: Edições Sílabo, 2007.

MINGOTI, S. A. **Análise de Dados através de Métodos de Estatística Multivariada: Uma Abordagem Aplicada**. 1. ed. Belo Horizonte:UFMG, 2005.

PESTANA, M. H.; GAGEIRO, J. N. **Análise de Dados para Ciências Sociais: A Complementaridade do SPSS**. 4. ed. Lisboa: Edições Sílabo, 2005.

PMID – **Plano Mineiro de Irrigação e Drenagem**. Governo de Minas Gerais – Governador Hélio Garcia. Janeiro/1986.

PRONI – **Programa Nacional de Irrigação**, Governo José Sarney, 1986.

ROSADO, P. L., ROSSATO, M. V, LIMA, J. E. Análise do Desenvolvimento Socioeconômico das Microrregiões de Minas Gerais. **Revista Econômica do Nordeste**, Fortaleza, v. 40, n. 2, p. 297-310, 2009.

SIH - SECRETÁRIA DE INFRAESTRUTURA HIDRÍCA. Levantamento da Situação dos Perímetros Irrigados em Minas Gerais. **Relatório**. Minas Gerais, 2005. Relatório. Impresso.

SHIKIDA, P. F. A. Desenvolvimento socioeconômico e agroindústria canavieira no Paraná. **Revista de Política Agrícola**, n. 3, p. 67-82, 2010.

EFFECTS OF THE ENVIRONMENTAL REGULATION ON THE INTERNATIONAL TRADE PATTERN FOR AGRICULTURAL COMMODITIES

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Abstract
The article presents an analysis aimed to clarify whether and how the patterns of international trade of agribusiness are being affected by the need to adapt the production to more stringent environmental regulations. In some ways, this study can be seen as a validation test of the Porter´s hypothesis in relation to the traditional approach (trade-off) to the agricultural sector. The analysis was conducted by the adjustment of the HOV model to allow the inclusion of variables representing the environmental performance of the countries analyzed. The agricultural sectors analyzed were corn, wheat, rice, tobacco, sugar, soybeans and cotton. The results show that agricultural exports could be affected positively or adversely by differences in countries' environmental performance and the degree of extension of this impact varies between developed and developing countries.

Key words: *agricultural trade, environmental regulations, H-O-V Model*

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The emergence of awareness of the societal costs and benefits of the environmental implications of private economic decisions launched a still ongoing enquiry into the economic costs of environmental regulation. At the most aggregate, macro level debate centered on the trade-offs between economic growth and environmental effects. Despite four decades of theory and empirical enquiry, a solid consensus has not been established, see Carson (2010). General acceptance has emerged with respect to the moderating effects of technical change, affluence and consumer preferences, endogenous population, and potential of environmental regulation to change behavior. Interestingly, the environmental Kuznets curve (EKC) (showing that pollution at first increases and then decreases as income increases) emerged from the trade literature that considered the trade flow implications of environmental regulations. By considering and highlighting the potential nonlinearity of relationships, the EKC suggested the complexity of underlying processes. Nonetheless, other work disputes this model, see e.g., Arrow et al. 1995; Stern 2004). Equally important, empirical evidence has yet to find consensus support for this view.

The debate on the subject follows polarized by two competing visions. On one hand, stand those who defend the traditional view of a trade-off between environmental gains and economic gains. Alternatively, and opposed to this view, those who advocate the revisionist approach, known as "followers of Porter," which highlights the potential synergistic effects between environmental regulations and competitiveness.

Despite this scientific uncertainty with respect to the relationships, governments and international organizations continue to implement policies that are motivated by particular perspectives on the economic/environmental performance nexus. As empirical results remained ambiguous, the literature has considered the issue from more specific perspectives including sector or product level studies as well as through reconsideration of underlying metrics used to characterize the extent of environmental regulation. This latter issue is clearly important as regulations vary substantially across emission types, feasibility and modes of enforcement, and geographic localization of emissions.

In this sense, throughout the 1990s, a series of studies sought to identify the industrial goods that might be classified as environmentally sensitive, and then confronting the revisionist and traditional approaches. During this period, particularly given the scarcity of environmental performance indicators reasonably harmonized to a number of countries, the analysis of the agricultural sector was relegated to a second plane. Only recently, progress has been made in this regard because of advances in production of statistics on the provision of capital, labor and natural resources in rural areas.

Since the middle of this decade, the United Nations Food and Agriculture Organization - FAO has been undertaking efforts aimed at the production and improvement of statistics that reflect the allocation of manpower, land, water, machinery, use of agrochemicals, fertilizers and investment to more than two hundred countries and for major crops. In parallel, since 2005, Yale Center for Environmental Law & Policy, in partnership with the Center for International Earth Science Information Network, began to develop a comprehensive system of Environmental Performance Index - EPI, whose results are published annually in the World Economic Forum Davos.

The recent availability of this data set enabled to a broader application of the main models of international trade to examine the effects of environmental regulations on competitiveness and world trade patterns of agribusiness. In the current scenario, the mere suspicion that a country is taking a passive position before the adoption of environmentally degrading practices, increasing their competitiveness, has overburdened the use of instruments of trade discrimination. In this sense, it is common the proliferation of diagnoses without proper scientific basis, relating the export growth of agribusiness in developing countries to the increased global environmental problems.

Given this context and the demand for flexibility in WTO law to include provisions allowing trade discrimination motivated by environmental issues, this paper aims at identifying the effects of heterogeneity of environmental regulations among countries on the global patterns of agribusiness trade. The empirical tests are conducted following the model Heckscher-Ohlin-Vanek (HOV) of international trade, traditionally employed to examine the effects of policies and/or variables of government control over trade patterns.

Within this context, this paper examines new data to consider at a sectorial level as well as at commodity specific levels the implications new metrics of environmental regulation for agricultural and food exports. Similarly to Kleemann and Abdula (2011), we further specialize our enquiry by considering how relationships vary across developed and developing countries.

The paper is organized into five sections including this introduction. Initially presents the summary of the main theories, empirical evidence and controversies relating to the environmental regulation, competitiveness and standards of international trade, with special emphasis to agriculture sector. The following section presents the methodological framework and the database used. The following comprises the analysis of the impacts of different environmental regimes on the world trade in agricultural and environmentally sensitive goods of this sector. Finally, considerations were made highlighting the importance of the present work and the context of its findings in relation to the existing literature.

2. Environmental regulation and competitiveness in the agriculture

Huang (2002) believes that the development of standards and environmental regulations and changes in understanding the meaning of the term "competitiveness" are factors that have driven the evolution of literature regarding the relationship between environmental regulation and competitiveness. According to the Department for Environment, Food and Rural Affairs of United Kingdom - DEFRA (2007), the debate began in the United States in the mid-1960s, when, given the demands of several segments of society, the Environmental Protection Agency – EPA was created and the Clean Air Act was signed. The vast volume and multiple forms of environmental regulations implemented have promoted a broad debate about their economic effects and as a result, since the early 1990s, a theoretical background on the subject had been consolidated.

Early studies, conducted by neoclassical economists, prominently by Baumol and Oates (1975), Pethig (1976) and Siebert (1977) concluded that new environmental regulations have impacted significantly on production costs and competitiveness of the United States. According to these authors, there would be a trade-off between stringency of environmental regulation and competitiveness.

For over a decade the focus of analysis was the measurement of this trade-off through the use of neoclassical approach and tools, until Porter (1991) and Porter and

van der Linde (1995) inaugurated a new approach that produced results opposite to those known until then. The new approach proved possible to achieve environmental protection while maintaining, or even increasing, competitiveness.

Almeida (2002) synthesized the polarization of the debate between advocates of the traditional view (trade-off or neoclassical) versus the recent revisionist view. The author notes that, according to proponents of the traditional view, there is an inevitable conflict (trade-off) between environmental gains and economic gains, which derives from the concept of negative externality. Since the microeconomic agent maximizes profits based on the selection of the alternative minimum production cost, the choice does not take into account the environmental damage related to the regulations that aim precisely to induce the agent to internalize environmental externalities, leading him necessarily an extra cost.

On the other side, the advocates of revisionist approach, known as "Porter hypothesis", emphasize the synergistic effects between environmental regulations and competitiveness. According to this view, there is no inevitable conflict between economic and environmental gains. By promoting environmental improvements, companies can save inputs, to streamline the production process, make waste, and differentiate the product and thereby improving competitiveness. Thus, compliance with stricter and increasing environmental regulations on production would not be a zero sum game because it could represent a new source of permanent structural change.

With the establishment of two radically opposed fields of study, Jaffe et al. (1995) entered the debate to occupy an intermediate position, stating "the truth about the relationship between environmental protection and competitiveness lies between the two extremes of the then current discussion." From this moment on, the literature erupted in a number of different lines of exploration. For Valluru and Peterson (1997), these disputes tend to become the center of the discussion agenda of future international negotiations related to trade, environment and development in the Third World.

Amid the global trends of trade liberalization, environmental crisis and intensification of inequality, agriculture assumes a prominent role. Indeed, one can say that it is the economic activity that has generated the most controversy and resented more heavily on direct and indirect effects of this situation (FEIX; VASCONCELOS, 2005).

At the most general level, the question of the environmental regulation and trade implications must be considered from a strategic perspective. That is, while exogenous regulation may reduce comparative advantage and increase costs, the trade implications of these changes will vary across commodities. Further, environmental regulations may be used as nontariff barriers against imports, but may also negatively affect exports. Ederington and Minier (2003) found evidence to support this effect, despite extensive earlier evidence based on specifications with exogenous regulation (see e.g. Leonard 1988, Tobey 1990, Grossman and Krueger 1993, 1995).

The agriculture, while fulfilling a vital role in the eradication of world hunger is directly related to unsustainable demand for natural resources. According to the United Nations Food and Agriculture Organization (FAO, 2003), agricultural production is the main source of anthropogenic greenhouse gases emissions and contributes significantly to other types of air and water contamination. Moreover, according to the study, some methods applied in agriculture, forestry and fishing are the main causes of biodiversity loss worldwide.

For Procópio Filho, Vaz and Tachinardi (1994), there is broad consensus that trade barriers and subsidies in agriculture have caused significant market distortions in developing countries and induced injury to the inefficient techniques of production.

There is ample evidence that agricultural protectionism not only may fail to help the environment but also it can be an important source of environmental degradation.

However, these authors make aware that the effects of liberalization can not be identified as responsible for the immediate environmental problems arising from agricultural production. In any case, the subsidy policy adopted by the major countries of the Organization for Economic Cooperation and Development - OECD, to reduce the international prices of agricultural commodities in order to ensure the competitiveness of its products, contributes to economic stagnation of developing countries. In contrast, the developing countries find themselves obliged to intensify the use of pesticides and other environmentally degrading practices in order to stay competitive in international markets.

Given the current trend in developed countries to enhance extra-territorial application of environmental, phytosanitary and zoosanitary standards, within a context of harmonizing them, the risk that developing countries come to confront restrictions on agricultural trade increases. This is so particularly if the environmental laws of the latter are not interpreted as congruent with the production and environmental standards in those countries (PROCÓPIO FILHO; VAZ; TACHINARDI, 1994).

3. Model specification

This section analyzes the role of the factor endowments and environmental regulations in determining patterns of global trade. The modern trade theories explain the comparative advantages in terms of different characteristics of countries. This is the case of the Hecksher-Ohlin model (H-O), which considers that the central hypothesis of the comparative advantages that are influenced by the interaction between the resources of the nation (the relative abundance of production factors) and technology (which influences the relative intensity to which different factors of production are used in the production of different goods). As a result, countries tend to export goods that are intensive in factors of which are abundantly endowed.

3.1 The Heckscher-Ohlin-Vanek model adapted to the environmental analysis[69]

The HOV model incorporates an important modification to the H-O theorem, since it allows working with *n* factors of production and establishes a relationship between net exports and factor intensities excess supply of factors. Thus, the generalization of the H-O model of international trade for *n* factors, as specified by Vanek (1968), embodies the idea of ordering factor intensities, so that the intensity of each factor is used as a benchmark for others in defining a range of abundance.

According to Maskus (1985), the relationship established by the HOV model shows that a country can be considered abundant in one factor, compared to a second factor, if its share in world supply of that first factor outweighs its participation in the global supply of the second factor.

In the HOV model equations incorporating measures of internal endowments of production factors are used to explain trade flows observed. To test whether environmental regulations distort trade patterns, variables representing the stringency and enforcement of these regulations are included in the model.

[69] For details on the structure of the HOV model see Vasconcelos (2001).

Alternatively to the original HOV model, relations between the internal allocation of factors and trade can also be perceived by applying the simplified theoretical model. Thus, the estimated coefficients show the direct influence of resources on trade for the specific product. However, the coefficients do not indicate the intensity of factors use in production. As shown by Leamer and Bowen (1981), there are not necessarily the relation between the relative intensity factors and the estimated coefficients due to the fact that the complementarities between the sectors are sufficiently severe.

Algebraically, the equation 1 expresses the value of net exports, by country, as a function of internal factors endowments.

$$W_{ij} = \sum_{k=1}^{S} b_k V_{kj} + c\Phi_{ij} + u_{ij} \quad (1)$$

where W_{ij} is the net export of sector i from country j, V_{kj} is the endowment of resource k of country j, b_k are the coefficients to be estimated, Φ_{ij} is the variable representing the environmental regulatory regime i in the country j, c is the coefficient that indicates the average conditional relationship between environmental regulation and trade balance, and u_{ij} are random disturbances.

The model expressed in equation 1 is based on Leamer (1987) and it is estimated by applying the Ordinary Least Squares - OLS[70] method, over the period 2004-2008, for five variables representing the endowments of resources and different aggregations of EPI, representing the environmental regulatory regime. The data cover a universe of 163 countries, classified as developed or developing countries, and according to the model, explain the patterns of trade to seven agricultural sectors (maize, soybean, wheat, rice, cotton, tobacco and sugar).

3.2 Sources of data and econometric procedures

This type of analysis, incorporating environmental variables to the HOV model, was inaugurated by Tobey (1990) and followed by Diakosavvas (1994), Valluru and Peterson (1997), van der Beers and van der Bergh (1997) and Xu (1999).

As mentioned earlier, the measure adopted to represent the accuracy and application of environmental policies for the countries studied is the EPI 2010, whose methodology was revised in 2008, enabling the calculation of indicators more closely aligned to agriculture sector. The EPI is focused on addressing two main environmental objectives: i) reduce wear with environmental effects on human health, ii) to promote the sustainability of the ecosystem and analyze natural resource management. These objectives reflect the policy priorities set by the international community, expressed in goal number seven of the Millennium Development Goals (ensure environmental sustainability). The two objectives mentioned above are calibrated using 25 performance indicators, divided into six categories of policies, which are combined at the end to create a single index (EPI total) (see Figure 1).

The methodology for calculating the EPI generates values expressed in terms of the proximity of the countries regarding the environmental goal established, classifying quantitatively the performances of a set of national goals of environmental policies that governments should pursue. Thus, countries whose environmental performance are in

[70] The software used for the estimation of econometric models was the Statistics Data Analysis, version 9 (STATA 9).

accordance with the present target, will have higher EPI than countries that still need to modify its regulation for sustainability (represented by the goals). By identifying the completion of a specific target and measuring the observed lagging behind the "ideal", the EPI provides a guiding principle for policy analysis over time and allows comparing international compliance to the principles of sustainable development.

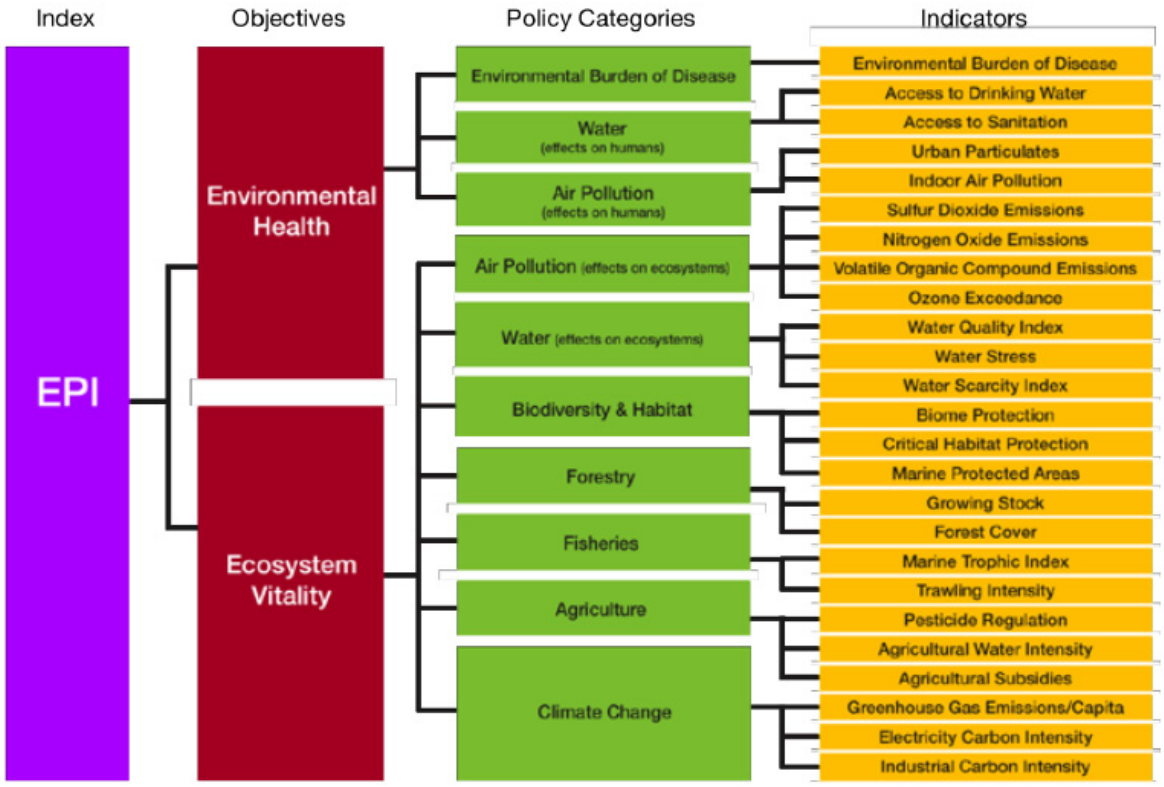

Figure 1 - Structure of the Environmental Performance Index - 2010

The statistics representing factor endowments and net exports were collected from the databases of FAO (FAOSTAT).

The set of EPI 2010 data used as a variable to capture the environmental regulation in the estimated models was correspondent to the highest level of aggregation of indicators (EPI)[71].

The variables of resource allocation in turn comprise the arable land, renewable quantity of water, physical and human capital in agriculture. However, as noted by Diakosavvas (1994), the performance of the agricultural sector also tends to be strongly influenced by government policies. Particularly in the developed countries, the agriculture sector receives a series of government incentives, a different situation from that observed in developing countries. In addition, Daly (1993), Esty (1994) and Esty and Geradin (1997) state that as a result of trade liberalization, countries are probably driven to compete with each other by relaxing domestic environmental quality standards in order to increase (or protect) their competitiveness (strategy race to the bottom), or even discourage the ratification of environmental policies in general. Although this type of argument is more common in the industrial sector, agriculture has also been the subject of controversy in this sense, despite the lack of empirical evidence.

[71] For more details regarding the composition of these indicators, see Esty et al. (2010).

Given this situation, the models were constructed in such a way to evaluate the expected performance for net exports from the perspective of possible differences between developed countries and developing countries. The models were tested in the presence of all countries in the database (model I) and also only with developed countries (model II) and developing countries (model III).

The hypothesis that environmental regulations affect trade patterns is tested by "t-student" and "F" tests, thus allowing verification of individual and joint significance of estimated coefficients for the environmental indicators.

Obviously, before estimating equation 1, it becomes necessary to build variables representing the factors endowments for each country. The theoretical basis to define these endowment variables was proposed by Leamer (1984).

Due to limitations of data on land endowment, originally used by Leamer (1984) and Tobey (1990), the statistics of land use available in FAOSTAT database were adopted in this study. According to the HOV model, it is expected that the estimated coefficients have the following signs displayed below each variable:

$$W_{ij} = \beta_0 + \beta_1 TRACTOR_j + \beta_2 HARVESTER_j + \beta_3 AGRPEA_j + \beta_3 AREA_j + \beta_5 WATER_j + \lambda_i EPI_j$$
$$\qquad\qquad (+) \qquad\quad (+) \qquad\quad (+) \qquad\quad (+) \qquad\quad (+) \qquad\quad (+/-)$$

where:

W_{ij} = average net exports in the period 2004-2008, measured in tones of product i by country j. Source: FAO (2010);
TRACTOR = number of agricultural tractors in use in country j. Source: FAO (2010);
HARVESTER = Number of Combine harvesters - threshers in use in contry j in 2008. Source: FAO (2010);
AGRPEA = average of economically active population engaged in agriculture in country j, expressed in thousands of people. Source: FAO (2010);
AREA= Average availability of arable land in the country j from 2004 to 2008 (in ha). Source: FAO (2010);
WATER= Average availability of Renewable Water Resources from 2008 to 2010. The sum of internal renewable water resources and external actual renewable water resources. It corresponds to the maximum theoretical yearly amount of water actually available for a country at a given moment (in 10^9 m3/year). Source: FAO (2010);
EPI_j = Environmental performance index in the country j. Source: Esty et al. (2010).

4. Results

Tables 1, 2 and 3 present the results of the models estimated. The first column of the tables presents the explanatory variables, the significance test of overall regression (F), the number of observations and the coefficient of determination (R^2). The first line comprises the explanatory variables, i.e., the average total net exports of agricultural products chosen for the analysis: cotton, maize, rice, soybeans, wheat, tobacco and sugar.

For each explanatory variable there are the estimated parameter value and its corresponding standard error (in parentheses). Significant estimates at 1%, 5%, 10% and 15% have their standard deviations labeled by superscripts "a", "b", 'c" and "d", respectively. The same is true for the calculated value of "F".

It is noteworthy that, for reasons discussed in Branson and Monoyios (1977) and confirmed by Diakosavvas (1994), it is expected to find heteroskedasticity in this kind of analysis. Through the test proposed by Breusch and Pagan (1979), the presence of heteroskedasticity was indeed observed. Aiming to correct this problem and enable more robust statistical inference, where it is necessary, the standard errors were corrected by using the Huber-White or sandwich [72] technique.

4.1. Model I

In general, analyzing the results of regressions for model I, presented in Table 1, and considering the particularity of cross-country data, one realizes that the quality of the adjustment of the regression lines to the data (R^2) is satisfactory, except rice. The null hypothesis that all coefficients are equal to zero could not be rejected at a significance level of 1% only for rice regression.

With regard to the individual analysis of the estimated coefficients, some of them show opposite signs to those which would be expected according to the HOV theory. For instance, this was observed to the coefficients estimated to capture the influence of the agricultural economically active population (PEA) on trade balance for cotton, soybean, wheat and maize. These coefficients are statistically significant, but have a negative sign. These results can be derived from the fact that cultivation of this products, increasingly, has become relatively intensive in capital and land and, and therefore, labor saving.

	Cotton	Rice	Soybean	Sugar	Tobacco	Wheat	Maize
LAND	5.769	8.900	31.864	-44.047	-2.195	151.805	105.488
	4.717	6.228	55.658	28.926d	0.364a	41.134a	70.901d
PEA	-6.572	2.179	-75.550	1.548	0.479	-44.229	-39.460
	1.152a	2.944	12.199a	5.000	0.108a	14.183a	24.936d
TRACTOR	0.408	0.424	3.569	1.402	0.092	-0.501	4.269
	0.216c	0.306	2.193c	0.980	0.015a	1.906	3.121
HARVESTER	-0.723	-0.794	-8.645	-6.055	-0.323	2.119	-9.861
	0.411c	1.391	3.96b	2.623b	0.049a	6.780	12.285
WATER	-38.445	-123.507	1,617.145	1,590.328	55.864	-1,000.384	-272.670
	24.418d	54.817b	666.665b	746.283b	5.504a	623.114d	403.077
EPI	-4,109.646	1,896.812	-46,373.370	-5,519.896	-897.640	31,328.210	-36,799.430
	1458.318a	3,414.565	15817.14a	9,089.405	328.08a	15046.85b	19858.93c
CONSTANT	203,756.4	-190,747.8	2,039,454.0	66,909.8	41,255.2	-2,396,624.0	1,120,101.0
	86350.54b	174,627.4	889782.3b	464,158.8	19402.26b	797725.3a	985,084.3
R2	0.6847	0.1361	0.7686	0.4742	0.5017	0.4708	0.4925
n	146	148	139	148	146	148	148
F	29.7a	5.01a	64.43a	1.32	23.33a	5.29a	1.54

Table 1 - Results of the regressions for the model I - HOV with all countries

Note: The superscripts "a", "b", "c' and "d" for the standard errors indicate the statistical significance of estimated coefficients at 1%, 5%, 10% and 15% respectively.

[72] For more details on this technique see White (1980).

For cotton, the stock of harvesters in use and water supply also negatively affected net exports of the product.

The regression performed for rice had the worst fit among all products tested. The only statistically significant factor was the water (5%) and with opposite sign than expected.

The results show that net exports of soybeans are positively related to water availability and tractors. Contrary to expectation, soybean exports are inversely related to the availability of labor in agriculture and harvesters. The last result is especially surprising given that the soybean harvesting is almost completely mechanized in the three main suppliers of international market (USA, Brazil and Argentina).

The endowment of land and harvesters showed inverse relationship with net exports of sugar and tobacco. The results revealed that the supply of water is the most important resource among tested endowments to achieve international competitiveness of sugar.

Among all the products tested, the best fit regression occurred for tobacco. The intensive use of labor and the adoption of farms smaller than the other products evaluated are characteristics that seem to impact on tobacco's external competitiveness (as statistically proven).

The results observed for wheat and corn products have similarities, since both net exports are positively affected by the availability of arable land and negatively affected by the abundance of economic active population in rural areas. Given the characteristics of wheat in relation to climatic aspects, it is not surprising that increased supply of water relates inversely with net exports of this commodity.

Table 1 also highlights that the environmental variable, represented by EPI, is highly significant to affect net exports of some agricultural commodities traded globally, particularly for cotton, tobacco and soybean. As we estimate commodity specific models, the sign of the effect of EPI is not hypothesized as negative as it would be for aggregate, sector level output or exports.

In fact, it is expected that regulation differentially affects commodities, leading some to have increased exports. Two recent studies have considered trade flow impacts at a sector level. Ederington, Levinson and Minier (2005) also examine the effect of environmental regulations on trade flows and find a small and significant impact. These authors discuss the existence of pollution havens and include three major factors that might affect the capability to prove its existence, and that were incorporated in their model: (1) the majority of trade occurs between developed countries, with comparable levels of environmental stringency; (2) industries' degree of mobility; and (3) the share of cost of complying with environmental regulations in total costs. Managi and Karemera (2005) analyze the agricultural trade for US states and the effects caused by stringent environmental regulations through them. They conclude that States loose comparative advantage due to these regulations. With respect to resource effects, again we note that our commodity specific models allow for either positive or negative effects of regulation and our results support that theoretical expectation.

So, regarding the influence of environmental sustainability on trade patterns, object of this study, was found that the greater proximity of the environmental sustainability affects negatively the net exports of cotton, soybean, tobacco and corn. This result is consistent with the views expressed by the traditional approach, i.e., environmental protection imposed as a restriction on external competitiveness.

However, increasingly, especially for soybeans destined for the European market, the assessment of environmental sustainability criteria has been crucial to the maintenance of trade flows. Therefore, if higher levels of environmental performance

reduce net exports from producing countries in general (as evidenced by the result), the unmet requirements that increasingly are imposed from the outside might also mean the loss of competitiveness in important specific markets.

A synergistic relationship between environmental sustainability and international competitiveness was verified only for wheat. These results, in general, confirm the assessment of Jaffe et al. (1995) for agriculture, i.e. the international competitiveness of the sector can be positive or adversely affected by environmental conditions of different countries. Since there are not significant pressures for environmentally sustainable demand for wheat in the international market, it is assumed that this product for achieving sustainability is beneficial in competitive terms, as proposed by the followers of Porter.

4.2 Model II

The model that incorporated only developed countries have proved to generate distinct results from those observed previously in Model I, in terms of the influence of factor endowments on the commodities' competitiveness. In developed countries, the allocation of arable land, except for tobacco, has a direct influence on net exports of agricultural products from these countries, as shown in Table 2.

	Cotton	Rice	Soybean	Sugar	Tobacco	Wheat	Maize
LAND	19.156	15.848	182.823	24.510	0.028	213.079	371.229
	6.714a	5.364a	60.8217a	10.517b	0.412	50.883a	119.435a
AGRPEA	-207.622	-160.340	-1,848.399	-138.958	-33.503	-2,318.128	-3,024.407
	42.353a	40.195a	469.066a	135.073	5.295a	653.528a	757.1519a
TRACTOR	0.225	0.335	1.503	-0.347	0.045	-0.020	3.945
	0.170	0.145b	1.517	0.300	0.012a	1.451	2.953
HARVESTER	-0.032	-0.810	-2.013	-0.449	-0.141	-2.119	-15.132
	0.369	0.31b	3.235	0.960	0.038a	4.644	6.3905b
WATER	-279.847	-268.789	-2,035.433	-1,014.634	-8.460	373.684	-5,228.460
	131.337b	134.328c	1132.686c	290.513a	11.388	1,405.600	2356.78b
EPI	-1,794.308	-2,327.670	-8,031.457	5,014.660	-772.398	23,755.460	18,456.940
	2,825.525	3,957.417	24,031.230	14,362.960	563.011	69,492.710	28,162.890
CONSTANT	82,304.0	65,410.7	-101,322.5	-130,248.8	53,603.0	-1,011,347.0	18,456.9
	193,252.7	268,183.2	1,601,000.0	1,016,783.0	39,856.7	4,919,530.0	28,162.9
R2	0.8768	0.8080	0.8472	0.4868	0.7646	0.7158	0.8826
n	41	41	41	41	41	41	41
F	11.76a	19.29a	11.80a	5.37a	18.40a	17.79a	19.29a

Table 2 - Results of regressions for model II - HOV with Developed Countries only

Note: The superscripts "a", "b", "c' and "d" for the standard errors indicate the statistical significance of estimated coefficients at 1%, 5%, 10% and 15% respectively.

The reverse is found for labor force in agriculture, although a similar pattern was observed in the model I. In addition, the relationship between net exports of agricultural products and the provision of water in these countries is contrary to expected. For all coefficients statistically significant, the observed signal was negative. The resources endowments are more important in explaining agricultural net exports of developed countries than for other countries.

Contrary to the general conclusion of the model I, there is no conflict between the achievement of environmental sustainability and performance of agricultural trade in developed countries. None of the estimated coefficients for the indicator of environmental performance was statistically significant.

4.3 Model III

The test of the HOV model to explain net exports of agricultural products from developing countries show similar results to those observed in the first model, as seen in Table 3.

	Cotton	Rice	Soybean	Sugar	Tobacco	Wheat	Maize
LAND	8.425	-3.107	100.807	10.243	0.560	34.511	86.118
	3.144a	22.547	50.126b	21.204	0.635	79.685	76.002
AGRPEA	-5.731	-5.823	-91.626	-13.844	-0.366	-3.918	-14.992
	0.711a	5.960	8.985a	7.014b	0.184b	16.256	16.565
TRACTOR	0.088	2.448	1.224	0.779	0.057	-1.235	-3.168
	0.159	1.541d	2.472	0.903	0.031c	2.991	2.745
HARVESTER	-1.920	7.517	-5.040	-5.683	-0.103	-4.412	-3.300
	0.454a	6.826	4.554	5.604	0.114	6.865	7.312
WATER	-4.156	-249.934	1,769.568	1,723.737	54.471	-579.781	340.235
	23.182	117.936b	393.852a	471.131a	14.284a	309.68c	290.976
EPI	-2,242.083	6,412.070	-27,544.010	-9,270.350	-753.737	3,644.940	-22,646.630
	1,677.423	7,774.888	15650.31c	10,432.470	321.242b	17,656.170	18,577.040
CONSTANT	119,076.6	-414,336.6	940,466.3	17,182.8	24,545.7	-659,238.8	635,868.7
	93,320.7	381,958.7	822,649.9	493,712.1	15766.79d	941,333.3	1,002,537.0
R2	0.7111	0.2280	0.8940	0.7110	0.7543	0.1099	0.1669
n	105	107	98	107	105	107	107
F	40.21a	3.04a	333.6a	3.42a	6.52a	3.00a	12.68a

Table 3 - Results of regressions for model III - HOV with Developing Countries only
Note: The superscripts “a”, “b”, “c’ and “d” for the standard errors indicate the statistical significance of estimated coefficients at 1%, 5%, 10% and 15% respectively.

Trade performance of developing countries in soybeans, sugar and tobacco are directly related to water supply. Results for Cotton, soybean, sugar and tobacco net exports from developing countries also show significant and negative coefficients to labor availability, which might be indicating that these exporters are becoming relatively less dependent on labor. It is noteworthy that the coefficient for tobacco is quite smaller than the others, which would be expected considering that this culture is usually conducted by small farmers and compared to the cotton, soybean and sugar is probably more labor intensive.

The results also show that the competitiveness of agricultural products produced in developing countries is more sensitive to the adoption of more stringent environmental policies than it was noted for developed countries. The average net exports of soybeans and tobacco decreased with increasing environmental performance represented by the EPI, which indicates that there is no evidence of Porter’s hypothesis for these cases.

5. Conclusions

The trade liberalization in goods and services markets registered in the last fifty years has coincided with the intensification of environmental problems on a planetary scale. Despite some initial resistance, the need for achieving economic development according to sustainability principles has induced countries to establish more stringent legal frameworks for the management of natural resources. Since the 1970s the proliferation of standards and environmental regulations, observed mainly in the United States and Europe, has deserved the attention of economists because of their possible impacts on international competitiveness.

In spite of agricultural production has always been at the center of discussions relating to economic performance and environmental sustainability, the analysis of the impacts generated by an increased number of more stringent environmental policies on trade pattern has always occupied space in the secondary agenda of research. Alongside this process, the practice of discriminating trade of agricultural products, which profit from environmentally degrading production methods, became widely advocated.

The scarcity of studies focusing on the agricultural sector is probably related to the lack of robust statistics, reconcilable and comparable, for a sufficiently large number of countries regarding the accuracy and application of existing environmental regulations. Applying the Environmental Performance Index (Esty et al., 2010), this study aims to contribute to filling this space, assessing the impact of environmental regulations on trade patterns for products considered environmentally sensitive.

The study adapted the HOV model to allow including variables representatives of the environmental regulations imposed by governments.

Similarly to a significant part of the literature relating to industrial segments, the findings for models run are also inconclusive to state unequivocally whether the degree of commitment of countries to sustainability principles and policy tools adversely (neoclassical) or positively (revisionist approach) affects trade patterns in environmentally sensitive agricultural sectors.

From the models run separately for developed and developing countries, our hypothesis that relationships vary across development status is clear. From results to developed countries, the coefficient of land is found positive and significant for Rice, Sugar, Wheat, and Maize, while for developing countries results indicate these effects are statistically insignificant. Similar, dramatic differences are apparent across the resource variables. With respect to EPI, we find that in developed countries it is statistically insignificant. However, for Soy and Tobacco we find a statistically significant negative effect for developing countries.

Therefore, soybean and tobacco net exports were the most impacted by differences in environmental status through developing countries, pointing to a negative (and significant) effect of the environmental requirements on the commodity international commerce. On the other hand, the Porter's hypothesis was confirmed only for one product. In fact, when the model I is considered, which relates to the whole set of countries, wheat coefficient for EPI is positive and significant at a 5 percent level. This indicates that the Porter´s hypothesis could be confirmed, and the environmental regulation improvements benefit net exports.

Moreover, results point that the origin of net exports (developed or developing countries) is a relevant factor to determine trade pattern in the case of soybean, wheat and maize.

Despite a recent trend of increasing environmental regulation, in general the differences in the compliance level to environmental goals among countries seem to play a secondary role in determining their trade pattern for agricultural products.

6. References

ALMEIDA, L. T. (2002) As interações entre comércio e meio ambiente. In: BRAGA, S. B.; MIRANDA, L. C. (Org.) **Comércio e meio ambiente**: uma agenda para a América Latina e Caribe. Brasília: MMA/SDS, p. 27 -40.

ARROW, K.; BOLIN, B. ; CONSTANZA, R.; DASGUPTA, P.; FOLKE, C.; HOLLINGS, C.S.; JANSSON, B.O.; LEVIN, S.; MALER, K.G.; PERRINGS, C.; AND PIMENTEL, D. (1995). Economic growth, carrying capacity and the environment. **Science** 268: 520–21.BAUMOL, W.; OATES, W. E. **The theory of environmental policy**: externalities, public outlays and the quality of life. New Jersey: Prentice-Hall. 1975. 221 p.

BEERS, C. van der; BERGH, J. C. J. M. van der. An empirical multi-country analysis of the impact of environmental regulations on foreign trade flows, **Kyklos**, Zurich, v. 50, n. 1, p. 29-46, Feb. 1997.

BRANSON, W.; MOLOYOS, N. (1977). Factor inputs in US trade. **Journal of International Economics**, 7: 111-131.

BREUSCH, T.; PAGAN, A. (1979) A simple test for heteroscedasticity and random coefficient variation. **Econometrica**, 47 (3): 1287-1294.

CARSON, R. T. (2010). The Environmental Kuznets Curve: Seeking Empirical Regularity and Theoretical Structure. **Review of Environmental Economics and Policy**, 4 (1): 3–23

DALY, H. E. (1993). The perils of free trade. **Scientific American**, 269: 50-57..

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS. DEFRA (2007), Exploring the relationship between environmental regulation and competitiveness – a literature review. Disponível em: http://randd.defra.gov.uk/Document.aspx?Document=SD14012_3476_FRP.pdf. Acesso em: 12 set. 2007.

DIAKOSAVVAS, D. (1994). The impact of environmental policies on agricultural trade, **Journal of International Development**, 6 (2): 207-218.

ESTY, D. C. (1994). **Greening the GATT**: trade, environment, and the future. Washington, DC: Peterson Institute. 319 p.

EDERINGTON, J.; MINIER, J. (2003). Is Environmental Policy a Secondary Trade Barrier? An Empirical Analysis. **Canadian Journal of Economics** 36: 137–154.

ESTY, D.C.; GERADIN, D. (1997) Market access, competitiveness, and harmonization: environmental protection in regional trade agreements. **The Harvard Environmental Law Review**, New York, 21(2): 265-336.

ESTY, D. C.; EMERSON, J.; KIM, C. H.; LEVI, M.; DE SHERBININ, A.; SREBOTNJAK, T.; MARA, V.; JAITEH, M. (2010) **2010 Environmental Performance Index**. New Haven: Yale Center for Environmental Law and Policy. 87 p.

FAO. **Perspectivas para la agricultura e el medio ambiente en los próximos treinta años**. Roma: FAO, 2003.

_____. **FAOSTAT**. Disponível em: <http://faostat.org>. Acesso em: 14 ago. 2008.

FEIX, R. D. ; VASCONCELOS, C. R. F. (2005) O ecoprotecionismo agrícola na União Européia e seus possíveis impactos sobre a economia brasileira. **Análise Econômica**, 23 (44):147-164.

GROSSMAN, G.; KRUEGER, A. (1993) Environmental Impacts of a North American Free Trade Agreement," in Peter Garber (Ed.), **The U.S.- Mexico Free Trade Agreement** (Cambridge, MA: MIT Press.

_____ (1995). Economic Growth and the Environment. **Quarterly Journal of Economics**, 110 (2): 353–377.

HUANG, H. (2002). **Modeling trade and environmental interactions.** Thesis (Doctor of Philosophy in Natural Resource Economics) – Davis College of Agriculture, Forestry and Consumer Sciences, West Virginia University, Morgantown, 2002. 276 p.

INTERNATIONAL LABOR ORGANIZATION. **Year book of labor statistics**. Geneva: ILO, 2004.

JAFFE, A. B.; PETERSON, S. R.; PORTNEY, P. R.; STAVINS, R. N. (1995). Environmental regulation and the competitiveness of US manufacturing: what does evidence tell us. **Journal of Economic Literature**, 33 (1): 132-163.

KLEEMANN, L.; ABDULA, A. (2011). The impact of trade and economic growth on the environment: revisiting the cross-country evidence. **Journal of International Development**. DOI: 10.1002/jid.1789

LEAMER, E. E.. (1984) **Sources of international comparative advantage**: theory and evidence. Cambridge: MIT Press. 324 p.

_____. **Sources of international comparative advantage**: the theory and evidence. (1987) Cambridge: MIT Press. 353p.

LEAMER, E. E.; BOWEN, H. (1981) Cross-section tests of the Hecksher-Ohlin theorem: comment. **American Economic Review**, 71 (1): 1040-1043.

LEONARD, H. J. (1988) **Pollution and the Struggle for World Product.** Cambridge University Press. Cambridge.

MANAGI, S.; KAREMERA, D.. (2005) Trade and Environment Damage in US Agriculture. **World Review of Science, Technology and Sustainable Development**, 2 (2): 168-190 (23).

MASKUS, K. E. (1985). A test of the Heckscher-Ohlin-Vanek theorem: the Leontief commonplace. **Journal of International Economics**, 19 (3): 201-212.

ORGANIZAÇÃO PARA COOPERAÇÃO E DESENVOLVIMENTO ECONÔMICO. OCDE. (2005). **Agriculture, trade and environment**: the arable crop sector. Paris. 349 p.

_____. **Agriculture, trade and environment**: the dairy sector. (2004). Paris. 401 p.

_____. **Agriculture, trade and environment**: the pig sector. (2003). Paris, 290 p.

PETHIG, R. Pollution, welfare and environmental policy in the theory of comparative advantage. (1976). **Journal of Environmental Economics and Management**, 2 (3): 160-169.

PORTER, M. E. America's green strategy. (1991). **Scientific American**, 264, p. 264-168.

PORTER, M. E.; LINDE, C. van. der. (1995). Toward a new conception of the environment-competitiveness relationship. **Journal of Economic Perspectives**, 9 (4): 97-118.

PROGRAMA DAS NAÇÕES UNIDAS PARA O DESENVOLVIMENTO. PNUD. **Relatório de desenvolvimento humano 2003**: as Metas de Desenvolvimento do Milênio. Disponível em: http://www.pnud.org.br/hdr/hdr2003/docs/hdr2003_01.doc. Acesso em: 15 mai. 2008.

PROCÓPIO FILHO, A. (Coord.). (1994) **Ecoprotecionismo**: comércio internacional, agricultura e meio ambiente. Brasília: IPEA (Estudos de Política Agrícola nº 17).

SIEBERT, H. (1977). Environmental quality and the gains from trade. **Kyklos**, 30 (4): 657-673.

STERN, D. (2004). The rise and fall of the environmental Kuznets curve. **World Development** 32: 1419–39.

TOBEY, J. (1990). The effects of domestic environmental policies on patterns of world trade: an empirical test. **Kyklos**, 43 (2):191-209.

VALLURU, S. R. K.; PETERSON, E. W. F. (1997). The impact of environmental regulations on world grain trade. **Agribusiness**, 13(3): 261-272.

VANEK, J. (1968). The factor proportions theory: the n-factor case. **Kyklos**, 21(1): 749-756.

VASCONCELOS, C. R. F. (2001). Análise do padrão do fluxo de comércio externo brasileiro sob a ótica do teorema de Heckscher-Ohlin: o caso do Mercosul e do comércio com o resto do mundo. **Estudos Econômicos** (IPE/USP), 31(4): 615-651.

WHITE, H. (1990). A heteroscedasticity consistent covariance matrix estimator and a direct test of heteroscedasticity. **Econométrica**, 48 (3): 817-818.

WORLD BANK. **World development indicator**. Disponível em: <www.wb.org>. Acesso em: 12 Jun. 2007.

XU, X. (1999). Do stringent environmental regulations reduce the international competitiveness of environmentally sensitive goods? A global perspective. **World Development**, 27(7): 1215-1226.

DETERMINANT ROLES OF CORPORATE INVESTMENT AND FISCAL SUBSIDIES IN THE EXPANSION OF SUGARCANE AGRIBUSINESS WITHIN THE STATE OF GOYAZ, BRAZIL. (2007 – 2010).

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Abstract
This article aims at discussing which role private investment played in the recent expansion of the sugarcane agribusiness within the state of Goyaz, Brazil. This goal, however, can only be reached if some of the fundamental determinants of the dynamics of Projects of Investments are strictly looked at. The relevance of such issue is that it appears to have lots of confusion about the reasons for them to be attracted and once welcomed, start different movements towards innovation diffusion, market strategies, areas demand and managerial of institutional arrangements, particularly fiscal subsidies. The issue this work agues is what are the fundamental determinant reasons for the investments being drained into Goyaz within the sugarcane agroindustrial system, especially between the intervals from 2007 to 2010. By guessing that fiscal subsidies solely do the job, explanations for the search of companies for an opportunity to place herein will not be complete, then five hypotheses are set in an attempt to clarify the problem. No individual theory can deal with such a complex matter. Thus, there will be made a set of theories that will be arranged to exploit the matter and, hopefully, retrieves an acceptable understanding for it. In general, one can state that an integration of Keynesian, Schumpeterian and neoschumpeterian schools will support the task. The chief conclusions that had been reached are that there seem not to be enough evidence to support that the expansion of sugarcane are due to productivity earnings; also, the study found out to be sufficient evidences to state that subsidies really has to do with the quest of the investments for placement in Goyaz; there also seem to be evidences that the investments are related to the level of flex fuel automobiles. It also came up to support with evidences that the autonomous investments are carrying out innovative diffusions. Finally, it appears that the economic indicator retrieved from the cities with cane projects has influenced the Gross State Product. The role of investment are of higher profile, establishing disputes for land, concurrence among global rivals, great variations in productivity levels, but could not ever do this job unless the fiscal subsidy, that attracted those investments, were made available.

Key words: Fiscal Subsidy – Investment – Foreign Direct Investment – Sugarcane agribusiness – Goyaz, Brazil.

DETERMINANT ROLES OF CORPORATE INVESTMENT AND FISCAL SUBSIDIES IN THE EXPANSION OF SUGARCANE AGRIBUSINESS WITHIN THE STATE OF GOYAZ, BRAZIL. (2007 – 2010).

1. Introduction.

This article aims at discussing which role private investment played in the recent expansion of the sugarcane agribusiness within the state of Goyaz, Brazil. This goal, however, can only be reached if some of the fundamental determinants of the dynamics of Projects of Investments are strictly looked at. The relevance of such issue is that it appears to have lots of confusion about the reasons for them to be attracted and once welcomed, start different movements towards innovation diffusion, market strategies, areas demand and managerial of institutional arrangements, particularly fiscal subsidies. The referred to dynamics stands for variations in Gross State Product, levels of employment, levels of productivity for goods over investments, fiscal subsidy and employment, as well as the sugarcane itself, different ratios of investment and unequal subsidies concession. However, the most highlighted dynamics is undoubtedly the variations in the number of projects between 2007 and 2010.

The issue this work agues is what are the fundamental determinant reasons for the investments being drained into Goyaz within the sugarcane agroindustrial system, especially between the intervals from 2007 to 2010. By guessing that fiscal subsidies solely do the job, explanations for the search of companies for an opportunity to place herein will not be complete, the hypotheses that are expected to clarify the problem are five, as follows:

A first one relates to the fact that the expansion of sugarcane may have to do with the availability of areas rather than productivity incomes; following to that, another issue that can support the quest and is far the most polemical is that fiscal subsidy exerts an important influence upon the attractiveness. A third one states that such investments are induced by the sales of flex-fueled vehicles to a national extent. The fourth is related to autonomous investments and states that they a represented by the diffusion of innovation and anticipation of future demands. The last one drives that the Gross State Product for those cities, which carry on cane projects, pulls the overall GSP.

In order to disclose those issues, obviously, no individual theory can deal with. Thus, there will be made a set of theories that will be combined to exploit the matter and, hopefully, retrieves an acceptable understanding for it. In general, one can state that an integration of Keynesian, Schumpeterian and neoschumpeterian schools will underpin the task.

In addition, the methodology employed will not be unique and will have to articulate its parts towards a response.

The chief conclusions that had been reached are that there seem not to be enough evidence to support that the expansion of sugarcane are due to productivity earnings; also, the study found out to be sufficient evidences to state that subsidies really has to do with the quest of the investments for placement in Goyaz; there also seem to be evidences that the investments are related to the level of flex fuel automobiles. It also came up to support with evidences that the autonomous investments are carrying out innovative diffusions. Finally, it appears that the economic indicator retrieved from the cities with cane projects has influenced the Gross State Product. Thus, the role of

investment are of higher profile, establishing disputes for land, concurrence among global rivals, great variations in productivity levels, but could not ever do the job unless the fiscal subsidy, that attracted those investments, were worked out.

The matter: what are the fundamental determinants for the investments projects expansion in Goyaz sugarcane agribusiness within 2007-2010 years?

Objective: explain the dynamics, i.e., the variations in the number and values of the projects in sugarcane agribusiness in Goyaz from 2007 to 2010 through the analysis of both indicators and strategies of different companies.

2. Hypotheses

there are five hypotheses embedded in the plan to find out the economic reshape process of the dynamics in Goyaz, as follows:

1. There seem to be evidences that the expansion of sugarcane is due to the productivity earnings rather than the availability of areas;
2. There seem to be evidences that the fiscal subsidy influences the investments;
3. There seem to be evidences the investments are induced by the national sales of flex fuel automobiles;
4. There seem to be evidences that the autonomous investments are related to fiscal subsidies and innovation, that stand for the diffusion of technologies;
5. There seem to be evidences that the economic increasing of the cities that has received investments projects drives the expansion of the Gross State Product.

3. Methodology:

Material:

This piece is supported by an exploitative research, which dug from a sheet made available by the state Secretariat of Industry and Commerce, particularly, under the board of 'PRODUZIR' *budget-programme* that decides and releases the fiscal subsidies for each submitted project. That document contains all values, number of projects, and the situation of each one (approved / running). Also, it permits that one can make new calculations for other indicators, e.g., productivities of employments, investments and of subsidies, as well as the products themselves (ethanol, sugar, electricity). Another source to be looked into is the chart of national sales of flex fueled automobiles, which has been prepared by the National Automobiles Fabricants Association (ANFAVEA). Furthermore, there are other two indicators charts that will be consulted: the finance state secretariat Gross National Product for cities with and without cane investment projects and planning secretariat's cane productivity and areas under plantation data.

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Quantitative simple methods are required for most of the hypothesis placed in this article. Thus, for the first one, it was employed a trend analysis in order to estimate the exponent that will give out the greater degree between area and productivity. Concerning the second, simple linear regression was used to find out *how much* did the fiscal subsidy influenced the investments in each year of the series 2007 to 2010. Looking at the third, since there are few data, which avoids a perfect regression, the choice was to make a single linear graph analysis showing the behavior of both investments in Goyaz sugarcane agribusiness and national flex fuel vehicles between 2007 and 2010. In order to verify the fourth – autonomous investments – a comparison involving some selected evidences from the empirical

reality, under the guidelines of the Industrial Organization Literature. Finally, regarding the fifth hypothesis, again, a simple linear graph analysis was drawn with the available data obtained from the chart of the Planning and Finance state secretariat.

4. Review and Theoretical Foundations.

Since the very object of the research is the investment, then the theoretical guidelines should be the theories about it. Anyway, not only for testing the hypothesis but also, and maybe chiefly, to build up a concise explanation of the dynamics, there should be a combination of a set of comprehensive theories. Thus, Keynesian, Schumpeterian and neoschumpeterian schools will be integrated.

- Theory of the Investments.
- Theories of Location.

The main economic approaches over location issues appear to start from a set of authors that supported their analyses onto the neoclassical economics, who behold a market structure under perfect competition, constant prices, balance between supply and demand of raw materials, production factors under fixed quantities and so on. *Von-Thünen* (1826) – the prominent one – stated a relation among land income (Richardian), distance and location. In short: the more the marketplace was distant, the less would be the surplus receipts of the producer in rural areas. Such output was a function of the transportation costs and production expenditure. The industrial location was worked out by Weber (1909); the theory of the central place was developed by Christaller (1933); Wingo (1961) e Alonzo (1964) studied the matter of land use. None of them, however, take into account the increasing of the productivity, inputs exchange, neither different size of the firms, production scale and their design, as well as the interdependence among the companies. A reasonable headway over those impervasive point-of-views has been made with the Industrial Organization School. The Theory of the Industrial Organization enlarged the roll of inputs and production factors beyond land, capital, work and natural resources. Porter, brought into the infra-structures (physical, commercial e administrative), as well as scientific knowledge. Porter also states that the advantage of a location competing for productivity comes from the high quality of inputs, particularly, specialized ones. The environment for rivalry and strategy comes up when incentives and institutions enhance the investments in a determined sector, which comprehends R&D, training services and market development. Anyway, before it becomes a general hypothesis, one should bear in mind that such advantages were conceived for a model that targets Productivity, seen as the main source of advantage for industrial competition. Unfortunately, there seem to be few evidences that preconditions for agricultural productivity and/or more systemic advantages can be explained from a conception based on locational advantages.

- Theory of Investment.

The theoretical references about investments that are adopted in this article are those proposed by Keynes and refined by his colleagues. If, at one hand, it's true that the pavement of the *Keynesian Revolution* are related to a timeline when the Systemic Crisis of super production and liquidity has found a new paradigm in economic management with a prominent and important role of the government, on the other hand, it's also true that the inherited research programme sheds light over the complex dynamics of investments. Keynes launched the bases of a new interpretation of the economic game, in which the investment plays a priority role within the economic

increasing models. Seldom after him did other authors not take investment into account in many other different models of economic increasing. Even though where the supremacy of capital over governments as well as those that highlight the public expenditures emphasize the 'public investment'. As far as a definition for investment is concerned, Keynes (1982) signs that it is not pacific what investments mean. Thus, suggests that aggregate investment corresponds to the liquid addition to every species of capital equipments after depreciations of older ones (still liquid incomes) had been deduced, and this stands for liquid investment. Different definitions occur perhaps because of light differences in the term 'capital', e.g., fixed capital, flowing capital or liquid capital. Thus, Hawtrey suggests that liquid capital has to do with stock variations and so on. After discussing many points-of-view and bring the meditations of D. H. Robertson about income, the less controversial conclusion that Keynes presented is that both savings and investment are equal, *inter alia*, because one can only save if he acquires an asset, that should correspond to an amount of the new current investment. Kalecki (1982) went along and refined that statement suggesting that investment decisions keep a close relation with the gross savings of the firms that consists in the depreciation and distributed profits. Moreover, the investment can be financed with any money out of the firms, which could be attracted by the inner accumulation of capital in the company so that gross savings overtake the constraints put by either the capital market or the "increasing risk". Kalecki adds to the register 'gross savings' the term personal savings (controller groups that invest in their own company by underwriting shares). Thus, the investment decisions are influenced by the total of the gross savings and the temporal expansion of the profits.

Comparing Keynes and Kalecki, the concept of investment becomes more complex although more structured because – at one hand – influences the economic increasing, but, on the other hand, it is also influenced by factors like the variation of the effective demand and by the technical progress, since what will generate a more regular behavior in the level of the economic activity. Such a comparison makes it possible to distinguish Autonomous Investment from Induced Investment. In other words: there will come up a model to interpret the individual effects of each one over the economy as a whole.

It is the Hansen Model, or Hansen-Samuelson Model.

In his article *Interactions Between the Multiplier Analysis and the Principle of Acceleration,* Samuelson (1939) explains a model that had been developed by his advisor Alvin Hansen, which intended to estimate the amount by which the National Income is multiplied after a plus in governmental expenditures. The original matter of Hansen's Model, as Samuelson puts it, is a sequence of Keynesian Model that states that the more government increases its expenditures, the consumers raises theirs too, and, as a matter of consequence, the entrepreneurs tend to practice incremental investments: the 'Multiplier Effect'. Nevertheless, the register 'multiplier' in its more common acceptance does not reveal the relation between the Total National Income induced by the government expenditure and the normally wasted amount, before the governmental raises. The solution to this puzzle is simple. According to Samuelson, the 'multiplier' gives the ratio between the total raise of the National Income vis-à-vis the total investments (government and private). He also explains that the effects over the private investments are often regarded as tertiary, that's why no systematic attention is paid to it. The last hypothesis put by Hansen-Samuelson is that the Private Induced Investment is proportional to the increment of the consumption in-between both the prior and the moment of the observation itself. However, it should be made clear that the relation

governmental spending x national income lead to different results depending on the period the expenses are made, whether they are constant, if their variation is not so large, etc and the *Proxy:*

$$\frac{I}{I-\propto}$$

(1)

There, (I) stands for the total investment and (α) is the multiplier. Thus, divide the graph and, four regions and establish discriminations.

The model find out that after rewriting the original equation of the National Income (**Y=C+G+I**) at the time of the observation.

Samuelson consolidates the thought that the National Income is, in essence, a function of Government Expenses and of the Consumption. Therefore, the Investment is induced by Demand. In this model, Autonomous Investment isn't enough to raise the Income.

5. Discussions and Results Presentation.

Once the hypotheses are verified, the next step will be to find out if the investments shaped any dynamics into the Agroindustrial System of sugarcane.

Hypothesis #1 states that there seem to be enough evidences that the expansion of sugarcane is due to the productivity earnings rather than land availability.

In order to assess it, tests of linear regression for "Area" and "Productivity" were run. Thus, the following results were retrieved:

Log(YG) = 11,32924+0.069996.t

Where: 'YG' is the planted area in Goyaz, and the first term represents the constant of linear function, and the second term (0.069996) is the exponent that shows the trend for the raise of the planted area with sugarcane within Goyaz state.

Log(PROD_GO) = 4.165409+0.011826.t

Whence: PROD_GO is the productivity of sugarcane in Goyaz, the first term is the constant, and the second one is the trend of the expansion of the productivity.

The findings are that there not seem to be sufficient empirical evidence to support that the productivity has been greater than the area. According to these results, the area raised almost 7% at the average between 1990 and 2009, and the average increment for the productivity was 1%. A possible explanation is that there is still a large amount of land available for sugarcane, although there are some institutional arrangements that constraint its expansion, such as the Agroecological Zones Decree and local rules.

Hypothesis #2 states that there seem to be evidences that the fiscal subsidies influence the total investments between 2007 and 2010.

To find out if it can be validated, it is going to be necessary to gather the time series of both Investments (Approved and Running) and Fiscal Subsidies recorded in the 'PRODUZIR' sheet. To find out if it can be validated, it is going to be necessary to gather the time series of both Investments (Approved and Running) and Fiscal

Subsidies recorded in the 'PRODUZIR' sheet. It will be evaluated how much the fiscal subsidies (CFiscal) will have influenced the level of investments within that period.

The first evaluation refers to the year 2007, as follows:

Loginv07= -3,847+1,124 CFiscal
(0,013) (0,001) R^2 = 0,622; Durbin-Watson = 1,593

Whence: the dependent variable (Loginv07) is the Total Investment, and the 'regressor' variable is the Fiscal Subsidies, which, accordingly to the data retrieved above accounts for over 60% of the variation in the investment through 2007. In short: the role of attracting investments had been perfectly fulfilled.

It can be inferred that there really seem to be sufficient evidences to support the hypothesis that the fiscal subsidies influence the investments of sugarcane projects in Goyaz in 2007.

The second evaluation (2008) can be presented as follows:

Loginv08= -2,170 + 1,037 CFiscal
(0,220) (0,001) R^2 = 0,662; Durbin-Watson = 1,885

As shown, in the year of 2008, the fiscal subsidy was responsible for about 66% of the variation of the total investments - recorded in 'PRODUZIR' sheet - therefore, it seems to be enough evidences to support that 2008 investments were influenced by the subsidies.

The third test refers to the year 2009 and the following results were achieved:

Loginv09= -2,948 + 1,075 CFiscal
(0,046) (0,001) R^2 =0,766; Durbin-Watson = 1,812.

As shown above, "CFiscal" were responsible for 76% of the variation in the investments. It is therefore possible to infer that there seem to be enough evidences to support the hypothesis that in 2009, the investments were influenced by the fiscal subsidies.

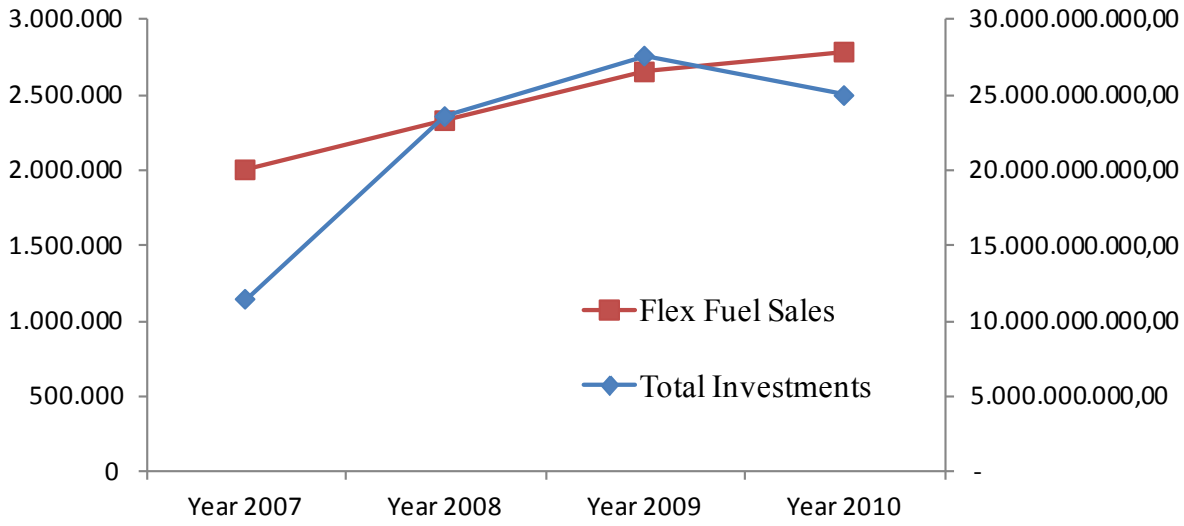
The last test refers to year 2010 data. The following retrievals were returned:

Loginv10= -2,596 + 1,058 CFiscal
(0,068) (0,001) R^2 = 0,724; Durbin-Watson = 1,99.

As seen, the Fiscal subsidies were responsible for around 70% of the variation of the total investments in 2010. Thus, there really seem to be enough empirical evidences to support the hypothesis that subsidies influenced the investments level.

The third hypothesis states that the investments are being induced by the variations of the sales of flex fuel vehicles to a national extent. In order to verify it, both 'PRODUZIR' and 'ANFAVEA' records from 2003 to 2010 will be compared.

Figure 1 – Relations between national flex fuel cars sales x Total Investments.



Source: PRODUZIR/ANFAVEA.

The analysis supports the following inferences:

Although the sales of flex fuel cars in Brazil started in 2003 and increased in the following years and the investments in Goyaz strengthened since 2007, it is possible to watch symmetrical trends from 2007 to 2010. It is noticeable the 'skip' that the set of total investments perform: from BRL 10 million millions to around BRL 25 million millions as short as in one year interval, when the sales starts from 2 million units and peaks around 2,5 millions. This suggests that there had been an effort to contribute with the sourcing of ethanol. In the next period, the sales records little above 2,5 cars and the investments appears to be somewhat stable around BRL 25 million millions.

A possible explanation is the variability of the data recorded within 'PRODUZIR' sheet, probably because both the Mergers and Acquisitions movements among the firms and the fiscal subsidies contests among the states nearby.

Hypothesis #4:

Autonomous investments are supported on Fiscal Subsidies and on technical change; they represent the technological diffusion (R&D) as well as an anticipation of future demands. Such investments can be determined either by corporate strategies or any other reason. The literature has treated them as being associated with the technological diffusion and the anticipation of future demands, i.e., strategic investments.

In order to verify such a hypothesis, it will be needed to collect empirical evidences supported by neoschumpeterian literature, as follows: in the first hypothesis, the findings were that, in general, the fiscal subsidies influences the investments in the recorded projects, and the respective credit (CFiscal) does not stand for a loan fund.

Anyway, subsidy can be seen as a component of the investment because it works as stimuli and indirect savings that creates a power of purchase, thus the firm has the capability to invest. The subsidy can thus make the capability of investing feasible by indicting the company to a Project Funding, whose credits can be borrowed from the ordinary bank system.

Equally important is that the Schumpeterian theory states that innovations depend upon access to credits. In the second hypothesis, the investments have its

inductive component given by the national sales of flex fuel, which are a derivative innovation from the use of sugarcane ethanol as a fuel under 1970's 'ProAlcool' programme.

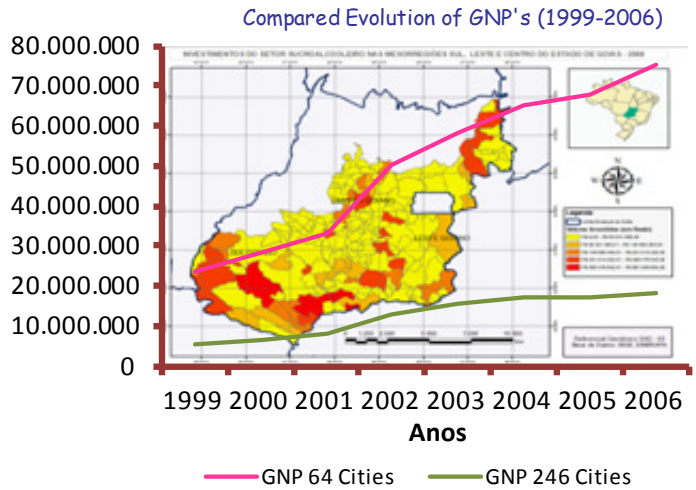
Thus, come up here two forms of credit: the Fiscal Credit and Finance Credit (Banks): the first stimulates the investments and the latter makes it happen.

In Goyaz, the projects of investment have three different dynamics concerning this matter: the local companies, of a minor size, that are not exactly innovative; larger companies, usually subsidiaries of national groups, specially from São Paulo and Minas Gerais; and the global players, even the 'Brazilian multinational' firms like ETH, a branch of Odebrecht. The autonomous investment of the first ones are related to keep the production running without expecting to enhance their businesses; if this is the case, the common is the acquisition by larger ones. The second type of companies are closer to the definition because they come from a region where the 'original' innovation, so to say, started, since it was there that the ethanol industry arose. It is inside the Alcohol Industry that the technology will be generated and adapted; and the more that technology is applied, the more the Technological Paradigm of sugarcane ethanol becomes consolidate. The last set of companies - Global Players (or multinationals) ally both the capability of investing and of learning (fast) the technology of sugarcane ethanol. Besides learning the Paradigmatic technology, they make an effort to enhance the available knowledge and invest to expand the production capability, once ethanol is turning to be an international commodity.

Therefore, it can be inferred that there seem to be evidences that in Brazil the productivity has been greater than in Goyaz (12,45% x 11,82%, 1990-2009) and a possible explanation is that there is an homogeneous increasing of the productivity, to a national extent, because of the narrow differentiation of the technological packs, because, inter alia, the areas where those firms come from are very near and even make boundaries with Goyaz, which would not account for extraordinary innovations. Thus, there is a movement of technological diffusion.

Hypothesis #5: there seem to be evidences that the economic increasing of sugarcane activity is exerting influence on the Gross State Product of Goyaz.

The verification of the hypothesis will be made through a descriptive analysis watching the graph. With the elements for analysis at hand, the Gross National Product for Goyaz can be compared watching the evolution of this indicator both for the cities with projects and all other ones. As follows:



Source: FCO/PRODUZIR.

Thus, there is not such a change itself, but changes at a higher speed. There seems not to be any doubts left that it is the investments for ethanol that are pulling this change.

If, at one hand, accordingly to theory, the Institutions (markets and organizations) exist to supply market failures and, specially, diminish uncertainties; maybe it's time to think once again or, perhaps, improve those institutions.

The change is getting faster because the organizations (particularly firms) are turning into Global Players, which implies that they are learning faster. This fact should be highlighted because the main strategy, besides Merger and Acquisitions that target the systemized knowledge worked out within an elder firm in the global marketplace, and, also, for transmitting knowledge out of its core competence, is the Skills Transfer at minimum marginal cost, represented by the *greenfields*. Such companies will be skilled for coordinating global chains and to produce at lower costs, since they almost won't face asymmetric information. *Greenfields* are not only newer sites, machinery or factories; they are above all an organizational innovation.

Attention should be paid to the fact that a concentration of investments within the ethanol agribusiness and in greenfields at Goyaz signals a future trend. Possibly, for all thinkable reasons for paying attention to ethanol, specially for its market potential, the fact that it is not so important anymore the oscillations of prices between sugar and ethanol, allows to think that organizations are "anticipating the future", i.e., foreseeing a global market structure for ethanol and its competitiveness factors.

The strongest investments are in ethanol because it is which aggregate more value, since it demands a more efficient coordination, which involves innovations, infra-structure, quality, logistics and the product can be traded like *tie and bundle*, i.e., one can sell both the final product and the embedded technology (mills and distillers), engines, cane varieties, and, customized contracts with governmental agencies and other companies, besides running a great deal of money with financial services.

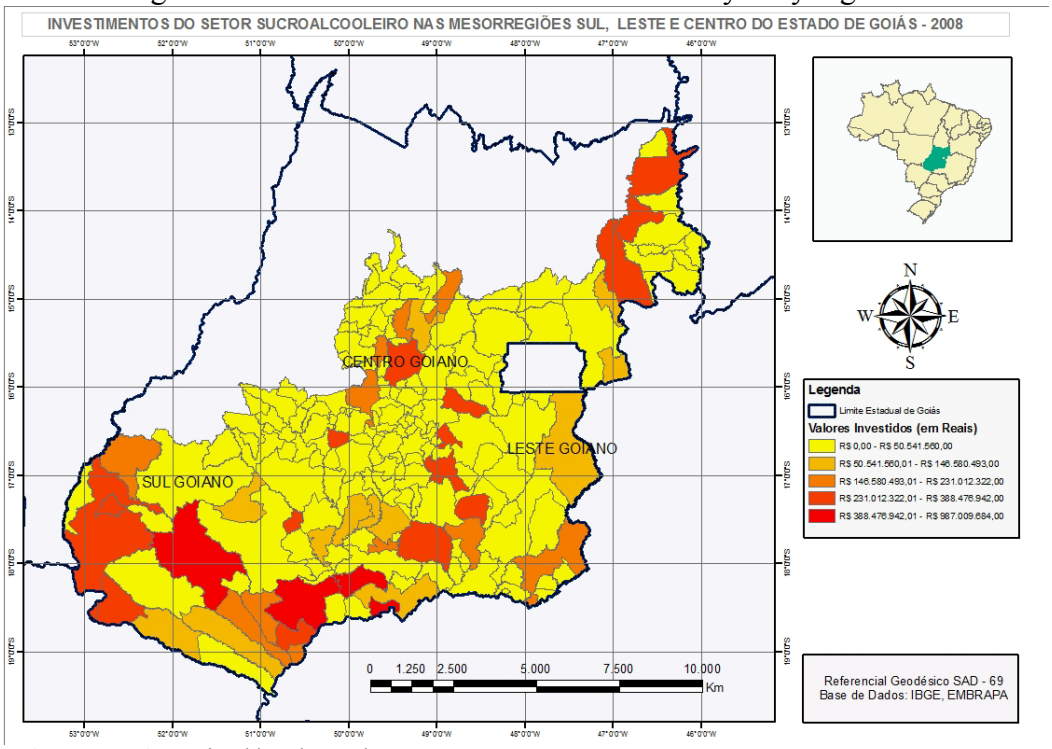
It is worth watching that not all approved projects are running, and, furthermore there are projects whose records are repeated in the enrollment of 'PRODUZIR', since there are companies that enter into the fruition of the subsidy, then leave, and come into once again, keeping the original values. An example of such instability is Usina Porto das Águas, located at Aporé, Goyaz South Region.

Regarding Direct Investment, in between the years 2005 and 2007, there is only one record of Foreign Direct Investment into the 'Approved Projects' roll. In 2009, 5 FDI's occurred in 'Approved' roll. And the news involve a particular dynamics in this arena, for instance, Shell establishing a merger process with Cosan, so as to rival and compete with British Petroleum (BP) that made a Joint Venture with Maeda Group, Santa Elisa Vale; this one, in its turn, has made another with Global Foods, and Dow Chemical.

With all that bore, it is now possible to chart how the investment project are shaping Goyaz by concentrating in some regions, and, also, select areas, although it is not possible to make proof of any correlation between regions and areas.

The following figure shows the concentration of projects of investment in Goyaz by region. The stronger the color is, more expensive is the investment.

Figure 2 – Concentration of Investments in Goyaz by region.

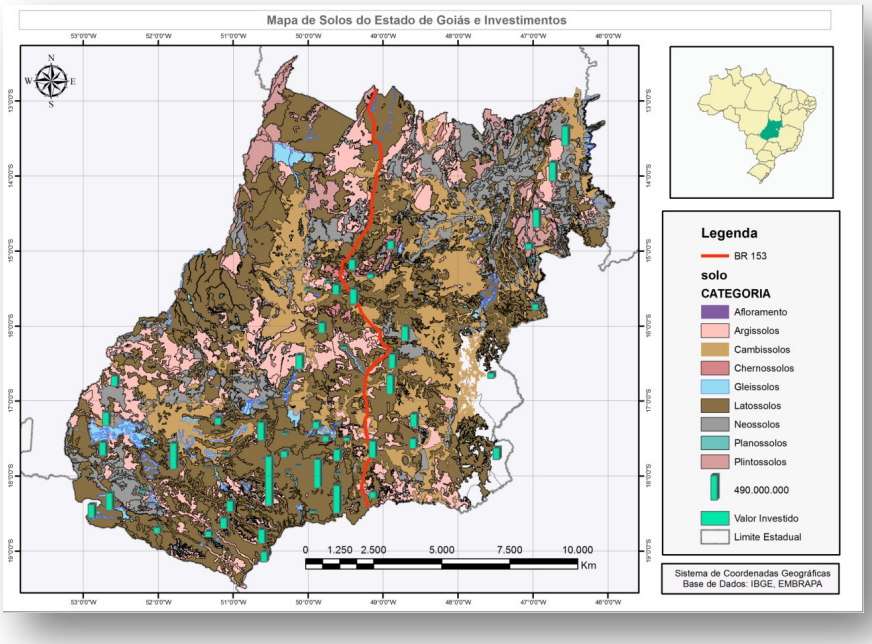


Source: PRODUZIR. Organized by the author.

Another determinant for the investment is the selection of areas.

Although there are no empirical evidences that the companies make a careful plan considering the features of the soil and other variants before they hire the areas and start running the project, there is much coincidence with the choice revealed in the map bellow: the higher the bar is, more expensive is the investment, and the darkest the color is, better is the soil for the cane. As follows:

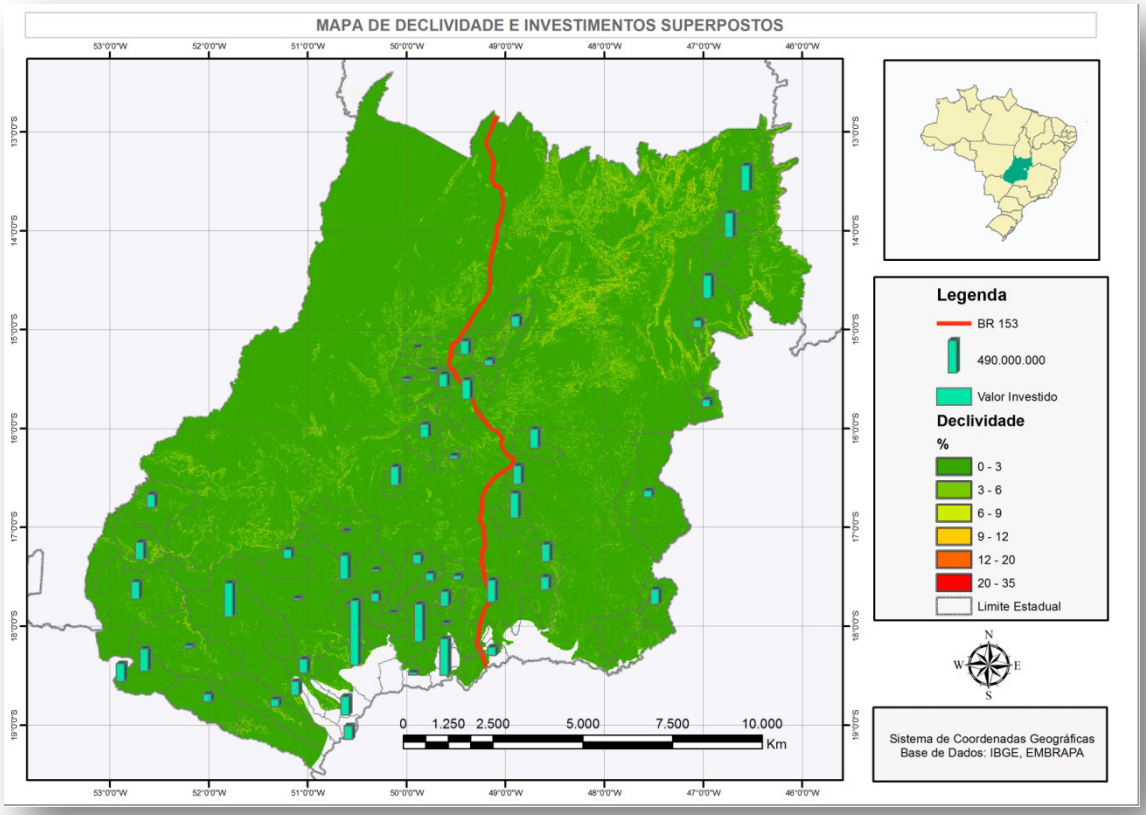
Figure 3 – Chart of soils in Goyaz with investments.



Source: PRODUZIR/SIEG/EMBRAPA. Organized by the author.

Last but not the least, there is the matter of slope. Anyway, it should not be viewed as a problem, because, as it is shown bellow, most of the lands in Goyaz are within the strip 0% - 12%, which is recommended for running the business of sugarcane, since it is almost plain. Greenish and yellowish colors are the best.

Figure 4 – Chart of Slopes in Goyaz with Investments within.



Source: PRODUZIR/SIEG/EMBRAPA. Organized by the author.

6. Final Regards:

The very issue of this article was to find out what is the role that the private investment plays in the reshaping of Goyaz territory in the recent expansion of sugarcane. Nevertheless, the dynamics of Projects of Investment, as seen, could not occur unless the fiscal subsidy was made available. There seem to be no doubt that Goyaz are naturally biased to develop cane and its correlate businesses. The matter, anyway, is that once the subsidies were conceded, the larger companies started a new movement towards a niche that is cane ethanol's. Some companies entered into arrangements and made higher investments in order to *catch-up* and to innovate forecasting bigger and newer demands in the future; some of them began a more fierce competition and ran aggressive merger and acquisition processes so that they could earn from scale and raise barriers to rivals not only in Brazil, but to a global extent. So, as a matter of conclusion, the role of the Fiscal Subsidies was to stimulate the investments and theirs was to positioning the state of Goyaz in the innovative Industry of Cane Sugar and Alcohol in the world.

7. Bibliography:

Kalecki, Michal. **Teoria da Dinâmica Econômica: ensaio sobre as mudanças cíclicas e a longo prazo da Economia Capitalista**. Coleção 'Os Economistas'. Ed. Abril. São Paulo, 1983.

Keynes, John Maynard. **A Teoria Geral do Emprego, do Juro e da Moeda**; Coleção 'Os Economistas'. Ed. Abril. São Paulo, 1983.

Porter, Michael E. **Competição- Estratégias Competitivas Essenciais**. Rio de Janeiro: Ed. Campus, 1999.

Samuelson, Paul Anthony**. Fundamentos da Análise Econômica**. Coleção 'Os Economistas'. Ed. Abril. São Paulo, 1983.

_____. **Interactions between the Multiplier Analysis and the principle of Acceleration**. The Review of Economic Statistics, volume 21, Issue 2. The MIT Press. Boston, May, 1939, p. 75-78.

Schumpeter, Joseph A. **A teoria do desenvolvimento econômico**. Coleção 'Os Economistas'. São Paulo: Abril Cultural, 1982.

Electronic Sheet: **Distillers: Investments and Situations**. Secretariat of Industry and Commerce of State of Goyaz. Budget-Programme PRODUZIR.

Electronic Sheet: National Association of Automotors Vehicles Manufacturers (ANFAVEA) – **Annual Report**, several years.

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INTERNATIONAL STANDARDS AND SMALL-SCALE FARMER BEHAVIORS: EVIDENCE FROM PERU

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Abstract
The prevalence of food quality standards in international trade is constantly increasing and has a growing influence on developing countries. A wide range of literature in development economics focused on the determinants of the standard adoption and on the debate of whether international standards exclude small-scale farmers from high-value food markets. Otherwise, when exclusion is pointed out, very little is said on how problematic such forms of exclusion are. In this paper, we use the Hirschman's (1970) conceptual framework to examine which behaviors small-scale farmers adopt face to the incontrovertible standards, what happens to the farmers that are excluded from a specific certified market, and to what extent small farmers are affected to not be certified. Based on an analysis of primary data collected to examine the implication of GlobalGAP on the mango sector in Peru, we consider three main options for the small-scale farmers: "loyalty" (implementation of the standard under specific conditions), "switch" of market segment, and "exit" from the market. The last option leads farmers to sell all their production to small and volatile exporters, called golondrinos (swallows). We show empirically that some small-scale farmers (8% of the sample) comply with GlobalGAP standard thanks to the support from exporters (farming contrats which include the certification cost), while others switch of market segment by complying with the organic certification (12,5%). Organic certification substitutes for the GlobalGAP requirement in the EU market. Finally, we find a significant level of exit option (24%), especially among smaller farms, less specialized, and furthest from exporter plants. The latter seem very affected by the changes related to the GlobalGAP standard requirements: price risk on their production has increased and their bargaining power and agricultural income have decreased. They are particularly vulnerable because their level of investment (mango trees) impedes to radically change of farm activity.

Key words: standards, certification, small-scale farmer behaviors, mango, Peru

INTERNATIONAL STANDARDS AND SMALL-SCALE FARMER BEHAVIORS: EVIDENCE FROM PERU

1. Introduction

The last two decades witnessed unprecedented changes in the agro-food sector through the proliferation of standards in international agricultural trade. After a period during which the states of developed countries actively implemented food safety standards (this has been exacerbated by a series of food scandals (Henson and Caswell, 1999)), voluntary standards emerging from the private sector have been developed to attend to rising consumer concerns regarding the conditions of production and trade of the goods they buy (Jaffee and Henson, 2004). These voluntary standards combine a mixture of food safety, environmental, and social dimensions, while an inherent emphasis is being given to product traceability. Consequently, standards not only affect the safety of final products, but also the whole organization of the supply chain (Hammoudi et al., 2009). For many farmers in developing countries, investing in agricultural niches for exportation may appear as a profitable option. However, a wide range of empirical literature dealing with the impact of rising international standards in developing countries so far has been to show that the stringent conditions tend to lead to the exclusion of smallholders and the inclusion of larger farmers (Augier et al., 2005; Dolan and Humphrey, 2000; Escobal et al., 2000; Key and Runsten, 1999; Reardon et al., 2003; VanDerMeer, 2006). Lack of access to human, physical, and social capital and the costs of certification are the most common factors explaining the non-compliance of smallholders with standards (Busch and Bain, 2004; Vorley and Fox, 2004). On the contrary, some less pessimistic studies find positive effects on very small farms, which are included in the high-standard market through a contract-basis with the agro-exporters (Asfaw et al., 2010; Chemnitz, 2007a; Henson et al., 2011; Maertens and Swinnen, 2009; Minten et al., 2009).

In fact, standards affect all producers differently, depending on the nature of the standard as well as the institutional environment of the country and the characteristics of farms (Chemnitz et al., 2007b). However, very little literature examines what happens to the farmers that are excluded from a specific certified market and to what extent small farmers are affected to not be certified. Moreover, exclusion from the market requiring standards may not necessarily be problematic, depending on the alternative options (market, employment opportunities...) for farmers (Belton et al., 2011). Our paper is a contribution to the scarce literature analyzing the implications that international standards have on the behavior of small-scale farmers and their impacts in terms of marketing risks and income levels.

In this paper, we focus on small-scale producers of fresh mangos in Peru. The fresh mango sector in Peru is an interesting case, as the private GlobalGap standard (GG) – the most important standard that applies to production of fresh mangos – has become quasi-mandatory for exportation to the European Union (EU) since 2007. Kleinwechter and Grethe (2006) have studied the adoption of the Globalgap standard in the mango export sector in Peru in 2004-2005. However, they didn't explore the implications for smallholders. Yet the new context raises the question of the manner in which Peruvian small-scale farmers respond to this new predominant standard. Drawing on an adaptation of Hirschman's (1970) conceptual framework – also used by Henson and Jaffee (2008) on the food safety standard's impact – we consider three main options for mango growers in Peru: "loyalty" (implementation of the standard), "switch" of market

segment, and "exit" from the market. We first held some qualitative interviews with experts and supply chain actors before implementing a quantitative approach aimed at identifying the producers' characteristics for each alternative option. Surveys were conducted with 223 small-scale mango producers from October 2010 to May 2011. Data was collected in the region of Piura, the main zone of mango production.

The paper proceeds as follows: section 2 provides a background of mango production and trade in Peru and the evolving international trade towards standards; section 3 develops the analytical framework used to formulate hypotheses; section 4 describes the survey and data; section 5 presents and discusses the empirical findings; and section 6 concludes the paper.

2. Fresh mango sector in Peru

Production and trade

In Peru, agriculture is still a source of economic development. It accounts for 8% of the GDP and provides 23% of direct and indirect employment (INEI, 2008). Contrary to numerous exported agricultural products, mango production in Peru is also locally consumed. The cultivated area is around 28,400 ha for a production of 250,000 tons in 2010 (MINAG, 2010). Peru exports around 30% of its national production (105,724 tons in 2009/2010) and is the fifth largest mango exporter in the world. Fresh mangos are by far the most important of exported mangos (87% of exported mango volumes in 2009, according to customs). Exports go to both the EU (65%) and US (35%) markets (Gerbaud, 2010).

Production is concentrated in northern Peru, in the region of Piura (around 70% of the national production and 90% of exported production). The main mango varieties grown for the domestic market are the local variety, Criollo, and the improved variety, Edward. For the export market, improved varieties such as Kent (94.5% of export volumes) are cultivated (SENASA, 2010). Piura export-oriented production is harvested between November and March. For the EU market, Peru – the second largest supplier – competes with Brazil in November and December. For the US market, Peru – the third largest supplier – competes with Ecuador in December and January (Gerbaud, 2010).

The Free On Board price (FOB, price at the exporting port) for exported Kent mangos is substantially higher than the price for mangos sold on the national market. The monthly FOB prices for exportation to the US and to the EU are nearly similar for both markets. Otherwise, prices for Edward or Criollo varieties are substantially higher than those for the Kent variety on the domestic market, as Peruvian consumers do not value the taste of the latter. The domestic market alternative for Kent mangos is thus not profitable.

Access to the market

For the domestic market, producers generally sell their mango production though brokers who supply the market of Lima. Most producers have informal contracts with their broker where price depends on the final demand price. These middlemen deduct a commission (around 10%) of the sale price (AVSF, 2008). These types of transactions require long-term relationships and confidence between the producer and the broker (AVSF, 2008).

For the export market, the first constraint to accessing an outside market is related to the minimum volume required by the buyer (at least one container, i.e. 20 tons). This explains why small-scale producers (on average hardly producing 20 exportable tons) have to form an association in order to get export market access. The second constraint

is that the mango exporters must meet some commercial quality requirements: color (red), appearance (no scratches) and size (at least 450 g). Lastly, export-oriented producers require a phytosanitary certificate from the SENASA (Servicio Nacional de Sanidad Agraria del Peru) – the public agency in charge of inspection, control, and eradication of the fruit fly.

Non-tariff measures and constraints from the US and EU markets

For both the US and EU markets, exports are required to respect the Codex Alimentarius and maximum pesticide residual levels (MRL). Nevertheless, some differences exist between the market requirements. The most demanding norm for exportation to the US relates to a public norm: a hydrothermal treatment is required to kill fruit flies; the mangos undergo a hot water treatment in a certified processing plant. For this, the APHIS-USDA (U.S. Department of Agriculture's Animal and Plant Health Inspection Service) allocates personnel to each treatment plant so as to monitor the hydrothermal process during the fresh mango season. The high costs of initial investment in certified plants and treatment supervision are charged by the exporters, which explains why there are so few treatment plants in Peru: there are nine certified treatment plants, but only six are working (two in the Sullana area and four in the Tombogrande area). Otherwise, the US private standards required by importers are most frequently specific to manufacturing or processing plants: the GMP (good manufacturing practices) and the BASC (certified good handling and shipping practices). Concerning production, the most widespread private standards in mango production are those for organic certification. Contrary to the US, Europe does not require hydrothermal treatments. Mangos exported to Europe are cleaned and then packed in 20 existing packing plants in Peru. Most of them are also located in the Sullana and Tombogrande areas. Beyond the Codex Alimentarius and the MLR, barriers to trade in the EU are therefore much more relative to private standards: at the plant level, the HACCP is essential; at the production level, Globalgap has been becoming almost mandatory since 2007, and organic certification has spread.

Export-oriented organizations and stakeholders

In Peru, about 28,400 ha are cultivated for mango production, 70% of which are located in the Piura region. In 2009, 1,627 producers received phytosanitary certificates from the SENASA and were thus allowed to export their mangos. Among these producers, 75% are smallholders (less than 20 ha of total land), 20% are medium farmers (from 20 to 50 ha), and 5% are large-scale farmers (more than 50 ha). They account for 30%, 30%, and 40% of exported produce, respectively. Larger farmers are generally vertically integrated into exporter enterprises and thus export their own mango production. However, there is large variability in mango production from year to year[73]. Thus, these exporters generally complete they own production by purchasing from smaller farmers. Small-scale producers may thus have annual contracts (written or oral contracts, but hardly enforceable). Through these contracts, they steadily delegate harvests to the exporter (or a third party assigned to harvest on behalf of the packing plant), since it becomes very difficult to gather daily workers. In addition, in many cases, producers hardly have any access to credit to pay workers. A disadvantage of that service is the high level of mangos discarded during the harvest – the discarded mango rate is on average 20%. Exporters are also in charge of carrying out transportation to the

[73] For example, the 2008-2009 season was disastrous in terms of production (due to agronomic reasons). Numerous producers mention a reduction of around 50% of their production level.

processing plant. Nonetheless, for a monthly adjustment strategy, exporters do not implement farming contracts with smallholders.

In 2009-2010, there were 106 fresh mango-exporting companies (SENASA, 2010). While the production is highly atomized, there is a rather medium concentration of exports in few exporting companies: the top 10 represent 46% of the total export volume. However, when compared to the figures from 2005-2006 (Fulponi, 2007), this concentration in the mango-exporting sector has decreased these last five years, revealing a still very attractive and expandable market. Furthermore, the sector shows a relatively low entry barrier for small exporting companies. Therefore, the sector actors complain about the high number of small and very volatile exporter firms (60% treat less than 500 tons per year) that enter the market for short run market opportunities. These sporadic exporters are called "*golondrinos"* (meaning "swallows"). These firms are subjected to the most border rejections. On the other hand, larger exporters mostly rely on their own production (from 50 to 250 ha) and still tend towards increased vertical integration, even though land has become very expensive nowadays. They are generally targeting both the EU and US markets. They have easily enforced quality, traceability and certified production – in particular GG. They own packing or treatment plants or subcontract for the packing and treatment process.

International standard schemes for fresh mangos

The GG guideline ensures good agricultural practices focusing first on food-safety, but also a number of issues concerning environment quality, worker safety and hygiene, and traceability on the farm. The certificate includes some initial investments (such as toilets, canteens for workers, water taps, safety equipment, and storage facilities for agricultural inputs and outputs, respectively) that require substantial financial capital to upgrade the farm. It also entails annual costs for external inspection by a certification body. Finally it requires that the producer know how to read, write, and keep records – which means a high level of human capital. Producers have two options to obtain certification under the standard: they can apply individually or apply collectively for a producer group certificate. Forming producer groups may reduce costs at various levels (lower cost for external inspection, shared investments…) (Asfaw et al., 2010; Belton et al., 2011; Narrod et al., 2009). However, the mango-producing sector is little organized. Furthermore, the cost of compliance may appear particularly high since GG certification does not include the price premium. The size of an individual enterprise may thus appear as the major determinant of the standard's adoption. According to our first qualitative interviews, the minimum profitable size to individually implement GG is around 20 ha.

Organic production represents 1% of the total mango production in Peru (3,000 tons in 2007). According to Promperu data from 2007, 36% of organic mangos are exported to the US and 64% to Europe (that is almost the same as the conventional mango market). Organic certification focuses on food-safety, environment quality, and traceability on the farm through agricultural practices that do not involve chemical inputs. The certificate includes few initial investments, but entails annual costs for external inspection by a certification body – meaning a minimum level of financial capital– and requires that the produce be able to read, write, and keep records – meaning again a minimum level of human capital. Again, producers have two options to obtain certification under the standard: they can apply individually or apply collectively for a producer group certificate. The organic certification generally includes a better price that could compensate the cost of certification and a possible lower yield.

3. Analytical framework and hypotheses

An analytical framework

Given the scarcity of an adequate amount of literature to analyze the implications that international sustainability standards have on the behavior of farmers, we propose to draw on the simple conceptual framework developed by Hirschman (1970), who analyzed the economic and political behavior of firms, organizations, and states facing a declining situation. Henson and Jaffee (2008) then used this framework in the specific case of food safety standards to analyze the strategic responses of developing countries.

Hirschman compares strategic options by various organizations and describes strategy types through the concepts of "exit", "loyalty", and "voice" (Hirschman, 1970). The "voice" option involves complaining or negotiating through lobbying. Concerning food standards, Henson and Jaffee (2008) argue that "voice" could be understand as protesting again new standards, for example, at the WTO level when standards are judged unfair or as a protectionist barrier. The "loyalty" option involves the organization's participation – this could be interpreted in the food sector as an alignment with the standard's requirements (Henson and Jaffee, 2008). Lastly, the "exit" option involves ceasing participation – this could be interpreted in the food sector as choosing not to comply with the standard in a particular market, i.e. switching customers or particular markets if alternative profitable markets exist or, if no alternative is available, definitively stopping the activity. Moreover, Henson and Jaffee (2008) propose another dimension to Hirschman's framework related to when option is implemented: ex-ante "proactive" behaviors (anticipating standards) or ex-post "reactive" behaviors (waiting and adapting). The most negative approach is thus a combination of "exit" and "reactive" behaviors.

As Chemnitz *et al*, (2007) and Henson and Jaffee (2008) have already highlighted, the ability to implement the various options will depend on several factors at the country, market, and firm levels, as well as the specific food standards.

Specificity of the case study

In our paper, we question the impacts of the restructuring of the mango supply chain by growing private standard requirements, GG in particular, on small-scale farmers. The farmers we surveyed are export-oriented (they grow the Kent variety, which is not valued locally), but may not be certified since they do not have enough land (they own less than 20 ha).

We have to specify the above framework according to the relevant options for our case study. For instance, because we focus our analysis on small-scale farmers in Peru who are very fragmented and little organized, the "voice" option does not appear relevant and most of these smallholders have "reactive" behaviors. We thus specify three main alternative options available to small-scale export-oriented farmers:

(i) Loyalty: As we mentioned above, producers have two options to obtain certification under the standard: either by applying individually or by applying collectively for a producer group certificate. In the case of small farmers who hold less than 20 ha, the loyalty strategy at the individual level seems difficult due to the fixed costs of compliance. The only option is thus that farmers organize themselves within producer organizations so as to comply collectively with standards. Yet the length of the mango harvest (three months) seriously limits the opportunities for the development of efficient collective action.

(ii) Switch[74]: Producers will continue to export to the EU and the US indifferently since they adopt organic certification. Organic certification substitutes for the GG requirement in the EU market.

(iii) Exit: They will no longer export to the EU and will target the US or domestic markets instead. This means that the "auspicious" export window is reduced for these producers, perhaps implying that the farmers replace their usual exporter. In extreme cases, the farmers may uproot their Kent mango trees (intended for export) and replant new orchards with Edward or Criollo mango trees for the domestic market (targeting the higher segment of the domestic market).

We must mention that non-certified producers do not yet face total exclusion from the EU market as a whole since EU importers can buy non-certified products when no GG produce is available. Consequently, some small-scale producers still have not chosen an option (later, they will be included in a control group named "continue"). Moreover, these alternatives are not totally exclusive, but we assume that the third is probably more frequent.

Besides, the above analysis framework does not give any idea of the benefits or disadvantages for small farmers to adopt one type of marketing behavior. We will thus additionally formulate a research hypothesis on the impacts of these options on income and marketing risk for farmers.

Research hypotheses

It may be necessary to introduce some hypotheses to test the impacts of marketing options on prices and marketing risks. We think that GG's introduction may have ambiguous impacts on non-certified smallholders.

First, when some small-scale producers choose the "loyalty" option (i.e. compliance with the GG standard), one could expect positive results on income and marketing stability:

(iv) Price and Stability: GG certification does not involve the price premium, but since it could increase market access when the EU export market is favorable, we expect prices to increase. Besides, since GG compliance often leads to stronger vertical coordination through farming contracts, we expect producer-exporter relationship stability to increase.

Second, the "switch" option may have positive results on the income and marketing stability for small-scale producers:

(v) Price and Stability: Organic certification involves the price premium, which could balance the costs of compliance. It could also increase the security of market access due to product diversification. Consequently, we expect price and market stability to increase.

Third, the "exit" option may have negative results on the income and marketing stability of non-certified smallholders:

(vi) Price: Non-certified producers switch to supplying the domestic market, where the price for Kent mangos is substantially lower than on the international market.

(vii)Risk: Non-certified producers switch to supplying "*golondrinos*" (unknown buyers). This is likely to increase their marketing risk (unstable relationships, low prices, etc.).

[74] Contrary to Hirschman's framework, in our particular case, we do not include switching customers in the exit option because "switching" here means to comply with another standard, which is related to an offensive strategy by farmers following the widespread use of GG certification.

However, the demand for certified products may have indirect positive results on the income of non-certified producers:

(viii) Price: Conventional product demand from the US may mostly be satisfied by the supply chain responses of non-certified producers. In addition, the bargaining power of these producers compared to small-scale exporters, such as *golondrinos*, may increase. Consequently, we could expect non-certified producer prices to increase.

(ix) Hired labor: The increase in certified exporters' own production increases the need for hired labor. Consequently, we could expect a higher labor demand at the village level.

(x) Income: The increase of price for conventional mangos and the increase of hired labor may increase the total income of non-certified producers.

4. Survey and data

Survey and method

This empirical study was led in the framework of the EU NTM-Impact Project (www.ntm-impact.eu), whose objectives include the analysis of the impacts of non-tariff measures (NTMs) from high-income countries – governmental regulations and private standards – on developing countries. Between October 2010 and May 2011, we undertook a survey of 223 mango producers in the main mango region of Piura, where over 90% of exported mangos originate. We focus our analysis here on small farmers with less than 20 ha and who represent 20-30% of mango exports and 70-80% of all mango producers. We randomly selected 19 villages located in the two main areas where exporters' plants are found – Sullana and Tambogrande. Within these villages, producer surveys were chosen randomly among the farmers growing Kent mangos (i.e. export-oriented) with holdings of less than 20 ha (i.e. small farmers for whom individual GG certification might be unprofitable). Surveys were conducted on a face-to-face basis. The data collected through the questionnaire include: farm and household general characteristics, household assets, mango production and marketing behavior, mango standard certifications (organic and GG), other activities, changes and perceptions since GG is required by exporters. According to the surveys, producers no longer know where their mangos are exported to because large exporters generally export to both markets. The producer does not choose an export target, but rather an exporter.

Data analysis

To describe the sample of producers, descriptive statistics are applied. To describe factors that may have influenced the farmers' marketing behaviors and determined perceived impacts of standard requirements, an analysis is performed using t-test and Chi²-test[75]. In this paper, we do not show a causal effect of GG certification on producers, but rather we depict the characteristics and perceptions that characterize the different types of producers in the alternative options. Finally, estimating a regression model tests the hypothesis concerning the impact of these options on the price received for mangos. In addition, we also control for other factors considered to be relevant, such as the variables of farm and household characteristics and relationships with buyers. The dependant variable of the regression is the logarithm of the highest price received by the farmer. We do not know the volume sold at this price, but since farmers

[75] We cannot use a multivariate logistic regression model because alternative options are not totally exclusive.

generally harvest once or twice per season and that the discarded mangos could not have received the highest price, we can assume that it was a sizeable amount of the farmer's production. We think that it could be a good proxy of the producer's bargaining power and final income (given the volume of mangos).

Characteristics of farmers and marketing behaviors

Within our sample of 223 producers, the average farm size is 8 ha, 3.3 ha of which is dedicated to mango production (85% of land dedicated to mango production is for Kent mangos, followed by traditional mango varieties for the domestic market and personal consumption). 80% of respondents say that mangos are the most important product grown in terms of cash flow. Most small-scale producers are also day laborers at other farms (13%) or have extra agricultural income (14%). On average, they have grown mangos since 1997, but most of them started after 2000, when exportation raised dramatically. Their distance from the nearest plant (treatment or packing plant) is around 14 km.

(i) Loyalty: 31% of farmers surveyed have heard about GG certification and only 8% are GG certified. GG certified producers are scarce, as we expected for smallholder farmers. The average certification date is 2009 (from 2007 to 2010). The compliance cost is US$ 2,000 per year (without any variability among respondents). The certificate is paid sometimes by the producer himself, but mostly by the exporter if the farmer is under contract or by a producer organization (half of GG producers are members of an organization, 22% of the total sample). Initial investments (such as toilets, canteens for workers, water taps) are more often paid for by the producers thanks to a rural credit bank.

(ii) Switch: 12.5% of producers are certified organic. The average certification date is 2007 (from 2004 to 2010). The cost of certification is around US$ 2,000/year and is mostly paid for by the producer himself or a producer organization (in few cases by the exporters).

Nine producers are both GG and organic certified.

(iii) Exit: 9% of producers declare to have increased their volumes sold to the domestic market since 2007 (33% have decreased and 54% have experienced no change). All producers grow varieties for the domestic market (around 15% of their total mango area), but they have not increased these areas nor decreased the Kent variety areas. Otherwise, 33% say that they have increased their volumes sold to unknown traders since 2007 (29% have decreased and 35% have experienced no change). Unknown traders are generally *golondrinos*[76], i.e. exporters with a very volatile existence. We already know that most producers (85%) work with unknown traders each year, particularly to sell any Kent mangos rejected by their usual exporters. 34% of producers declare selling low volumes to these traders and 42% of producers declare selling a high volume to these traders each year. 56% of producers who declare huge volumes to unknown traders say that these volumes have increased since 2007 – the latter (24% of the total sample) are considered among the "exit" option below because they no longer know to whom they are selling their mangos.

5. Results and discussion

[76] This is less likely to be a new broker for the domestic market, which does not present a profitable opportunity for the Kent variety. In addition, in the domestic market, producers are used to working with the same broker, often a relative.

At the producer level, we compare the three options proposed above: loyalty (GG adopters), switch (organic adopters) and exit (selling mangos to unknown traders) behavior categories according to some selected variables.

As presented in Table 1, the average total land size of GG adopters (loyalty) is significantly lower than the control group (continue). Yet similar to organic adopters (switch), the farmers are significantly more specialized in mango production (ratio of land). Regarding yield, there are no significant differences among the groups – the lower yield expected for organic farming is not significant. Regarding the exit option, the average size of total land is a little lower than their counterparts and these producers have a little less mango production.

Household characteristics do not show any important results in terms of our comparison, except that GG adopters and exit producers are more likely to have income from an agricultural off-farm activity. This could be explained in different ways: while it is proof of GG adopters' access to financial capital that could be reinvested in their farms, conversely in this case of exit producers this could suggest that their farm is not profitable enough to bring sufficient income. They are also less likely to own a car.

Table 1: Mean comparison of producer characteristics according to alternative options

	Continue[a] **(n=137)**	Loyalty (Globlgap) **(n= 18)**	Switch (Organic) **(n=28)**	Exit (Do not know anymore their buyer) **(n=49)**
Farm characteristics				
Total land size	8,81	4,2***	6,8	7,18*
Ratio of land size under	0,52	0,82***	0,65**	0,53
Ratio of mango area under	0,84	0,88	0,87	0,84
Volume of mangos 2009	16,96	10,4*	10,71*	12,48*
Yield 2009	8,00	8,34	6,69	7,47
Household characteristics				
Age	55,6	51,4*	51,3**	57,7
Education	1,49	1,61	1,46	1,48
Experience	15,77	14,4	12,96**	15,57
Children (<15 years)	1,67	1,5	1,70	1,43
Mobile phone	0,64	0,77	0,64	0,65
Car	0,27	0,16	0,18	0,12**
Date of car	1995	2004*	2002*	1991
Agri. off farm Income	0,08	0,33***	0,14	0,20**
Market access and relation w/ buyer				
Distance to plant	14,9	7,8***	11,5**	14,4
Packing plant	0,68	0,94**	0,68	0,84**
Works only w/ 1 exporter	0,71	0,88*	0,73	0,37
Used to have written contract	0,15	0,66***	0,43***	0,02**
Used to have no contract	0,57	0,27***	0,39**	0,77***

Technical advices	0,5	0,77***	0,5	0,02***
Advance payment	0,18	0,44***	0,28*	0,04**
Month is important for buyer	0,27	0,22	0,14	0,39**
Color is important for buyer	0,49	1***	0,90***	0,44*
Weight is important for buyer	0,51	1***	0,85***	0,51

Statistical significance at the 0.01 (***), 0.05 (**) and 0.1 (*) level of probability

[a] Continue is the control group (i.e. the total sample without standard adopters and producers who declare huge volume to unknown traders and said that this volume has increased since 2007).

Among variables related to market access, the distance is significantly lower for standard adopters. This could suggest that standard compliance may be more the result of an exporter's decision rather than that of the farmer. This could be supported by the fact that it is the exporters who manage the harvest inside the mango farms. Other variables related to relationships with buyers, such as contracts (used to having written contracts or not) and advance payments, differ significantly. Written contracts and advance payments attest to close relationships with the buyers. In the case of GG adopters, farmers are also more likely to receive technical advice from the buyer and the presence of nearby packing plant (namely exclusively EU-oriented) is significantly higher compared to the control group. The results lead to the same conclusion as Kleinwechter and Grethe, who have shown that vertical integration or some forms of vertical coordination, such as contract farming, can be seen as the most important factor influencing GG compliance (Kleinwechter and Grethe, 2006). Moreover, standard adopters' buyers are significantly more demanding in terms of commercial quality (color and weight) than those of their counterparts. Finally, exit producers have significantly less contracts with buyers; they do not benefit from technical advice or advance payments, even if a packing plant is generally and significantly more accessible for them than for the control group. For the exit option, buyers are more demanding on the month of the available production, suggesting that the buyers have shortened export windows.

Table 2: Mean comparison of producer perceptions according to alternative options

	Continue **(n=137)**	Loyalty (Globlgap) **(n= 18)**	Switch (Organic) **(n=28)**	Exit (Don't know anymore their buyer) **(n=49)**
Risks and stability in market access				
Production costs have increased	0,60	0,72	0,75	0,67
Production costs have decreased	0	0	0	0,12***
Price risk has increased	0,66	0,66	0,50**	0,82**
Price risk has decreased	0,15	0,11	0,28*	0,14
Stability of relation w/ buyer has increased	0,32	0,50**	0,43*	0,14**
Stability of relation w/ buyer has decreased	0,25	0,05**	0,25	0,37
Increased land under Kent	0,21	0,11	0,14	0,20

Increased land under cereals	0,22	0***	0***	0,35*
Increased land under fruit trees	0,36	0,61*	0,39	0,47
Increased land under cocoa	0,02	0,44***	0,21***	0
Income and bargaining power				
Off farm labor has increased	0,07	0,16*	0,21***	0**
Off farm labor has decreased	0,18	0,05	0,18	0,12
Mango prices have increased	0,37	0,55	0,57*	0,40
Mango prices have decreased	0,32	0,22	0,21	0,34
Earlier payment	0,24	0,38	0,14	0,24
Later payment	0,33	0,05**	0,28	0,24
Bargaining power has increased	0,26	0,33	0,32	0,08***
Bargaining power has decreased	0,31	0***	0,17**	0,53***
Income has increased	0,34	0,55**	0,43	0,22
Income has decreased	0,30	0,16	0,32	0,48**
Working conditions				
Labor has increased	0,49	0,77**	0,86***	0,63*
Labor has decreased	0,021	0	0,01	0
Working conditions are improved	0,26	0,72***	0,50***	0,14*
Working conditions are deteriorated	0,19	0***	0***	0,42***

Statistical significance at the 0.01 (***), 0.05 (**) and 0.1 (*) level of probability

From Table 2, which analyzes the farmers' perceptions of changes since 2007, the perception of farmers regarding production costs do not show any significant differences between option categories: 60% to 75% of producers declare that production costs have increased. However, within the exit option group, a significant number of producers (12%) declare that production costs have decreased. The higher production costs expected for GG and organic farming are thus not significant. On the contrary, the perception of price risk and the stability of buyer relationships show stark differences: while a significant number of organic producers declare that price risk has decreased or at least not increased, GG producers insist on the heightened stability of their buyer relationships. For the exit option group, both indicators of price risk and stability have deteriorated since 2007.

According to the categories, 11% to 21% of producers have increased the amount of land dedicated to mangos, particularly the Kent variety[77]. Nonetheless, there is no significant difference between the categories. In addition, none of the producers have decreased their land allotments for mangos (i.e. uprooted mango trees). These results suggest that, for the moment, none of the producers tend to exit from the mango production activity. Since mango trees represent an investment, we could easily understand why producers do not react promptly to the market signals. Switching costs are high. In addition, both standard adopters are more likely to increase their land allotments for cocoa than the control group, and inversely the land for cereals. Cereals are annual crops for the national market. Prices vary, but farmers can switch crops yearly. Fruit trees (mainly lemon trees) mentioned by the producers surveyed are

[77] While producers have increased land allotments for mangos since 2007, it is always with the Kent variety and never with other domestic market varieties (Criollo or Edward).

planted to sell the production on the domestic market. They represent an investment for farmers (trees do not produce the first years), but prices on the local market are more secure than on the international one. Cocoa trees represent an investment for farmers and the production is sold exclusively on the international market, generally allowing for better prices, but also higher marketing risks. Therefore, the result suggests that standard adopters are less risk-averse than the non-adopters[78]. With regards to the exit option, farmers have been more likely to grow cereals since 2007, which illustrates a defensive strategy.

Among the variables related to income and bargaining power, standard adopters are more likely to declare that off-farm labor has increased. When looking at the qualitative answers for the kind of job they have adopted, they declare to have small shops. Increasing off-farm labor may thus reflect a better financial situation for these farmers, as they were able to invest in the shop, rather than a pessimistic one (looking for extra income outside of an unprofitable farm). For the exit option group, off-farm labor has not increased. Our hypothesis that certified exporters are more likely to increase their need for hired labor and thus the demand for labor at the village level does not concern hired labor from the exit option group. Since labor contracts are for only three months, the mango season's peak, we can think that the seasonal workers are thus generally not mango producers themselves. Organic farmers are more likely to declare that mango prices have increased (57% of them) since GG farmers a large number of them declare that their income has increased and that they do not receive later payment for that. In addition, both standard adopter categories perceive that their bargaining power has not decreased since 2007, while their counterparts dramatically perceive a decrease of their bargaining power. Lastly, among the variables related to working conditions, both standard adopter categories declare that the labor has increased in their farm since they have complied with the standard. However, their working conditions have also significantly improved. Actually, mango production is low labor-intensive. Yet because they comply with the standards, farmers have increased their labor time on the farm, mostly because they have to keep records of all their farm practices. On the contrary, exit option producers declare that their working conditions have deteriorated on the farm.

To further investigate how the bargaining power of farmers is affected by the certification, we estimate a simple regression on the level of the highest price received by farmers in 2009 for Kent mangos (Table 3). According to the results of our model, the loyalty option (GG adopters) is positively and strongly related to receiving a better price for mangos, corroborating our hypothesis. We cannot conclude that the causality of certification on the price level[79], but the result can suggest that if there is no price premium included in GG compliance, certified farmers have better access to the market when the price is high and the supply is highly competitive. In the same way, the coefficient for the switch option (organic certification) shows that produced received a significantly better price, corroborating the fact that organic certification generally includes a price premium from the buyer. According to our initial hypothesis, the exit option (non-certified producers who no longer know their buyers) may have ambiguous effects on the price: from the Table 3 results, none of the hypotheses (positive or negative impacts on the price) are actually verified. Among the other statistically

[78] Since cereals may require more land than fruit trees or cocoa to be profitable, we control that the land size area available for other crops in the farm was not a limiting factor for standard adopters to increase land allotments for cereals.

[79] We have no latent variables to control whether the price is due to the new certification or to the fact that this group of producers may have been initially more efficient.

significant variables in our model, the total volume of mangos sold in 2009 is positively correlated to a higher price, as we could expect since the volume also determined the bargaining power of farmers with traders. The month of the mango harvest is also important in determining the price received. Consequently, producers for whom harvests mostly take place in January are more likely to receive a lower price. Otherwise, we find no evidence that having more experience, getting a car or a mobile phone – this could increase farmer bargaining power through better access to information —improves the prices received by farmers. Moreover, the fact that a treatment plant (i.e. easier exporter access to both the US and EU markets) is the most available plant for the farmer does not influence the price received for mangos. And finally, to be paid earlier does not damage the bargaining power of farmers.

Table 3: Regression estimation results

Dependant variable: log. of highest price for mango in	Coeff.	Std. dev.
Alternative options		
Loyalty	0.205***	0.080
Switch	0.123**	0.064
Exit	- 0.156	0.049
Farm characteristics		
Volume of mangos 2009	0.002**	0.001
Production peak in December	- 0.005	0.042
Production peak in January	- 0.119***	0.049
Household characteristics		
Experience	-0.002	0.002
Mobile phone	0.045	0.044
Car	0.067	0.050
Market access and relation w/ buyer		
Packing plant	0.042	0.049
Risks and stability in market access		
Earlier payment	-0.057	0.047
Constant	**2.382*** **	**0.141**
Pseudo-R^2	**0.17**	
N	**207**	

6. Conclusion

This paper addresses the gap in the literature regarding the implications that international sustainability standards have on the behavior of (potentially) excluded farmers and their impacts in terms of marketing risks and income levels. Drawing on the adapted concepts of Hirschman (1970), we have used this analytical framework to compare alternative options that mango producers in Peru have been progressively following since GG exporter requirements are growing. Data collected through a representative and large number of surveys with small-scale export-oriented producers (223 surveys) show three main options adopted by these farmers. First, we find

evidence that the loyalty option exists since some small-scale producers are complying with GG (8% of our sample). Exporting companies thus support these farmers in complying with the standard through farming contracts, technical advice, and by paying the annual certification costs. This support allows small-scale producers to be included in the lucrative international market (these farmers received a significantly better price for mangos). Nonetheless, farmers who are integrating into this supply chain seem to be selected according to two characteristics: they are more specialized in mango production (more than 80% of their land) and they are closer to the exporter plant. Exporters may thus decrease transaction costs by selecting productive farmers close to their plant. Second, we found farmers who adopt another option (switch option) to bypass the difficulties of complying with GG certification by implementing organic certification. Organic certification, which required less initial investment from farmers, substitutes for the GG requirement in the EU market. Third, we found a steady number of farmers who declare that they no longer know their mango buyers. These buyers are the well-known *golondrinos*, which represent 30% to 50% of the exporter companies and are very volatile. Farmers belonging to this option group seem to be very affected by this change: a large majority (82%) declares that price risk has increased, that stability with farmers has rather not increased (compared to their counterparts), their bargaining power and their agricultural income have decreased, and last that their working conditions have deteriorated. They are particularly vulnerable because their level of investment (mango trees) impedes to radically change of farm activity. Switching costs are high. These farmers – characterized by rather low total land size, low mango volume, and never used to getting any contract farming, technical advice, or advance payments – represent 24% of our total sample.

This study aimed to contribute to the analysis of the extent to which small-scale farmers are affected by non-certification and thus how problematic such forms of exclusion are. The latter is of interest to policymakers since Peruvian agriculture is still source of economic development and represents a large source of employment. We show in this case study a significant level of exit option (which is more an exit of the stable usual supply chain than a definite market exit). Consequences of growing international standards in different agricultural sectors are thus very important to analyze in order to develop adapted policy recommendations and support for farmers.

Finally, to pursue this analysis it would be interesting to better understand why some farmers (the “continue” control group) are still not affected by the international standard requirements, without any changes to their way of supplying exporters. It would thus be necessary to interview their specific exporters. Otherwise, this could be due to the lack of GG enforcement, since it is known that some exporters mix certified production with uncertified production and sell it under the same brand (Fulponi, 2007). Unfortunately, it is difficult to get GG figures to compare the surface certified and the volume sold with the global standard.

7. Bibliography

Asfaw, S, Mithöfer, D and Waibel, H, 2010. Agrifood supply chain, private-sector standards, and farmers' health: evidence from Kenya. Agricultural Economics, 41(3), 251-263.

Augier, P, Gasiorek, M and Tong, C Lai, 2005. The Impact of Rules of Origin on Trade Flows. Economic Policy, 20(43), 567-623.

AVSF, 2008. Estudio de impacto del comercio justo en la asociación de productores de mango del valle del alto Piura (Apromalpi-Perú), ONG report. Agronomes et Vétérinaires sans Frontières.

Belton, B, Haque, M M, Little, D C and Sinh, L X, 2011. Certifying catfish in Vietnam and Bangladesh: Who will make the grade and will it matter? Food Policy, 36, 289-299.

Busch, L and Bain, C, 2004. New! Improved? The transformation of the global agrifood system. Rural Sociology, 69(3), 321–346.

Chemnitz, C, 2007a. The Compliance Process of Food Quality Standards on Primary Producer Level: A Case Study of the EUREPGAP Standard in the Moroccan Tomato Sector. Humboldt University Berlin, Institute for Agricultural Economics and Social Sciences, Working Paper Series. Working Paper 81

Chemnitz, C, Grethe, H and Kleinwechter, U, 2007b, Quality Standards for Food Products – A Particular Burden for Small Producers in Developing Countries?, EAAE Seminar "Pro-poor Development in Low Income Countries: Food, Agriculture, Trade, and Environment", Montpellier, France.

Dolan, C and Humphrey, J, 2000. Governance and trade in fresh vegetables: the impact of UK supermarkets on the African horticulture industry. Journal of Development Studies, 37 (2), 147-176.

Escobal, J, Agreda, V and Reardon, T, 2000. Endogenous institutional innovation and agroindustrialization on the Peruvian coast. Agricultural Economics, 23, 267-277.

Fulponi, L, 2007. Market Access and Private Standards: Case Study of the Peruvian Fruit and Vegetable Markets, Directorate For Food, Agriculture and Fisheries Commitee For Agriculture, Working Party on Agricultural Policies and Markets. OCDE Report.

Gerbaud, P, 2010. La mangue. FruïTrop, 175, 13-42.

Hammoudi, A, Hoffmann, R and Surry, Y, 2009. Food safety standards and agri-food supply chains: an introductory overview. European Review of Agricultural Economics, 36(4), 469-478.

Henson, S and Caswell, J, 1999. Food safety regulation: an overview of contemporary issues. Food Policy 24 589–603.

Henson, S and Jaffee, S, 2008. Understanding Developing Country Strategic Responses to the Enhancement of Food Safety Standards. The World Economy, 31(4), 548–568.

Henson, S, Masakure, O and Cranfield, J, 2011. Do Fresh Produce Exporters in Sub-Saharan Africa Benefit from GlobalGAP Certification? World Development, 39(3), 375-386.

Hirschman, A O, 1970, Exit Voice and Loyalty: Responses to Decline in Firms, Organizations, and States. Harvard University Press, Cambridge, Massachussetts and London, England.

INEI, 2008. Censo Nacional Economico, Instituto Nacional de estadistica e Informatica, Peru.

Jaffee, S and Henson, S, 2004. Standards and Agro-Food Exports from Developing Countries: Rebalancing the Debate. World Bank Policy Research Working Paper No. 3348.

Key, N and Runsten, D, 1999. Contract Farming, Smallholders, and Rural Development in Latin America: The Organization of Agroprocessing Firms and the Scale of Outgrower Production. World Development, 27(2), 381-401.

Kleinwechter, U and Grethe, H, 2006 The adoption of the Eurepgap standard by mango exporters in Piura, Peru, International Association of Agricultural Economists Conference. Gold Coast, Australia, August 12-18, 2006.

Maertens, M and Swinnen, J, 2009. Trade, standards and poverty: Evidence from Senegal.
World Development, 37(1), 161–178.
MINAG, 2010. Ministerio de Agricultura del Peru: http://www.minag.gob.pe.
Minten, B, Reardon, T and Vandeplas, A, 2009. Linking urban consumers and rural farmers in India: A comparison of traditional and modern food supply chains, International Food Policy Research Institute, Washingrton
Narrod, C, Roy, D, Okello, J, Avendano, B, Rich, K et al., 2009. Public–private partnerships and collective action in high value fruit and vegetable supply chains Food Policy, 34(1), 8-15.
Reardon, T, Timmer, C and Barrett, C, 2003. The rise of supermarkets in Africa, Asia and Latin America. American Journal of Agricultural Economics, 85(5), 1140-1146.
SENASA, 2010. Servicio Nacional de Sanidad Agraria del Peru: http://www.senasa.gob.pe/.
VanDerMeer, C, 2006, Exclusion of small-sacle Farmers from coordinated supply chains: Market failure, policy failure or just economies of scale? In: R Ruben, M Slingerland and H Nijhoff (Eds.), The agro-food chains and networks for developement. Springer, Dordrecht, The Netherlands, pp. 209-218.
Vorley, B and Fox, T, 2004. Global Food Chains—Constraints and Opportunities for Smallholders, OECD, Agriculture and Pro-Poor Growth Task Team Helsinki workshop.

ASSESSMENT OF SANITARY NON-TARIFF MEASURES (NTM) UPON BEEF TRADE FLOWS FOR GERMANY AND ARGENTINA

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Abstract
International trade of agri-food products is impeded by both tariff and non-tariff barriers (NTM). Even though there has been a reduction in the level of tariff barriers, the implementation of non-tariff barriers has recently been increasing. One of the most important among the latter has been Sanitary and Phytosanitary (SPS) measures which have had an economic impact on international trade, affecting the quantity of goods traded and the price of them. This has had a large impact on the beef trade, an important agri-food product traded internationally by Argentina and Germany. Quantifying the impact of such barriers has particular importance, not only for the government but also for companies, and it is necessary to do so in order to analyse and negotiate them internationally. The aim of this study is to investigate and measure the effect that some SPS measures, such as bovine spongiform encephalopathy (BSE), foot and mouth disease (FMD) and hormonal growth promoters regulation have had on Argentine and German beef trade using a gravity model. A Poisson Pseudo Maximum-Likelihood (PPML) method for estimating gravity models for trade is used in this study. This model is compatible with the existence of zeros in trade data and their estimates are robust even with different patterns of heteroskedasticity. The period analysed was 1995 to 2007. In the Argentine case study bilateral beef trade consisting of chilled and frozen beef between Argentina and 24 countries was taken into consideration. In the Germany case study bilateral beef trade consisting of chilled and frozen beef between Germany and 22 countries was taken into consideration. A wide range of resources were utilized to collect information such us. It was found important differences of their implications for the two cases studied. While a specific measure such as FMD have a substantial positive effect on Germany beef trade, it has a significant negative impact on Argentina beef exports. On the other hand, it was found that BSE restrictions have an important negative effect on both German and Argentine beef exports. These findings suggest that the same SPS regulation may be either trade-restricting, trade-facilitating or may have no trade impact depending on the case of study.

Key words: Non-tariff barriers, SPS, gravity model, beef trade, FMD, BSE

ASSESSMENT OF SANITARY NON-TARIFF MEASURES (NTM) UPON BEEF TRADE FLOWS FOR GERMANY AND ARGENTINA

1. Introduction

The importance of international trade is widely known for any exporting country. For some countries it is particularly important within its agri-food sector. However, this sector is highly protected by many countries. Not only is international trade in this sector impeded by tariff barriers but it is also blocked by non-tariff measures (NTM). Even though, as a result of multilateral trade negotiations, there has been a reduction in the level of tariff barriers, the implementation of NTM has recently been increasing. One of the most important among the latter has been Sanitary and Phytosanitary measures.

Sanitary and Phytosanitary policies have had an economic impact on international trade, affecting the quantity of goods traded and the price of them. This has had a large impact on the beef trade, an important agri-food product traded internationally by Argentina and Germany. Quantifying the impact of such barriers has particular importance, not only for the government but also for companies, and it is necessary to so in order to analyse and negotiate them internationally.

The aim of this study is to investigate and measure the effect that some Sanitary and Phytosanitary measures, such as bovine spongiform encephalopathy (BSE), foot and mouth disease (FMD) and hormonal growth promoters regulation have had on Argentine and German beef trade.

Sanitary and Phytosanitary Barriers

Non-tariff measures related to SPS measures are very common in international beef trade. The most important NTM are FMD, BSE and hormones residues.

In the case of FMD, *FMD-free* countries have set a ban on imports of fresh, chilled or frozen beef (not cooked or corned beef) from countries where this disease is endemic or sporadic. The US, Canada and Japan have followed the *"zero risk criteria*" however in contrast, the EU has followed the *commodity-based* approach, taking an "acceptable risk" criteria, also referred as "appropriate level of protection" (ALOP), allowing imports of boneless beef (chilled and frozen) from countries with presence of FMD.

Regarding to BSE, after the European outbreak in the late 90's, many countries, following a "*zero risk criteria*", placed a ban for European beef imports. Afterwards, between 2001 and 2003, different outbreaks hit the Japanese, the US and the Canadian beef industries which were under a respective ban from the rest of the countries. As the US beef industry had been radically affected by those measures, the US government conducted protracted negotiations to reopen its markets (USTR 2008). As a result many countries have moved into a "minimal risk criteria" based on science[80] from countries classified as "BSE controlled risk" by the World Organization for Animal Health (OIE). Therefore many markets, such as Japan and the Russian Federation, have been opened once again to US beef exports (USTR 2008; EuropeanCommission 2010; OIE 2010).

Finally, EU has banned beef treated with artificial hormones[81]. Therefore, the EU does not authorize imports of beef products without certification that it is hormone

[80] The OIE international standard identifies the products which could be safely traded, including de-boned skeletal muscle meat regardless the BSE risk status of the country.

[81] Hormones makes cattle muscle to grow faster in treated animals

free. On the other hand, the US is more flexible with this, because artificial hormones are permitted in the US. However the US has set maximum limits of residues of hormones.

As discussed above, beef exporters are forced to follow sanitary, technical and other requirements demanded by importing countries and, when exporters supply multiple markets, they have to deal with different regulations and standards at the same time. Raw and Schlueter (2009) suggest that the capacity to comply with all these requirements plays an important role in determining the impact of regulatory measures on the competitiveness of developing countries. They conclude that *"regulations and standards impose compliance costs on producers that wish to supply foreign markets and can undermine exporters' comparative advantages in trade"* (Rau and Schlueter 2009).

These regulations may represent important trade barriers and their use has been extending. Furthermore, it has been argued that while tariff barriers have been falling, occurrences of NTMs have been growing (Field 2006; Yue and Beghin 2009). Therefore an accurate estimation of their representation is becoming increasingly important. In this way quantitative analysis can provide elements to calculate to what extent such regulations are liable to cause trade distortions. Studies made in the agri-food sector (Cato and Lima dos Santos 1998; Otsuki, Wilson et al. 2001) propose that NTMs imposed by Developed Countries represent an important obstacle to agricultural, food and others exports from Developing Countries. Therefore, Beghin and Bureau (2001) affirm that *"a better estimation of the damage caused to a country by foreign regulations may help solving disputes, and serve as a basis for calculating compensation claims"*.

Furthermore, Desidier et al (2008) argue that when there is incomplete information, SPS barriers and TBTs (Technical Barriers of Trade) could facilitate trade by signalling to the consumer that the products are safe. On the other hand, they state that when the regulation is used as a sort of protectionism they have "trade impeding" consequences. Thilmany and Barrett (1997) also make a distinction between informative and uninformative regulatory trade barriers. They affirm that informative barriers provide information to tackle concerns about quality or safety of the product, but uninformative barriers do not. They suggest that in both cases producer surplus increases, because they provide de facto protection to import-competing firms. Nevertheless, consumer surplus declines with the imposition of uninformative barriers but it rises with informative ones.

2. Theory and Methodology

In order to identify non-tariff barriers and estimate their impact, different methodologies have been proposed. Some authors analyse existing methods to model and quantify the impact of NTMs. Beghin and Bureau (2001), for instance, identify seven methodologies found in the agricultural and food sectors: the price-wedge method (a partial equilibrium model), inventory-based approaches, survey-based approaches, gravity based approaches (an econometric model), risk assessment-based cost-benefit approaches, stylized microeconomic approaches and quantification using sectoral or multi-market models. Other examples include Deardorff and Stern (1997); Beghin and Bureau (2001), and Cipollina and Salvatici (2008).

The most accurate and reliable approach which would facilitate addressing the research questions presented in this study, is the econometric model based on Gravity

equations. Gravity models have been applied to study aggregate impact of regulatory measures and also sector and product specific regulations. At the aggregate level of agricultural trade examples include Disdier et al. (2008), Fontagné et al. (2005), Moenius (2004), Wilson and Otsuki (2001) and Schlueter and Wiek (2009). Fontagné et al. (2005), and Moenius (2004) have reported positive effects on trade in manufacturing sector and for some industrialized agriculture products and negative effects among other products. Disidier et al (2008) has found that regulatory measures do not significantly impact on OECD (Organization for Economic Co-operation and Development) member countries (more developed countries), but exports from developing and less developed countries are negatively affected. Similarly, Wilson and Otsuki (2001) have shown this negative effect in developing countries, analysing sector and product specific regulations.

The closest antecedent to this study is Schlueter and Wiek (2009). They have analysed the impact of different regulatory measures imposed in a country on trade in the meat sector. They have found further support for the theoretically well-known ambiguous trade impact of many of these measures. While there are specific measures which have a substantial positive impact, others have a significant negative impact (Schlueter, Wiek et al. 2009).

Specification of the model

For several years economists have been using log-linearized equations for estimating gravity models:

$$\ln T_{ij} = \ln \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln D_{ij} \ln \eta_{ij}$$

Using this log-linearized equation, the parameters can be estimated by ordinary least squares. The robustness of this method relies on the assumption that η_{ij} and $\ln \eta_{ij}$ are statistically independent of the regressors because the mean and the distribution of a random variable affects the expected value of its logarithm (Santos Silva and Tenreyro 2006).

Nevertheless, Silva and Tenreyro (2006) have demonstrated through different cases studied that "*the error terms in the usual log linear specification of the gravity equation are heteroskedastic, which violates the assumption that* $\ln \eta_{ij}$ *is statistically independent of the regressors and suggests that this estimation method leads to inconsistent estimates of the elasticities of interest*". They have found that that the presence of heteroskedasticity in gravity models is both quantitatively and qualitatively relevant, even controlling for fixed effects.

An additional problem for estimating gravity models through the log linear equation arises when there are values of 0 in the dependent variables (because $\ln 0$ is $-\infty$). Therefore, many researchers have been estimating the equation using $T_{ij} + 1$ as the dependent variable. Even though this methodology will lead to inconsistent estimators of the parameters, its importance will be determined by the specific attributes of the sample and model used (Santos Silva and Tenreyro 2006).

Therefore, after studying and analyzing results obtained through a number of models, the authors propose use of Poisson Pseudo Maximum-Likelihood (PPML) method for estimating gravity models for trade. They conclude that the estimates from this method are robust, even with different patterns of heteroskedasticity. In addition to this, this model is compatible with the existence of zeros in trade data. This is relevant to this study, not only because of the presence of heteroskedasticity in trade flows, but also because Argentine and Germany beef exports present zero trade values in some years, with many countries.

Therefore the multiplicative gravity model under this function for beef trade is:

$$m_{ijt} = p_{it}^{\beta_1} c_{jt}^{\beta_2} d_{ij}^{\beta_3} exp\left(\alpha_i + \alpha_j + \beta_4 z_t + \beta_5 t_{ijt} + \sum_k \beta_k r_{itj}^k\right)\eta_{itj}$$

Where: m_{ijt}: Trade flow value from exporter i to importer j at time t; p_{ij}: Production of beef of exporter i at time t. This is a measure of beef exporter size; c_{jt}: Consumption quantities of importer j at time t. This is a measure of beef importer size; d_{ij}: Distance between exporter i and importer j; α_i: Country-specific exporter fixed effects; α_j: Country-specific importer fixed effects; z_t: Time dummy variable; t_{ijt}: Tariff variable; $\sum_k r_{ijt}^k$: It presents k different regulatory measures which are include in varying aggregation levels; η_{itj}: Transformed error; $E(\eta_{itj}|x) = 1$: According to Silva and Tenreyro (2006, p.644).

Then, previous equation can be written as an exponential function:

$$m_{ijt} = exp\left(\beta_1 ln\, p_{it} + \beta_2 ln\, c_{jt} + \beta_3 ln\, d_{ij} + \alpha_i + \alpha_j + \beta_4 z_t + \beta_5 t_{ijt} + \sum_k \beta_k r_{ijt}^k\right) + \varepsilon_{ijt}$$

It has the functional form of the previous equation and is estimated by PPML.

Data source

In the Argentine case study, the period analyzed was 1995 to 2007 and bilateral beef trade consisting of chilled and frozen beef between Argentina and 24 countries (EU(15), Brazil, Russia Federation, Israel, Switzerland, Peru, Canada, Chile, USA and Venezuela) was taken into consideration. These countries account for 90% of Argentine beef exports. Subsequently HS four-digit data on trade product were collected from the United Nations Conference on Trade and Development (UNCTAD) Comtrade database (UNCTAD 2010). Zero trade flows between Argentina and the partners were included. There are *n*=7800 observations on trade flow, of which 45.7% are nonzero.

In the Germany case study, the period analyszd was 1995 to 2007 and bilateral beef trade consisting of chilled and frozen beef between Germany and 22 countries (rest of EU(15), Russia Federation, Israel, Switzerland, USA, Egypt, Korea, Poland and Japan) was taken into consideration. These countries for roughly 95% of Germany beef exports. HS four-digit data on trade product were collected from the United Nations Conference on Trade and Development (UNCTAD) Comtrade database (UNCTAD 2010). Zero trade flows between Germany and the partners were included. There are *n*=7176 observations on trade flow, of which 46.5% are nonzero.

Data of production and consumption were collected from FAO STATA database (FAOSTAT 2010). Data of GDP per capita come from the "World Developer Indicator", a World Bank publication (WorlBank 2010). Remoteness (o relative distance) was calculated as the (log of) GDP-weighted average distance to all countries as Wei (1996) and Frankel and Wei (1998). The rationale for including a control for remoteness is to take into consideration that larger distances to all other countries might increase bilateral trade between two countries[82] (Silva and Tenreyro 2003).

[82] The control for remoteness is done to take into consideration that larger distances to all other countries might increase bilateral trade between two countries. In order to understand this concept, considering two pairs of countries, (i,j) and (k,l) and assuming that distance between the countries in each pair is the same D_ij=D_kl, but I and j are closer than other countries. Then, the most remote countries, k and l, would

The border effect, common language and common second language were included as fixed effects. In the Argentine case study model common market was taken into consideration. Border effect is a dummy variable which takes value 1 for those countries that are contiguous. Common language is a dummy variable which takes value 1 when the importer country shares the common official language with the exporter and Common language-ethno when same language is spoken by at least 9% of the population in both countries. The data were collected from the Centre d'Estudes Prospectives et d'Informations Internationales homepage (CEPII 2010). Also taken from this site was bilateral data on the explanatory variable geographic distances. Weighted distances were calculated by this Centre based on bilateral distances between the biggest cities of those two countries, those inter-city distances being weighted by the share of the city in the overall country's population (CEPII 2010). The general formula used for calculating distances between country i and j was:

$$d_{ij} = \left(\sum_{k \epsilon i} (pop_k / pop_i) \sum_{l \epsilon j} \left(pop_l / pop_j \right) d_{kl}^{\theta} \right)^{1/\theta}$$

Where: pop_k designates the population of agglomeration k belonging to country i; pop_l designates the population of agglomeration l belonging to country j; θ measures the sensitivity of trade flows to bilateral distance d_{kl}. The calculation setting θ equal to -1 corresponds to the usual coefficient estimated from gravity models of bilateral trade (CEPII 2010).

Tariff measures were included in the study. Tariff were retrieved from the *"Tariff World Integrated Trade Solution"* - WITS (WorlBank 2010) and *"Tariff Data"* (WTO 2010). The tariffs considered for each country were those applied for imports from the partner country. Most of the tariff values were expressed in percentage *Ad valorem,* but some of them were expressed in *Non Ad valorem* value (in U$S/Kg). Switzerland is an example of this. In these cases the conversion to Ad valorem was carried out. In calculating this, average values of imports (dividing aggregate volume imported by its aggregate value) were taken into consideration in order to determine the weight *ad valorem* of the Non ad valorem tariff.

Data on sanitary regulations is a bottleneck in this kind of study. Furthermore, the information about SPS requirements is dispersed and it is difficult to gather in order to make up a complete and comparable series data set.

This study focuses on BSE, FMD and hormones (hormonal growth promoters) restrictions measures effects; as these have been the more important NTMs affecting beef trade flows in the last years. Besides, there is a lack of reliable and complete information of SPS regulations. As a result, the collection of the data is an important limitation to this research. For this study a wide range of resources were utilized to collect information, such as SPS Information Management System (WTO 2010), International Food and Food Safety, Animal and Plant Health (IPFSAPH 2010), World Organization for Animal Health (OIE 2010), SPS *The Sanitary and Phytosanitary export database* (EuropeanCommission 2010), Office of the United States Trade Representative (USTR 2008), and the Argentine National Institute of Agricultural Research database (INTA 2010).

In order to measure the effect of the dynamics of BSE disease a dummy variable was included. A dummy variable (*bse*) which takes value 1 when countries set measures

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trade more between each other because they do not have alternative trading partners (Silva and Tenreyro 2003)

due to the outbreak of the diseases occurred in the EU in mid 90's and in Japan, USA and Canada between 2001 and 2003. Value 0 means non restrictions.

Regarding the measurement of the effect of FMD barriers in beef trade another dummy variable was included. The dummy variable *fmd* captures restrictions from the country partner to FMD-non free countries such as Argentina. This variable takes value 1 when the importer country has restrictions to trade from FMD-non free countries. It takes 0 when there is not restriction[83] or the exporter is a FMD-free country.

Also, it was included a dummy variable to measure the impact of sanitary restrictions related to the presence of hormonal growth promoters residues. The dummy variable *hormo* takes value 1 when the country bans hormonal residues.

3. Results and discussion

Argentine case study

In Table 1 is presented the summary statistics.

Table 1: Summary statistics of dependent variables and regressors.

Variable	Mean	Std. Dev.	Min	Max	Observations
Value	14600000	62400000	0	1.26E+09	N = 7800
prod	1339919	2594406	11300	12400000	N = 7800
lnprod	12.9339	1.528394	9.3326	16.3354	N = 7800
consum	1311034	2590351	15138	12800000	N = 7800
lnconsum	12.93111	1.470531	9.625	16.3617	N = 7800
remm	7387.456	2439.149	5010	11922	N = 7800
lnremm	8.857255	0.310031	8.5191	9.3862	N = 7800
gdpcm	24056.26	15795.88	1338.986	103823.5	N = 7800
ln_gdpcm	9.773088	0.92	7.1997	11.5504	N = 7800
landlockm	0.12	0.324982	0.00	1.00	N = 7800
remx	7387.683	2439.011	5010	11922	N = 7800
lnremx	8.857293	0.310009	8.5191	9.3862	N = 7800
gdpcx	24056.26	15795.88	1338.99	103823.5	N = 7800
ln_gdpcx	9.773088	0.92	7.1997	11.5504	N = 7800
landlockx	0.12	0.324982	0.00	1.00	N = 7800
commmkt	0.370513	0.482973	0.00	1.00	N = 7800
contig	0.09	0.2862	0.00	1.00	N = 7800
comlang_off	0.136667	0.343517	0.00	1.00	N = 7800
comlang_ethno	0.143333	0.350435	0.00	1.00	N = 7800
distwaces	5149.47	4148.499	141	14731.54	N = 7800
lndistwaces	8.062764	1.117843	3.1569	9.5977	N = 7800
tariff	0.212927	0.333652	0.00	1.47	N = 7800
bse	0.923077	0.266486	0.00	1.00	N = 7800
fmd	0.022308	0.147692	0.00	1.00	N = 7800
homo	0.64	0.480031	0.00	1.00	N = 7800

[83] For example in the case of Argentina, restrictions were lifted in 1997 as it was recognized as FMD-free with vaccination which allowed it to open new markets. In 2001 as a result of a new outbreak in Argentine, those restrictions were placed again.

Where: $value$: Trade flow; in *U$S*; $prod$: Exporter's beef production; in *tonnes*; $lnprod$: Natural log of production; $consum$: Importer's beef consumption; in *tonnes per year*; $lnconsum$: Natural log of consumption; $remm$: Importer remoteness; $lnremm$: Natural log of importer remoteness; $gdpcm$: Importer GDP per capita; in *U$S*; $lngdpcm$: Natural log of importer GDP; $landlockm$: Landlocked effects. Dummy variable: 1 if importer country is landlocked; $remx$: Exporter remoteness; $lnremx$: Natural log of exporter remoteness; $gdpcx$: Exporter GDP per capita; in *U$S*; $lngdpcx$: Natural log of exporter GDP; $landlockx$: Landlocked effects. Dummy variable: 1 if exporter country is landlocked; $commmkt$: Common market effect. Dummy variable: 1 if exporter and importer are members of a common market agreement; $contig$: Border effects. Dummy variable; $comlang\_off$: Common language effect. Dummy variable; $comlang\_ethno$: Second language effect. Dummy variable; $distwaces$: Distance between exporter and importer; in *kilometres*; $lndistwaces$: Natural log of distance; $tariff$: Tariff variable, in *% ad-valorem*; bse: BSE restrictions effect. Dummy variable: 1 if importer places BSE restrictions; fmd: FMD restrictions. Dummy variable: 1 if importer has FMD restrictions; $hormo$: Dummy variable: 1 if importer has restrictions to growth hormones.

PPML Random Effects estimation was performed using Stata/SE package version 10.0 for Windows. Table 2 presents the estimated coefficients of the model

Table 2: PPML Random Effects Estimates

	Coef.	**Std. Err.**	**z**	**P>z**
lnprod	1.270***	0.0000279	45511.80	0.000
lnconsum	0.495***	0.0000358	13812.37	0.000
lndistwces	-10.372***	0.0444035	-233.60	0.000
lnremm	-5.727***	0.0003735	-15000.00	0.000
lnremx	2.407***	0.0003837	6273.05	0.000
ln_gdpcm	0.961***	0.0000211	45568.48	0.000
ln_gdpcx	-0.023***	0.0000188	-1239.81	0.000
tariff	1.423***	0.0002166	6568.18	0.000
landlockx	-6.278***	0.8062915	-7.79	0.000
landlockm	-4.431***	0.6696071	-6.62	0.000
contig	-13.746***	0.878151	-15.65	0.000
comlang_off	-0.484	2.646853	-0.18	0.855
comlang_ethno	-3.652	2.578049	-1.42	0.157
commmkt	0.632***	0.0000711	8894.82	0.000
fmd	-3.207***	0.000227	-14000.00	0.000
bse	-0.227***	0.000012	-19000.00	0.000
hormo	-2.213***	0.6248303	-3.54	0.000
_cons	106.740***	0.6874266	155.28	0.000
/lnalpha	3.258***	0.0523108		
alpha	26.00789	1.360493		

Note: * significant at 10% ; ** significant at 5%; *** significant at 1%

The key variables have the expected signs. Both, an increase in beef production in the exporter country and the level of consumption of the importer country have has a positive influence on Argentine exports. Both are positive and statistically significant at 1%. As both values are regressed as *ln*, then:

$$y = \exp(\beta_1 \ln prod) \equiv y = prod^{\beta_1} \equiv \ln y = \beta_0 + \beta_1 \ln prod \therefore Log - Log\ function$$

$$y = \exp(\beta_2 \ln consum) \equiv y = consum^{\beta_2} \equiv \ln y = \beta_0 + \beta_2 \ln consum$$

$$\therefore Log - Log\ function$$

As they are both a Log-Log function type, then the slope of these curves changes at any point, but the elasticity remains constant and it is equal to β_1 and β_2 respectively. As both results, β_1 and β_2, are positive then the value of Argentine beef exports is an increasing function of Argentine beef production and the importer level of consumption. Moreover, since $\beta_1 > 1$, then when Argentine beef production goes up, the national beef exports grow at an increasing rate. Meanwhile, as $0 < \beta_2 < 1$ when the consumption of beef in importers countries increase, Argentine beef export increases at a slower rate.

Other variables which have a positive impact on beef trade are importer's GDP per capita and common market. Interestingly, the estimate elasticity of importer's GDP per capita is close to 1 (0.961). Regarding common market estimates suggests that free-trade agreement between countries rises expected bilateral trade by 88% ($(e^{0.632} - 1) * 100$). Nevertheless, as free trade agreements might also cause trade diversion, this value probably does not reflect the net effect of common market (see Frankel, 1997; Silva and Tenreyro, 2003).

In contrast, and as expected, distance, exporter's GDP, remoteness of importer and landlocked country have a negative impact in trade. All of them are statistically significant at 1%.. Some variables seem not to have impacted trade at all. Common language and second language effect are not significant thus it is not possible to make any assumptions about them.

The effect on beef trade of a controversial issue such as tariff rate has been positive in this study. However, this result must be read with caution since no distinction between imports under preferential tariff rate quotas and imports under tariffs has been made.

The values of the parameters measuring the effect of SPS restrictions suggest a negative impact of FMD, BSE and hormones regulation on Argentine beef trade. All of them are negative and significant at 1%. Furthermore, the most important SPS restriction affecting Argentine beef trade is FMD. The high value of this estimate indicates that these restrictions negatively affect Argentine exports in a great extent.

The Wald test was performed to measure the significance of the explanatory variables included in the model.

Table 3: Wald test.

$\boldsymbol{H_0: \beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6=\beta_7=\beta_8=\alpha_1=\alpha_2=\alpha_3=0}$
Wald chi2 (17) = 1.38e+10
Prob. > Chi2 = 0.0000

The Wald test rejected the hypothesis that the coefficients associated with those variables were zero.

Germany case study

In Table 4 is presented the summary statistics.

Table 4: Summary statistics of dependent variables and regressors.

Variable	Mean	Std. Dev.	Min	Max	Observations
value	16000000	78900000	0	1680000000	N= 7176
prod	1022524	2320071	11300	12400000	N= 7176
lnprod	12.80	1.37	9.33	16.34	N= 7176
consum	1100330	2425552	15138	12800000	N= 7176
lnconsum	12.88	1.35	9.63	16.36	N= 7176
remm	6729	1926	5010	11391	N= 7176
lnremm	8.78	0.25	8.52	9.34	N= 7176
gdpcm	26370	14901	942	103823	N= 7176
ln_gdpcm	9.92	0.90	6.85	11.55	N= 7176
landlockm	0.13	0.33	0.00	1.00	N= 7176
remx	6729	1926	5010	11391	N= 7176
lnremx	8.78	0.25	8.52	9.34	N= 7176
gdpcx	26370	14901	942	103823	N= 7176
ln_gdpcx	9.92	0.90	6.85	11.55	N= 7176
landlockx	0.13	0.33	0.00	1.00	N= 7176
contig	0.09	0.29	0.00	1.00	N= 7176
comlang_off	0.11	0.31	0.00	1.00	N= 7176
comlang_ethno	0.14	0.35	0.00	1.00	N= 7176
distwaces	3667	3184	141	11027	N= 7176
lndistwaces	7.76	1.01	4.95	9.31	N= 7176
tariff	0.27	0.38	0.00	1.47	N= 7176
bse	0.92	0.27	0.00	1.00	N= 7176
fmd	0.17	0.37	0.00	1.00	N= 7176
homo	0.67	0.47	0.00	1.00	N= 7176

References: see Table 1.

PPML Random Effects estimattion was performed using Stata/SE package version 10.0 for Windows. The Table 5 presents the parameters estimates of the model.

Table 5: PPML Random Effects Estimates

	Coef.	Std. Err.	z	P>z
lnprod	0.633***	0.000031	20214.61	0.000
lnconsum	1.657***	0.000035	47765.84	0.000
lndistwces	-10.176***	0.044406	-229.16	0.000
lnremm	-3.836***	0.000221	-17000	0.000
lnremx	-2.883***	0.000191	-15000	0.000
ln_gdpcm	0.285***	0.000027	10596.02	0.000
ln_gdpcx	-0.007***	0.000024	-304.37	0.000
tariff	-1.199***	0.000081	-15000	0.000

landlockx	-11.327***	1.043566	-10.85	0.000
landlockm	0.894	0.647703	1.38	0.167
contig	-12.318***	1.217074	-10.12	0.000
comlang_off	-1.784**	0.875223	-2.04	0.042
comlang_ethno	2.987***	0.977185	3.06	0.002
fmd	6.428***	0.891922	7.21	0.000
bse	-0.296***	0.000012	-25000	0.000
hormo	0.084	0.834668	0.1	0.920
_cons	127.894***	0.888920	143.88	0.000

/lnalpha	3.091***	0.05294
alpha	21.98952	1.164118

Note: * significant at 10% ; ** significant at 5%; *** significant at 1%

The key variables have the expected signs. An increase in beef production in Germany has a positive impact on exports. Also, this has had a positive impact on the level of consumption of beef in the importer country. Both are positive and statistically significant at 1%. As both values are regressed as *ln*, then:

$$y = \exp(\beta_1 \ln prod) \equiv y = prod^{\beta_1}$$

$$y = \exp(\beta_2 \ln consum) \equiv y = consum^{\beta_2}$$

As both results, β_1 and β_2, are positive then the value German beef exports is an increasing function of German beef production and the importer level of consumption. However, as $0 < \beta_1 < 1$, then when German beef production goes up, the national beef exports grow at an decreasing rate. Meanwhile, since $\beta_2 > 1$ when the consumption of beef in importers countries increase, German beef export increases at an increasing rate.

As expected distance, remoteness and exporter landlocked estimates are negatives and significant at 1%. The estimate elasticity of German trade with respect to Importers' GDP is 0.28; and the elasticity of trade with respect to the Exporter's GDP is -0.007.

The effect on beef trade of a controversial issue such as tariff rate has been negative in this study. However, this result must be read with caution since no distinction between imports under preferential tariff rate quotas and imports under tariffs has been made.

Regarding to the SPS restrictions, it is possible to see that FMD and BSE measures are significant at 1%. On the other hand, restrictions related to hormones have not effect at all and it is not possible to make any assumption about the effect of them.

In the case of BSE, the restriction placed on the international market due to this disease affects negatively German beef exports. In contrast, the high positive value of the FMD's estimate suggests that this restriction has a high positive impact on German beef trade.

The Wald test was performed to measure the significance of the explanatory variables included in the model.

Table 6: Wald test.

$\boldsymbol{H_0}$: $\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6=\beta_7=\beta_8=\alpha_1=\alpha_2=\alpha_3=0$
Wald chi2 (16) = 9.12e+09

Prob. > Chi2 = 0.0000

The Wald test rejected the hypothesis that the coefficients associated with those variables were zero.

4. Conclusions

This research has addressed the issue of the impact of Sanitary and Phytosanitary measures on Argentine and German beef exports using a gravity model estimated by Poison Pseudo Maximum Likelihood methodology.

Some interesting conclusions can be drawn from the results illustrated above. It has been seen that when Argentine beef production increases, national beef exports increase at an accelerated rate and that when the consumption of beef in importers' countries increase, Argentine beef export increase at a slower rate. Consequently, an increase in beef production would have a higher positive impact on exports than a rise in the level of consumption of importers' countries. In contrast, Germany exports increase at decreasing rate when national beef production goes up and at an increasing rate when importer's consumption rises.

Interestingly, the research has identified a marked contrast between income elasticities of Argentine and German beef exports. In the Argentine case study the estimated importer's GDP per capita elasticity is close to 1 whereas for German beef exports it is much lower (0.285).

Regarding the SPS effects, it was found important differences of their implications for the two cases studied. Furthermore, while a specific measure such as FMD have a substantial positive effect on Germany beef trade, it has a significant negative impact on Argentina beef exports. On the other hand, it was found that BSE restrictions have the same effect on both countries. Indeed, restrictions placed on countries affected by BSE disease have an important negative effect on both German and Argentine beef exports.

These findings suggest that the same SPS regulation may be either trade-restricting, trade-facilitating or may have no trade impact depending on the case of study. Consequently it would be difficult to find consensus about the controversy arisen over the effects of SPS measures on beef trade.

This study does not take into consideration the effect of quotas on Argentine and German beef exports. This may play an important role because if Argentine, for instance, exporters were allowed to export more beef than they actually are to the EU, they would increase the volume of beef sent to this market. Actually, Argentine exporters use the total of the quotas assigned by the EU. Then, this study compares the amount of beef sent to countries without any restriction with countries with a limit allowance (like EU or Russia).

Another important issue not considered here is the effect of balancing the carcase as a driver of international trade. This is particularly important in the case of Argentina because the impossibility to meat processors and exporters to balance the high price forequarters cuts sent overseas with cheap forequarter cuts of the carcase in the internal market[84]. As, on the contrary, they have to balance all cuts in international

[84] This is due to Argentine meat processors for export face additional Sanitary and Fiscal requirements which translate into higher cost of beef. Domestic prices in Argentine generally do not cover those cost for most of the cuts (especially the low value forequarter cuts).

markets this plays an important role as a driver of sales strategy (Tapia 1999). This should be taken into consideration in further studies.

Future research should take into consideration the effect of other technical barriers, such as traceability requirements, GM bans, hormones residues, etc. In order to have more accurate and robust parameters of the effect of different Non-tariff barrier on Argentine and German beef exports. Finally, further studies should take into consideration more countries and other SPS measures to increase accuracy of its effects on Argentine and German beef trade.

5. References

Beghin, J. and J. C. Bureau (2001). "Quantitative Policy Analysis of Sanitary, Phytosanitary and Technical Barriers of Trade." Economie Internationale **87**: 107-130.

Cato, J. C. and C. A. Lima dos Santos (1998). "European Union 1997 Seafood Safety Ban: The Consequences on Bangladesh Shrimp Processing." Marine Resources Economics **13**: 215-227.

CEPII (2010). "Distances Database." Retrieved July 20, 2010, from http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

Cipollina, M. and L. Salvateci (2008). "Measuring Protection: Mission Impossible?" Journal of Economic Surveys **22**(3): 577-616.

Deardorff, A. and R. M. Stern (1997). Measurement of Non-tariff Measures. Economics Department Working Paper No. 179. Paris, OECD/GC**:** 129.

Disdier, A. C., L. Fontagné, et al. (2008). "The impact of Regulations on Agricultural Trade: Evidence from the SPS and TBT Agreements." American Journal of Agricultural Economics. **90**(2): 336-350.

EuropeanCommission (2010). "SPS The Sanitary and Phytosanitary Export Database." Retrieved July 22, 2010, from http://madb.europa.eu/madb_barriers/indexPubli_sps.htm.

FAOSTAT (2010). Retrieved July 14, 2010, from http://faostat.fao.org/default.aspx.

Field, A. (2006). "Back door protectionism?" The Journal of Commerce - Cool Cargoes **Fall 2006**: 34-38.

Fontagné, L., M. Mimouni, et al. (2005). "Estimating the Impact of Environmental SPS and TBT on International Trade." Integration and Trade Journal **22**: 7-37.

Frankel, J.A. (1997). ‘‘Regional Trading Blocs in the World Economic System. Washington, DC: Institute for International Economics.

IPFSAPH (2010). " International Portal on Food Safety, Animal and Plant Health ". Retrieved July 23, 2010, from http://www.ipfsaph.org/En/default.jsp.

Moenius, J. (2004). Information versus Product Adaptation: The Role of Standdards in Trade. Working Paper. Evanston, Northwestern University.

OIE (2010). "World Animal Health Situation." Retrieved July 22, 2010, from http://www.oie.int/eng/info/en_fmd.htm.

Otsuki, T., J. S. Wilson, et al. (2001). "What Price Precaution? European Harmonisation of Aflotoxin Regulations and African Groundnut Exports." European Review of Agricultural Economics **28**(3): 263-283.

Rau, M. and S. W. Schlueter (2009). Framework for Analysing Regulations and Standards in the NTM Impact Project. International Association of Agricultural Economists Conference. IAAE. Beijing, China.

Santos Silva, J. M. C. and S. Tenreyro (2006). "The Log af Gravity." The Review of Economics and Statistics. **88**(4): 641-658.

Silva JMC and Tenreyro, S (2003). "Gravity-Defying Trade". Federal Reserve Bank of Boston Series. Retrieved November 16, 2010, from http://www.bos.frb.org/economic/wp/wp2003/wp031.pdf

Schlueter, S., C. Wiek, et al. (2009). "Regulatory SPS Instruments in Meat Trade." American Journal of Agricultural Economics. **91**(5): 1484-1490.

Tapia, C. (1999). La Industria Frigorífica en los '90: Lógica de funcionamiento y Coordinación con Clientes y Proveedores. Departamento de Economía Agraria. Balcarce, Universidad Nacional de Mar del Plata.

UNCTAD (2010). "UNCTAD Comtrade Database." Retrieved July 14, 2010, from http://comtrade.un.org/db/.

USTR (2008). "2008 National Trade Estimate Report on Foreign Trade Barriers." Retrieved July 26, 2010, from http://www.ustr.gov/about-us/press-office/reports-and-publications/archives/2008/2008-national-trade-estimate-report-fo-0.

Wei, S.J. (1996). ‘‘Intra-National vs. International Trade: How Stubborn Are Nations in Global Integration?’’ NBER Working Paper No. 5531 (Cambridge, Massachusetts, National Bureau of Economic Research).

Wilson, J. S. and T. Otsuki (2001). Global Trade and Food Safety. Working Paper 2689. Washington DC, Development Research Group, The World Bank.

WorlBank (2010). "World Developer Indicator." Retrieved July 28, 2010, from http://data.worldbank.org/.

WorlBank (2010). World Integrated Trade Solution (WITS).

WTO (2010). "SPS Information Management System ". Retrieved July 20, 2010, from http://spsims.wto.org/web/pages/report/custom/Report.aspx.

WTO (2010). "Tariff Data." Retrieved July 25, 2010, from http://tariffdata.wto.org/ReportersAndProducts.aspx.

Yue, C. and J. Beghin (2009). "The Tariff Equivalent and Forgone Trade Effects of Prohibitive Technical Barriers to Trade." American Journal of Agricultural Economics. **91**(4): 930-941.

QUALITY ATTRIBUTES IN A GLOBAL PRODUCTION CHAIN

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Abstract

The purpose of this research is to determine the level of alignment established between the quality attributes consumers want from beef in the European market, and the quality attributes the Brazilian meat industry has to offer. This study was prepared based on empirical studies of the behavior of beef consumers in the European Union. Together with a bibliographic research, the quality attributes of the beef products cherished by the European market consumers were identified. This information was then compared with the quality attributes cherished by the supplying companies responsible for the manufacturing of beef in the initial stages of the production chain. After analyzing the quality attributes cherished by demand and supply, this study demonstrated how the organizations can take advantage of a broader perspective of the production chain which values the consuming markets.

Key words: Production chain, food industry, Brazil, European Union

QUALITY ATTRIBUTES IN A GLOBAL PRODUCTION CHAIN

1. Introduction

During the last decades, the pattern of food consumption has changed significantly, especially in developed countries. Consumers have searched for foods that will bring benefits to their health, and therefore avoid those that could potentially affect their organisms negatively.

In fact, the search for food safety in the international markets could be understood in a context under which the companies use new mechanisms, such as food labels and certification systems, to assure the consumer that the product he or she is buying is safe to their health, and does not have anything in its composition that could be harmful to the human organism.

The innovation present in food manufacturing process has interfered in the behavior of the consumer (ISSANCHOU, 1996; VERBEKE; VIAENE, 1999). Therefore, researchers and organizations search to know the changes in taste, preferences, habits and attitudes of the consumers, so that the inclination and perspectives of the consumer's behavior may be identified.

Situations that involve crisis and food contamination risk also interfere in the behavior of the consumer, such as the areas contaminated with Bovine Spongiform Encephalopathy (BSE) in European countries, or the cases of dioxin in Belgium, which happened in the late 90's, and even the Asian Flu, in recent years. These matters reinforce the preoccupation with food safety, seen mainly in developed countries.

The theme of food quality has been proving to be significantly important. In fact, the importance of adapting food to proper human consumption, according to the well being of society, many times cause governmental regulations in markets. The national governments interfere in the quality control of food products for exports and for internal consumption. Therefore they establish rules for production and commercialization of these products. Information asymmetry is clearly reduced when the government imposes its norms and rules to control the quality of the product (STARBIRD, 2005). The government (or a third party instituted by the government) decides whether the product the consumer is buying has the quality expected by the government. This takes place because sometimes the quality level of the company's products is not good enough, but the consumer does not notice it. As a result, there is a certain level of difficulty in measuring the quality attributes of the product, thus the need for a certification.

The purpose of this research was to identify the level of satisfactoriness established among the quality attributes cherished by the beef consuming market of Europe, and the attributes present in the Brazilian operations in agri-industrial manufacturing. In this sense, Randall *et al.* (2003) studied the association between product demand characteristics and the initial investment in a supply chain at the time of market entry. The research also finds support in the work of O`Shaughnessy and O`Shaughnessy (2000), which demonstrates how the reputation of a category of products in a country may influence the choice of the consumers in reference markets, and in the work of Slack and Lewis (2001), which a definition to Operations Strategy is developed, based on the reconciliation of market requirements with operations resources.

This study points to a new direction for the operations management in Brazil, as already done in France (BERGERET; HA, 1997; COLLET, 1999; SANS;

FONTGUYON, 1999) and among other countries (LOADER; HOBBS, 1996; SANS; DE FONTGUYON; BRIZ, 2005).

2. Structure of the research

The *filières* model of analysis has been widely used during the last decades as a theoretical tool to analyze the changes that happen in different production chains, changes such as technological, socio-cultural or demographic, and even competitive changes (CHEVALIER, 1978; MALASSIS, 1979; MORVAN, 1988). The technological changes are characterized by quality improvement and grater convenience offered to the consumer. The socio-cultural and demographical changes show an increasing interest of researchers in the marketing area, given to the fact that they focus their research on the so called market niches or segments. Finally, competitive changes happen as a result of globalization, where the global organizations search to expand their markets by entering many countries.

The *filière*, or production chain, is a great succession of operations of dissociable transformations, which is capable of being separated and reconnected through technical linkage. The production chain is also a group of commercial and financial relations that establish, among all the states of transformation, a flow of exchange, upstream and downstream, among suppliers and clients (MORVAN, 1988).

Morvan (op. cit.) states that a production chain can be segmented into three macro-segments. These macro-segments are commercialization, industrialization and the production of raw materials. The commercialization is represented by the companies that are in contact with the final clients of the production chain and enable the consumption and commercialization of final products. The industrialization is made by companies responsible for transforming the raw materials into final products destined to the consumers. And finally, the production of raw materials, which is done by companies and farms that supply the initial raw materials so that the other companies may advance in the process of production of the final product.

The analysis of the *filières* calls for the need of incorporating a dynamic aspect to the studies of agribusiness, and to link it to similar activities, by verifying the changes that occur in the system as times goes by. The logic of linkage of operations assumes that the conditions imposed by the final consumer are the main guidelines in the changes of the *status quo* of the system. With this in mind, it becomes important for all economic agents of any production chain to know the behavior of the final consumers, and the market's consumption trends, for these are responsible for the great part of modifications that occur along the chain.

The consumer's importance is mentioned by Lambert (1992), when he says the starting point in developing a logistics strategy must be a thorough understanding of final customer's requirements. Only then is it possible to determine the required performance of firms throughout the supply chain.

When a productive chain is studied, it become necessary understand that it encompasses the processes necessary to create, source, make to and deliver to demand. A key point is that the entire process will be viewed as one system. As consequence, the performance of each member of the productive chain (suppliers, manufacturing plants, warehouses, customers, etc.) will affect the overall performance of the system (LUMMUS *et al.,* 2001).

The issues highlighted in this article are based on the research of competition of the beef industry sub-chains, as seen in Sproesser *et al.* (2000). Through the systemic

analysis of the beef production chain as a whole, one can locate in Brazil three sub-systems, as shown in figure 1.

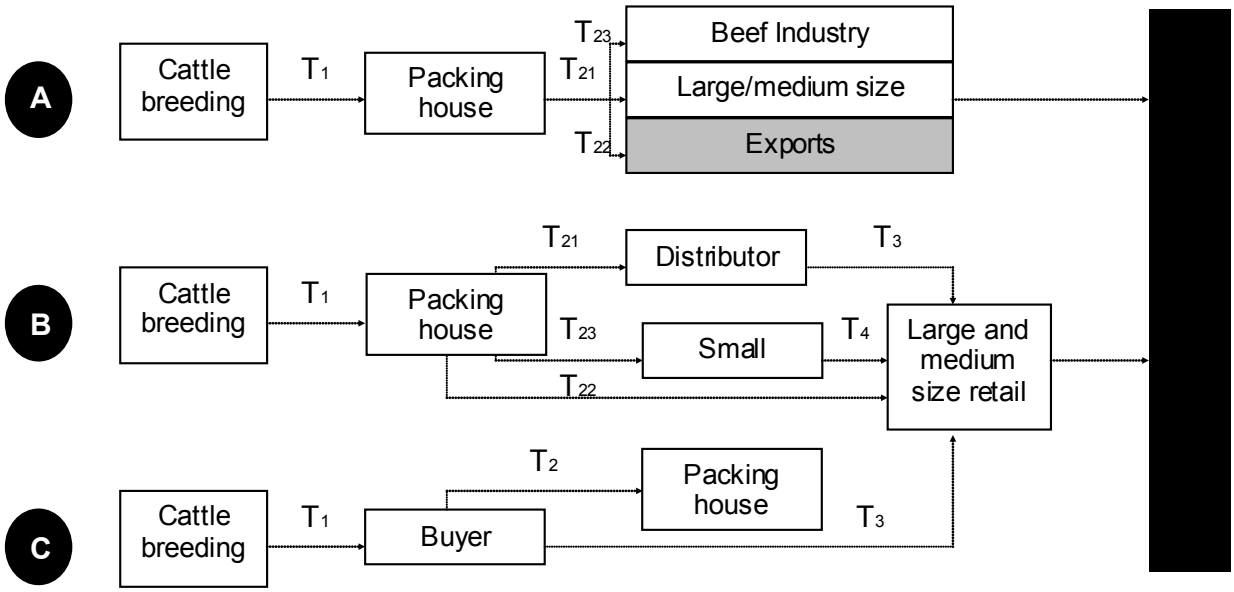

Figure 1 – Production chains of the beef industry in Brazil
Source: Adapted from Sproesser *et al*. (2000).

The companies that belong to the upstream links of transactions **T_{22}** of sub-chain **A** are those whose quality attributes will be identified, together with the information obtained from studies that approach the European beef consumer.

3. Background

3. 1 Asymmetric information

The problem of asymmetric information plays an important role in the identification of quality attributes. Considering the problem of information asymmetry, it is difficult to evaluate and measure the performance of economic agents, therefore the variables risk and uncertainty must be considered for the analysis of quality production. In order to maximize the value generated in the transaction, the design of incentives modes and monitoring mechanism are necessary to produce and trade quality in an efficient way.

The existence of asymmetric information implies the analysis of two different dimensions: the hidden information and the hidden action. The concept of hidden information is related to the idea of adverse selection proposed by Akerlof (1970). The phenomenon of adverse selection is present when the seller has better knowledge of the quality of the product than the buyer. As a consequence, the buyer considers and pays only for average quality. Uncertainty about the product quality generates a perverse effect, since superior quality products have no incentive to be marketed and, ultimately, only the lower quality products will be traded on that market. The assumption of hidden action, also called moral hazard, is presented by Eisenhardt (1989) as the lack of effort

that the agent applies in performing a task in accordance with the principal's interest. The difficulty of observing and verifying (measuring) the agent's action or when the monitoring cost is high enhances the occurrence of cheating.

The information asymmetry is also at the root of agent's opportunistic behavior, which along with bounded rationality are the behavior assumptions considered in the model of efficiency proposed by Williamson (1985). According to this author, opportunism should be understood as the pursuit of self-interest with guile (Williamson, 1985). The information asymmetry is a source of opportunism, whether from the aspect of the lack of information or the possibility of distorting of its meaning. Moreover, the possibility of occurring mistakes in the quality attribute measurement is related to opportunistic action by who detains the larger body of information about the product. The measurement error allows the capture of income generated in the transaction. The informational asymmetry combined with the difficulties of attributes measurement implies the need of creation of safeguards in order to minimize transaction costs (BARZEL, 1982).

3.1 Changes in the quality pattern of the food industry

If the center of attention in the industrial world could be presented in a time line, the consumer would probably show up at the end of this line. Therefore, from the Industrial Revolution until the years that the Taylorist / Fordist large scale logic production was spread, the emphasis was solely attributed to the product. During the 1950's, 1960's and 1970's of the last century, the advance in automation and computerization changed the technological path, with the productive process taking an important role as a source of profits. During the 1980's and 1990's, great emphasis was given to quality control. Today, with the advent of globalization, and the rise of so called "world-class companies", greater attention has been given to the consumer.

If companies could establish their own patterns in the past (since the final product and the productive process were nothing more than different forms of allocating resources for a certain goal), today is not anymore possible, because of complex variables out of control of the companies.

Today, quality is seen as what the consumers expect. This definition points out the current focus of the companies responsible for producing food products. Just as other organizations, they incorporate subjective attributes to their strategic objectives, such as consumer expectations, in order to characterize their efforts in producing personalized products.

In fact, expectations are created based on individual world views of each person, which are formed based on each individual's past experiences, knowledge acquired and participation in history. More than benefits to consumer, incorporating customer service and exceeding expectations as a goal of the modern organizations may be dangerous, because these promises may become unfulfilled.

The point is that the gap between speech and actual practice may lead to the dissatisfaction of the consumer, and therefore resulting in the opposite result companies want. In the food industry, this becomes even more obvious. Cultural differences, changes in habits and tastes, changes in the demographic pyramid, among other things, make it difficult to supply an individual a product that satisfies all of his or her expectations (GODSON *et al.*, 2002).

The industrial organizations, especially food producers, should focus their attention not only on the expectations of the consumer, but also in the product and process. The quality, if comprehended in a global sense, is presented by Brunsø, Fjord

and Grunert (2002). These authors attribute great emphasis to the subjective and objective quality, in order to separate the perceptions of quality of the consumer of food products.

The quality of the product, process and quality control can be understood under the context of objective quality, which is a feature that can be measured by the consumer and is tested by documented aspects of the product and process of production. The quality given to the product includes all physical aspects that provide a precise description of the product after the manufacturing process. The quality given to the process includes the ways in which the product is produced. The description of the process informs the consumer the procedures used in manufacturing the final product. Finally, quality control is defined as adapting the product to the pre-established patterns, so it may be approved in a specific quality class. An example of this is the Brazilian bovine veal beef, produced based on the distribution of animal characterists among established guidelines, which should be observed by the cattle breeders and packers of the products, as well as the retailers responsible for retail sales.

The quality attributed by consumer, on the other hand, could be understood as a subjective quality, since it can be measured only by the final consumer, and may differ among different consumers, even though it is the same product. As already seen in this section, the consumer's conception of quality is influenced by their expectations, besides other exogenous influences (figure 2).

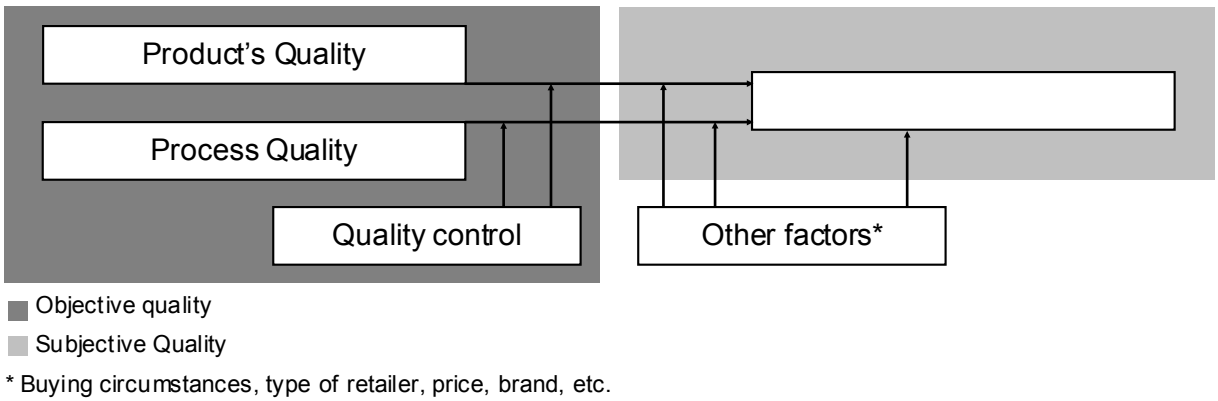

Figure 2 – Types of quality
Source: Adapted from Brunsø, Fjord, Grunert (2002)

While objective quality may be obtained by means of wide internal documented programs in a company, the subjective quality may only be reached through the combination of a variety of attributes of a product (BRENDAHL, 2004). It is absolutely unnecessary to say that there will not be homogeneity in the evaluation of the consumers as far as the favorable attributes in a food product. This occurs because the world's population consumes some sort of food, which has been, in a greater or smaller degree, processed for consumption. Since the perception of quality is formed in many dimensions, based on the attributes of the products, which may be positive or negative for the consumer, there will be some level of difficulty during this evaluation. Nonetheless, during the next part of this article, an effort has been made to determine the attributes of quality that are cherished by the European consumer.

3.2 The European beef consumer

The literature review suggests it is important to consider that there were incidents that decreased the level of trust of the consumer in relation to beef products (RICHARDSON *ET AL.*, 1994; BECKER ET AL., 1998). The situation in England, for example, that had its exports banned by the European Commission because of the Bovine Spongiform Encephalopathy infection (BSE) (GRUNERT, 2001). Hence, two characteristics of the product took the primary role in the discussions of the consuming markets: the quality of the product, and the perception of safety.

According to Acebrón and Dopico (1999), Spanish consumers imply the quality of beef to intrinsic attributes (color, freshness, and visible fat) and the extrinsic attributes (price, sales, origin of the product, and packaging). The quality attributes based on flavor, tenderness, and juiciness determine how the sensorial perception will be during the act of consumption, which will define the experienced quality, from which will result the satisfaction or dissatisfaction in the post-purchase stage.

The most important aspects for the Belgian consumers of fresh beef that were identified by Verbeke (2001) are: freshness, quality, flavor, hormone-free beef and food safety. A research conducted by this author about Belgian beef consumers concluded that beef will be well consumed if it is healthy, trustworthy and tender. This evaluation is a result of the campaigns of rebuilding the image of the product after a serious crisis of contamination in the animal food with dioxin in 1999, which became a health hazard for Belgian beef consumers (VERBEKE, 2001).

The quality attributes of beef (those that can be verified in the moment of consumption), as proposed by Steenkamp (1990), are convenience, freshness and sensorial characteristics. The credential attributes, proposed in the author's study as an abstract level, are attributes such as healthiness, natural and safe beef.

Considering the beef chain the challenge is how to signal quality to consumers. For that, traceability is a relevant tool to deliver quality and safety food to attend specific consumers' demands and to solve the problem of information asymmetry. Sikuta (2005) highlights the importance of traceability as a mechanism for preserving the identity of transacted attributes (for instance, the absence of genetically modified organisms, no BSE contamination, organic production, etc...) and monitoring different stages of production. Traceability reduces transaction costs and insures that incentives for quality are guaranteed. Hence the importance of traceable systems, certifications and seals are other forms to better transmit the information and also to reduce informational asymmetry in transactions along a productive chain.

Based on the attitudes of a sample of 3000 individuals, Becker *et. al.* (1998) have used clusters analysis to determine wide groups of meat consumers. The study was conducted in Germany, Ireland, Italy, Spain, Sweden and United Kingdom. The analysis resulted in three great groups: (a) Conventional Meat Consumers, those who give great importance to meat, mainly because of its nutritious values, besides they have a slightly superior concern than the other groups as referred to animal health; (b) Price Oriented Meat Consumers, give a significant importance to the price of the meat, leaving for second the other attributes that are also important for them, as meat nutritious value; and (c) Skeptical Meat Consumers, those who do not firmly believe in the advertised meat nutritious value and are not driven by price, being basically interested in the animal origin.

Ashworth (1999), in a research performed in Scotland, presents some results that indicate the way under which producers should concentrate to increase the consumption of their product. The key attribute that influences the consumer to purchase the beef would be quality, together with freshness, flavor and tenderness. Consumers are willing to pay a premium for more information about the product such as the origin of the beef,

and the guarantee that the product is safe, which would be done through labeling and packing as well as a tracking mechanism. After these studies, similar trends were found in Finland by Lavatna and Kola (2000), and in Belgium by Verbeke (2001).

In the European Union, Nielsen and Jeppesen (2001) conducted a study about the beef market, in which they say that the consumption of this product has been level during the last decades, an average of 20 kg *per capita* per year. Nonetheless the trend is to decrease as time goes by. Just as in Brazil, in the European Union there are also only few brands of beef. However, European countries have proof of origin seals (regional or international), which fills the information gap of the entrepreneurial brands.

4. Results and discussion

After reviewing the literature about the behavior of beef consumption in Europe, it was possible to identify the attributes of quality, intrinsic and extrinsic, cherished by the consumer. Quality attributes cherished by the breeding and packing house industry were also identified, and therefore obtaining the following results in figures 3 and 4.

The intrinsic attributes are easily noticed by the consumer, because they are responsible for the physical differentiation characteristic of the product with other products of the same category, for example, the appearance, color and shape. The extrinsic attributes, on the other hand, represent organizational efforts to widen the perception of value given to the consumer. These attributes will only be noticed through attributes incorporated to the processed product, such as labels, tags, a brand name, quality seals, good freezer counters in stores, among others.

The analysis of the attributes identifies that packing houses have a similar perception of quality as the final consumer. Some aspects are associated to the technical activity of the production, such as the "breed". Nevertheless, "tenderness" and "color" seem to be valued by both sides.

Figure 3 – Attributes cherished by final consumers

Quality Attributes	
Intrinsic	**Extrinsic**
Freshness Color Visible Fat Tenderness	Origin Food safety

Fonte: Acebrón and Dopico (1999), Ashworth (1999), Becker et al. (1998), Grunert (2001), Issanchou (1996), Richardson *et al.* (1994), Verbeke (1999), Verbeke (2001).

Figure 4 – Attributes cherished by Packing Companies

Quality Attributes	
Intrinsic	**Extrinsic**
Packaging* Fat layer Color Tenderness	Not identified

* Michels (2000: 269), as far as beef packing, the author says "the lack of standardization of the concepts among breeders is obvious about this aspect", therefore we will not use terms related to packing, just the general term "packing".
Source: Michels (2000); Sproesser *et al.* (2000).

The "fat layer" attribute, for packing houses, and "visible fat" for the final consumers, have different meanings to the extent that of both perceptions. The fat content of the beef, for packing houses, matters as how much fat each cut will have. For

the European consumer, fat is not well seen and influences the perception of the beef quality (SIRET; ISSANCHOU, 1996).

On the subject of "flavor" and "freshness", these are attributes that are related to the organoleptic characteristic of the product, and is experienced in the post-purchase stage. These attributes identify the experienced qualities, which happen when the product is being consumed. These attributes are related to the cognitive level, in which the influencing factors that influence the behavior of the consumer are determinant for future purchases.

The discussion of the extrinsic attributes of quality of beef, under the perspective of the final consumer, should be highlighted. Attributes as "safety" and "region of origin" are items that should be added to the analysis of value of the product, and whose amplitude reaches all links in the beef production chain, especially in the link of primary production.

The relative value of the beef product for the European consumer could be explained according to the five levels of the product proposed by Levitt (1980). The highest level is the core benefit, which is what the consumer is really buying: food/animal protein. The second level is the generic product, which is beef. The third level, expected product, is the freshness, tenderness, and flavor of the product. The fourth level, augmented product, refers to the safety and origin of the product. The fifth level, potential product, includes all the transformations the product will undergo in the future. A graphic representation of these levels can be seen in figure 5.

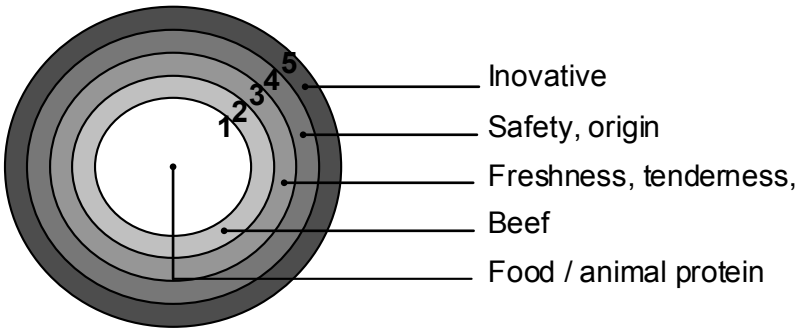

Figure 5 – Five levels of the product
Source: the authors.

Entrepreneurial practices such as traceability (or following the product from its origin until the point of sale), are becoming benefits already expected by the European consumer. Traceability is not any more a characteristic that may be found in the product, it has become an attribute that is demanded by the consumer. The European market purchases beef preferably from external suppliers that have reliable traceability systems.

The traceability procedure opens the possibility for better acceptance of beef in Europe. The consumer gets health information of the beef, and can identify where contaminated and/or poor quality products come from. Traceability also allows for the control of diseases and monitoring residues, besides satisfying public laws for developing the brand.

The extrinsic attributes can also be noticed in the seal of quality. The certification represents a market effort to assure the consumer that the product was produced in a proper manner, and therefore has good standards as far as health and organoleptic attributes. The possibilities found in seals of quality includes the certification of organic products, superior quality seals, proof of origin seals, certificates of conformity, among others. One should add that the seals of quality have a great potential to expand Brazilian exports, considering the current barriers for exports (BATALHA; SPROESSER, 2002).

Another strategy that can be used is the effort of building the reputation of the manufacturer's brand. The brand has the power of communicating to the consumer the origin of the product and can protect both the consumer as the competitor that offers similar products (AAKER, 1998). According to Tybout and Carpenter (2001), the brands assure a level of quality, simplify the choice and help the consumers obtain a wide range of objectives that includes satisfying basic functional needs and the consumption itself. Some authors say that communication is the main component in the process of purchasing (BRUNS∅; FJORD; GRUNERT, 2002). This is so because the consumers have vague, complex and even conflicting needs, as far as the food they are buying. Take for example fatless beef as a measurement of quality. Although it is seen by many consumers as a sign of quality, the absence of fat can be the opposite of what the consumer thinks. A certain level of fat can make the beef tender, flavorful and juicy, and consumers think that fat diminish these qualities. Likewise, by creating expectations about the flavor, the tenderness and juiciness, based solely on the presence of fat, may be dysfunctional.

When utilizing the process of prioritizing the criteria understood by the clients, according to Hill (1985), the qualifier criterion would be guaranteed by the seals of quality; order winners criterion would come through attributes of quality, and the least important attributes are those that producers obtain through the consumption of resources that clients do not cherish.

Another benefit for companies that create brands is the bridge made between the company and the clients. Ferreira and Barcellos (2001) have studied in the southern region of Brazil the initiative of six companies that have developed beef brands, searching to aggregate value to their product, by guaranteeing quality through identifiable tags that differentiate their products from the competitors.

5. Conclusions

After analyzing the quality attributes cherished by demand and supply, this study demonstrates how the operations can take advantage of a broader perspective of the production chain which values the consuming markets. Given the fact that Brazil is an enormous supplier of beef to the international market, this analysis will be able to subsidize entrepreneurial strategies and public policies.

This research shows that the European consumer is willing to pay more for information and safety. The consumers wish to know the name of the breeder, how the animal was raised and what food it ate. They want the assurance that the beef they will consume will not represent any risk to their health, not only as far as toxic substances, but also the role that beef has in their diet, as a source of protein and minerals. Such aspects are revealed in the product through its extrinsic attributes, which are characterized by being noticed by the consumer through instruments as seals, labels and packaging.

Extrinsic attributes, such as the traceability, represent for Brazilian breeders and packing companies the possibility of aggregating value to their product and meet the desire of the European consumers.

Consequently, the entrepreneurial strategies that result from this analysis should base themselves on increasing the perception of extrinsic quality attributes cherished by final consumers. The important axis in which there are necessary attributes for formulating entrepreneurial strategies for the beef industry are strongly based on the fact that there is a need to develop the perception of the consumer in regards to the extrinsic attributes of beef. Extrinsic attributes such as "region of origin" and "food safety", have much importance for European consumers.

Some of the proposals presented in this article were found in Brazil. The so called "green beef", certifies that the animal was raised in open pastures and is hormone free, and has the requirements for identifying the extrinsic attributes cherished by the consumers, as well extrinsic attributes related to safety. Nevertheless, the lack of seals of quality, which represent the qualitative attribute that the consumer cherishes (and whose usage may be a competitive edge regionally and internationally) do not allow for the objectives to be reached, even with efforts such as marketing, standardization and optimization that have proved to be insufficient (BATALHA; SPROESSER, 2002).

As Porter (1993) discusses economic development, he states that the economies develop and improve their competitive positions. Therefore the group of competitive and comparative advantages of the breeding activity in Brazil offer conditions for the agents of the productive chain to innovate, and reach the level of the potential product, which will result in greater gains given to the aggregation of value. On the other hand, the strategic agenda of these economic agents should include negotiations to reduce external barriers such as health and sanitary barriers, high tariffs, and subsidies to European producers that are a result of regional policies that are financed by the European Agricultural Guarantee Fund.

6. References

AAKER, D. A. **Marcas – brand equity**: gerenciando o valor da marca. Negócio Editora, São Paulo, 1998.

ACEBRÓN, L. B.; DOPICO, D. C. The importance of intrinsic and extrinsic cues to extended and experienced quality: an empirical application for beef. **Food Quality and Preference**, v.11, n.3, pp. 229-238, 2000.

AKERLOF, G. *The market for "lemons": quality uncertainty and the market mechanism.* **Quartely Journal of Economics**, v.84, n.3, p. 488-500, 1970.

ASHWORTH, S. **Consumer perceptions of meat quality and their willingness to pay a premium**. (SAC Working Paper), Edinburgh: The Scottish Agricultural College, 1999.

BARZEL, Y. *Measurement cost and the organization of markets*. **The Journal of Law and Economics**, v. XXV. p. 27-48, April, 1982.

BATALHA. M. O.; SPROESSER, R. L. Quality labels for food products: an option for differentiation in brazilian agribusiness. In: PALOMAR A.A.; FERREIRA, C.R.P.; GUERRA, R.E.H. (Org.). **Competitive growth in the global environment.** Valencia, 2002.

BECKER, T. Consumer perceptions of fresh meat quality: a framework for analysis. **British Food Journal**, v.102, n. 3, pp.158-176, 2000.

BECKER, T.; BENNER, E.; GLITSCH, K. **Summary report on consumer behaviour towards meat in Germany, Ireland, Italy, Spain, Sweden and United Kingdom**.

Department of Agricultural Policy and Agricultural Economics: University of Hohenheim, 1998.
BERGERET, P.; HA, P.H. Dynamiques comparées de trois filières dans le delta du fleuve Rouge: riz, porc, ail. **Cahiers Agricultures**, v.6, n.5, pp.337-43, 1997.
BLANDFORD, D. The food people eat. In: RITSON, C.; GOFTON, L.; MCKENZIE, J. **The food consumer**. Chicester: John Wiley & Sons, 1986.
BREDAHL, L. Cue utilization and quality perception with regard to branded beef. **Food Quality & Preference**, v.15, pp.65-75, 2004.
BRUNSØ, K.; FJORD, T. A.; GRUNERT, K. G. **Consumers' food choice and quality perception** (MAPP working paper No. 77). Aarhus: Aarhus School of Business, 2002.
CHEVALIER, J.M. ET. AL. A propos des filières industrielles. **Revue d'Economie Industrielle**, v.6, 1978.
COLLET, E. **Introduction étude de cas Gawi/Fruitnet**. Les Nouvelles Filières Agro-alimentaires - Report 5. Ghent: Ghent University, 1999.
EISENHARDT, K. M. *Agency theory: an assessment and review*. **Academy of Management Review**, v.14, n.1, p. 57-74, Jan. 1989.
FERREIRA, G. C.; BARCELLOS, M. D. Desenvolvimento de marca em carne bovina: um caminho para a diferenciação. **Proceendings of 3th International Conference on Agri-Food Chain/Networks Economics and Management**, Universidade de São Paulo, Brazil, 2001.
GOFTON, L. The rules of the table: sociological factors influencing food choise. In: RITSON, C.; GOFTON, L.; MCKENZIE, J. **The food consumer**. Chicester: John Wiley & Sons, 1986.
GOODSON, K. J. ET AL. Beef customer satisfaction: Factors affecting consumer evaluations of clod steaks. **Journal of Animal Science**, v.80, n.2, pp. 401-408, 2002.
GRUNERT, K. G. Current Issues in the understandig of consumer food choise. **Proceendings of 3th International Conference on Agri-Food Chain/Networks Economics and Management**, Universidade de São Paulo, Brazil, 2001.
HILL, T. **Manufacturing Strategy**. Londres: McMillan Education, 1985.
ISSANCHOU, S. Consumer expectations and perceptions of meat and meat products quality. **Meat Science**, v.43, pp.S5-S19, 1996.
LAMBERT, D. Developing a Customer-focused Logistics Strategy. **International Journal of Physical Distribution & Logistics Management**, v. 22, n.6, 1992.
LATVALA, T.; KOLA, J. Consumers'willingness to pay for informastion about food safety and quality: case beef. **Proceedings of 2000 World Food and Agribusiness Congress**, Chicago, USA, 2000.
LEVITT, T. Marketing sucess through differentiation – of anything. **Harvard Business Review**, pp.83-91, jan.-fev. 1980.
LOADER, R.; HOBBS J. E. The hidden costs and benefits of BSE. **British Food Journal**, v.98, n.11, pp.26-35, 1996.
LUMMUS, R. R.; KRUMWIEDE, D. W.; VOKURKA, R. J. The relationship of logistics to supply chain management: developing a common industry definition. **Industrial Management & Data Systems**, v.101, n.8, pp. 426-432, 2001.
MALASSIS, L. **Economie agro-alimentaire**. Paris: Cujas, 1979.
MICHELS, I. L. **A bovinocultura de corte brasileira e o mercador externo**: regiões sanitárias e a cadeia produtiva da carne bovina de Mato Grosso do Sul. Ph.D. diss., Faculdade de Filosofia, Letras e Ciências Humanas (FFLCH), Universidade de São Paulo, Brazil, 2000.
MORVAN, Y. **Fondements d'Economie Industrielle**. Paris: Economica, 1988.
NIELSEN, N. A.; JEPPESEN, L. F. **The beef market in the European Union**. MAPP

working paper no. 75. Aarhus: The Aarhus School of Business, 2001.
O`SHAUGHNESSY, J.; O`SHAUGHNESSY, N.J. Treating the nation as a brand: some neglected issues. **Journal of Macromarketing**, v.20, n.1, pp.56-64, 2000.
OLSON, A.; PETTERSON, M.; JÖNSON, GUNILLA. Packing demands in the food service industry. **Food Service Technology**, v.4, n.3, pp.97-105, 2004.
PORTER, M. E. **The competitive advantage of the nations**. New York: The Free Press, 1993.
RANDAL, T. R.; MORGAN, R. M.; MORTON, A. R. Efficient versus Responsive Supply Chain Choice: An Empirical Examination of Influential Factors. **Journal of Product Innovation Management**, v.20, n.6, pp.430-443, 2003.
RICHARDSON, N.; MACFIE, H.; SHEPERD, R. Consumer attitudes to meat eating. **Meat Science**, v.36, pp.57-65, 1994.
SANS P.; DE FONTGUYON, G.; BRIZ, J. Meat safety as a tool of differentiation for retailers: Spanish and French examples of meat 'supply chain brands. **International Journal of Retail & Distribution Management**, v.33, n.8, pp.618-635, 2005.
SANS, P., DE FONTGUYON, G. Choc exogène et évolution des formes organisationnelles hybrides: les effets de la crise dite 'de la vache folle' sur la filière viande bovine. **Sciences de la Société**, v.46, pp.173-90, 1999.
SIKUTA, M. *Agricultural organization in an era of traceability*. **Journal of Agicultural and applied economics**, v.37, n.2, p. 365-377, Aug. 2005.
SIRET, F.; ISSANCHOU, S. Production industrielle et qualité sensorielle. **Agoral 96**, Paris: Lavoisier Technique & Documentation, 1996.
SLACK, N.; LEWIS, M. **Operations Strategy**. New York: Prentice Hall, 2001.
SPROESSER, R. L.; MICHELS, I.; CAMPEÃO, P. Eficiência comparada: competitividade de sub-cadeias da carne bovina em Mato Grosso do Sul. **Desafio**: Revista de Economia e Administração, v.1, n.1, pp.55-59, 2000.
STARBIRD, S. A. Moral Hazard, Inspection Policy, and Food Safety. **American Journal of Agricultural Economics**, v.87, n.1, pp.15-27, 2005.
STEENKAMP, J.B. Conceptual model of the quality perception process. **Journal of Business Research**, v.21, pp.309-333, 1990.
TYBOUT, A. M.; CARPENTER, G. S. Criação e gestão de marcas, In: IACOBUCCI, D. (org.). **Os desafios do marketing**. São Paulo: Futura, 2001.
VERBEKE, W. Influence of consumerism on livestock products and eventually the feed industry. **Proceedings of 2001 AFMA Forum**, Universiteit Gent, Sun City, South Africa, 1999.
VERBEKE, W. Beliefs, attitude and behaviour towards fresh meat revisited after the Belgian dioxin crisis. **Food Quality and Preference**, v.12, n.8, pp. 489-498, 2001.
VERBEKE, W.; VIAENE, J. Beliefs, attitude and behaviour towards fresh meat consumption in Belgium: Empirical evidence from a consumer survey. **Food Quality and Preference**, v.10, n.6, pp.437-445, 1999.
WILLIAMSON, O. E. ***The Economic Institutions of Capitalism****: Firms, Markets, Relational Contracts*. New York: The Free Press, 1985.

IMPACT ASSESSMENT OF THE NON-TARIFF MEASURES (NTM) UPON INTERNATIONAL LEMON TRADE

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Abstract
This work analyses the effect of Sanitary and Phytosanitary (SPS) regulations on the lemon trade using a non-linear panel data gravity model estimated by Poisson pseudo-maximum likelihood (PPML). We study the potential effects of the NTM on the global trade and on the relative performance of Spain and Argentina. We analyze the Lemon exports from Argentina, Spain, USA, Mexico, South Africa and Turkey to their principal trade partners for the period 1995-2005. The data were collected from the United Nations Conference on Trade and Development (UNCTAD) Comtrade database (UNCTAD 2010). The SPS measures analyzed were collected from a wide range of resources such as SPS Information Management System (WTO 2010), International Food and Food Safety, Animal and Plant Health (IPFSAPH 2010), SPS The Sanitary and Phytosanitary Export Database (European Commission 2010), and the Argentine National Institute of Agricultural Research database (INTA 2010). The econometric results regarding the SPS effects show differences for the global case and the two specific cases studied. While SPS measures have a negative and marginally significant effect on global trade, a negative but non significant effect was found over Argentine and Spain exports. These findings suggest that the SPS regulation may be trade-restricting, but also that is difficult to isolate specific country effects. We found that the real exchange rate is an important determinant for Argentine lemon exports and that there are a significant and positive border effect (contiguous countries) and a negative effect related to the distance from trade partners for Spain exports.

Key words: Non-Tariff Measures, lemon, Gravity models, Trade.

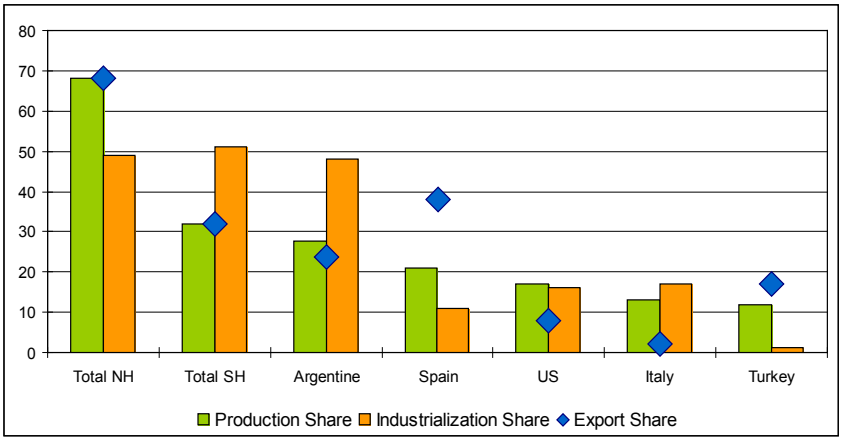
IMPACT ASSESSMENT OF THE NON-TARIFF MEASURES (NTM) UPON INTERNATIONAL LEMON TRADE

1. Introduction

The objective of this study is to analyze the importance of lemon Sanitary and Phytosanitary (SPS) measures in shaping trade from EU (Spain) and Argentina assuming that any change in these players in the world lemon market can affect the trade flow. In the recent past there had been an increasing number of trade disputes as a result of bans on citrus imports based on phytosanitary policies.We study the potential effects of the NTM on the global trade of lemon and, in particular, on the relative performance of Spain and Argentina.

According to USDA estimations (2000-2006), the world produces around 4.42 million tons of lemon each year. Five countries represent 92.7 percent of the production: Argentina, Spain, the United States, Turkey, and Italy (see Figure 1).

Figure 1 : Share in the world production, processing and export of lemon by country (2000-2006), in %

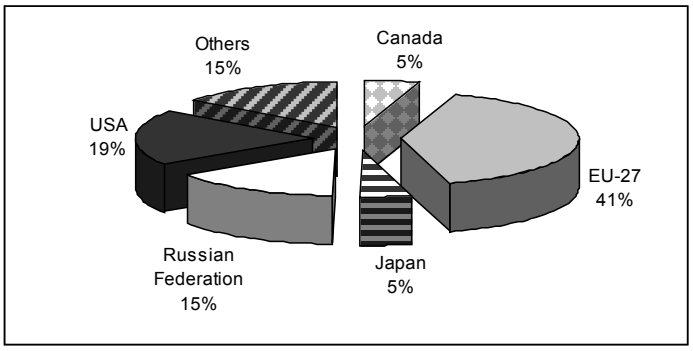


Source: USDA

World exports of fresh lemon in 2008 were 2,4 million tons (U$S 2.073 million). The main exporters are Mexico, Spain and Argentina which concentrated 50 percent of sales, followed by the US, South Africa and Turkey with 30 percent. The Spain Lemon exports represent the 60% of its lemon productions, meanwhile it´s the 30% for Argentina.

The main importers are located in the northern hemisphe the EU, Russia, United States, Canada and Japan represent 85 percent of world imports of lemon (see Figure 2).

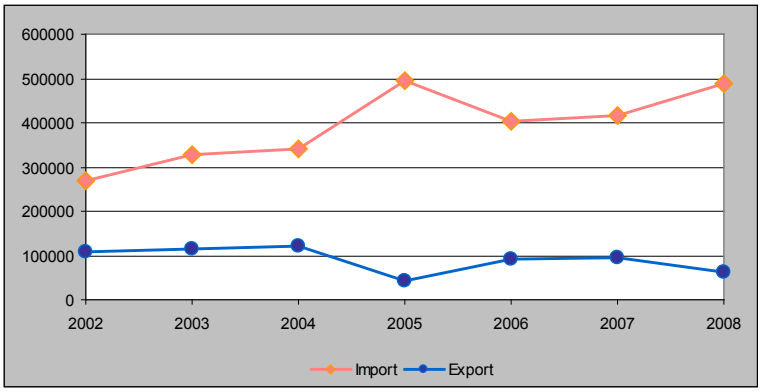
Figure 2 : Main importers of fresh lemon, 2008



Source: UN COMTRADE

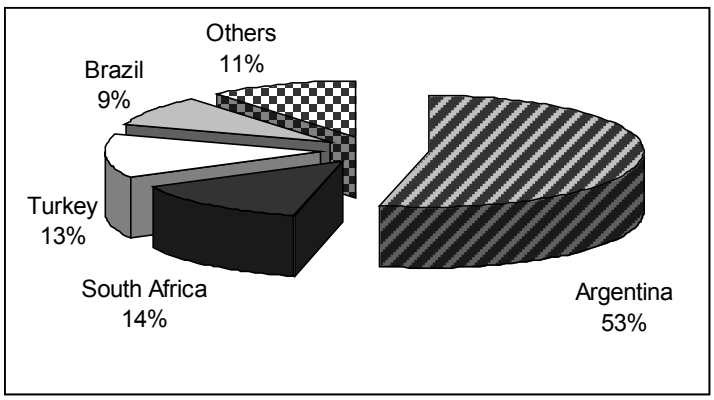
In the last years, EU has deepened its position of net importer of fresh lemon, but it has been essentially covered by intra trade competing with Argentina. EU's extra imports represent around 500,000 tons of lemon for US$ 666 million. The main source is Argentina (53 percent) followed by South Africa, Turkey and Brazil (see Figures 3 and 4).

Figure 3 : Evolution of EU fresh lemon trade (tons, 2002-2008)



Source: UN COMTRADE

Figure 4: EU imports by country (2008)



Source: UN COMTRADE

Russia is the main destination of the Argentine lemon exports (233, 177 tons), followed by others country of EU with 11 per cent each one. In all cases, the sales have increased in absolute values and in total exports participation (Table 1)

Table Nº 1: Main markets for Argentine lemon exports.

	2002		2007		Variation
	Ton	%	Ton	%	2007/02
Russia	17.524	12,0	35.924	15,4	105,00
Spain	12.257	8,4	26.613	11,4	117,12
Italy	16.979	11,6	26.467	11,4	55,88
Netherland	12.937	8,9	26.297	11,3	103,27
Canada	7.059	4,8	14.159	6,1	100,58
Total	**146.000**	**100,0**	**233.177**	**100,1**	**59,71**

Source: INDEC-Argentina

The main markets for Spain are the intra-EU countries, and for extra-EU countries prevails Russia and Switzerland (Which represent only 10% of total exports).

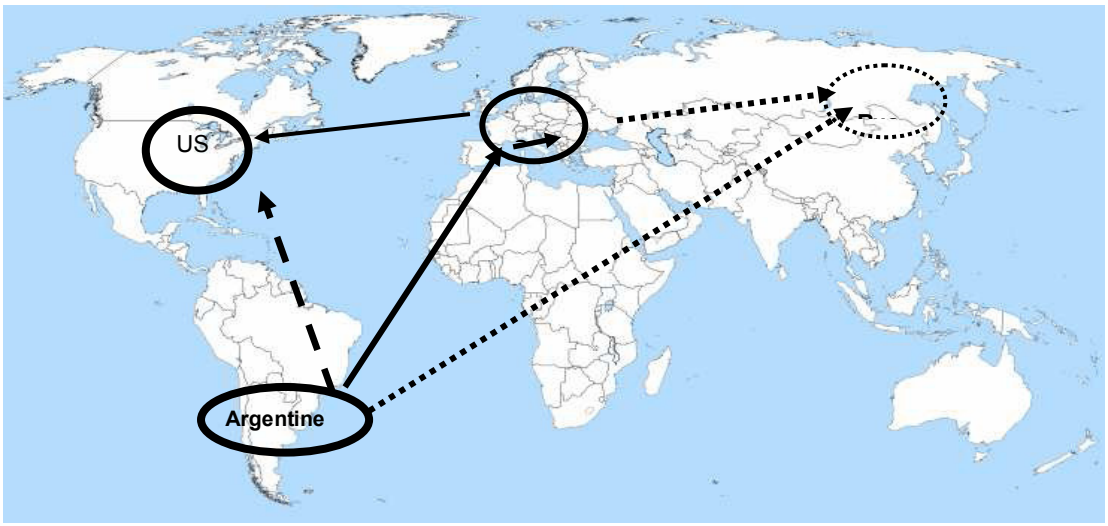
Table 2: Main markets for Spain lemon exports.

	2002		2008		Variation
	Ton	%	Ton	%	2007/02
France	94.125	16,9	68.563	20,8	-27,2
Germany	113.125	20,3	73.452	22,2	-35,1
United Kindom	42.244	7,6	34.466	10,4	-18,4
Poland	74.784	13,4	41.144	12,5	-45,0
Italy	47.108	8,4	21.720	6,6	-53,9
INTRA EU	**371.386**	**66,5**	**239.345**	**72,5**	**-35,6**
Rusia	34.319	6,1	16.213	4,9	-52,8
Canada	1.239	0,2	159	0,0	-87,2
US	21.499	3,9	592	0,2	-97,2
Switzerland	9.980	1,8	4.315	1,3	-56,8
EXTRA EU	**67.037**	**12,0**	**21.279**	**6,4**	**-68,3**
TOTAL	**558.234**	100,0	**330.171**	**100,0**	**-40,9**

Source: UN COMTRADE

Figure 5 summarizes the main lemon trade flows from Argentina and Spain.

Figure 5 : Lemon trade flows



2. SPS Measures in Citrus

Citrus pests are recurrent and eradication and prevention of infestation or re-infestation is often the only viable alternative to avoid potentially significant crop losses. Unfortunately pest eradication in citrus plantations is difficult to achieve, and in some cases uprooting trees in extensive areas is the only effective solution (e.g. canker and citrus variegated chlorosis, or CVC). In the recent past there had been an increasing number of trade disputes as a result of bans on citrus imports based on phytosanitary policies.

- 1997 Argentina vs. European Community: the EC claimed that Argentina could not demonstrate the equivalence of control measures with those of the European Community in relation with citrus canker. The consultation was successfully resolved the following year with the possibility of recognizing systems of certification equivalent to those of the European Community.

- 1999 Argentina vs. United States: negotiations were held on the postponement of US measures concerning the export of citrus produced in northwest Argentina. An agreement was reached the following year. However, the protocols which form the basis for the agreement have been challenged in US courts, creating an impediment to Argentine citrus (primarily lemon) sales to the United States[85].

[85] *The present assessment follows a quantitative assessment done by APHIS in 1997 for the import of citrus (grapefruit, lemons, and oranges) from Argentina. The previous assessment provided the basis for a program authorizing the import of citrus from Argentina beginning in*

- 2001: Clementines from Spain were banned by USDA after Mediterranean fruit fly larvae were found in several shipments already in the United States.

- 2002: The USDA (APHIS) amended its regulations to allow the importation of clementines from Spain under strict conditions. The new requirements impose the establishment of a Mediterranean fruit fly management program by the Spain's government, severe inspections and cold treatment, as well as other conditions designed to impede the introduction of the Mediterranean fruit fly.

- 2002 European Community vs. United States: APHIS banned imports of clementines from Spain due to detections of Mediterranean fruit fly larvae. Based on new agreed protocols for cold treatment, trapping and spraying, physical examination of shipment, exports from the European Community (Spain) to the United States have resumed.

- The US phytosanitary agency in charge of reviewing and defining phytosanitary import requirements, APHIS, is presently assessing the situation in Argentina. In a recent document listing illnesses and diseases affecting lemons in the region of Tucuman, the fruit fly has been introduced, much to the surprise of Argentina's growers and exporters. This implies the use of cold treatments which affect the quality of lemon fruits.

3. Data and Methodology

We analyze the Lemon exports from Argentina, Spain, USA, Mexico, South Africa and Turkey to their principal trade partners for the period 1995-2005. The data were collected from the United Nations Conference on Trade and Development (UNCTAD) *Comtrade database* (UNCTAD 2010). There are 1089 observations, of which 80% are nonzero. The SPS measures analysed were collected from a wide range of resources such as SPS Information Management System (WTO 2010), International Food and Food Safety, Animal and Plant Health (IPFSAPH 2010), SPS The Sanitary and Phytosanitary Export Database (European Commission 2010), and the Argentine National Institute of Agricultural Research database (INTA 2010). The SPS measure is a binary variable that takes the value of 1 if the importer country imposed a SPS (medfly, citrus canker) to the exporter country and 0 otherwise.
We study the effect of Sanitary and Phytosanitary (SPS) regulations on the lemon trade among its more important markets using a non-linear panel data gravity model estimated by Poisson pseudo-maximum likelihood (PPML). As the previous literature suggest, the estimates from this method are robust, even with different patterns of heteroskedasticity. In addition to this, this model is compatible with the existence of zeros in trade data.

Gravity models have been frequently applied to study the impact of regulatory measures on trade flows. At the global level of agricultural trade examples include Disdier et al.

2000. In 2001, the authorization was successfully challenged in court and imports of citrus from Argentina were suspended.

(2008), Fontagné et al. (2005), Moenius (2004), Wilson and Otsuki (2001) and Schlueter and Wiek (2009). Fontagné et al. (2005), and Moenius (2004) has found positive effects on trade in manufacturing and for some industrialized agriculture products and negative effects among other products. Disidier et al (2008) has found that regulatory measures do not significantly impact on OECD (Organization for Economic Co-operation and Development) member countries, in contrast exports from developing and less developed countries are negatively affected. Wilson and Otsuki (2001) have shown this negative effect in developing countries, analysing sector and product specific regulations.
In estimating a gravity model, there are econometric issues to be addressed which are related to the heterogeneity of countries and to sample selection bias. Country heterogeneity introduces a potential bias in the estimation because of the likely correlation between the country-specific effects and the explanatory variables of the gravity equation. Heterogeneity may be due to observable and unobservable factors (such as the propensity of a country to export more than others, cultural and historical links or business cycle effects), and/or to several other aspects of the relationships between each country-pair (i.e., common language, colonial past, shared border or religion). Observable factors can be handled by using a set of dummy variables.

In presence of zero trade value, the log-linearization of gravity equations fails and leads to biased estimates. The issue of zero-trade flows has been widely addressed in the literature on gravity empirics. In particular, Santos Silva and Tenreyro (2006) contribute to the discussion as to which estimator provides the most reliable results by assessing the potential bias of elasticities in a log linearized regression. They show that the consistency of an OLS estimator depends on a restrictive assumption regarding the error terms and suggest that the gravity equation could be estimated in its multiplicative form by using the Pseudo Quasi Maximum Likelihood Method (PQML) based on a Poisson Model.

The usual specification for gravity models is a log-linearized equation:

$$\ln T_{ij} = \ln \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln D_{ij} \ln \eta_{ij}$$

From this equation the parameters can be estimated by least squares. The robustness of this method relies on the assumption that η_{ij} and $\ln \eta_{ij}$ are statistically independent of the regressors because the mean and the distribution of a random variables affects the expected value of its logarithm (Santos Silva and Tenreyro 2006).
Silva and Tenreyro (2006) have demonstrated that "*the error terms in the usual log linear specification of the gravity equation are heteroskedastic, which violates the assumption that* $\ln \eta_{ij}$ *is statistically independent of the regressors and suggests that this estimation method leads to inconsistent estimates of the elasticities of interest*".
In consequence, the presence of heteroskedasticity in gravity models is both quantitatively and qualitatively relevant, even controlling for fixed effects.
An additional problem for estimating gravity models through the log linear equation arises when there are values of 0 in the dependent variables (because $\ln 0$ is $-\infty$). The standard approach to solve this problem is using $T_{ij} + 1$ as the dependent variable. This methodology could lead to inconsistent estimators of the parameters.

Silva and Tenreyro propose the use of Poisson Pseudo Maximum-Likelihood (PPML) method for estimating gravity models for trade. They conclude that the estimates from this method are robust, even with different patterns of heteroskedasticity. In addition to this, this model is compatible with the existence of zeros in trade data.

Therefore the multiplicative gravity model under this function for lemon trade is:

$$m_{ijt} = p_{it}^{\beta_1} c_{jt}^{\beta_2} d_{ij}^{\beta_3} exp\left(\alpha_i + \alpha_j + \beta_4 z_t + \beta_5 t_{ijt} + \sum_k \beta_k r_{itj}^k \right) \eta_{itj}$$

Where:
m_{ijt}: Trade flow value from exporter i to importer j at time t.
p_{ij}: Production of lemon of exporter i at time t. This is a measure of beef exporter size.
c_{jt}: Consumption quantities of importer j at time t. This is a measure of lemon importer size.
d_{ij}: Distance between exporter i and importer j.
α_i: Country-specific exporter fixed effects.
α_j: Country-specific importer fixed effects.
z_t: Time dummy variable.
t_{ijt}: Tariff variable.
$\sum_k r_{ijt}^k$: It presents regulatory measures.
η_{itj}: Transformed error.
$E(\eta_{itj}|x) = 1$: According to Silva and Tenreyro (2006, p.644).

Then, previous equation can be written as an exponential function:

$$m_{ijt} = exp\left(\beta_1 ln\, p_{it} + \beta_2 ln\, c_{jt} + \beta_3 ln\, d_{ij} + \alpha_i + \alpha_j + \beta_4 z_t + \beta_5 t_{ijt} + \sum_k \beta_k r_{ijt}^k \right) + \varepsilon_{ijt}$$

It has the functional form of the previous equation and is estimated by PPML.

4. Results

We estimate three different models to assess the impact of NTM's on lemon trade: i) a global model considering all countries that have lemon trade; ii) Argentina exports model considering Argentina and its main trade partners; and iii) Spain exports model considering Spain and its main trade partners.

The dependent and independent variables included in the models are as follows:

Dependent Variable:

- *Lemon exports* (HS 080550) from Argentina, Spain, USA, Mexico, South Africa and Turkey to their principal trade partners. The data were collected from the United Nations Conference on Trade and Development (UNCTAD) *Comtrade database* (UNCTAD 2010). There are 1089 observations, of which 80% are nonzero.

Indepent Variables:

- Consumption of lemon (*cons*), of trade partners, were collected from *FAO database* (FAOSTAT 2010) for the period 1995-2005. (tons).

- GDP (current US$) (*pbim*), of trade partners, was collected from the *World Developer Indicator*, a World Bank publication (World Bank 2010), for the period 1995-2005. (in US dollars).

- Tariffs (*tax*), of trade partners, were collected from the *Tariff World Integrated Trade Solution – WITS* (UNCTAD 2010) and *Tariff Data* (WTO 2010), for the period 1995-2005. (ad-valorem).

- Border Effects (*frontera*), were collected from the Centre d'Estudes Prospectives et d'Informations Internationales (CEPII 2010). The variable takes 1 if the countries are contiguous, 0 otherwise.

- Common Languages (*idioma*), were collected from the Centre d'Estudes Prospectives et d'Informations Internationales (CEPII 2010). The variable takes 1 if the countries share a common language, 0 otherwise.

- Weighted Distances (*distw*) between the biggest cities of a pair of countries, those inter-city distances being weighted by the share of the city in the overall country's population. Data were collected from the Centre d'Estudes Prospectives et d'Informations Internationales (CEPII 2010). The general formula developed by Head and Mayer (2002) and used for calculating distances between country i and j is

$$d_{ij} = \left(\sum_{k \epsilon i} (pop_k / pop_i) \sum_{l \epsilon j} (pop_l / pop_j)\, d_{kl}^{\theta} \right)^{1/\theta}$$

Where:
pop_k designates the population of agglomeration k belonging to country i. pop_l designates the population of agglomeration l belonging to country j. θ measures the sensitivity of trade flows to bilateral distance d_{kl}. The calculation setting θ equal to -1 corresponds to the usual coefficient estimated from gravity models of bilateral trade (CEPII 2010).

- Real Exchange Rate (*indextcr*), between pairs of trading partners, was calculated using the formula:

$$e_{ij} = E_{ij} \frac{P^j}{P^i}$$

Where e_{ij} designates de real exchange rate between country i and country j. E_{ij} represent the nominal exchange rate between country i and country j. P^J designates de consumer price index of country j and P^i designates de consumer price index of country i. Nominal exchange rate and consumer price index were collected from the International Monetary Fund (IMF 2010).
For the estimation of the model, we created a real exchange rate index using the formula:

$$indexRER = \frac{e_{ij}^t}{AVG\ e_{ij}^{1990-2005}}$$

- Sanitary and Phytosanitary Measures (*ntm*), were collected from a wide range of resources such as SPS Information Management System (WTO 2010), International Food and Food Safety, Animal and Plant Health (IPFSAPH 2010), SPS The Sanitary and Phytosanitary Export Database (European Commission 2010), and the Argentine National Institute of Agricultural Research database (INTA 2010). The variable takes 1 if the importer country imposed a SPS (medfly, citrus canker, etc) to the exporter country, 0 otherwise.

Trade Partners:

- Argentina: Canada, Poland, Russia, USA, Japan and EU (15). These countries account for 90% of Argentine lemon exports for the period 1995-2005.
- Spain: Canada, Poland, Russia, USA, Switzerland and EU (14). These countries account for 90% of Spain lemon exports for the period 1995-2005.
- USA: Australia, Canada, China, Japan, Rep. of Kore and New Zealand. These countries account for 95% of USA lemon exports for the period 1995-2005.
- Mexico: Canada, USA, Japan and EU (15). These countries account for 95% of Mexico lemon exports for the period 1995-2005.
- South Africa: Saudi Arabia, China, United Arab Emirates, Japan, Russia and EU (15). These countries account for 85% of South Africa lemon exports for the period 1995-2005.
- Turkey: Saudi Arabia, Poland, Russia, Romania, Bulgary and EU (15). These countries account for 85% of Turkey lemon exports for the period 1995-2005.

Tables 3, 4 and 5 present the coefficient estimates for the different models.

Table 3: PPML Estimates: Global Model (All trading countries)

```
Random-effects Poisson regression               Number of obs      =      1089
Group variable: id                              Number of groups   =        99

Random effects u_i ~ Gamma                      Obs per group: min =        11
                                                               avg =      11.0
                                                               max =        11

                                                Wald chi2(8)       =     29.51
Log likelihood  = -3287.3153                    Prob > chi2        =    0.0003

------------------------------------------------------------------------------
             |   Observed                                      Normal-based
      lnxpos |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lncons |   .0257268   .0229057     1.12   0.261    -.0191674    .0706211
     lndistw |  -.3139063   .0767754    -4.09   0.000    -.4643833   -.1634293
      lnpbim |   .2119473   .0514005     4.12   0.000     .1112042    .3126904
         tax |   .3599841    .299475     1.20   0.229    -.2269762    .9469443
```

lnindextcr	.0330763	.0120095	2.75	0.006	.0095381	.0566145
frontera	-.1843426	.1474891	-1.25	0.211	-.473416	.1047307
idioma	.3754911	.2233703	1.68	0.093	-.0623067	.8132889
ntm	-.1534569	.0966688	-1.59	0.112	-.3429243	.0360106
constant	3.609511	.4948693	7.29	0.000	2.639585	4.579437
/lnalpha	-.9036451	.2704514			-1.43372	-.3735701
alpha	.4050904	.1095573			.2384203	.6882727

Likelihood-ratio test of alpha=0: chibar2(01) = 1958.27 Prob>=chibar2 = 0.000

Table 4: PPML Estimates:Argentina

Random-effects Poisson regression — Number of obs = 209
Group variable: id — Number of groups = 19

Random effects u_i ~ Gamma — Obs per group: min = 11, avg = 11.0, max = 11

Wald chi2(7) = 36.59
Log likelihood = -767.19983 — Prob > chi2 = 0.0000

lnxpos	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lncons	.0460329	.0616945	0.75	0.456	-.0748862	.166952
lndistw	-1.05402	1.102607	-0.96	0.339	-3.215091	1.107051
lnpbim	.2007417	.0965483	2.08	0.038	.0115106	.3899729
tax	-.8077387	1.981838	-0.41	0.684	-4.692069	3.076591
lnindextcr	.0527523	.0138129	3.82	0.000	.0256795	.0798251
idioma	.2480285	.657186	0.38	0.706	-1.040032	1.536089
ntm	-.2058255	.2054988	-1.00	0.317	-.6085957	.1969448
constant	10.69892	10.36368	1.03	0.302	-9.613526	31.01136
/lnalpha	-1.019858	.3383727			-1.683056	-.3566592
alpha	.3606463	.1220329			.1858053	.700011

Likelihood-ratio test of alpha=0: chibar2(01) = 405.32 Prob>=chibar2 = 0.000

Table 4: PPML Estimates: Spain

Random-effects Poisson regression — Number of obs = 209
Group variable: id — Number of groups = 19

Random effects u_i ~ Gamma — Obs per group: min = 11, avg = 11.0, max = 11

Wald chi2(7) = 44.79
Log likelihood = -536.97619 — Prob > chi2 = 0.0000

lnxpos	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lncons	.026651	.0246962	1.08	0.281	-.0217526	.0750545
lndistw	-.3370508	.0534084	-6.31	0.000	-.4417294	-.2323722
lnpbim	.0083561	.0320527	0.26	0.794	-.0544661	.0711782
tax	5.599403	2.193782	2.55	0.011	1.299669	9.899137
lnindextcr	-.0095812	.0086122	-1.11	0.266	-.0264608	.0072983
frontera	-.2026875	.0934552	-2.17	0.030	-.3858564	-.0195186
ntm	-.0355184	.06763	-0.53	0.599	-.1680708	.0970339
constant	4.94005	.4183216	11.81	0.000	4.120155	5.759945
/lnalpha	-5.2532	.7888433			-6.799305	-3.707096

```
-------------+----------------------------------------------------------------
       alpha |   .0052308   .0041262                      .0011145    .0245487
-------------+----------------------------------------------------------------
Likelihood-ratio test of alpha=0: chibar2(01) =     3.35 Prob>=chibar2 = 0.034
```

The estimates results regarding the SPS effects show differences for the global case and the two specific cases studied. While SPS measures have a negative and marginally significant effect on global trade, a negative but non significant effect was found over Argentine and Spain exports.

Estimates suggest that the real exchange rate is an important determinant for Argentine lemon exports. Also the income elasticity of importer is a significant variable for Argentine lemon exports.

In the Spain case there is a significant and positive border effect (contiguous countries) and a negative effect related to the distance from trade partners.

These findings suggest that the SPS regulation may be trade-restricting, but the results are case specific. As a general remark, we could conclude that it is difficult to isolate specific country effects, probably due to the lack of more detailed data because our measure of SPS NTM is a rough approximation to trade restricting measures.

5. Conclusions

This paper has addressed the issue of the impact of Sanitary and Phytosanitary measures on lemon trade flows using a gravity model estimated by Poison Pseudo Maximum Likelihood methodology. Regarding the NTM effect, it was found a substantial negative effect on the global trade. However the country specific studies show a non significant negative impact on lemon exports.
These findings suggest that the same SPS regulation may be trade-restricting or may have no trade impact depending on the data and the case of study. Consequently it would be difficult to find consensus about the effects of country specific SPS measures on lemon trade.

Future research should consider a more detailed measure of NTM (i.e. an index of quantity and quality of SPS measures), because the use of dummy variables is a rough estimate of the intensity of the SPS measures and could result in biased estimates.

6. References

Beghin, J. and J. C. Bureau (2001). "Quantitative Policy Analysis of Sanitary, Phytosanitary and Technical Barriers of Trade." Economie Internationale **87**: 107-130.

CEPII (2010). "Distances Database." Retrieved July 20, 2010, from http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

Deardorff, A. and R. M. Stern (1997). Measurement of Non-tariff Measures. Economics Department Working Paper No. 179. Paris, OECD/GC**:** 129.

Disdier, A. C., L. Fontagné, et al. (2008). "The impact of Regulations on Agricultural Trade: Evidence from the SPS and TBT Agreements." American Journal of Agricultural Economics. **90**(2): 336-350.

EuropeanCommission (2010). "SPS The Sanitary and Phytosanitary Export Database." Retrieved July 22, 2010, from http://madb.europa.eu/madb_barriers/indexPubli_sps.htm.

FAOSTAT (2010). Retrieved July 14, 2010, from http://faostat.fao.org/default.aspx.

Field, A. (2006). "Back door protectionism?" The Journal of Commerce - Cool Cargoes **Fall 2006**: 34-38.

Fontagné, L., M. Mimouni, et al. (2005). "Estimating the Impact of Environmental SPS and TBT on International Trade." Integration and Trade Journal **22**: 7-37.

IPFSAPH (2010). " International Portal on Food Safety, Animal and Plant Health ". Retrieved July 23, 2010, from http://www.ipfsaph.org/En/default.jsp.

Rau, M. and S. W. Schlueter (2009). Framework for Analysing Regulations and Standards in the NTM Impact Project. International Association of Agricultural Economists Conference. IAAE. Beijing, China.

Santos Silva, J. M. C. and S. Tenreyro (2006). "The Log af Gravity." The Review of Economics and Statistics. **88**(4): 641-658.

Silva JMC and Tenreyro, S (2003). "Gravity-Defying Trade". Federal Reserve Bank of Boston Series. Retrieved November 16, 2010, from http://www.bos.frb.org/economic/wp/wp2003/wp031.pdf

UNCTAD (2010). "UNCTAD Comtrade Database." Retrieved July 14, 2010, from http://comtrade.un.org/db/.

Wilson, J. S. and T. Otsuki (2001). Global Trade and Food Safety. Working Paper 2689. Washington DC, Development Research Group, The World Bank.

WorlBank (2010). "World Developer Indicator." Retrieved July 28, 2010, from http://data.worldbank.org/.

WorlBank (2010). World Integrated Trade Solution (WITS).

WTO (2010). "SPS Information Management System ". Retrieved July 20, 2010, from http://spsims.wto.org/web/pages/report/custom/Report.aspx.

WTO (2010). "Tariff Data." Retrieved July 25, 2010, from http://tariffdata.wto.org/ReportersAndProducts.aspx.

LAS EXPORTACIONES AGROINDUSTRIALES Y EL CRECIMIENTO ECONONICO: LA APERTURA EXTERNA

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Abstract
The relation between the current account of the balance of payments and the growth of the GDP for the period 1870-2010 in Argentina is explained by applying the model proposed by Thirlwall (1979, 2003). Through this model of general equilibrium, it can be set a theoretical relation between exports and economic growth. It was verified the existance of cointegration between the exports of goods and services and the GDP, which is a demostration of the equilibrium of the variables in the long-term. As well is possible to demonstrate that the exports of the Agro-industrial System have represented during 141 years, the 87% of the total exports of the country, considering a bigger frame of trade openness. That fact constitutes a clear demonstration of its importance in the growth of the country. This paper presents an explanation to these stylized facts using historical data and a formal.

Key words: Exports, Economic Growth, Agroindustrial Exports, Trade Opennes

LAS EXPORTACIONES AGROINDUSTRIALES Y EL CRECIMIENTO ECONONICO: LA APERTURA EXTERNA

1. Justificacion

La actividad del sector agropecuario argentino ha fortalecido y consolidado el desarrollo de tecnologías vinculadas a la ganadería y a la agricultura, destacándose la habilidad de los recursos humanos para adaptarse a los cambios en la estructura de precios relativos. Un ejemplo reciente es el rápido crecimiento de la siembra directa, la relocalización de la ganadería según los cambios en la función de producción de las actividades de engorde y cría.

Por otra parte, la contribución de la actividad agropecuaria al desarrollo económico es motivo de continuo análisis, empezando por el tamaño que se le atribuye al sector oficialmente y su relación con el resto de la economía. En tal sentido, en trabajos realizados por especialistas de organismos internacionales y regionales se ha comenzado a imputar al sector el valor agregado de actividades del sector manufacturero que tienen como principal proveedor al sector primario agropecuario y forestal dándose paso así a un enfoque de encadenamiento hacia delante (World Bank, 2005). En esta línea de pensamiento, se ha definido el Sistema Agroindustria (SAI). Este sistema se modernizó y se estima que ha sido un factor significativo de desarrollo, Por lo tanto, la importancia del sistema agroindustrial como factor de crecimiento y su vínculo con el potencial exportador argentino justifica la realización de este trabajo.

2. Objetivos del trabajo

- **OBJETIVO GENERAL:**

Establecer los efectos de las exportaciones totales en el crecimiento económico y la relevancia que tienen las ventas externas del Sistema Agroindustrial.

- **OBJETIVOS ESPECIFICOS:**

1. Explicar la relación entre las exportaciones y el crecimiento de la economía argentina en el largo plazo.
2. Establecer la importancia de las exportaciones del Sistema Agroindustrial en las exportaciones.

3. Marco conceptual

El crecimiento de largo plazo de la economía en países con problemas en la cuenta corriente de la balanza de pagos, como es el caso de la Argentina, depende de las exportaciones (Thirwall, 1979, 2003). Ello se debe a que un aumento de la oferta de recursos no genera automáticamente el crecimiento de un país si no consigue equilibrar la cuenta corriente de su balanza de pagos. Si las exportaciones no crecen y sí lo hacen las importaciones, la situación externa se transforma en insostenible, por cuanto el déficit de la cuenta corriente no puede mantenerse indefinidamente. Esto lleva a un exceso del producto sobre el gasto, y en consecuencia a una subutilización de los

recursos. La solución se encuentra en el crecimiento de las exportaciones, la cual conduce a la salida de la situación de stop and go.

4. Metodologia

La metodología utilizada es de carácter cuantitativo y descriptivo, comprende la sistematización y análisis de variables económicas y de población a nivel nacional en el periodo 1870-2010. Se definen los instrumentos para mostrar la importancia de las exportaciones en el crecimiento y especialmente de las exportaciones del sistema agroindustrial (SAI). Para la relación de la exportación con el PIB y de las exportaciones del SAI se considera el período 1980-2010.
Se analizan las variables que conforman la oferta y la demanda de Argentina, o que se derivan de estas. Se procede al uso de un modelo económico para investigar la importancia de las exportaciones y su vinculación con el crecimiento económico. Se definen ecuaciones y métodos econométricos para mostrar la cointegración y relación entre las variables. Luego se relacionan las exportaciones totales con las provenientes del SAI. Se procede a la descripción metodológica más detallada.

Sobre la base de los datos entre los años 1870 y 2010, se efectúa un análisis de las fases de período teniendo en cuenta las consideradas por Angus Maddison, que fueron ajustadas a las características de la evolución de la política económica de la Argentina. Las fases consideradas son: 1870-1913, 1913-1950, 1950-1973 y 1973-2010. No se ha considerado la etapa 1920-1870 debido a que la Argentina no había consolidado su institucionalidad (Luna, 1993).

La evolución de las principales variables de la oferta y la demanda de la economía argentina se presentan a precios de 1993; por tanto, se descarta el efecto de variación de los precios en la evolución del PIB y se puede ver la evolución de la actividad. En relación al empalme de las distintas series, se utiliza como fuente la información del trabajo denominado “Dos Siglos de la Economía Argentina”, dirigido por Ferreres. Se define la serie de apertura externa en base a la suma, en cada año, de las importaciones más las exportaciones divididas por el Producto Interno Bruto, (X+M)/PIB.

Con el objetivo de explicar el crecimiento de la economía en base a las exportaciones se parte del modelo de Thirlwall (1979 y 2005), y se trabaja a precios de 1993 para las series de PIB y X. Se verifica la estacionariedad de las series (Dickey-Fuller, 1979 y Mackinnon, 1991). Luego a través de ecuaciones se define el comportamiento de largo plazo del PIB en base a las exportaciones y la existencia de cointegración entre las variables a través de la estacionariedad de los residuos del modelo de corrección de errores (Charemza y Deadman, 1997), partiendo de un modelo de corto plazo autorregresivo dinámico de orden uno (ADL (1,1)).

Respecto de las exportaciones agroindustriales como porcentaje de las ventas externas totales del país, se presentan los cuadros y comentarios con sus respectivas fuentes de información en dólares corrientes.

5. La apertura comercial en el crecimiento y desarrollo de la argentina

Evaluando por etapas el comportamiento de la oferta y la demanda de Argentina, a precios de 1993, se observa que en el período 1870-2010, el PIB creció a un ritmo anual de 3,7%, el Consumo lo hizo a razón del 3,7%, la Inversión Bruta Fija al 3,9% y la población a una tasa anual del 2,2%. Asimismo, el coeficiente de apertura externa promedio fue del 19,3% del PIB, las Exportaciones representaron el 8,4% del producto en promedio y la Inversión Bruta Fija el 21,0%. En el caso del ingreso per cápita, el crecimiento anualizado 1,5% (cuadros 5.1, 5.2 y 5.3).

El nivel del coeficiente de apertura externa ha sido un factor importante en la explicación del crecimiento económico del país. Cada vez que aumentó o disminuyó el coeficiente de apertura, como consecuencia de las políticas públicas vigentes relacionadas al comercio, el PIB per cápita se movió en el mismo sentido. Una excepción se registra en la etapa de 1950-1973 en la cual hubo crecimiento con baja apertura y un fuerte nivel de inversiones inducido por la política económica vigente en el marco del proteccionismo (cuadro 5.3). La apertura externa produce efectos estáticos y dinámicos sobre la economía. Los estáticos están vinculados a las ventajas comparativas del país, su adecuación a los cambios tecnológicos y a la creación y desviación de comercio, mientras que los dinámicos están relacionados con el comportamiento de la tasa de inversión en el largo plazo y sus efectos sobre el crecimiento, además de las economías de escala, cambios en la eficiencia y movilidad de factores.

La mayor apertura tuvo un apreciable impacto sobre la exportación, la IBIF y el PIB per cápita (cuadros 5.2 y 5.3). Como se comentó en el punto anterior en la etapa 1950-1973, la economía creció a tasas más altas que en la fase anterior y posterior, y la variación de la inversión está relacionada con el consumo interno, mientras que su rendimiento fue relativamente más bajo que el obtenido en los años 1870-1913 con respecto al PIB, tal como se ver al comparar el cociente implícito entre las tasas de crecimiento del PIB y de la inversión en las etapas comentadas.

El mayor aumento promedio anual del PIB se registró en los años1870-1913, con una tasa del 5,61%. En esta fase también se logra el mayor dinamismo anual en el Consumo y el segundo nivel de crecimiento en las Inversiones Brutas Fijas después de la etapa de 1950-1973. Por otra parte, el promedio de apertura externa de la economía alcanza su máximo nivel con el 30% de promedio en los 44 años que la comprende, hecho que se repite en términos de Exportación e Inversión Bruta Fija en relación con el producto, con porcentajes del 10,8% y 28,2%, en cada caso (cuadro 5.2). La tasa promedio anual de ingreso per cápita fue 2,2%, la más alta de todas las fases consideradas por Maddison. Si bien se debe destacar en la fase de 1973-2010 en el subperíodo de 1990-2010 observa por la mayor apertura respecto del subperíodo 1973-1990 y una tasa de crecimiento del ingreso per cápita mayor a la fase de 1870-1913.

Es importante destacar que un estudio sobre "Comercio Exterior, Crecimiento y Pobreza", (Dollar. y Kraay, 2001), muestra que el comercio exterior tiene un efecto estadístico significativo sobre la actividad económica. El trabajo realizado señala que un aumento del coeficiente de apertura externa de 20 puntos porcentuales se traduce en un crecimiento del PIB entre el 0,5% y 1% anual. Por otra parte, los beneficios económicos se distribuyen entre muchos grupos y no se observa una tendencia

sistemática de desigualdad a medida que se amplía el comercio. Este estudio buscó aislar los componentes del comercio que dependen de factores geográficos y para ello prepararon estimaciones del impacto del comercio sobre el crecimiento en base a la variación decenal de la proporción que el comercio externo representa en la economía de los países considerados. Además se agregan otros indicadores acerca de la estabilidad de la política monetaria, el desarrollo financiero y la inestabilidad política. El estudio se realizó con datos de países en desarrollo, de los cuales hay 24 globalizados o sea economías más abiertas después de 1980. Como resultado aquellos que se globalizaron duplicaron su comercio exterior, aumentaron su proporción en el PIB llegando hasta el 33%, mientras que aquellos que no lo hicieron redujeron el flujo comercial, la participación del comercio en la economía y afectó su crecimiento.

El subperíodo 1913-1929, dadas las características del comportamiento de la economía Argentina, se lo considera como la parte final de una etapa de crecimiento que comenzó en 1870, debido a los hechos internacionales, también lo destaca así Maddison al identificarlo junto a los otros tres subperíodos (1913-1929, 1929-1938 y 1934-1950), en la fase de 1913 a 1950.

Cuadro 5. 1. Evolución del PIB, de la IBIF, del consumo y de la población argentina en diferentes períodos, entre los años del 1870-2010

AÑOS	TASA DE CRECIMIENTO DEL PIB	TASA DE CRECIMIENTO DE LA IBIF	TASA DE CRECIMIENTO DEL CONSUMO	TASA DE CRECIMIENTO DE LA POBLACIÓN
	%	%	%	%
1870-2010	**3,7**	**3,9**	**3,7**	**2,2**
1870-1913	**5,6**	**4,7**	**5,8**	**3,3**
1913-1929	**3,5**	**3,4**	**3,6**	**2,7**
1913-1950	**3,0**	**1,6**	**3,1**	**2,2**
1950-1973	**3,6**	**5,1**	**3,3**	**1,7**
1973-2010	**1,5**	**0,9**	**2,3**	**1,3**
1973-1990	***0,3***	***-2,9***	***0,5***	***1,5***
1990-2010	***3,0***	***5,7***	***2,7***	***1,1***

FUENTE: Elaborado en base al trabajo de Orlando Ferreres " Dos Siglos de Economía Argentina". Fundación Norte Y Sur. 2007. INDEC.

Cuadro 5.2. Apertura de la economía, relación de la exportación y la inversión bruta interna fija respecto del producto interno bruto, en diferentes fases de la economía argentina, entre los años 1870 y 2010

AÑOS	APERTURA EXTERNA (X+M) / PIB %	X / PIB %	IBIF / PIB %
1870-2010	**19,3**	**8,4**	**21,0**
1870-1913	**30,0**	**10,8**	**28,2**
1913-1929	**21,9**	**10,0**	**16,5**
1913-1950	**17,2**	**8,3**	**15,5**
1950-1973	**7,3**	**3,5**	**19,5**
1973-2010	**16,4**	**8,5**	**19,2**
1973-1990	***9,5***	***5,4***	***19,6***
1990-2010	***22,2***	***11,2***	***18,5***

FUENTE: Elaborado en base al trabajo de Orlando Ferreres " Dos Siglos de Economía Argentina". Fundación Norte Y Sur. 2007. INDEC

Cuadro 5.3. Apertura externa y PIB per-cápita, según etapas, entre los años 1870-2010

AÑOS	APERTURA EXTERNA (X+M)/PIB	TASA DE CRECIMIENTO ANUAL DEL PIB PER-CAPITA
1870-2004	**19,3**	**1,5**
1870-1913	**30,0**	**2,2**
1913-1929	**21,9**	**0,8**
1913-1950	**17,2**	**0,7**
1950-1973	**7,3**	**1,9**
1973-2010	**16,4**	**1,1**
1973-1990	***9,5***	***-1,2***
1990-2010	***22.2***	***3,1***

FUENTE: Elaborado en base al trabajo de Orlando Ferreres " Dos Siglos de Economía Argentina". Fundación Norte Y Sur. 2007. INDEC

6. El crecimiento de la economia en el largo plazo y la importancia de las exportaciones

Una de las preguntas que los economistas se hacen frecuentemente es por qué algunos países crecen más rápidamente que otros. En tal sentido se usará la respuesta dada por Thirlwall (1997 y 2003) sobre uno de los determinantes del crecimiento económico.
La llamada Ley de Verdoorn (Verdoorn, 1949 y Kaldor, 1966), expresa que la expansión del producto derivada de la demanda del sector agrario o de las exportaciones

precede al crecimiento de la productividad en las manufacturas. La "Ley de Verdoorn" postula que un incremento en la tasa de crecimiento de las exportaciones conduce a un aumento en la productividad del trabajo dentro del mismo sector, como consecuencia del proceso de aprendizaje que se deriva de la división del trabajo y de una especialización mayor, asociadas a la ampliación del mercado, las economías de escala, la incorporación del progreso tecnológico y la mecanización de las actividades productivas. La productividad en los sectores no exportadores aumenta cuando la tasa de crecimiento de las exportaciones se incrementa. Ello se explica en primer lugar por la expansión del sector exportador que acrecienta la demanda de trabajo, convirtiéndose en un foco de atracción de trabajadores de sectores tradicionales en una situación de subempleo. En estas actividades se reduce el empleo pero no el producto, lo cual implica un aumento de la productividad del trabajo.

En segundo lugar la transferencia de recursos de sectores de baja productividad a otros de alta, genera un efecto favorable en esta variable agregada de la economía, por cuanto los trabajadores poco productivos empleados en actividades tradicionales se transforman en más productivos. El resultado es la ampliación de las posibilidades de producción de la economía, no sólo en su capacidad exportadora sino también en su capacidad de producción en los sectores no exportables. Se genera un círculo virtuoso de crecimiento al interactuar recíprocamente los diferentes sectores.
En el enfoque de Thirlwall la demanda externa desempeña un papel fundamental en el crecimiento económico. El límite a la expansión económica es el déficit de la cuenta corriente de la balanza de pagos. Como consecuencia, la variable exportación, de carácter autónoma, se transforma en el factor determinante del crecimiento a largo plazo. El aumento de la oferta de recursos (o de su productividad) no genera automáticamente el crecimiento de un país si no consigue equilibrar la cuenta corriente de su balanza de pagos. Si la demanda por exportaciones no crece y sí lo hacen las importaciones, la situación externa se transforma en insostenible, ya que el déficit de la cuenta corriente no puede mantenerse indefinidamente. Esto conduce a un exceso del producto sobre la demanda, y luego a una subutilización de los recursos. La crítica situación encuentra solución en el crecimiento de la demanda de las exportaciones, a través de la cual se sale de la conocida situación de stop and go.

Las crisis de balanza de pagos en la Argentina han sido bastantes frecuentes. Entre 1885 y 2010 fueron recurrentes en razón de problemas de políticas internas y externas. Testimonios en tal sentido pueden encontrarse el libro “El Control de Cambios en la Argentina” (Avila,1989), publicado por la Fundación de Investigaciones Económicas Latinoamericanas (FIEL), que comprende los años 1885 a 1987, y hasta la actualidad se agrega la pérdida de reservas de los años 1995, 2000, 2001 y 2002. Se puede estimar que en 136 años se han registrado en promedio una crisis de balanza de pagos cada 4 años, aproximadamente.

El modelo de Thirlwall ha sido utilizado en varios trabajos, en general con resultados diversos en lo que respecta a la comparación del crecimiento real de los países con el crecimiento teórico predicho para el largo plazo por la Ley de Thirlwall. Se pueden citar entre otros los de Atesoglu (1993, 1997), Hieke (1997), McCombie y Thirlwall (1994) y McCombie (1997) para países desarrollados. En el caso de países de América Latina se mencionan Moreno-Brid (1999) Moreno-Brid y Pérez (1999) y Pacheco-López y Thirlwall (2004). Con relación a la Argentina se destacan, los trabajos de López y Cruz (2000), y Fugarolas Álvarez y Matesanz Gómez (2005).

La Ley de Thirlwall

El argumento central de la Ley de Thirlwall es el siguiente:
Desde que una economía no tiene capacidad de atraer un permanente flujo neto de capital desde el exterior, su tasa de crecimiento estará restringida por la necesidad de equilibrar su cuenta corriente, vendiendo suficientes exportaciones para pagar sus importaciones.
En su forma más simple el modelo de crecimiento BPC[86] puede ser expresado como sigue:

(1) $x = a_0 y^*$
(2) $m = b_0 y^a$
(3) $y^a = y^d$
(4) $x = m$

donde:
x es la tasa real de crecimiento de las exportaciones,
y* es la tasa real de crecimiento del ingreso del resto del mundo,
m es la tasa real de crecimiento de las importaciones,
y^a es la tasa real (no meramente potencial)[87] de crecimiento interno,
y^d es la tasa de crecimiento de la demanda agregada –todo medido en términos reales (no nominales)– y a_0 y b_0 son las elasticidades ingreso de la demanda de exportaciones e importaciones, respectivamente.

Las ecuaciones (1) y (2) muestran de qué dependen las tasas de cambio de las exportaciones e importaciones, respectivamente. La ecuación (3) explica que la tasa real de crecimiento en cada punto en el tiempo está determinada por la demanda; y finalmente la ecuación (4) impone la condición de balance dinámico en cuenta corriente.

Si substituimos (3) en (2) y luego la expresión resultante junto con (1) en (4), obtenemos lo siguiente:

(5) $y^d = (a_0 / b_0) y^*$

Esta es la Ley de Thirlwall. Simplemente expresa que la tasa de crecimiento está restringida por el equilibrio de la Cuenta Corriente del Balance de Pagos, que se deriva de las ecuaciones (1) a (4). Cualquier esfuerzo para elevar la tasa de crecimiento de la demanda y^d (y por lo tanto la tasa real de crecimiento y^a) por encima de su valor de equilibrio establecido en (5) resultará en $m > x$ y, por lo tanto, en un déficit en cuenta corriente.

La condición que la cuenta corriente debería balancear, fuerza así una reducción en y^d hacia la tasa de equilibrio mostrada en (5). Esta condición garantiza un crecimiento sustentable para la economía en cuestión.

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[86] BPC = Balance of Payments Constrained. Estas son las siglas en inglés. Pero en esta (su versión más sencilla) debería leerse como CAC = Current Account Constrained.
[87] Actual rate (in English). Entiendo que se refiere al producto (output).

La ley de Thirlwall (1979), en cuanto a la restricción de la balanza de pagos en su enfoque más simple, es en una versión dinámica del multiplicador del comercio exterior (Harrod, 1933), que afirma que el nivel de ingreso de una economía ha de ser similar a las exportaciones divididas por la propensión marginal a importar.

Este modelo simple de Thirlwall ha tenido diferentes explicaciones para incluir en la tasa de crecimiento económico teórica, compatible con el equilibrio de balanza de pagos, los efectos de los términos de intercambio, el tipo de cambio real, el flujo de capitales extranjeros o ambos. En términos generales los estudios han tendido a suponer que los términos del intercambio y los flujos de capital permanecen constantes en el largo plazo.

En el caso de este trabajo se ha trabajado para los períodos de 1870 y 2010, a precios de 1993.

En las series de PIB y X (exportaciones de bienes y servicios) en primer lugar se procedió a realizar un test para analizar la estacionariedad de las series en el nivel y primera diferencia, con 4 lags y con intersección, pero sin tendencia.
Se debe señalar que las series originales PIB y X han sido transformadas en series logarítmicas.

Para estimar empíricamente la relación teórica de largo plazo propuesta por Thirwall se utilizó el concepto de cointegración implementado a través de un modelo de corrección de errores. Se aplicó la metodología de "general a particular" (Charemza y Deadman, 1997), partiendo de un modelo de corto plazo autorregresivo dinámico de orden uno (ADL (1,1)).

Las ecuaciones del modelo de corto plazo estimado se presentan a continuación

$$LOGPIBt = b1 + \alpha 1 * LOGPIBt - 1 + \beta 1 * LOGXt + \beta 2 * LOGXt - 1 + Ut$$

A partir que en el largo plazo en un modelo podemos suponer que en equilibrio $t = t\text{-}_1$ se presenta la siguiente ecuación de largo plazo de equilibrio, donde PIB* es el nivel de equilibrio.

$$LOGPIB * = b1 + \beta 1 * LOGXt$$

Esta es la ecuación original de Thirlwall que se plantea como relación de largo plazo.

De la ecuación de corto plazo y a partir de los coeficientes estimados en el modelo ADL (1,1) pueden recuperarse los coeficientes originales de la ecuación de largo plazo para estimar el término de corrección de errores.

Por lo tanto se tiene por pasaje de términos

$(1 - \alpha) * \widehat{LOGPIB} = b1 + (\beta 1 + \beta 2) * LOGX\ t$

Por lo cual

$$\widehat{LOGPIB} = b1 / (1 - \alpha) + (\beta 1 + \beta 2 / (1 - \alpha) * LOGX\ t$$

En base a lo expuesto se establece el término de corrección de errores (ECT), el cual será

$$ECT = LOGPIB - \widehat{LOG\,PIB}$$

Definido los valores de esta variable se procede a la estimación del modelo de corrección de errores a través del cual se establece la elasticidad de la primera diferencia del logaritmo del LOGX respecto de Δ LOGPIB y el retardo de los residuos (ECT (-1)). En tal sentido la ecuación es:

$$\Delta\, LOGPIB = b1 + \beta 1 * \Delta\, LOGX + ECT\,(-1) + Ut$$

Cuadro 6.1. Estacionariedad de las series logarítmicas PIB y X

Serie	**Estadístico ADF**	**Valores críticos para el 1% y 5%***	**Decisión**
Log del PIB en el nivel	-2,227344	-3,4793 y -2,8827	No se rechaza la H_0
Log de PIB en primera diferencia	-5,336466	-3,4796 y -2,8828	Se rechaza la H_0
Log de X en el nivel	-0,90855	-3,4793 y -2,8827	No se rechaza la H_0
Log de X en primera diferencia	-5,636459	-3,4796 y -2,8828	Se rechaza la H_0

*Valores críticos de MacKinnon para rechazar la hipótesis de la raíz unitaria

En relación a las ecuaciones correspondientes se tiene para la de corto plazo:

$$LOGPIB = C\,(1) + C(2) * LOGPIB(t-1) + C(3) * LOGXt + C(4) * LOGX(t-1)$$

Sustituyendo por los coeficientes

$$LOGPIB = 0.1285346488 + 0.9781833716 * LOGPIB\,(t-1) + 0.118845869 * LOGX - 0.1019536595 * LOGX\,t-1)$$

Cuadro 6.2. Estadísticos de la función de corto plazo

Variable dependiente: LOGPIB
Método: Mínimos Cuadrados

Período (ajustado): 1871 2010
Observaciones incluidas: 140 años después del ajuste de los puntos

Variable	Coeficientes	Error Estándar	t-Estadístico	Prob.
C	0.128535	0.041565	3.092399	0.0024
LOGPIB(-1)	0.978183	0.011066	88.39316	0.0000
LOGX	0.118846	0.033228	3.576706	0.0005
LOGX(-1)	-0.101954	0.034226	-2.978836	0.0034
R^2	0.998132	F estadístico		24221.14
R^2 ajustado	0.998091	Prob.(F estadístico)		0.00000
Estadístico de Durbin Watson	1.910053			

La ecuación estimada de corto plazo a partir de los coeficientes establecidos en la primera y teniendo en cuenta como se ha dicho oportunamente t=t-$_1$

$$\widehat{LOGPIB} = 0.1285346488 + 0.9781833716 * LOGPIBt + 0.118845869 * LOGX\,t - 0.1019536595 * LOGXt$$

Por lo tanto al efectuar pasaje de términos

$(1 - 0.97818337160) * \widehat{LOGPIB} = 0.1285346488 + (0.118845869 - 0.10195365957) *$ LOGXt

$$\widehat{LOGPIB} = \frac{0.1285346488}{0.02181663} + \frac{0{,}01689221}{0.02181663} * LOGXt$$

En cuanto al $\widehat{LOGPIB} = 5.891590875 + 0.774281396 * LOGXt$

El ECT surge de la siguiente diferencia siguiente

$$ECT = LOGPIB - \widehat{LOGPIB}$$

En consecuencia la ecuación correspondiente al modelo de corrección de errores es igual a:

$$\mathrm{D}LOGPIB = C(1) + C(2) * DLOGX + C(3) * ECT(-1)$$

Sustituyendo

$$\mathrm{D}LOGPIB = 0.06273026688 + 0.114151781 * DLOGX - 0.0074983480 * ECT\,(-1)$$

A continuación se presentan los estadísticos del modelo de corrección de errores.

Cuadro 6.3. Estadísticos del modelo de corrección de errores

Variable dependiente: DLOGPIB
Período (ajustado): 1871-2010
Observaciones incluidas: 140 años después del ajuste de los puntos

Variables	Coeficientes	Error Estándar	t Estadístico	Prob.
Constante	0.062730	0.016005	3.919479	0.0001
DLOGX	0.114152	0.033157	3.442722	0.0008
ECT(-1)	-0.007498	0.003694	-2.029983	0.0443

R^2	0.105424	F estadístico	8.072564
R^2 ajustado	0.092364	Prob.(F estadístico)	0.000485
Estadístico Durbin Watson	1.918681		

A los efectos de verificar la cointegración entre las variables se realiza la prueba ADF por la cual se rechaza la hipótesis de raíz unitaria de los residuales y se puede asumir que estos son estacionarios, lo cual es condición para que se compruebe la cointegración.

Cuadro 6.4. Test estadístico de Dickey Fuller Aumentado (ADF) para ver que no hay raíz unitaria en los residuales

Test estadístico ADF -9.281289		1% Valor crítico* - 3.4786		
		5% Valor crítico -2.8824		
		10% Valor crítico -2.5778		
*Valores críticos de MacKinnon para rechazar la hipótesis de raíz unitaria.				
Variables	Coeficientes	Error Estándar	t Estadístico	Prob.
RES (-1)	-1.099942	0.118512	- 9.281289	0.0000
D(RES(-1)	0.141954	0.085391	1.662393	0.0988
Constante	0.000240	0.005234	0.045888	0.9635
R^2	0.490707	F estadístico	65.03670	
R^2ajustado	0.483162	Prob.(F estadístico)	0.000000	
Estadístico Durbin Watson	1.984061			

Para todo el período la elasticidad delΔLOGX respecto del ΔLOGPIB es positiva y se observa cointegración entre las variables, lo cual significa que hay un equilibrio de largo plazo entre las mismas. Se puede decir que los resultados no son espurios. En el largo plazo la elasticidad delΔLOGX actúa como variable explicativa del crecimiento del ΔLOGPIB, con lo cual se comprueba lo establecido en el modelo de Thirlwall.

7. Las exportaciones del sistema agroindustrial y su relación con las exportaciones totales y el crecimiento

Las exportaciones del Sistema Agroindustrial respecto de las exportaciones totales de bienes en 141 años presentaron una participación promedio del 87%, tal como se presenta en el siguiente cuadro.

Cuadro 7.1. Participación de las exportaciones agroindustriales (XSAI) en el total de las exportaciones de bienes, período 1870-2010

Períodos	Cantidad de años	% Años	% promedio de XSAI/X
1870-1930	**61**	**43**	**98**
1931-1980	**50**	**35**	**90**
1981-1990	**10**	**7**	**63**
1991- 2005	**21**	**15**	**53**
Promedio ponderado	**141**	**100**	**87**

Fuente: Elaborado en base la siguiente información: Ferreres O. "Dos Siglos de Economía Argentina", Obschatko E."El Aporte del Sector Agroalimentario al Crecimiento Económico 1965-2000" (IICA) e INDEC

Se puede ver que en el subperíodo 1870-1930 el 97% de las ventas externas eran agroindustriales. Si se contemplan solo los primeros 111 años del período, las exportaciones SAI representaban el 94% de las totales en todo concepto. Asimismo se registra una caída importante en la participación a partir de la década de 1980.

En los gráficos siguientes (7.1 y 7.2) se observan el comportamiento de las variables exportaciones totales de bienes en dólares corrientes y aquellas que son del SAI. Se puede ver que entre 1870 y principios de los años 1960 se registra un alto nivel de participación de las XSAI, luego acompañan en forma menos creciente el total de las mercancías exportadas debido al incremento de las exportaciones manufacturas industriales, del petróleo y las del sector automotriz principalmente después de constituido el MERCOSUR.

Gráfico 7.1.Evolución de las exportaciones del sistema agroindustrial y las totales de bienes en dólares corrientes, período 1870-2010

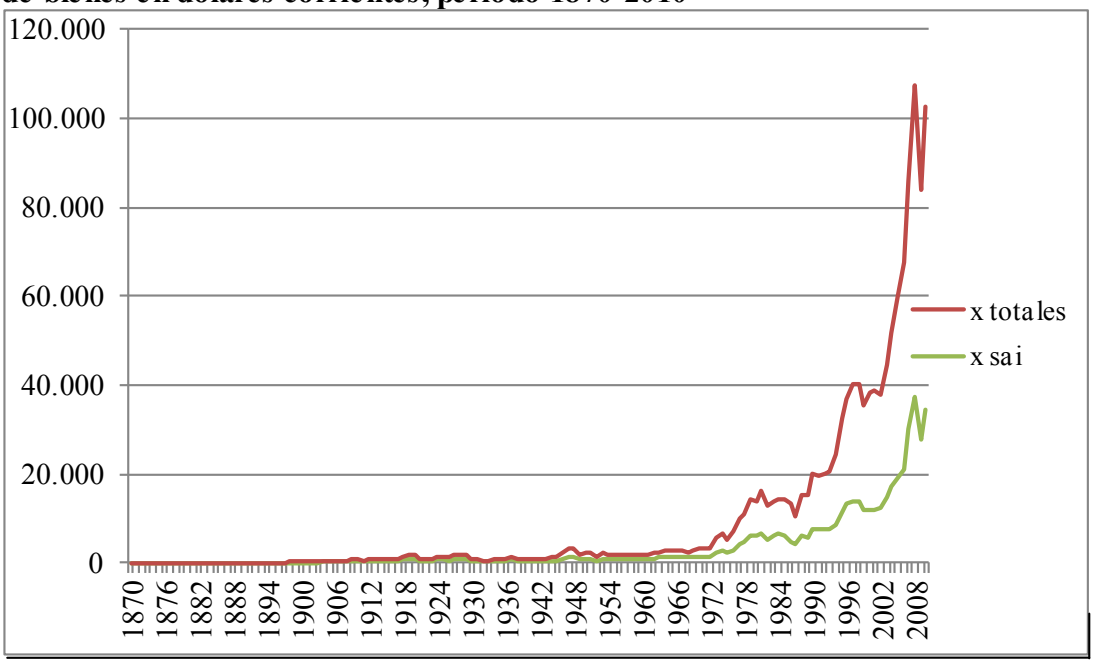
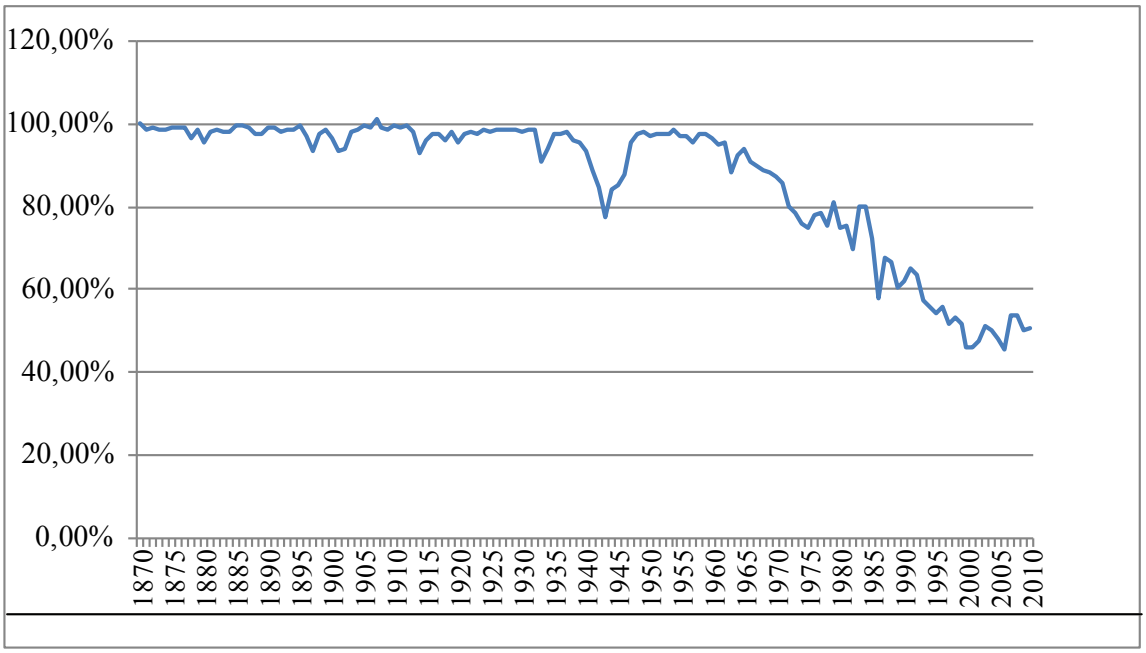


Gráfico 7.2. Evolución de % de exportaciones de sistema agroindustrial sobre el total de las exportaciones de bienes, período 1870-2010



Fuente: Elaborados en base la siguiente información: Ferreres O. "Dos Siglos de Economía Argentina", Obschatko E."El Aporte del Sector Agroalimentario al Crecimiento Económico 1965-2000" (IICA) e INDEC

Sobre la base de lo expuesto con respecto al modelo de Thirlwall que las exportaciones explican el crecimiento en el largo plazo del PIB y de la importancia de las XSAI en el total de X, se puede inferir que las exportaciones del sistema contribuyen al crecimiento económico en el largo plazo.

Es importante resaltar que entre los años 1870-2010 donde se comprueba la importancia de las exportaciones en relación al PIB, la apertura externa promedio a precios de 1993 fue del 19,3%. Pero en el subperíodo 1870-1929 la apertura fue del 28,0%, lapso en que la tasa de crecimiento del PIB resulta mayor que la del periodo completo. Además, el 98% de las exportaciones correspondían al SAI. En el subperíodo 1930-2010, si bien se debe destacar una mejora de la apertura en los años 90 hasta el 2010, el promedio de la apertura externa fue de apenas 13,3% y la participación de las exportaciones agroindustriales se redujo desde un promedio de 98% a 80%.

8. Conclusiones

A partir del modelo de Thirlwall este trabajo muestra que la exportación, en países con problemas en la cuenta corriente del balance de pagos, como ha sido el caso de la Argentina, actúa como una variable autónoma y define el crecimiento económico en el largo plazo, debido a que para poder crecer la demanda real requiere de un equilibrio en la cuenta corriente. Sobre la base de precios de 1993, para el período 1870-2010, previa comprobación de la estacionariedad de las series, que fueron expresadas en logaritmos, se establece a través del modelo de corrección de errores una ecuación en la cual la variación del PIB está explicada por la elasticidad de la variación de la exportación y de un retardo en el residuo. Luego a través de la prueba ADF se comprueba la estacionariedad de los residuos, condición para decir que hay cointegración entre las variables y en consecuencia estas se encuentran en equilibrio en el largo plazo. Así se

verifica el objetivo referido a “explicar la relación entre las exportaciones y el crecimiento de la economía argentina en el largo plazo".

En base a 141 años analizados, el promedio anual de las exportaciones SAI representó el 87% de las totales y si se consideran los primeros 111 años esta participación se eleva al 90%. Por lo tanto, se puede inferir que las exportaciones SAI gravitaron en el crecimiento del PIB en el largo plazo. De esta forma se cumple el objetivo definido, “establecer la importancia de las exportaciones del Sistema Agroindustrial en las exportaciones totales y su relación con el crecimiento”. Se manifiesta la relevancia de las políticas que favorecen la apertura y el crecimiento de las exportaciones, si bien esta variable como ha sido definida puede estar afectada por los términos de intercambio, además de la política comercial.

9. Bibliografía

ATESOGLU H.S.1997 Balance of Payment constrained growth model and its implications for the United States, Journal of Post Keynesian Economics, Vol 19, N°3. p.327-335

ATESOGLU H.S.1993.: Balance-of-Payment-Constrained Growth, Journal of Post Keynesian Economics, Vol 15, N°4. p. 507-516

AVILA, J .2000. El Riesgo Argentino y Perfomance Macroeconómica. Universidad del CEMA.

DICKEY, D y FULLER, W. 1979. Distribution of Estimators for Autoregressive Time Series with a Unit Root. Journal of the American Statistical Asociation. Vol 74. p. 427 - 331.

DIRECCIÓN NACIONAL DE ESTADÍSTICAS Y CENSOS -INDEC-. Censos Nacionales: 1869, 1895, 1947, 1960, 1970, 1980, 1991 y 2001.

DIRECCIÓN NACIONAL DE CUENTAS NACIONALES, INDEC, SECRETARÍA DE POLÍTICA ECONÓMICA, MINISTERIO DE ECONOMÍA Y PRODUCCIÓN. 2007. Producto Interno Bruto a Precios de Marcado, Serie empalmada 1980-2005. Millones de pesos a precios de 1993. Valores Agregados Brutos sectoriales a Precios Básicos. Buenos Aires.

DOLLAR, D Y KRAAY, A. 2001. Trade, Growth and Poverty. Finanzas y Desarrollo. p.16 - 19 DORNBUSCH, R. Y FISCHER, S. 1990. Macroeconomía. McGraw Hill/ Interamericana de España, S.A. España. p. 755 -793.

FERRERES, O. 2007. Dos Siglos de Economía Argentina 1810-2004. Fundación Norte y Sur. Edit. El Ateneo. Buenos Aires.

FUGAROLAS ÁLVAREZ G. Y MATESANZ. D. 2005. Restricción de balanza de pagos y vulnerabilidad externa en la argentina de los noventa. Un análisis del caso. Munich Personal RePEc. Archive (MPA).
[http://mpra.ub.uni-muenchen.de/210/]

FUNDACIÓN DE INVESTIGACIONES ECONÓMICAS LATINOAMERICANAS. 1989. El Control de Cambios en la Argentina. Liberación cambiaria y crecimiento. Ediciones Manantial SRL. Buenos Aires. p. 41 - 108.

HARROD, R. 1933. International Economics, Cambridge: University Press, (5ª ed.1973).

DIRECCIÓN NACIONAL DE CUENTAS NACIONALES. 2005. Serie histórica del PBI. INDEC, Buenos Aires.

INDEC. 2005. Anuario Estadístico de la República Argentina. Buenos Aires.

KALDOR, N. 1966:" Causes of the slow rate of economic growth of the United Kingdom:
LOPEZ, J. y CRUZ, A. 2000. Thirlwall's Law and beyond: the Latin American Experience. Journal of Postkeynesian Economics., Vol 22, N°3, p 477-495.
LUNA, F. 1993. Breve Historia de los Argentinos. Editorial Planeta SAIC. Buenos Aires. p. 97-152.
MACKINNON, J. G. 1991. Critical Values of the Cointegration Tests, en Engle R.F y Granger W. J. eds. Long-Run Economic Relationship: Reading in Cointegration, Chapter 13, Oxford, University Press, New York.
MADDISON, A. 1995. La Economía Mundial 1820-1992. Análisis y Estadísticas. Centro de Desarrollo de la OCDE. Paris.
MADDISON, A. 2001. The World Economy. A Millennial Perspective. OCDE. Paris.
MC COMBIE, J., y THIRLWALL, A.P. 1994 Economic Growth and the Balance of Payments constrained Growth. New York, St Martin Press,
MC COMBIE, J.1997: On the empirics of Balance of Payments-Constraint Growth, Journal of Post Keynesian Economics, Vol19 N°3, p.345-376.
MORENO-BRID, J.C.y PÉREZ, E.:1999, Balance of Payments Constrained growth in
OBSCHATKO, E. 2003. El Aporte del Sector Agroalimentario al crecimiento económico argentinos 1965-200. Instituto Interamericano de Cooperación para la Agricultura. (IICA)-Oficina en la Argentina. Grupo Editor Latinoamericano.
PACHECO-LÓPEZ, P. y THIRLWALL, A.P.:2004 Trade Liberalisation in Mexico: Rhetoric and Reality,Banca Nazionale del Lavoro Quarterly Review, 229, p.141-167.
RICARDO, D. 1985. On the Principles of Political Economy and Taxation (1821). Ediciones Orbis S.A, España.
THIRLWALL, A. P. 1997. Reflections on the concepts of Balance - of Payments-Constrained Growth. Journal of Post Keynesian Economics. p. 377- 385.
THIRLWALL, A.P. 2003. Trade, the balance of payments and exchange rate policy in developing countries. Edward Elgar
THIRLWALL, A.P. 2003. La naturaleza del crecimiento de la economía. Un marco alternativo para comprender el desempeño de las naciones. Fondo Nacional de la Cultura. México.
VERDOORN, P. J. 1949. "Factors that Determine the Growth of the Labour Productivity", Productivity Growth and Economic Perfomance. Essays on Verdoorn's Law. New york. Palgrave y Macmillan.
VERDOORN, P. J. 1980 "Verdoorn's Law in Retrospect: A Comment", The Economic Journal 90, 358, p. 382-385.
WORLD BANK. 2005. Beyond the City: The Rural Contribution to Development. World Bank, Washington DC. p. 1 - 44, 871.

Corporate Strategies




EXCHANGING COMPETENCES IN STRATEGIC ALLIANCES: A CASE STUDY OF COSAN AND SHELL BIOFUEL VENTURE

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Abstract
In a competitive world, the way a firm establishes its organizational arrangements may determine the enhancement of its core competences and the possibility of reach new markets. Firms that find constraints in expand their markets once their skills can be applied just for one type of market may find in the alliances a competitive form of capture value. The hybrids forms of organization appeared as an alternative to capture value and manage joint assets mainly when the market and the hierarchy modes don´t present any yields for the competitiveness of the firm. Therefore, this form may present other challenging issues as the allocation of rights and principal-agent problems. The biofuel market has presented a strong trail of changes in the last 10 years. New arrangements intra-firms have appeared as a path to participate or survive in a world level competition. Given the need for capital and economies of scale to achieve better results in recent years since before the 2008 crisis, there was a consistent movement of mergers and acquisitions in this sector. Currently there are five major groups with a grinding capacity of more than 15 million tons per year: Raízen, Louis Dreyfus, Tereos Petrobrás, ETH and Bunge. Using a case study of the Cosan and Shell alliance in the Brazilian biofuel market, this paper analyses the governance mode and challenges issues raised by the strategic alliances when firms intend to reach new markets through the exchange of core competences. The article was based on documentary research and interviews with Cosan´s Investor Relations employees. Through the lens of TCE, RBV and dynamic capabilities theoretical approaches, the main questions evolving hybrids forms are discussed. The case study analysis illustrates the hybrid arrangement as a middle form to organize the transaction neither in the market nor in the hierarchy mode, rather in more flexible commitment agreement with a strategic central authority. These characteristics led to an organism with bilateral dependence with favorable conditions for developing dynamics capabilities. However, those conditions might rely on partner´s long term interest in the joint venture.

Key words: biofuel, joint venture, strategic alliance

EXCHANGING COMPETENCES IN STRATEGIC ALLIANCES: A CASE STUDY OF COSAN AND SHELL BIOFUEL VENTURE

1. Introduction

The ProÁlcool Governmental Program changed the history of fuel in Brazil. Created as an alternative due the oil crisis in the 70's, the sugar/ethanol agribusiness chain had its peak in the period of 1980 to 1986, subsequently losing ground to petroleum due the falling prices of the barrel ranging from US$ 12 to US$ 20 from1986 to 1995 (Biodiesel.br, 2011). However, the new context of climate change issued a new warning sign to automotive chain. A new era for renewable fuels in the world and was started in Brazil was represented by the creation and launch Flex Fuel technology in March 2003: hybrid engines powered by gasoline and ethanol.

Ethanol comes from several sources; however there is a demonstrably superior in their efficiency: the sugar cane, due to its higher concentration of biomass per hectare and a higher degree of fermentation. Currently there are 7 million hectares planted in the Southeast, Midwest, South and Northeast, placing Brazil as the world's largest producer, with an industrial processing of sugar and ethanol comprising about 415 dams across the country. This sector has been growing 10% per year since 2003 and having as basis the Brazilian fleet of cars, is composed of 92% cars Flex (UNICA, 2010).

Given the need for capital and economies of scale to achieve better results in recent years since before the 2008 crisis, there was a consistent movement of mergers and acquisitions in this sector. Currently has five major groups with a grinding capacity of more than 15 million tons per year: Raizen, Louis Dreyfus, Tereos Petrobras, ETH and Bunge. Moreover, major oil companies have implemented the strategy of diversification in its business as a preventive measure to the rising cost of oil. The spot price of a barrel of Brent crude oil crossed the $ 100 threshold in January 2011, generating Meaningful impacts in supply chains worldwide. There are several alternatives to replace the oil being tested and marketed, but no other has been so successful on a large scale as the abuse of ethanol from sugar cane.

Aware of the need to diversify their business, Royal Dutch Shell has undertaken a survey on the market of renewable sources in order to invest in promising businesses at large. The result was the establishment of a joint venture with the Brazilian market leader in the production of ethanol, Cosan. The strategic alliance established in February 2011 has just begun, but already started its operations with greatness. Are 23 plants, 16 billion gallons of ethanol, 4500 jobs and $ 26 billion net revenue (COSAN RI, 2011). Joint ventures (JV) arrangements are known as efficient and low risk compared with acquisitions and greenfield strategies for internationalization or diversification, and these incentives central Cosan and Shell, respectively. In the center of this alliance is the exchange of knowledge between two market leaders, who focus on one hand the exploration technology of biomass fuel and another fuel distribution.

From the standpoint of incentives, the resulting joint venture as a business appears logical and promising, but has important challenges to its governance. The central question of this paper is to discuss how the JV´s with knowledge transfer should be governed in order to create value for their parental companies. This paper analysis the case of Raízen, the resulted joint venture between Shell Royal Dutch and Cosan, based on documentary research and interviews with Cosan´s Investor Relations employees.

This article has five sessions including this introduction. In the second session, the theoretical framework is presented discussing the origins of the alliances as a source for value capture and the governance challenges of hybrids forms. The third session presents a panorama of the ethanol market in Brasil and in the worlds. The four session presents and discuss the case in focus, the Cosan and Shel joint venture. The conclusions are presented in the fifth session.

2. The governance modes, the core competences and the strategic alliances

2.1. The strategy to seek new markets: the role of the alliances

In Penrose (1995) the firm is a collection of productive resources, human and non-human resources. This concept exceeds the mainstream economic theory of the firm, that considers the firm as a set of supply and demand function. As Coase (1937), Penrose (1995) was concerned to the real world and poses the distinction between the firm and the market: 'firms and markets are both, in their different ways, networks of activity, but the difference between them is crucial to an understanding of the nature of the economy as a whole'

The difference was primarily related to "central managerial direction" presented in the firms. The administrative coordination and "authoritative communication" are not available in the market and they are a firm-specific resource.

The boundaries of the firm for Penrose (1995) are moreover related to the internal resource than exogenous causes of growth as demand condition or capital raising. In fact, a firm is more defined by its resources instead of its products. Whether the resources can be potentially used, demand cannot limit a firm´s expansion.

Therefore, Penrose (1960, p.1) does not ignore the exogenous impacts in firm´s growth as she states:

> *'growth is governed by a creative and dynamic interaction between a firm's productive resources and its market opportunities. Available resources limit expansion; unused resources (including technological and entrepreneurial) stimulate and largely determine the direction of expansion. While product demand may exert a predominant short-term influence, over the long term any distinction between 'supply' and demand' determinants of growth becomes arbitrary'*

The firm may use its managerial capabilities in order to capture the external environment opportunities in a manner that its growth will be determined by the rate at which experienced managerial staff can plan and implement plans.

If the intention is to grow the firm, there are several strategies that can be adopted and which are not necessarily focused on the pursuit of monopoly power. The modern firm used strategic alliances in order to capture capabilities and resources of other companies that can lead to sustainable competitive advantages. The increase of market power might be a consequence. Also according to Penrose (1996):

> *'corporate alliances or cooperative arrangements, as driven 'not necessarily by monopolistic intent but as a means of gaining mutual access to resources such as technology, regional markets and information services'* (Penrose, 1996,p. 1722).

The dynamic capabilities view of the firm proposes the acquisition of new competences through organizational learning and an important tactic to obtain it is the strategic alliance. Therefore, which can be the incentives for strategic alliances?

Mowery *et al.* (1996) points out the joint ventures were formed primarily to exploit natural resources, but only after the 70´s the alliances became widespread in technology-intensive industries. There are several incentives to alliances be formed: a) access to capital markets, b) internationalization, c) acquisition of technological and

other complex capabilities from partner companies. This last incentive has showed to be more cited in the researches in this field.

In TCE literature, the economizing incentive will determine the contracting level of the alliances. Considering the asset specificity argument of Williamson (1996), the hybrid forms can be strongly tied as joint ventures when the firms are searching for combining specificities and take economizing advantages from hierarchy or markets modes. Therefore, Williamson (1996) associates the hybrids forms moreover as a contracting mode and uses franchising as an example. In this case, the franchising contracting creates a coordination incentive in order to protect the specific investments in processes and brand. Although there will be more costs control and local adaptation comparing to hierarchy mode, cost-effective procurements will be reduced comparing to market mode.

Related to equity Joint Ventures, which means those formed whenever two or more sponsors bring given assets to an independent authority company and receive contributions from the profits earned, Hennart (1988) distinguishes them by two types: a) scale JV: two or more firms enter together on similar moves as forward or backward vertical integration, horizontal expansion or diversification and b) Link JV: constitute a vertical investment for one of the parties, and a diversification for the other. Those forms suggest that hierarchical coordination presented by the equity option was preferable in comparison to spot markets or contracts, and distinguishes from hierarchy mode once control over the JV is shared with other firms.

Hennart (1988) also argues that the presence of inefficiencies in intermediate market is thus a necessary condition for JV´s to emerge. There are some sorts of inefficiencies: access to raw materials or components, knowledge, distribution and loan capital. As Teece (1998) argues, the author also arguments the difficulty to trade knowledge in the market. In the case of link JVs, those arise to combine different types of knowledge. But is this knowledge transfer effective? Mowery et al (1996) find out that equity joint ventures appear to be more effective vehicles for transferring complex capabilities than are contract-based alliances due the hierarchical coordination. The results were based on empirical research and econometric models testing the casual relationship between technological overlap, R&D intensity and size and the citation of a firm´s patents by the alliance partner.

Although JV`s are reported extensively in prior studies as successful hybrid forms for economizing purposes such as knowledge transferring, a range of issues arise when it comes to discuss its governance mechanisms, which will be theme of the next session.

2.2. Hybrids forms and the challenging issues

The concept of corporate governance has been increasingly widespread in the Brazilian market. It is based on the principles of transparency, equity, accountability (accountability) and ethics. The Brazilian Institute of Corporate Governance (IBGC, 2010) defines the concept as follows: "These are the practices and relationships between investors / shareholders, board of directors, officers, independent auditors and the supervisory board, in order to optimize performance the company and facilitate access to capital."

The issue of separation of ownership and control in modern organizations was brought to discussion by Berle and Means (1933), and now occupies a central position in developing the theory of the firm, as is highlighted by Demsetz and Lehn (1985). From the seminal work of Spence and Zeckhauser (1971) and Ross (1974), scholars of science organizations began to pay attention to the development of so-called "Agency

Theory" later developed by Jensen and Meckling (1976), Fama and Jensen (1983). The agency problem is an essential element within the contractual view of the firm, brought by Coase (1937). The "Agency Theory" is central to the issue of corporate governance. The principal-agent relationship is always conflicted when a particular individual (agent) acts on behalf of another, called the "principal", and the goals of both does not fully coincide. Thus, an employer / employee, or shareholder / executives, the "principal" seeks to implement a structure of incentives and monitoring in order to align the interests of the agent to his interests.

In essence the practice of good corporate governance is the need of economizing in "agency costs", searching for long-term interests. Organizational models that emerge from partnerships like JV are very sensitive to conflicts of governance. On one hand this kind of alliance can provide lower costs of scale and scope, in the other, additional agency costs can be decisive for the stability of the alliance. Mc Cahery and Vermeulen (2009) point to studies that highlight JV rupture, especially in cases of societal arrangements with majority and minority party.

Menard and Raynaud (2010) define the JV´s as complex hybrid forms where some rights and some assets are assigned with associated payoffs to a `Strategic Center` while parent firms hold main assets and rights. In this case, the author explains, supposing two firms,"1 and 2, and four assets (A,a, B,b), with A and B highly specific assets related to the core activity of 1 and 2, respectively and remaining with their boundaries, while a and b are assets valuable only if used jointly. Each firm holds full decision rights, Da and Db, while rights da and db, require coordination". It´s expected that the agents sharing the control will be prepared to private monitoring the conflicts and ambiguities revealed ex post and that this will require renegotiations and adaptations. Therefore, Menard and Raynaud (2010) identified that in cases where the authority is shared by members of collective ventures, they might as well endorse a voting procedure to exercise their control rights. Cost will emerge as costs of collective decision-making, but they might be smaller than those of ex post enforcement/monitoring cost or yet public ordering (judicial system) for disputes.

Efficiency in agency relationships (better alignment) emerges when some assumptions are presented:

1. Agents have no hidden information (absence of information asymmetry). The principal knows what constitutes effective action and what product is expected.
2. The principal has complete information about the actions and results.
3. The agents act at low risk (and are aware that the payment received is a result of the alignment with principal interests).

On this basis, the challenges for the JV may occur motivated by the unlikely symmetry of information between the parties. Additionally, the principals in a JV can be "agents" in their respective parent companies, characterizing a situation of a double agency problem. So often the conduct of these officers is guided by the hidden agendas of their companies to the detriment of the common agenda of the JV in which they act as principal.

A balanced relationship should mitigate, through private ordering, possible risks of contract breaches. In practice the "shareholder agreements" in JV alliances constitute an essential mechanism for reducing agency conflicts. This agreement should encourage ways to create a relationship of mutual interdependence, sustained by self-regulating norms and reputational issues that align the interests of the parties in the alliance.

As other challenges in knowledge transfer alliances, Mowery *et al* (1996) argue that cultural differences and distance might be obstacles for the governance effectiveness of the JV.

3. The biofuel panorama

Biofuel is the name used to describe fuels that are formed by biomass. Among the most common sources are ethanol, biodiesel, methane and coal.

Worldwide, the production of biofuels has been motivated by the war of Yom Kippur on the 70. The Organization of Petroleum Exporting Countries (OPEC) decided to increase oil prices by 70% in order to embargo the United States, which supported Israel. The primary effect of this measure adopted by OPEC was the support for programs focused on diversification of energy sources. Among the new options for fuel use, biofuels emerged for energy security in affected countries (GORREN, 2009).

After that episode dozens of countries began to seek for renewable energy sources to replace fossil fuels. According to Filho (2007) global demand for energy will grow 40% by 2020. For the author, among the factors that should further enhance the production of biofuels are: "deficit between supply and energy demand growth, declining reserves of fossil fuels, uncertainty in supply, increasing environmental pressures, and demand for sustainable and economically viable energy sources"(FILHO, 2007, p.16).

The trend of growth in the biofuels industry is already manifested in consumption levels. Data released by the Brazilian Ministry of Mines and Energy (MME) show that global consumption will increase from the current 1.1 million barrels per day (63.8 billion liters / year) to 4.4 million barrels per day (255.3 billion liters / year) by 2035. Several countries around the world are implementing policies for biofuel production.

The United States, through the Energy Policy Act, and the European Union, through the Plan of Action of bio-fuels, have set targets to increase the use of bio-fuels. These initiatives were especially motivated by the context of high oil prices, the increased risks in the supply of oil and, especially, for environmental problems.

In the case of the United States, ethanol from maize is a major investment in biofuels. To meet the growing demand for ethanol, there is an extensive investment program to increase the production capacity of the fuel. The production structure has consolidated in the Corn Belt as well the new investments. With these investments, the capacity of ethanol production would increase from approximately 12.9 billion liters in 2004 to more than $ 18 billion in 2012 (FIGUEIRA; BURNQUIST, 2006)

With greater production capacity, there was a stimulus to the use of biofuel in the country. The mixture of ethanol (by volume) in gasoline rose 1.5 percent in 2002 to 3.8 percent in 2006, representing a consumption of 20.4 billion liters. In January 2011, the Environmental Protection Agency of the United States allowed the use of 15% ethanol. Before, the mixture was allowed at 10%.In Europe, the mixing rate is 10% with perspectives to increase to 15% (KUTAS; AMARAL, 2007).

According to Oliva (2007) the biodiesel production in Europe represents more than 3600 million liters per year and the main sources are canola, sunflower and soybean. Alcohol fuel has a much smaller market than the biodiesel in the European Union valued at USS $ 2 billion a year, but growing. Total demand is expected to reach 12.3 billion liters in 2010 (WSJ, 2011).

It is estimated that the United States and Brazil remain the largest producers and consumers of biofuels. The U.S. will account for 38% of global consumption of biofuels in 2035 - a decrease in relation to the current 45% - while Brazil will be responsible for 20% of global consumption of biofuels in 2035 - a reduction compared to 28% now -. The reduction is due to the expectation on the entry of new countries consumers of biofuels in this period (MME, 2011).

Just as there are estimates of entry of new countries in the production chain of biofuels, there is also the expectation of producing new products. They are called non-conventional biofuels or biofuel-edge.

Projects of unconventional biofuels will enter the market from 2020, primarily in OECD countries. These unconventional fuels will account for 36% of total use of biofuels in OECD countries in 2035 and only 5% of total use of biofuels in countries outside the OECD (MME, 2011).

Production in Brazil is not recent, occurring since the '20s, when vegetable oils were used as material geared to production. In 1938, it was launched the first Brazilian aid policy for biofuel by Law No. 737, which determined the ethanol blend in all gasoline in the country. Today, Brazil is the largest ethanol producer in the world. To Cetrulo (2010) current investments in the sector might lead the country to a strategic position. The potential for ethanol production in Brazil led to reduce in the dependence on international oil market, appropriating benefits from the energy autonomy. These benefits are easily verified when analyzing the economic crises caused by periods in with high fluctuations in oil prices and also due to ambiguity of the petroleum availability in the medium and long term. (CETRULO, 2010, p. 13)

Brazil is aware of the potential that biofuels represent in terms of growth. Thus, the sugar cane must occupy more space among the Brazilian lands. One of the reasons cited to explain the current scenario is the recognition of the quality / sustainability of ethanol. The estimate, according to UNICA (2011), is that in 2015/2016 the production cycle of cane sugar will overpass the 829 million tons and to 1038 billion in 2020/2021. The growth has a direct impact on the volume of biofuel produced in the country, but also represents gains in renewable energy.

Brazil will increase from 46.9 billion liters of ethanol in 2015/2016 to 65.3 billion in 2020/2021. This represents a 39% increase in production in the period of five years. Investments in the sector should represent gains either in bioelectricity. Today, the average share is 6% in the Brazilian energy matrix. It is estimated that by 2012 the percentage more than double, reaching 15%.

Brazilian scenario demonstrates that the commitment of government in agro and biofuels chains is based mainly in the growing importance given from U.S. and European Union governments. Brazil should not loose of its sight the opportunity to remain a leader in this segment contributing actively to the technical and political debate, with proposals and initiatives to bridge the challenges.

Considered one of the most competitive sectors in the world, the ethanol business is facing an important merger and acquisition movement.

Oil companies have made acquisitions or alliances with equity stakes in the ethanol market. In 2008 Petrobrás Biofuels was formed as an arm of the industry group Petrobrás. Its market share of ethanol began in late 2009 with the purchase of 40% of Total Sugarcane Industry in Minas Gerais. In 2010, Petrobrás Biofuels and Tereos Group, the third largest sugar producer in Europe, announced a strategic alliance to jointly invest in Guarani, the fourth largest processor of sugarcane in Brazil, forming Tereos International, becoming the fourth largest producer of ethanol the world, producing 490 million liters (Petrobrás, 2010).

The Beyond Petroleum (formerly British Petroleum), the third largest oil producer worldwide, began its investments in renewable energy in 2000. In 2008, acquired 50% of Tropical plant located in Góias and most recently in March 2011, the control of CNAA plant, moving from 32nd to 21th place among the largest producers of sugar and ethanol. The focus of this study is the largest of all these operations led by two great players, Cosan and Shell, and it will be detailed in the next session.

4. The case in focus: Cosan and Shell

Cosan, one of the largest producers / exporters of sugar and ethanol in the world and largest producer of electricity from sugar cane bagasse, was founded in the 30s, specifically in 1936, with construction of the Usina Costa Pinto in Piracicaba, Sao Paulo.

From the 80's began the process of expansion based primarily on acquiring companies. In 2005, Cosan had shares traded on the Novo Mercado da Bolsa de Valores de Sao Paulo (Bovespa). In 2007, the group's actions were listed on the New York Stock Exchange, which made the firm the first Brazilian company to control securities traded directly on the NYSE. A year later, in 2008, has completed the acquisition of Esso Brasileira de Petroleo SA, acquiring the assets and distribution of fuels business and the manufacture and distribution of lubricants and aviation fuels business from Esso in Brazil, including the license to use the Esso and Mobil brands.

Nowadays COSAN holding participates in 8 economic segments: sugar and ethanol production, fuel distribution, power generation, lubricants, logistics and land.

The company defines its field of operation as follows: "It is part of the solution in this new context of sustainable development. Invests in technology, plant, harvest, produces and distributes power to the people (food) for cars (fuel) and houses (electricity). Produces energy for life"

Shell is a leading oil and gas company in the world. It also holds businesses in producing liquefied natural gas, products for converting gas into liquids, development of sustainable biofuels and wind power projects.

The group's history began about 200 years, when Marcus Samuel opened a business of import and export of sea shells from the Far East. The trade was then assumed by Samuel's sons, Mark and Sam Junior.

It was in 1886 that the format of the old business began to change. With the arrival of the internal combustion engine was no increase in demand for transport fuel. Leveraging the expertise in shipping, the brothers Samuel hired a fleet of ships powered by steam to carry crude oil. They revolutionized the transportation of oil with the maiden voyage of its first tanker, the Murex. In 1892, the tanker Murex was the first to transit the Suez Canal in Central America. In 1897, the company was named Shell Transport and Trading Company and used a mussel shell as its logo. In 1907, Shell Transport in the East has merged with Royal Dutch Petroleum and led to Royal Dutch Shell Group. Currently the company operates in over 90 countries with over 101,000 employees. In Brazil, Shell has subsidiaries since 1913. In the country, the company works in fuel retail, aviation, lubricants, marine, chemicals, supplies and fuel distribution.

In February 2011, Cosan SA and Royal Dutch Shell announced an equity joint venture operation called Raízen. The resulted Joint Venture is one of the five largest company in Brazil by revenue, with a market value estimated at U.S. $ 12 billion, approximately 40,000 employees, 23 sugar plants (Sao Paulo, Mato Grosso do Sul and Goias), 4,500 service station, more than 500 convenience stores, 53 distribution terminals and a presence in 54 airports in the aviation fuel business. It will occupy a position among the most competitive companies in the area of sustainable energy in the world.

Raízen will be responsible for the production of more than 2.2 billion gallons of ethanol per year to serve domestic and foreign markets. Besides ethanol, the current 23 mills produce 4 million tons of sugar and have 900 MW of installed capacity of electric

power production from sugarcane bagasse. In the fuel area, the joint venture will market approximately 20 billion liters for the segments of Transport, Industry, and its network of 4,500 service stations.

The shareholders expect to have a production mix of 50% from sugar and 50% from ethanol until 2016 and after that, reach 60% for ethanol production. The strategy to grow is based on acquisitions of plants and expansion of the group´s plants.

In the distribution sector, Raízen was born as the third player, behind Ultra Group and Petrobrás. In two years, Raízen intends to convert all Esso´s service stations into Shell branded units, which can bring Raízen as the second in the downstream business ranking.

5. The background: what were the incentives?

Shell's interest in a possible alliance with Cosan initiated with Peter Voser when he was the Chief Financial Officer (CFO) in Royal Dutch Shell. However, at that time, mid-2005, Cosan saw no reason for partnership. The discussions began only in 2007, in the moment when Cosan had already begun the process of purchasing the fuel distribution operations of Exxon Mobil in Brazil. The negotiations had significantly advanced when Peter Voser was appointed Chief Executive Officer (CEO) in 2009.

Shell's incentives for the alliance were aligned to a strategic goal: to expand its activities in renewable fuel with high efficiency. The choice for Cosan was based on its leadership position in the sugar and ethanol market, considering the particular raw material, the sugar cane.

Since 2002 Shell has a stake in Iogen Corporation in line with the strategy to amplify its presence in the market for biofuels. Shell and Iogen are cooperating on commercialization of cellulosic ethanol. Iogen is a manufacturer and marketer of enzyme products for application in processes that hydrolyze or modify natural fiber, and those products can be applied for the pulp and paper, grain, brewing, textile and animal feed industries (Iogen website, 2011). In the company Codexis, Shell owns around 50% of participation in its capital since 2007. Through a research program, Shell aimed to shorten the timeline for deployment of the Iogen technology for biofuels on a commercial scale.

In the other hand, for Cosan, the JV was driven primarily by four factors:

• Generate scale in distribution of fuel, increasing its network that had began with the acquisition of Exxon's operation

• Have access to international markets

• Obtain financial leverage

• Acquire knowledge on new technologies for the ethanol 2nd generation

As a net debt amounted to US$ 2.5 billion, Raízen received an injection of US$ 1.6 billion in the form of royalties relating to the Shell brand licensing for Cosan in 10 years. Internationalization will be made possible through the sale of ethanol in countries where Shell operates. Shell is a major fuel producer and trader player in the world and the world's largest integrated oil companies.

Shell also contributed to Raízen its participation in Iogen and Codexis, which allows the JV access 2nd generation technologies for extracting ethanol from high performance biomass as sugarcane bagasse. Figure 1 describes the assets contributed and not contributed by Cosan and Shell for the joint venture Raízen.

In five years, the JV intends to raise its crushing capacity in 65%, amplify the cogeneration in 44%, launch the 2nd generation of ethanol and grow the ethanol trading in 136%.

Both firms expand their competences through the JV. The growth of the two parent firms was motivated not only by exogenous factors as the climate pressure and the rising oil prices, which affected other players as well, rather the apparent commitment with the internal resources as a starting point of their competitive advantages. As a result, the power of market arises due the greatness of both companies.

The main incentive relies on the assessment of new competences by the two firms. Indeed, the exchanging knowledge emerged from the alliance reflects the sharing of core competences of each firm. The JV will benefit from the Conan's knowledge of ethanol production and distribution over the country as well Shell´s knowledge of fuel production, trade and retailing and also Iogen's and Codexi's biofuels 2nd generation technology.

Considering the JV types proposed by Hennart (1988), Raízen can be fitted in the Link type, once it constitutes a vertical investment for Cosan and a diversification for Shell. The decision for the JV against other governance modes as hierarchy or market, can be understood as a way to economize in transaction costs and also to jointly protect specific investments in process and brand. The Figure 1 illustrates the full integration of ethanol chain in the JV creation, resulting in cost effective procurement as stated by Williamson (1996).

Figure 1. Fully integrated chain

Source: Cosan RI, 2011

6. Sharing competences: the resulted competitive advantages

Although it is a new organization, the Raízen holds the experience of its shareholders. It is a national organization that benefits from having the products and solutions portfolio of a global leader in fuel production and distribution, and a global player in the ethanol and sugar market.

For the investor, Cosan (2011) highlights the alliance benefits:

- Increased competitiveness in the biofuels and fuels distribution businesses
- Broader access to ethanol consumer markets
- Substantial growth perspectives
- Building of a unique platform to develop second generation technology
- Improvement of debt ratios through capital injection and potential increase of cash generation
- Improved business intelligence
- Access to the highest standards in corporate management

The synergies are several, but few are more profound:

1. Internationalization: Cosan can take advantage for the Shell´s downstream structure around the world, in order to trade premium products form ethanol as already traded in Brazil as V-Power Ethanol and aviation fuels;

2. Scale from the integrated structure: Raízen amplifies Shell´s and Cosan´s downstream network, and can trade ethanol to the competitors, as well buy fuel from others oil companies, searching always for the best bargain.
3. Knowledge and technology transfer: from land development, going to farming, technology, crushing, production and cogeneration to trading and fuel retailing, Raízen benefits from the knowledge of the core competences of both parent companies. Specially, Raizen will have a R&D dedicated to the development of and access to new generation technologies of biofuels production and extraction.
4. Brand equity: In 2014 all the Esso´s service stations (1700) will be converted into Shell brand accounting for an investment of US$ 50 million. The Shell brand was licensed to Raízen for a 10 years period.

According to Cosan documents for the investors, the net present value of all synergies account to US$ 2 billion earned from: a) commercial synergies for greater volume, unified pricing policy and sell of premium products (US$ 700 mi), b) financial synergies with improvement in the credit rating, refinancing of contributed debt and reduction in the average cost of debt (US$ 200 mi), c) logistics, distribution and trading synergies from reduction of freight costs, Optimization of distribution terminals, centralized commercialization of ethanol (US$ 850 mi), and d) conversion of service stations synergies (US$50 mi).

The observable competitive advantage arises from the combination of several specific assets from the parent firms that cannot be redeployable efficiently without losing value for its specific use. As Teece (1998) states the competitive advantage can be assigned to the ability to combine knowledge assets needed to create value. Besides the knowledge, the JV holds other specific assets as a source of value creation:
a) dedicated assets and site specificity: the ethanol production from sugarcane has its specificity and Brazilian producers had showed its superiority in productivity and biomass exploitation, which captured Shell´s and others players attention. Those assets are dynamic capabilities once it evaluates constantly and in the JV case will grow further based on 2nd generation technology,
b) brand name: Shell build a reputation that is stated in its full integrated chain for oil production, trading and retailing. The JV will benefit from this reputation in order to economize in transaction costs whether it had to establish contracts by itself. JV might take advantage of relational contracts and all the explicit and tacit knowledge embedded in the downstream processes and routines.

7. The governance mechanisms and the challenges

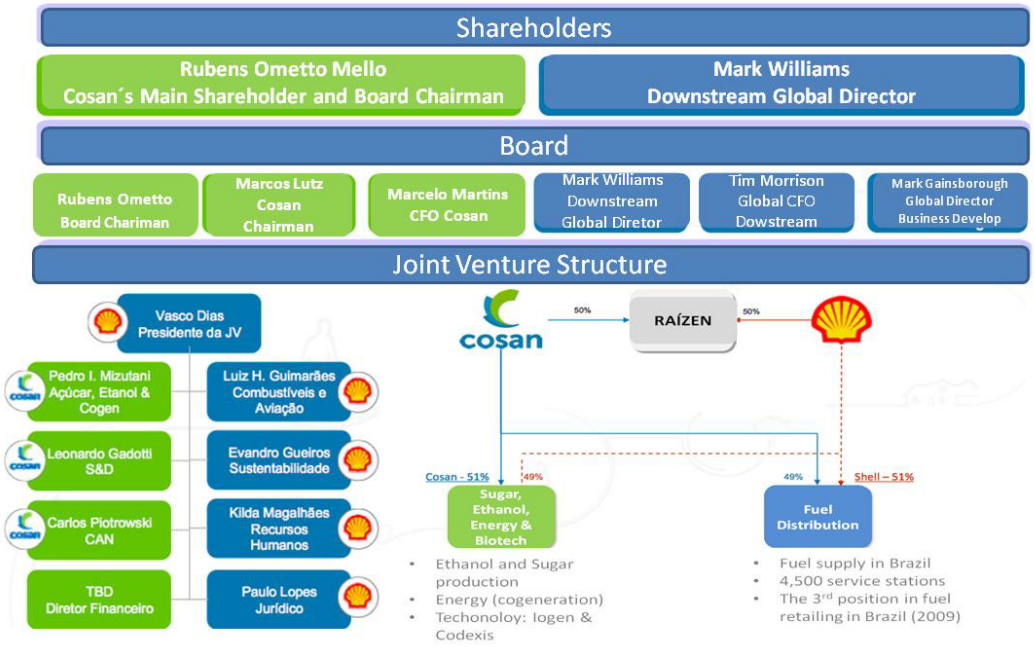
As analyzed in the other two prior sessions, Raizen represents a hybrid form based on bilateral dependence and in a central strategic authority. The economizing incentives also brought out other costs, as monitoring and controlling costs to avoid agency problems.

Figure 2 shows the equal sharing of authority, either in the formation of the management board, with equal numbers of members from each partner company, as in the constitution of the new business areas that are now headed by former employees of partner companies in their respective knowledge areas.

Following the principles of the corporate governance, the JV has just begun its operation. Therefore, the agents may face some governance challenges related to the decision rights allocation mechanisms and even the coordination of the assets used jointly. Some challenges are discussed below:

1. The double agency problem: the board might bring to decision matters related to the parent companies more than those related to the JV. This can happen once the members are agents of the parent firms and their main incentive are linked to those firms more than the JV.
2. Agent and principal as shareholders: Rubens Ometto Mello is the main shareholder and also chairman of the Cosan´s Board and is located in Brazil. In the other hand, Mark Williams is the global CEO for the Shell´s downstream business and it is located in United States. Clearly, there are different incentives for each shareholder. The possible asymmetry information between the two shareholders might be solved by the JV chairman, who is a former Shell employee. It´s expected that he might monitor and control the other partner influence and knowledge of Brazilian market that lacks for the Shell´s shareholder. As point out by Mowery et al (1996) cultural differences and distance should be taken into account as obstacle for governance effectiveness.
3. Lock up and Buy Options: After 10 years, Shell can exercise the right to buy the half or the totality of Cosan's shares in the JV. In the 15th year, the two parties can mutually exercise their options, which are: Cosan has the rights to buy the totality of Shell´s share or the Shell´s participation on the sugar, ethanol and power business, whether Shell intends to keep the downstream business in the JV. The lock up period will be extended for six years after the JV´s creation, which means that neither Cosan, or Rubens Ometto or Shell can´t transfer their shares in the JV. Once these agreements were established, the knowledge transferring issues might appear important to be analyzed.

Figure 2. The Governance Structure



Source: COSAN RI, 201

During the ten-years first period of the JV both companies can benefit from the scope and scale economies, as well the competences developed as dynamic capabilities.

After that, Shell has the preference to buy the Cosan´s part in JV. This might point out for different incentives for each company. Shell has more interest of appropriating and developing new technologies for biofuels than appears to Cosan in this arrangement. Whether Shell exercise its buy option in the tenth year, the company will become the world largest producer and retailer of biofuels (ethanol or others biomass sources). In other hand, Cosan will be transformed into a diversified company with business in the areas of lubricants, lands, sugar trading and, logistics, and also turned into a Raizen´s buyer and supplier. Are all ambiguities of this incentive disaligment considered in the JV agreements? Those issues should be controlled and monitored for both company in order to avoid future disputes.

Although the issues discussed here are abstraction for the future based on theoretical and prior empirical research, Raízen has undertaken a leadership position in the ethanol world market, showing the planning and vision of both partners.

8. Conclusion

In this paper, a joint venture between two major players in the fuels market, Cosan and Shell Royal Dutch was analyzed through the lens of TCE and dynamic capabilities theoretical framework. The central point for the merger was the partner´s incentives to reach new markets, capture value through scope and scale economies and mainly jointly use specific and valuable assets. Those elements characterizes a hybrid form that appeared to be the more effective governance mode to appropriate and continuously develop knowledge economizing in transaction costs comparing to market and hierarchy modes.

Raízen was born as an important player in the world energy sector. For this matter, it might use its competitive advantages to continue enlarge and aggregate more valuable resources. As Penrose (1995) stated, the firm´s growth will be determined by the rate at which experienced managerial staff can plan and implement plans. In hybrid forms, the managerial staff corresponds to a central authority shared by the two partners. And at this point, governance mechanism for better rights allocation should be undertaken.

Raízen has some challenges ahead related to the control and monitoring agents' behavior, considering the two-part organism formed by distinctive organizational culture, tacit knowledge and long-term incentives. Therefore, the study case presents a current successful joint venture, that exhibits market power and a well-structured corporate governance. Are hybrids the dominant form to organize transactions in a market economy due its efficiency in settle down conventional transaction frictions more evident in the polar modes? This can be the central question for further studies in this complex theme.

10. References

BERLE, A, MEANS, G. *The Modern Corporation and Private Property*. New York: McMillan, 1933.

BIODIESEL.BR. *A história do ProÁlcool.* Disponível em http://www.biodieselbr.com/proalcool/pro-alcool.htm. Acesso em abr/2011

CETRULO, Tiago B. *Instrumentos de Intervenção Governamental e Postura Ambiental Empresarial: uma análise da agroindústria canavieira do Estado de São Paulo.* Dissertação Mestrado em Ciências da Engenharia Ambiental da Universidade de São Carlos. 2010.

COASE, R.H. The Nature of the Firm. Economica, New Series, Vol. 4, No. 16. (Nov., 1937)

COASE, R.H. *The New Institutional Economics*, American Economic Review, V. 2, no. 88, p. 72-74, may 1998.

COSAN, R.I. *Investor Relations-Presentations and Conference Calls*. Disponível em http://www.cosan.com.br/cosan2009/web/index_pt.html. Acesso em abr/2011

DEMSETZ H., LEHN, K. *The Structure of Corporate Ownership: Causes and Consequences*. Journal of Political Economy, 1985.

FAMA, Eugene F. , JENSEN, M. *Separation of Ownership and Control*. Journal of Law and Economics. Vol XXVI, junho, 1983.

FIGUEIRA, Sérgio Rangel. BURNQUIST, Heloisa Lee. *Programas para álcool combustível nos Estados Unidos e possibilidades de Exportação do Brasil.* São Paulo, 2006.

FILHO, Oliva Sillas. *Perspectivas mundiais dos biocombustíveis.* Maio 2007. Disponível:<http://www.senado.gov.br/sf/comissoes/CRA/CRABIO/AP/AP_20070509_Petrobras.pdf>. Acesso em Fevereiro de 2011.

GORREN, Regiane Catarina Ribeiro. *Biocombustíveis – Aspectos sociais e econômicos: Comparação entre Brasil, Estados Unidos e Alemanha* – São Paulo, 2009. 132p. Dissertação (Mestrado – Programa de Pós-Graduação em Energia) – EP/FEA/IEE/IF da Universidade de São Paulo.

HENNART, Jean-Francois. 1988b. *A Transaction Costs Theory of Equity Joint Ventures. StrategicManagement Journal.* 9: 361-374.

INSTITUTO BRASILEIRO DE GOVERNANÇA CORPORATIVA (IBGC). Disponível em: < http:// www.ibgc.org.br>. Acesso em: 10 nov 2010.

JENSEN, Michael, MECKLING W. *Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Strucuture.* Journal of Finance Economics, n.3: 305-360, 1976.

KLEIN, Benjamin; CRAWFORD, Robert G.; ALCHIAN, Armen A. Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. Journal of Law and Economics, v. 21, 1978

KUTAS, Géraldine. AMARAL, Luiz Fernando**.** *Ethanol Boom in the U.S.: an Export Opportunity for the Caribbean and Central American Countries?* RevueVisages d'Amérique Latine. Setembro, 2007.

MC CAHERY, *J. &*VERMEULEN, E. - *Corporate Governance and Innovation - Venture Capital,* Joint Ventures*, and Family Businesses.* Disponível em *papers.ssrn.com/sol3/papers.cfm?abstract_id=133991*.2009.

MENARD, Claude, RAYNAUD, Emmanuel. *Ulysses and sirens: Hands-tying governance in hybrid organizations.* Working Paper Presented at ISNIE, 2010.

MME. Ministério de Minas e Energia. Boletim Mensal dos Combustíveis Renováveis. Edição 35, novembro de 2010. Disponível em: <http://www.ubrabio.com.br/sites/1700/1729/00000270.pdf>. Acesso em Fevereiro de 2011.

MOWERY, David, OXLEY, Joanne, SILVERMAN, Brian. *Strategic Alliances and interfirm knowledge transfer.* Strategic Management Journal, v. 17, special issue, p. 77-91, 1996

OLIVA, Felipe Cardoso. *O desafio das energias renováveis na OMC: commodity agrícola ou bem ambiental.* Universidade de São Paulo, Piracicaba, 2007.

PENROSE, Edith.*The Theory of the Growth of the Firm.* Oxford: Basil Blackwell, 3rd ed, 1995

PENROSE, Edith. *The growth of the firm: a case study: the Hercules Powder Company*, Business History Review, v. 34, n. 1, p. 1-23, 1960.

SPENCE, M., ZECKHAUSER, R. *Insurance, Information and Individual Action.* American Economic Review. Vol.LXI, n.2 (May):380-387, 1971.

TEECE, David. *Knowledge and competences as strategic assets*. IN: FOSS, Nicolai. Resources, firms and strategies: a reader in the resource-based perspective. New York: Oxford University Press, 1997.

ÚNICA. Dados e Cotações – Estatísticas. Disponível em http://www.unica.com.br/dadosCotacao/estatistica/. Acesso em abr/2011

VALOR ECONÔMICO. Estudo apóia o uso de etanol na Europa. Publicado em 10 de março de 2010. Disponível em <http://www.biodieselbr.com/noticias/energia/r1-estudo-apoia-etanol-europa-290310.htm> Acesso em: Fevereiro de 2010.

WILLIAMSON, O. *The Mechanisms of Governance*. Oxford, New York, USA: Oxford University. 429p. 1996.

WILLIAMSON, O. *Transaction costs and organization theory*. Industrial and Corporate Change, v.2, n.2, p.107-156, 1993.

WSJ (Wall Street Journal), Houston**.** Brasil perde participação em mercado de etanol para Estados Unidos. Publicado em 09 de fevereiro de 2011. Acesso em Fevereiro de 2011. Disponível:<http://online.wsj.com/article/SB129729728770684903.html>

FIRM, INDUSTRY, CORPORATE AND TIME EFFECTS ON FIRM PERFORMANCE IN THE U.S. FOOD ECONOMY

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Abstract
This paper applied a relatively novel approach – hierarchical linear modeling (HLM) – to a large panel of food economy corporations in the U.S. to shed new light on the long-standing debate about the relative importance of industry, corporate-parent, and business unit effects on firm performance. Our results indicated that business unit and corporate effects are of primary importance in explaining firm performance differences in the food economy Additionally, HLM allowed us to investigate the effect of specific strategic factors within each class of effects on firm performance. We find positive influence of corporate strategic variables on business unit performance. These findings suggest that the resources and competencies provided by corporate parents significantly affect the profitability of business segments in the food economy. That is, corporate strategy does matter and thus should continue to draw attention from scholars interested in explaining profitability in the food economy.

FIRM, INDUSTRY, CORPORATE AND TIME EFFECTS ON FIRM PERFORMANCE IN THE U.S. FOOD ECONOMY

1. Problem

Industrial organization and strategy scholars have long been interested in understanding the determinants of firm performance. Two alternative views coexist about the relative importance of industry, corporate-parent, and business unit effects on firm profitability. According to the industry view of industrial organization (Bain 1968; Schmalansee 1985; Connor et al. 1985), industry structure affects firm conduct and performance. Industry effects are thus of primary importance to explain performance differences across firms. Another competing view ascribes variability of firm performance to efficiency differences between firms. According to the business strategy perspective, a firm's unique resources and capabilities are the principal determinants of variance in profitability across firms (Barney 1991; Mahoney and Pandian 1992; Wernerfelt 1984). This latter perspective implies that business unit and corporate-parent characteristics are more relevant than industry structural factors in explaining firm performance (Rumelt 1991).

Several empirical studies have partitioned the variance in profitability across firms into components associated with year, industry, corporate-parent, and business unit effects (see Bowman and Helfat 2001 for a review). However, two main limitations are identified in this empirical literature. First, the literature offers varying conclusions about the relative contributions of each effect to firm performance. Misangyi et al. (2006) attribute this problem to limitations of the statistical techniques (i.e., analysis of variance and variance component analysis) employed to decompose the observed variance in firm profits. The second limitation is that these studies measure the relative importance of year, industry, business unit, and corporate-parent effects on firm profitability, but fail to examine the *sources* of these effects – that is, the specific industry structure and firm strategic factors that explain firm performance differences.

The contribution of this paper is twofold. First, we use the multilevel approach of hierarchical linear modeling (HLM) to estimate the relative importance of industry, corporate-parent, and business unit effects on firm profitability in the food economy without assuming independence between effects. This way, HLM allows us to overcome some of the empirical limitations of previous studies. Second, we identify and estimate the effect of specific strategic factors within each level (industry, corporate-parent, and business unit) that determine firm performance in the food economy. Following Schumacher and Boland (2005), we focus our empirical analysis on four sectors of the food economy – food processing, wholesale distribution, retailing, and restaurant.

2. Background

The fundamental debate in this literature centers on the relative importance of business unit, corporate-parent and industry effects on performance differences across firms. In the traditional industrial organization economic view, the firm is defined as a single-business entity. Assuming that productive resources (e.g., technology and human capital) are homogeneous and uniformly available to all firms, firm performance depends fundamentally on industry structural factors (Bain 1968). Because competition directs resources towards the highest return uses, persistently unequal firm returns (i.e.

abnormal returns or economic rents) are attributed to impediments to resource flows or market imperfections. As a result, the most important source of rents is industry structure including industry concentration and entry barriers. Waring (1996) shows the persistence of abnormal returns differs widely and systematically across industries.

A competing view is proffered by business strategy scholars. According to this view, the most important impediments to resource flows arise from unique endowments and strategic actions of individual firms. Sources of resource immobility or specificity include product-specific reputation, team-specific learning, first-mover advantages, and costly or ineffective imitation (Rumelt 1984). In addition, firms can diversify and have business units operating in different industries or in different stages along the supply chain (i.e. vertical integration). Diversity in firm's resources, capabilities and business unit configurations is thus the major determinant of the dispersion in profitability across firms. Rumelt (1991), McGahan and Porter (1997) and Roquebert, Phillips and Westfall (1996) are among the empirical studies showing that corporate-parent and business unit effects are as much, if not more, important than industry effects. In other words, differences between business units within industries are more pronounced than the degree to which industries differ from one another.

Schumacher and Boland (2005) provide the first analysis of firm performance differences and profit persistence in four sectors of the U.S. food economy: food processing, wholesale grocery, retail supermarket, and restaurant. Using a large cross-sectional sample over an extended period (1980-2001), they find that profits are more persistent within an industry than within a corporation. Their empirical results also suggest that the retail supermarket sector generated more stable profits than the other three sectors during the study period. However, they do not identify and estimate the effects of specific strategic factors on firm profitability in the food economy. This paper builds on Schumacher and Boland (2005) and identifies specific factors that affect firm performance at the industry, corporate-parent and business unit levels.

3. Hierarchical Linear Modeling

Previous studies have decomposed the variance in profitability across business units using statistical techniques such as variance component analysis (VCA) (Schmalensee 1985, Rumelt 1991; Roquebert Phillips and Westfall 1996) and analysis of variance (ANOVA) (McGahan and Porter 1997, 1999; Schumacher and Boland 2005). Each of these techniques has limitations. VCA results are inconsistent (Brush and Bromiley 1997; Misangyi et al. 2006) and unreliable (Bowman and Helfat 2001). ANOVA appears to produce more stable estimates than VCA but results from ANOVA are dependent on the sequential ordering in which effects are entered into the model (i.e., year, industry, corporate, and business unit) (see, for example, results in McGahan and Porter 1997, 1999 and Schumacher and Boland 2005). Perhaps more importantly, "both techniques assume that effects are generated independently, an assumption that does not appear to be met by the underlying theory or data … and breaches of which may produce biased estimation" (Misangyi et al. 2006, p. 572). Recent variations of these statistical techniques, such as simultaneous ANOVA, attempt to accommodate the non-independence between effects by addressing the covariance between industry and corporate-parent effects (McGahan and Porter 2002), but they fail to identify the structural relationships among industry and business unit specific effects, and among corporate-parent and business specific effects.

Previous research offers alternative explanations and conclusions about the relative effects on firm performance. Misangyi et al. (2006) argue that the equivocally

nature of the extant empirical evidence is due to the limitations of the statistical approaches described above. The multilevel method of Hierarchical Linear Modeling (HLM) (Raudenbush and Bryk 2002; Raudenbush et al. 2004) is an alternative way to estimate the relative importance of industry, corporate-parent, and business unit effects on firm profits without assuming independence between effects. HLM allows us to overcome the empirical limitations of VCA and ANOVA in the estimation of the relative effects on firm performance as follows. First, HLM explicitly accounts for the interdependence of industry, corporate-parent and business unit effects on firm performance. Second, the use of simultaneous equation estimation in HLM overcomes the problem of sequential estimation techniques such as ANOVA. Additionally, HLM allows us to estimate the effect of specific factors on firm performance within each level of analysis. It is also important to highlight that HLM allows for a model specification that explicitly assesses the rate of change in each firm over time as a systematic trend (Short et al. 2006).

We describe the HLM estimation approach based on Raudenbush and Bryk (2002) and Misangyi et al. (2006). HLM involves the estimation of a series of equations which nest observations of business unit profits across time within business units, and cross-nests business units within both corporations and industries.[88] A business segment[2] is defined as the portion of a firm's operations reported as a single four-digit SIC code. Firms are, therefore, defined as sets of business segments and may have one or more business segments. Following the literature, our dependent variable (profits) is measured by return on assets (ROA). A three-level model represents how variation in business-unit ROA is allocated across time (level 1), between business segments (level 2), and between corporations (level 3).

Unconditional Model

The simplest three-level model is fully unconditional (i.e., no predictors). At level 1, business segment ROA at time t in business segment i in corporation j (ROA_{tij}) is modeled as a function of business segment mean ROA across time (π_{0ij}) plus a random error (e_{tij}) that represents the variance across time:

(1a) $$ROAtij = \pi_{0ij} + e_{tij}$$

where the indices t, i, and j denote time, business segments, and corporations respectively. There are t=1, 2,…, T_{ij} time periods within business segment i in corporation j; i=1, 2,…, I_j business segments within corporation j; and j=1, 2,…, J corporations. The model (1a) assumes that e_{tij} is normally distributed, with a mean of zero and variance of σ^2. This variance across time is assumed to be uniform only among the observations within each of the i business segments.

At the second level of analysis, the business-segment mean ROA over time (π_{0ij}) is simultaneously modeled as an outcome varying randomly around some corporation mean:

(1b) $$\pi_{0ij} = \beta_{00j} + r_{ij}$$

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[88] It is important to distinguish the meaning of the terms "nested" and "hierarchical" in the ANOVA approach from their meaning in HLM. In ANOVA, these terms refer to the examination of the sequential and incremental improvement in the fit of the statistical model. In that context the term "nested" indicates that the statistical analyses are dependent upon the effects preceding them. In HLM, "nested" or "hierarchical" refer to the recognition of a relationship between effects. Both industries and corporations are considered to be sets of business units. Firm performance varies across industries, corporations and business units and theory suggests that these levels of variance are related in a nested manner such that business segment performance is cross-nested within corporations and industries.

[2] In this paper, business segment is used as synonymous to business unit – that is, both terms refer to divisions of a diversified firm with operations in different industries.

where β_{00j} is the mean ROA of the business segment i in corporation j; and r_{ij} is a random between-business effect representing between-business variance. This effect is assumed normally distributed with mean zero and variance τ_π. Within each of the j corporations, the variability among business segments is assumed the same.

The level-3 model represents the variability among corporations. The intercept of the level-2 model (β_{00j} in equation 1b) is simultaneously modeled as an outcome varying randomly around a grand mean:

(1c) $\beta_{00j} = \gamma_{000} + \mu_j$

where γ_{000} is the grand mean of business-segment ROA and μ_j is a random between-corporation effect. This between-corporation residual is assumed to be normally distributed with mean zero and variance τ_β. Thus, in this unconditional model the variance across time is represented by σ^2, the between-business variance is represented by τ_π, and the between-corporation variance is represented by τ_β.

Conditional model

The cross nesting of industry effects on business segment performance is estimated by incorporating these effects at the business-segment level of analysis (level 2). Similarly, year effects are estimated through their incorporation at the time level of analysis (level 1) as shown in equation (2a):

(2a) $ROAtij = \pi_{0ij} + \pi_{1ij}(\text{Year}_1)_{\text{tij}} + \cdots + \pi_{nij}(\text{Year}_\text{n})_{\text{tij}} + e_{tij}$

(2b) $\pi_{0ij} = \beta_{00\text{j}} + \beta_{01\text{j}}(\text{Industry}_1)_{\text{ij}} + \cdots + \beta_{0\text{nj}}(\text{Industry}_\text{n})_{\text{ij}} + r_{ij}$

(2c) $\beta_{00\text{j}} = \gamma_{000} + \mu_j$

where in equation (2a), π_{nij} represents year effects capturing the impact of macroeconomic fluctuations on firm performance; Year_n is a set of n dummy variables coded for each of the years included in this study (1984-2006) for each business segment i in corporation j; and π_{0ij} represents mean business segment ROA across time for business segment i in corporation j adjusted for year effects. In equation (2b), β_{0nj} represents the effect of industry membership on mean business segment ROA; Industry_n is a set of n dummy variables capturing the industry membership of business segment i in corporation j; and β_{00j} is the mean ROA of the business segments in corporation j adjusted by industry effects. ROA_{tij}, e_{tij}, r_{ij}, γ_{000}, μ_j are all as defined previously in the unconditional model.

Variance Partitioning

The unconditional and conditional models are used to estimate the relative importance of each type of effect (year, industry, corporate-parent, and business unit) on firm performance. First, the unconditional model partitions the total variance in business segment ROA into variance across time (σ^2), between-business variance (τ_π), and between-corporation variance (τ_β). Second, a reduced version of the conditional model is used to calculate the total variance explained by year effects. This version of the conditional model consists of entering the year dummies at the time level (level 1) without the industry effects – i.e., equations 2a, 1b, and 2c are estimated simultaneously. Year effects are calculated by comparing the time-level variance (σ^2) in this reduced model with the estimated variance in the unconditional model (equations 1a through 1c).

Next, industry effects are examined by comparing the estimation of the complete conditional model (equations 2a through 2c) with the reduced model used to estimate year effects (equations 2a, 1b, and 2c). Industry effects are calculated by examining the reduction of variance at the business (level 2) and corporate (level 3) levels as a proportion of total variance when industry effects are included. Last, business segment and corporate effects are calculated by adjusting the between-business-segment variance

and the between-corporation variance estimated in the unconditional model by the industry and year effects.

Additionally, the HLM multilevel approach also allows us to examine specific strategic factors at their appropriate level of analysis. Specific industry, corporate, and business unit variables can be entered into the model to investigate whether they are associated with business unit performance. These specific strategic factors are incorporated as predictors into the unconditional model presented in equations (1a) through (1c).

4. Data and Sample

This study uses data from Compustat Business-Segment Reports for the food economy. Following McGahan and Porter (1997, 1999) and Schumacher and Boland (2005), business segments are assigned industry membership based upon primary four-digit SIC codes reported in Compustat. Our initial data set consists of 20,269 observations of yearly individual business segments operating in four sectors of the U.S. food economy from 1984 to 2006. Similarly to Schumacher and Boland (2005), we identify a list of four-digit SIC codes related to the food economy covering four sectors: processing, wholesale, retail, and restaurant.

We screened the Compustat data based on the following steps, which are standard practice in the literature. From our initial data set, we dropped 1,520 observations of business segments with less than $2 million in annual sales as these segments may be particularly affected by financial anomalies rather than operating activity (McGahan and Porter 1999; Misangyi et al. 2006). We then dropped 2,285 outlier observations when the dependent variable – the ratio of operating income to total assets (ROA) – exceeds the 95th percentile or falls below the 5th percentile of the sample distribution. An additional 5,170 observations with missing values on the depend variable (ROA) and 518 observations from industries containing only one business-segment in a given year are also removed from the data set. Our final sample consists of 10,776 observations comprising 1,925 business segments, 998 corporations, and 69 industries in the food economy.

Table 1 shows average total assets, operating income and return on assets by sector and year. The average business segment in the final sample has $1,188 million in total assets and $135 million in operating profits. The processing sector has the highest mean returns (10.8%) and the second highest mean total assets ($1,477 million). Business segments in the retail sector have, on average, the largest size in terms of total assets ($1,845 million) but the lowest mean return on assets (8.7%) during the study period.

<Insert Table 1>

Measures for specific strategic factors at the industry, corporate, and business-segment levels are computed using two Compustat data files. Industry and corporate variables are generated using the Fundamentals file and business unit variables are obtained from the Business Segments file. All variables reflect the years 1984-2006. Table 2 describes the variables used in this study.

<Insert Table 2>

To represent industry factors, we measure seller concentration, capital intensity, research and development intensity, and advertising intensity. Industry concentration is measured by the four-firm concentration ratio (CR-4), a commonly used measure of

industry structure in industrial organization studies. Following standard IO theory, this variable is expected to positively affect firm profits. Industry capital intensity, a common measure of barriers to entry, is also expected to be related positively to firm performance (Waring 1996). This variable is measured as the average of the ratio of net property, plant and equipment to net sales across all business segments in each industry in each year. Industry R&D and advertising intensities are alternative measures of industry barriers to entry. High R&D and advertising intensities are associated with high product differentiation, high entry barriers and abnormal profits (Connor et al. 1985; Stiegert, Wang and Rogers 2009). Advertising and R&D intensities are measured as the average ratios of advertising and R&D expenses, respectively, to net sales across all business segments in each industry for each year.

In this study we examine the effects of capital intensity, resource availability, diversification strategy, long-term debt, R&D intensity, and advertising intensity as corporate strategic factors affecting business unit performance. Corporate capital intensity is expected to negatively affect business unit performance, as it is a sign of structural inertia (Hannan and Freeman 1977). It is measured by the ratio of the net value of property, plant and equipment to net sales for each corporation in each year. Corporate diversification is measured by a categorical variable identifying firms with multiple business units (dummy = 1) and single business units (dummy = 0). Given that our sample only includes firms in the U.S. food economy, this variable is capturing related diversification and thus we expect corporate diversification to have a positive impact on business unit performance. We also include two financial variables that we expect to be positively related to business unit performance: resource availability (the ratio of working capital to net sales) and long-term debt (the ratio of long-term debt to total assets). Two additional corporate-level variables are also expected to lead to enhance business unit profits: advertising and R&D expenditures.

In addition to our dependent variable (ROA), at the business unit level we measure business-segment size as the natural log of business-segment net sales. Business-unit size is a commonly used explanatory variable in most empirical studies of firm performance and is expected to positively affect performance. Table 3 reports descriptive statistics for all variables used in this study.

<Insert Table 3>

5. Empirical Results and Analysis

Table 4 shows our estimation of the relative importance of industry, corporate-parent, and business-segment effects on firm performance. The top panel in the table reports the estimation of the unconditional model and indicates that 38.9% of the variance in business-segment ROA occurs across time, 38.9% of the variance occurs between business segments ($p<0.001$), and 22.1% of the variance occurs between corporations ($p<0.001$). In the middle panel of table 4 we report that the total variance explained by year effects is 0.5%. We calculate the year effect by comparing the time-level variance estimated in the model incorporating year dummies at level 1 (equations 2a, 1b, 2c) with the unconditional model (equations 1a, 1b, 1c).

<Insert Table 4>

In the bottom panel of table 4 we report that industry effects account for 7.0% of the total variance in business-segment ROA. As described in the previous section, industry effects are calculated by examining the reduction of variance between business segments (level 2) and between corporations (level 3) as a proportion of total variance when industry dummies are included in the model. Finally, we calculate business-

segment and corporate-parent effects by adjusting the between-business-segment variance and the between-corporation variance estimated in the unconditional model (top panel) by the industry effects. Table 4 shows that business-segment effects account for 36.1% and corporate effects for 18.0% of the total variance in business-segment ROA.

Table 5 summarizes our results and compares them with selected previous studies. First, we compare our results with previous studies using HLM (columns 1-3). Our results are very similar to Misangyi et al. (2006) and to Short et al. (2006). This finding highlights the fact that HLM results are robust across different samples and study periods. This is important because, as discussed in the previous section, one of the problems with the extant research based on VCA and ANOVA is the coexistence of alternative explanations. In particular, it is important to note that over one third of the total variance in business-segment ROA occurs between business units, and that less than 10% of the total variance is attributed to industry effects. Our estimated corporate-parent effects are larger than in Misangyi et al. (2006) suggesting that a greater proportion of business-segment profits is due to synergies and economies of scope arising from corporate diversification. Our results are in line with previous research on corporate diversification showing that related corporate diversification across similar lines of businesses (as is the case in our food economy sample) is value enhancing (Montgomery 1994).

<Insert Table 5>

The dominant importance of business-segment effects on firm performance is also aligned with previous studies using ANOVA, such as McGahan and Porter (1997) and Schumacher and Boland (2005). In other words, our results lend further support to the view that industry structural factors are not the primary sources of firm profitability. This finding indicates that researchers and practitioners should devote most of their attention to firm-specific strategic management and resource differences in trying to explain business unit performance.

A second important result derives from comparing our results with Schumacher and Boland's (2005) as both studies focus on firm profitability differences in the U.S. food economy with alternative statistical techniques. Our results on the relative importance of business segment, corporate-parent, and industry effects are markedly different from those reported by Schumacher and Boland (see columns 1 and 5 in table 5). For instance, Schumacher and Boland (2005) conclude that for the industries in the food economy "the structure of the industry is more important than being a member of a diversified corporation as suggested by the FIRM view" (p. 113). Our results, on the other hand, suggest that business-segment effects and corporate effects play a bigger role than industry factors in explaining sources of firm performance differences. In addition, the results reported by Schumacher and Boland (2005) depend on the order that the factors are nested in the ANOVA estimations and are also different from the estimations reported by McGahan and Porter using the same statistical technique (column 4 in table 5). This can be interpreted as evidence of the problems of the statistical technique used by Schumacher and Boland (2005) leading to alternative explanations about relative effects on firm performance.

Our estimation of year effects is consistent with previous research, which indicates that a small proportion (0.5%) of the total variance in firm performance is attributed to macroeconomic fluctuations. It is important to note that, according to our results, a substantial portion of the total variance in business-segment ROA occurs

across time (38.4%). This is our estimate of the *transient* component of business-segment ROA, which is consistent with the other studies using HLM. This result is also consistent with McGahan and Porter (1997) if the unexplained variance (error in table 5) is attributed to transient factors. In fact, this constitutes another advantage of the HLM approach as it explicitly recognizes variance across time and thus provides an estimation of the proportion of variance explained by factors that vary over time.

Finally, our estimate of the corporate-parent effect on business-segment ROA (18.0%) is higher than comparable results in table 5 and markedly higher than the reported corporate effect (7.2%) in Misangyi et al. (2006). The main difference is that Misangyi et al. focus on a stratified sample of 85 industries that is representative of 850 industries in all sectors of the U.S. economy, while our study focuses on 69 industries in the food economy. Although further analysis is required to provide a robust interpretation, this result can be interpreted as a higher importance of corporate effects on firm performance in the food economy. Our estimate of the corporate-parent effect might be capturing the synergies, economies of scope and other positive effects of related diversification across food economy industries. In addition, this result supports further examination of specific strategic factors at the corporate level, which is pursued in the next section.

Specific strategic effects on firm performance in the food economy

In this section we identify and estimate the effects of specific strategic factors within each level of analysis – industry, corporate-parent, and business unit – on firm performance. Most studies using variance decomposition techniques have focused primarily on determining the relative importance of each level of analysis on firm profit variance (McGahan and Porter 1997; Rumelt 1991; Schumacher and Boland 2005). These studies, however, fail to identify and measure the specific determinants of firm performance at each level of analysis. In this context, adding relevant business unit, corporate-parent, and industry level characteristics provides the next logical step in this research stream.

We use HLM to estimate the effect of specific strategic factors on business segment profits by incorporating them as predictors into the unconditional model represented by equations (1a-1c). As described in the previous section, we use measures of strategic factors at the industry, corporate, and business-segment level from Compustat (See Table 3). Equations (3a-3c_{28}) present our model specification in which year dummies are entered at level 1 (time level), industry and business-segment factors are entered at level 2 (between business segments), and corporate factors are entered at level 3 (between corporations).

$$(3a) \quad ROAtij = \pi_{0ij} + \pi_{1ij}(\mathrm{Year}_1)_{\mathrm{tij}} + \cdots + \pi_{20ij}(\mathrm{Year}_{22})_{\mathrm{tij}} + e_{tij}$$

$$(3b) \quad \pi_{0ij} = \beta_{00\mathrm{j}} + \beta_{01\mathrm{j}}(\mathrm{LN_{SALE}})_{\mathrm{ij}} + \beta_{02\mathrm{j}}(\mathrm{indCR4})_{\mathrm{ij}} + \beta_{03\mathrm{j}}(\mathrm{indCAP})_{\mathrm{ij}} + \beta_{04\mathrm{j}}(\mathrm{indRD})_{\mathrm{ij}} + \beta_{05\mathrm{j}}(\mathrm{indADV})_{\mathrm{ij}} + r_{ij}$$

$$(3b_1) \quad \pi_{1ij} = \beta_{10j}$$

$$\cdots$$

$$(3b_{22}) \quad \pi_{22ij} = \beta_{220j}$$

$$(3c) \quad \beta_{00\mathrm{j}} = \gamma_{000} + \gamma_{001}(\mathrm{crpCAP}) + \gamma_{002}(\mathrm{crpRES}) + \gamma_{003}(\mathrm{crpDIV}) + \gamma_{004}(\mathrm{crpDEB}) + \gamma_{005}(\mathrm{crpRD}) + \gamma_{006}(\mathrm{crpADV}) + \mu_{\mathrm{j}}$$

$$(3c_1) \quad \beta_{01\mathrm{j}} = \gamma_{010}$$

$$(3c_2) \quad \beta_{02\mathrm{j}} = \gamma_{020}$$

$$(3c_3) \quad \beta_{03\mathrm{j}} = \gamma_{030}$$

$(3c_4)$ $\beta_{04j} = \gamma_{040}$
$(3c_5)$ $\beta_{05j} = \gamma_{050}$
$(3c_6)$ $\beta_{06j} = \gamma_{060}$
$(3c_7)$ $\beta_{10j} = \gamma_{100}$
...
$(3c_{28})$ $\beta_{220j} = \gamma_{2200}$

In equation (3a), business-segment ROA at time *t* in business segment *i* in corporation *j* (ROA_{tij}) is modeled as a function of year dummy variables. The intercept π_{0ij} represents the mean ROA across time for business segment *i* in corporation *j*, adjusted for year effects. In Equation (3b) π_{0ij} is modeled simultaneously as a function of business-segment size, industry concentration, industry capital intensity, industry R&D intensity, and industry advertising intensity. Here the intercept β_{00j} represents the mean ROA of all business segments in corporation *j* adjusted for these predictors. In Equation (3c) β_{00j} is simultaneously modeled as a function of a set of corporate variables expected to explain between-corporation variance. These predictors include corporate capital intensity, corporate resource availability, corporate diversification, corporate long-term debt, corporate R&D intensity, and corporate advertising intensity. The intercept in Equation (3c), γ_{000}, represents the grand mean of business-segment ROA adjusted for these predictors. Each level of analysis has its own random error term – e_{tij} represents the across-time residual, r_{ij} the between-business residual, and μ_j represents the between-corporation residual. HLM models the slopes at the time and between-business-segment levels as outcome variables at the higher levels of analysis. The modeling of the slopes is shown in equations ($3b_1$-$3b_{22}$) and ($3c_1$-$3c_{28}$).

Table 6 reports our HLM estimations for three alternative model specifications. Model (3) is our preferred specification described in equations (3a-$3c_{28}$). In this specification year dummies enter at level 1; business segment and industry variables enter at level 2; and corporate-parent variables enter at level 3. Models (1) and (2) are reported for robustness analysis. Model (1) is very similar to model (3) but it does not include year dummies and thus does not account for year effects (macroeconomic fluctuations). In Model (2) all variables are entered at level 3 and year dummies are not included. Model (2) is important to check whether results change significantly when changing the level at which explanatory variables are entered into the equations. Overall our results are robust across the three reported model specifications and the signs of estimated coefficients are in line with the predicted signs shown in table 2.

<Insert Table 6>

The results of model (3) suggest that the variance in business unit performance (ROA) attributable to between-business-segment effects is explained by business-segment size ($p<0.01$), industry capital intensity ($p<0.02$) and industry advertising intensity ($p<0.1$). These results corroborate previous research that firm size and industry barriers to entry positively affect firm performance. However, our results do not indicate that industry concentration affects firm profits in the food economy. Additionally, the variance attributable to the corporate-parent effect is explained by corporate capital intensity, corporate diversification, corporate R&D intensity and corporate resource availability. As suggested by theory, firm performance is positively affected by corporate diversification and R&D intensity, while corporate capital intensity negatively affects firm profits. The negative sign on the corporate resource availability coefficient suggests that the corporate working capital to sales ratio

negatively affects business unit performance – a result that is not expected from extant theory.

6. Conclusions

This paper applied a relatively novel approach – hierarchical linear modeling (HLM) – to a large panel of food economy firms to shed new light on the long-standing debate about the relative importance of industry, corporate-parent, and business unit effects on firm performance. Our results indicated that business unit and corporate effects are of primary importance in explaining firm performance differences in the food economy. Differently from Schumacher and Boland (2005), our estimated corporate effects are greater than industry effects.

Additionally, HLM allowed us to investigate the effect of specific strategic factors within each class of effects on firm performance. In particular, we identified business segment (size), corporate (diversification, R&D intensity, capital intensity and resource availability) and industry (barriers to entry) variables that significantly explain firm performance differences in the food economy. Given the relatively important role of corporate effects and the positive influence of corporate strategic variables on business unit performance, our findings suggest that the resources and competencies provided by corporate parents significantly affects the profitability of business segments in the food economy. In other words, corporate strategy does matter and thus should continue to draw attention from scholars interested in explaining profitability in the food economy.

7. References

Bain, J.S. 1968. *Industrial Organization*, 2nd ed. New York: Wiley.

Barney, J.B. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17: 99-120.

Bowman, E.H. and C.E. Helfat. 2001. "Does Corporate Strategy Matter?" *Strategic Management Journal* 22(1): 1-23.

Brush, T.H. and P. Bromiley. 1997. "What Does a Small Corporate Effect Mean? A variance components simulation of corporate and business effects." *Strategic Management Journal* 18(10): 825-835.

Connor, J.M., R.T. Rogers, B.W. Marion and W.F. Mueller. 1985. *The Food Manufacturing Industries: Structures, Strategies, Performance, and Policies.* Lexington, MA: D.C. Heath.

Hannan, M.T. and J. Freman. 1977. "The Population Ecology of Organizations." *American Journal of Sociology* 82: 929-964.

Mahoney, J. and J. Pandian. 1992. "The Resource-Based View within the Conversation of Strategic Management." *Strategic Management Journal* 13: 363-380.

McGahan, A.M. and M.E. Porter. 1997. "How Much Does Industry Matter, Really?" *Strategic Management Journal* 18: 15-30.

McGahan, A.M. and M.E. Porter. 1999. "The Persistence of Shocks to Profitability." *Review of Economics and Statistics* 81(1): 143-153.

McGahan, A.M. and M.E. Porter. 2002. "What Do We Know about Variance in Accounting Profitability?" *Management Science* 48(7): 834-851.

Misangyi, V.F., H. Elms, T. Greckhamer, and J.A. Lepine. 2006. "A New Perspective on a Fundamental Debate: A Multilevel Approach to Industry, Corporate, and Business Unit Effects." *Strategic Management Journal* 27(6): 571-590.

Montgomery, C.A. 1994. "Corporate Diversification." *Journal of Economic Perspectives* 8(3): 163-178.

Raudenbush, S.W. and A.S. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods*. 2nd ed. Thousand Oaks: Sage Publications.

Raudenbush, S.W., A.S. Bryk, Y.F. Cheong, R. Congdon and M. du Toit. 2004. *HLM 6: Linear and Nonlinear Modeling*. Lincolnwood, IL: Scientific Software International, Inc.

Roquebert, J.A., R.L. Phillips and P.A. Westphal. 1996. "Markets vs. Management: What drives Profitability?" *Strategic Management Journal* 17(8): 653-664.

Rumelt, R. 1984. "Toward a Strategic Theory of the Firm," In R.B. Lamb (ed.), *Competitive Strategic Management*. Englewood Cliffs, NJ: Prentice-Hall, pp. 557-570.

Rumelt, R. 1991. "How Much Does Industry Matter?" *Strategic Management Journal* 12(3): 167-185.

Schmalensee, R. 1985. "Do Markets Differ Much?" *American Economic Review* 75 (June): 341-351.

Schumacher, S.K. and M.A. Boland. 2005. "The Persistence of Profitability among Firms in the Food Economy." *American Journal of Agricultural Economics* 87(1): 103-115.

Short, J.C., D.J. Ketchen, N. Bennett, and M. du Toit. 2006. "An Examination of Firm, Industry, and Time Effects on Performance using Random Coefficients Modeling." *Organizational Research Methods* 9(3): 259-284.

Stiegert, K.W., S.S. Wang and R.T. Rogers. 2009. "Structural Change and Market Power in the U.S. Food Manufacturing Sector." *Agribusiness* 25(2): 164-180.

Waring, G.F. 1996. "Industry Differences in the Persistence of Firm-Specific Returns." *American Economic Review* 86(5): 1253-1265.

Wernerfelt, B. 1984. "A Resource-Based View of the Firm." *Strategic Management Journal* 5: 171-180.

Table 1. Descriptive Statistics by Sector and Year

Sector/Year	Number of Observations	Mean Total Assets ($mil)	Mean Operating Profits ($mil)	Mean ROA (%)
Processing	5,255	1,477	176	10.8%
Wholesale	926	732	44	9.0%
Retail	1,493	1,845	188	8.7%
Restaurant	3,102	520	68	9.3%
1984	443	307	42	11.7%
1985	408	421	51	11.2%
1986	407	507	62	10.8%
1987	386	568	67	10.2%
1988	377	721	76	10.1%
1989	380	820	89	9.9%
1990	376	883	98	10.2%
1991	374	1,010	117	10.7%
1992	413	957	112	10.2%
1993	427	861	102	10.0%
1994	444	899	110	9.7%
1995	469	981	112	8.5%
1996	489	1,078	126	8.9%
1997	472	1,187	145	9.5%
1998	553	1,106	121	9.6%
1999	628	1,320	162	9.7%
2000	613	1,426	153	9.1%
2001	590	1,484	161	9.4%
2002	579	1,503	168	10.1%
2003	536	1,707	204	9.7%
2004	485	2,073	246	10.5%
2005	484	2,145	247	9.9%
2006	443	2,377	228	10.0%
TOTAL	10,776	1,188	135	9.9%

Note: The Compustat variables used in this table include total assets (at); operating profit (ops); and ROA (ops/at).

Table 2. Description of Variables

Variable	Label	Description	Predicted Sign
Industry Variables			
indCR4	Industry Concentration Ratio (CR4)	Four-firm concentration ratio of sales in each industry (defined by 4-digit SIC codes) for each year	+
indCAP	Industry Capital Intensity	Average of the ratio of the net value of property plant and equipment to net sales across all firms in each industry for each year	+
indRD	Industry R&D Intensity	Average of the ratio of the research and development expenditure to net sales across all firms in each industry for each year	+
indADV	Industry Advertising Intensity	Average of the ratio of the advertising expenses to net sales across all firms in each industry for each year	+
Corporate-Parent Variables			
crpCAP	Corporate Capital Intensity	Ratio of the net value of property plant and equipment to net sales for each corporation in each year	-
crpRES	Corporate Resource Availability	Ratio of working capital to net sales	+
crpDIV	Corporate Diversification	Categorical variable which distinguishes multi-business corporations (dummy=1) from single-business corporations (dummy=0), where multi-business is defined as those corporations operating in two or more business segments at any point in time during the study period	+
crpDEB	Corporate long-term Debt	Ratio of long term debt to total assets for each corporation in each year	+
crpRD	Corporate R&D Intensity	Ratio of R&D expenditure to net sales for each corporation in each year	+
crpADV	Corporate Advertising Intensity	Ratio of advertising expenses to net sales for each corporation in each year	+
Business Segment Variables			
ROA	Return on Assets	Ratio of operating income to total assets	Dependent Variable
Sale	Net Sales (Log)	Gross sales reduced by cash discounts, trade discounts, and returned sales	+

Table 3. Descriptive Statistics: Business Segment, Corporate-Parent and Industry Variables

Variable Label	Variable Description	Obs.	Mean	Std. Dev.	Min	Max
indCR4	Industry Concentration Ratio (CR4)	7,791	62.40	23.47	30.15	100.00
indCAP	Industry Capital Intensity	7,791	0.34	0.20	0.05	3.80
indRD	Industry R&D Intensity	7,030	0.01	0.05	0.00	0.89
indADV	Industry Advertising Intensity	7,394	0.04	0.03	0.00	0.32
crpCAP	Corporate Capital Intensity	10,369	0.35	0.37	0.00	15.21
crpRES	Corporate Resource Availability	10,292	0.07	0.23	-6.00	6.47
crpDIV	Corporate Diversification	10,776	0.70	0.46	0.00	1.00
crpDEB	Corporate Long Term Debt	10,364	0.27	0.22	0.00	2.25
crpRD	Corporate R&D Intensity	5,151	0.00	0.01	0.00	0.44
crpADV	Corporate Advertising Intensity	5,812	0.04	0.04	0.00	0.45
ROA	Operating Profits / Total Assets (%)	10,776	9.93	8.19	-9.83	33.51
ln_sale	Natural Log of Net Sales	10,775	5.82	2.03	0.69	11.10

Table 4. Empirical Results: HLM Estimations of Variance Components

	Variance Estimate	d.f.	Chi-square	p-value
Unconditional model (Equations 1a, 1b, 1c)				
Level 1 variance (across time) e_{ijk}	0.00292			
Level 2 variance (between business segments) r_{0jk}	0.00292	927	5321	0.000
Level 3 variance (between corporations) u_{00k}	0.00166	997	1869	0.000
Percentage of total variance across time	38.9%			
Percentage of total variance between business segments	38.9%			
Percentage of total variance between corporations	22.1%			
Model incorporating year effect at level 1[a]				
Level 1 variance (across time) e_{ijk}	0.00288			
Level 2 variance (between business segments) r_{0jk}	0.00292	927	5363	0.000
Level 3 variance (between corporations) u_{00k}	0.00168	997	1886	0.000
Percentage of total variance explained by year effect	0.5%			
Model incorporating year effects at level 1 and industry effects at level 2[b]				
Level 1 variance (across time) e_{ijk}	0.00288			
Level 2 variance (between business segments) r_{0jk}	0.02710	859	5016	0.000
Level 3 variance (between corporations) u_{00k}	0.00137	997	1747	0.000
Percentage of total variance explained by industry effects	7.0%			
Industry effect across business segments	2.8%			
Industry effect across corporations	4.2%			
% of total variance explained by business segment effects	36.1%			
% of total variance explained by corporate-parent effects	18.0%			

[a] Model given by Equations (2a), (1b), (2c), including 22 year dummies.
[b] Model given by Equations (2a), (2b), (2c), including 22 year dummies and 60 industry dummies.

Table 5. Comparing our Results with Selected Previous Studies

	(1) Our Study	(2) Misangyi et al. (2006)	(3) Short et al. (2006)	(4) McGahan and Porter (1997)		(5) Schumacher and Boland (2005)	
Data source	Compustat	Compustat	Compustat	Compustat		Compustat	
Years covered	1984-06	1984-99	1995-01	1981–94		1981-01	
Sectoral coverage	Food Economy	All[a]	All	All		Food Economy	
No. of observations	10,776	10,633	15,958	58,132	58,132	5,854	5,854
Estimation method	HLM	HLM	HLM	A	B	A	B
% of total variance							
Year	0.5	0.8	[b]	0.3	0.3	1.1	1.1
Business segment	36.1	36.6	45.0	35.1	34.9	45.6	77.9
Corporation	18.0	7.2	[c]	9.1	11.9	10.6	14.7
Industry	7.0	7.6	8.3	9.4	6.8	20.8	5.2
Time	38.4	47.8	46.7			21.9	1.1
Error				46.1	46.1		

A Nested ANOVA with effects added in the sequence of year, industry, corporate parent, and business unit.
B Nested ANOVA with effects added in the sequence of year, corporate parent, industry, and business unit.
[a] Stratified random sample of 85 industries. [b] Not reported. [c] There is no corporate effect because the sample included only single-business firms.

Table 6. HLM Estimations of Strategic Factor Effects on Business Unit Profits in the Food Economy (1984-2006)

	Model (1)			Model (2)			Model (3)		
Log Sales	0.009	***	(0.002)	0.008	***	(0.002)	0.010	***	(0.002)
Industry CR4	0.000		(0.000)	0.000		(0.000)	0.000		(0.000)
Ind. Capital Intensity	0.083	***	(0.025)	0.053	*	(0.032)	0.089	***	(0.025)
Ind. R&D Intensity	-0.019		(0.024)	-0.157		(0.155)	-0.016		(0.026)
Ind. Advertising Intensity	0.260	*	(0.144)	0.621	***	(0.220)	0.239	*	(0.145)
Corp. Capital Intensity	-0.033	***	(0.010)	-0.037	***	(0.011)	-0.034	***	(0.010)
Corp. Resource Availability	-0.024	*	(0.014)	-0.028	**	(0.014)	-0.025	*	(0.014)
Corp. Diversification	0.010		(0.007)	0.012	*	(0.007)	0.012	*	(0.007)
Corp. Long-term Debt	-0.015		(0.016)	-0.017		(0.016)	-0.016		(0.016)
Corp. R&D Intensity	1.290	**	(0.642)	1.472	**	(0.606)	1.264	*	(0.674)
Corp. Advertising Intensity	-0.043		(0.109)	-0.052		(0.110)	-0.063		(0.110)
Intercept	0.006		(0.019)	0.024		(0.021)	0.008		(0.019)
Year Dummies	*no*			*no*			*yes*		
Variance Components									
Level 1, e_{tij}	0.0027			0.003			0.003		
Level 2, r_{ij}	0.0022	***		0.002	***		0.002	***	
Level3, u_j	0.0007	***		0.001	***		0.001	***	
Total observations	3,577			3,577			3,577		

Significant at *** p<0.01; ** p<0.05; * p<0.1% (two-tailed test). Robust standard errors in parentheses.

THE SUCCESSION PROCESS IN BRAZILIAN FAMILY FARM BUSINESS: A MULTICASE STUDY

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Abstract
This paper deals with the succession process in family businesses, within the context of rural enterprises development in Brazil. The main objective of this research is to deepen our understanding of succession in family farm business. The method used is the multiple case studies. The model proposed by Gersick et al (1997) supports case analysis. It concludes that the motivations for the continuity of rural enterprise combine the bonding between the family and the business as well as the fact that the assets of the company consist in capital reserve for family. The rural activity is considered as a professional alternative for family members and represents a business opportunity. Among the challenges identified, it was pointed out the importance of establishing a formal planning process and the implications of property splitting to the continuity on the family business. Also, the paper discusses the governance structures that emerge through farm family business development, pointing the evolution from informal structures based on confidence to formal ones, like Assembly and Boards of directors.

Key Words: 1. Succession in Family Business; 2. Farm family business; 3. Agribusiness

THE SUCCESSION PROCESS IN BRAZILIAN FAMILY FARM BUSINESS: A MULTICASE STUDY

1. Introduction

As the farming business evolves over time, emerges the problem on the continuity of the business through family´s generations emerges. Data from the Brazilian Agricultural Census (IBGE, 2006) show, in terms of longevity, 57% of rural Brazilian farm business have less than 10 years, 23% are between 10 and 21 years, 13% between 20 and 31 years, 5% between 30 and 41 years and only 2% have more than 41 years old. The succession process is mentioned as the main determinant in family businesses continuity as a determinant on company´s longevity (WERNER, 2004; WARD, 2003; FLORIANI; RODRIGUES, 2000, GERSICK et al, 1997; HANDLER, 1994).

Based on these observations, this paper deals with the understanding of the succession process in family farm business in Brazil. To achieve this goal it will be presented a theoretical review in which is presented a model called “development cycles” (Gersick at al, 1997). This model is applied to structure case studies in order to understand organizations’ development.

Settings for the family business are presented in the literature based on criteria intangible or tangible to determine if an organization is considered or not a family business (DYER, 2006; WERNER, 2004; LODI, 1994; BERNHOEFT, 1989). In this article, the definition for family-owned company is that the effective management´ control and ownership of most capital or shareholders' agreements belongs to a family in the form of quotas or individual actions.

2. Literature Review

Family businesses are dynamic entities that evolve through development stages. The first conceptual model proposed for the study of family businesses has emerged in the 60´s. Later in the 90´s, Gersick et al (1997) proposed a new model based on three dimensions: management, property and family, considering the temporal dimension presented in development axes in which there is a sequence of stages to be followed during the family business development (Illustration 01).

The axis captures the structural changes in the family business over time (GERSICK et al, 1997). This model was applied within the family firms analyzed in order to facilitate the understanding of evolution stages of these companies.

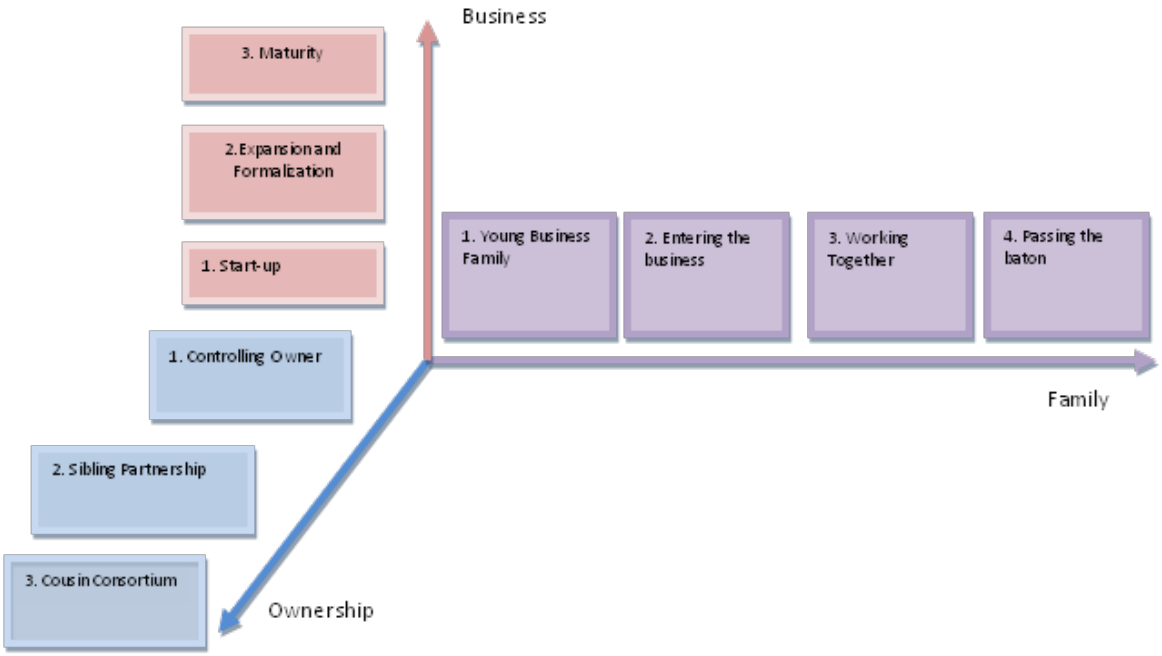

Illustration 1: Model analysis of the development of family business (GERSICK et al, 1997).

Succession in family farm business represents the continuation of a business over generations of one family. Challenges are faced during the development of the businesses and, in particular, in succession processes (GERSICK et al, 1997; HANDLER, 1994; LANDSBERG, 1988). These challenges are summarized in Table 01 .

Table 1: Challenges identified in the family business literature

Development of the axes of Family Business		
Family	**Ownership**	**Management**
1. Cooperation among successors (HANDLER, 1994)	1. Tendency to spray ownership (IBGC, 2009)	1. Sucession Planning (PETRY, 2009; MAZZOLA, 2008; WARD, 2003; NETO et al, 2001, LANDSBERG, 1988)
2. Sickness (LANDSBERG, 1988)	2. Keep the company attractive to a larger number of partners (NETO et al, 2001; ROMANO et al, 2000; HUBLER, 1999)	2. Establishing new organizational structures (NETO et al, 2001; SCHEFFER, 1995; DE VRIES, 1988; LEVINSON, 1971)
3. Stimulate the interest of the heirs to the company (LEVINSON, 1971, HUBLER, 1999; SCHEFFER, 1995)	3. Efficient cash flow: monitor family needs on capital (IBGC, 2009)	3. Sucessor´s self development (WERNER, 2004; HUBLER, 1999)
4. Choosing successor between heirs (LEVINSON, 1971, HUBLER, 1999)	4. Conflict between minority and majority shareholders (BERNHOEFT et al, 2003)	4. Develop a criteria for choosing sucessor (LANDSBERG, 1988; WARD, 2003, HANDLER, 1989)
5. Separation between home and work (GERSICK et al, 1997)	5. Market for the sale of shares (HUBLER, 1999, GERSICK et al, 1997)	5. Professionalization (GERSICK et al, 1997)
6. Managing expectations of the members' expectations heirs (GERSICK et al, 1997)	6. Company´s Capitalization (GERSICK et al, 1997)	6. Sharing decision-making between the partners and heirs (GERSICK et al, 1997)
7. Managing heirs relationship (GERSICK et al, 1997)	7. Definition of roles: Managers X owners (GERSICK et al, 1997)	7. Strategic renewal (GERSICK et al, 1997)
8. Placing limits on the influence of the family company (GERSICK et al, 1997)	8. Establish a forum for family interaction (GERSICK et al, 1997)	
9. Get over senile generation from family business (GERSICK et al, 1997)		

Besides challenges described in table 01, another aspect that influences the development of family businesses are the mechanisms of governance. In family business "*confidence"* can be used as a governance mechanism. Once the business evolves over generations this confidence can be eroded. For the business to continue, this informal mechanism must be substituted by formal ones in order to prevent opportunistic behavior. When the succeeding generations come, heirs distance themselves from their common origin. Cooperation among them, before stimulated by closer family relations, can be weakened in the process (STEIER, 2001). The challenges inherent in family businesses development are establishing mechanisms of governance to preserve the alignment of interests between owners and managers, even though managers also belong to families (STEIER, 2001; FAMA; JENSEN, 1983b).

3. Methodology

The article seeks to expand the understanding of the succession process in farm family business. The specific objectives of this study are: a) establish motivation for the process b) identify its challenges and c) discuss how governance mechanisms influence the succession process.

The research method chosen is the multiple cases study. The main purpose of the case study is to provide an overview of the problem or identify factors that influence or are influenced by it (YIN, 2005, p. 20). The data and facts used in the study were gathered from published texts in magazines, newspapers and websites and through interviews with managers, owners and family members of those companies. The interviews followed the logic of the definition of roles proposed in the study model (GERSICK et al, 1997), within the universe: Family, Property and Management.

3.1. Sample description:

Three companies were selected to structure the case studies by convenience. It is known that the succession issue is delicate, which can bring discomfort to the interviewed. However, the personnel in these companies were willing to collaborate, even being informed on the nature of the interview. Companies respond by the premise of the work: they have passed through one or two processes of succession and have family control, i.e., most of the property belonging to a family.

a) Company A

The Company A was founded in 1945. In 2010, the main activity was milk production and processing into pasteurized milk and yogurt, featuring a vertical integration. The company went through two processes of succession.

b) Company B

Company B was founded in 1947. In the beginning of its activity, it was cultivated coffee and orange. Gradually, these cultures were replaced by sugar cane, stimulated by the introduction of the first sugar mills and ethanol in the region of the outskirts of the company. In 2010 the company was in the family´s third generation.

c) Company C

The company C began in the seventies. The company's main activity is cattle raising. The company is family´s second generation: is the daughter of the company's founder the actual president.

4. Case Analysis: the succession process

This section present the succession process in farm family business used as our sample to case analysis, bases on the development axis model proposed by Gersick *et al* (1997).

In company A, succession in management has spontaneously occurred, as a natural event. Transfer of ownership took place after the death of predecessor, without prior planning. In company B, the management transfer was structured when predecessors were alive in 1997. In this case, this transfer also induced prematurely the immediate passage of ownership from second to third generation, driven by bureaucratic procedures and costs of transfer fees and fees of public record. In company C, the succession sequence was triggered by a serious illness that has overtaken the company´s founder. During his lifetime, he organized the company to ensure continuity among his heirs by planning ownership transfer, however there was no planning for management transfer.

In companies A and B, although there were no formal succession planning in the management both successors assumed a technical function before taking on the management, enabling them to understand the internal processes of enterprises gradually. In addition, these individuals have created a self-image as managers as they progressed on their role in the company. This is surely one of the drivers of succession success.

Regarding the criteria on selection of the successor, there was no formal establishment of parameters for this choice. In company A, the option was determined by successor affinity for the activity and the fact that he already had act in the company. In company B, it is clear that in both events of succession, the choice was the son. This check was not confirmed by the interviewees. It was said that the motivation to the choice was interest in the family business and professional development within the company. In company C, the criteria for choice on the daughter was based on the fact that she was the only daughter who had a closer contact to the father, once she came to the farm on weekends with his family.

The succession processes in the three companies have been successful, despite the failure of succession planning in the sphere of management. This is because, in succession described it follows that the choices still go on a sentimental sphere, as in the cases lived in the company C, in which the situation becomes clearer, but also implied in the companies A and B, in which successors were been chosen by a non-objective way. It was taken account affinity within business, without a real assessment on the chosen´s competence.

This research also aimed to understand the motivations for the continuity of family-owned rural enterprises. Among the companies surveyed, stood out as motivations for business continuance the affinity with the rural activity, also associated with perception that the company was a family business capable to generate sufficient income for the family. The emotional attachment to the property also identified as a factor that led to business continuity. A common observation in three companies is that the link with the family business to those chosen as successors comes very early in the lives of individuals, marked by a relationship

with the company since childhood, either because they have been raised in the farm, either by having begun their career in farm family business.

Among challenges identified in farm family business analyzed, in addition to those previously described, the passage to the next generation is an issue currently on the agenda in all three companies. A common perception is the need for a formal succession planning. Notably, interest of young generation is considered one of the main challenges to be faced in next succession process in family farm business. This is because, for future generations, the emotional connection with the company is not as tight as the previous ones.

The option in these cases may be professionalizing management in these companies. In turn, besides that, it runs another problem: find qualified professionals in the market to provide this function and have incentive structures to retain these professionals, which may imply in higher cost to these rural enterprises. Managers interviewed do not believe that the young professionals' attraction to rural enterprise would be the same as for other types of business activity that could pay higher wages and have greater incentives to those professionals with good managerial skills.

In relation to the current managers in rural enterprises analyzed, these managers are also family members, which could characterize a biased choice based on family relationships rather than skills. However, one factor that restricts the professionalization of management is cost of hiring an outside agency. In the case of familiar agents, there is an affective relationship with the company that provides non-financial incentives to them, allowing them to work in exchange for lower remuneration when compared to what they could receive out of family business, as also reported in McConaughy work (2000) and Gomez-Mejia *et al* (2003).

Regarding governance mechanisms, it has been identified that still prevails confidence as a major governance mechanism. A sense of collective ownership among the members were identified in respondents discourse. However, in the three organizations studied there have already been structures formal ones, which are slowly taking shape in replacement of the confidence mechanism. In companies surveyed is noted that the structure of governance mechanisms is a recent process, which aims to gradually replace the informal ones.

The structures observed in each company are listed below (Table 02):

Table 2: Governance structures observed in the companies surveyed:

Governance Structures	Company A	Company B	Company C
Assembly	+	-	-
Board of Directors		+	+
Executive Board	+	+	+
Auditing Bodies	-	-	+

Governance structures found in the company were called "Assembly" because only members to gather. In companies B and C, the governance structure was called "Board", in which participates partners, heirs and family.

In those farms family business, despite the different name, there is a concept overlap within governance structures: the assembly functions as a board of directors but also board works as an assembly. The boards of these companies are hybrid structures: they work both as

deliberative and consultative structures. Despite the name these structures are still informal and members do not respond by the deliberations of the board legally.

In addition to advice, there is in all cases, an executive board structure and executive director positions filled by family members. Only on Company C, the body was identified by external audit. The function of this audit is to monitor the company's processes and assessment of internal controls.

However, a potential problem identified in the companies analyzed is related to the possibility of going out of business, by selling personal shares. In cases analyzed there is no there is no trading market for shares or stakes in companies. This is a recent discussion in the companies studied and little conclusion on the subject was made, except for the fact that this could become a major challenge to be faced in a short period of time.

5. Concluding Remarks

Case studies helped the understanding of the dynamics of the succession process in family farm businesses. The succession process was analyzed in the companies as a natural sequence, intrinsic to organization development. There was a close relationship between family history and family rural enterprise, from which the bonding between successors, heirs and farm business was a determinant factor on continuity of family business.

The companies surveyed have more than thirty years of existence. Its structure is linked to the perception by the founders, that land constitutes a family capital reserve, as well as a means of production to generate income. The successors were motivated to continue the business for the same reasons set out in the early development of the company.

With these observations, we conclude that the value of the land and its respective housing appreciation combined to perceptions that this asset is a means to generate an income for the family and represents a job opportunity for some members were factors that were combined to determine maintenance of rural enterprise through family generations.

Despite lack of formalization didn't caused any rupture on the continuity of these companies so far, the failure to establish a formal planning is considered a major challenge that might jeopardize the continuity of the company in future generations.

The professional management of rural family-controlled company, enclosed in this dimension is considered as the main aspect that will determine the continuity of the company, considering that among the heirs of future generations, the emotional connection that was previously observed is not as strong. This disinterest is explained by the lower ability to generate income for a greater number of partners, and also to the very nature of 'rural' activity, perceived as less dynamic by young people.

In the dimension of the property, as opposed to the axis of management, planning has been structured induced by charges in the process, which requires a more detailed tax planning. Besides that, it is not implicitly linked to the question on family business continuity.

Regarding the mechanisms of governance in the companies present, throughout their development, the informal mechanism on confidence prevailed. However, this mechanism is being replaced by more formal mechanisms. We conclude that in farm family businesses

analyzed, the factor "confidence" between the agents in the early stages of development and transition to subsequent phases eliminated the need for formal governance mechanisms. However, mechanisms are being formalized given the need for shared decision making between managers and owners. These mechanisms are not yet formalized to the legal point, and also are structures which we call hybrid, since its concepts blend elements of boards and assembly.

For future generations, business continuity is a present challenge. Difficulty in attract younger generations´ interest and ability to generate income as the main reasons for this perception. Among the challenges faced, stands the formalization of the succession process, and also the need to professionalize management. Also, structure a "market" to sell the shares, and therefore the option whether to continue the family business.

This study aimed to analyze the process of succession in family farm business, which was possible through the case studies of three Brazilian companies that met the requirements of this research.

As limitations of the study should be pointed out that the method of multiple case study limits the fact that evidence found cannot be extrapolated to the universe of rural enterprises in Brazil. Thus, through findings obtained, other issues may open up for studies on the succession process, but also to a broader theme in governance in Brazilian farm family businesses.

6. References

ANDRADE, A.; ROSSETTI, J. P. Governança Corporativa. São Paulo: Atlas, 2006.

AZEVEDO, P. F. Concorrência no Agribusiness. In: ZYLBERSTAJN, D.; NEVES, M. F. (Org.). Economia e Gestão dos Negócios Agroalimentares. São Paulo: Pioneira Thomson Learning, 2005.

BERGHE, V.; CARCHON, S. Agency Relations within the family business system: an explanatory approach. Family Business Review, n.3, v. 11, p. 171-179, 2003.

BERNHOEFT, R. Empresa familiar: sucessão profissionalizada ou sobrevivência comprometida. São Paulo: Nobel, 1989.

BERNHOEFT, R. Governança na Empresa Familiar. São Paulo: Campus, 2003.

BERTUCCI, J. L. de O. et al. Mecanismos de Governança e Processos de Sucessão: um estudo sobre a influência dos elementos da governança corporativa na orientação do processo sucessório em uma empresa familiar. Revista Brasileira de Gestão de Negócios, n.11, v. 31, p. 152-167, 2009.

DE VRIES, K. The dynamics of family controlled firms: The good and the bad news. Organizational Dynamics, n. 3, v. 21, p. 59-71, 1993.

DYER JR, G. Examining the Family Effect on Firm Performance. Family Business Review, n.4, v. 19, p. 253-273, 2006.

FLORIANI, O. P.; RODRIGUES, L. C.. Sucessão empresarial: processo sucessório em empresas familiares. In: EGEPE I, 2000, Maringá, PR. Anais do EGEPE. Maringá, PR, 2000.

GERSICK, K. et al. Generation to Generation: Life Cycles on Family Business. Boston: Harvard Business School, 1997.

GOMEZ-MEJIA, L. et al. The Determinants of Executive Compensation in Family-Controlled Public Corporations. The Academy of Management Journal, n. 2, v. 46, p. 226-237, 2003.

HANDLER, W. C. Succession in Family Business: A Review of the Research. Family Business Review, n. 2, vol 7, p. 133-157, 1994.
HUBLER, T. Ten most prevalent obstacles to family-business succession planning. Family Business Review, n. 2, v. 12, p. 117-121, 1999.
INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. Censo Agropecuário 2006. Disponível em: <http://www.ibge.gov.br/home/estatistica/economia/agropecuaria/censoagro/2006/default.shtm>. Acesso em 30/03/2010.
INSTITUTO BRASILEIRO DE GOVERNANÇA CORPORATIVA – IBGC. Código de Melhores Práticas de Governança Corporativa. 4ª ed, São Paulo: IBGC, 2009.
LANSBERG, I. The succession conspiracy. Family Business Review, n. 2, v.1, p. 119-143, 1988.
LAZZARINI, S. Estudos de Caso para Fins de Pesquisa: Aplicabilidade e Limitações do Método. In: FARINA, E. Q. Estudo de Caso em Agribusiness. São Paulo: Pioneira,1997.
LEVINSON, H. Conflicts that plague family business. Harvard Business Review. p. 90-98, 1971.
LODI, J. B.. A Ética na Empresa Familiar. São Paulo: Pioneira, 1994
MAZZOLA, P. et al. Strategic Planning in Family Business: a powerful developmental tool for the next generation. Family Business Review. n 3, v.21, p. 239-258, 2008.
MCCONAUGGHY, D. Family CEOs vs. nonfamily CEOs in the family controlled firm: An examination of the level and sensitivity of pay to performance. Family Business Review, n. 2, v. 13, p. 121–131, 2000.
MILLER, D.; LE BRETON-MILLER, I. Family Governance and Firm Performance:Agency, Stewardship, and Capabilities. Family Business Review. n. 1. v. 19, p. 73-87, 2006.
NETO, A. de B.; MOREIRA JUNIOR, A. L. Dificuldades para realização da sucessão: um estudo em empresas familiares de pequeno porte. Caderno de Pesquisas em Administração, n. 4, v. 8, 2001.
PETRY, L. I. P.; NASCIMENTO, A. M. Um estudo sobre o modelo de gestão e o processo sucessório em empresas familiares. Revista de contabilidade e finanças, n. 49, v.20 , p. 109-125, 2009.
ROMANO, C. et al. Capital structure decision making: A model for family business. Journal of Business Venturing, n. 3, v. 16, p. 285-310, 2001.
SANT`ANNA, G. Agricultura familiar. 2006. Disponível em <www.cepea.esalq.usp.br/especialagro/EspecialAgroCepea_9.doc>. Acesso em 20/11/2009.
SCHEFFER, A. B. B. Fatores dificultantes e facilitadores ao processo de sucessão familiar. Revista de Administração, n 3, v. 30, p 80-90, 1995.
STEIER, L. Family Firms, Plural Forms of Governance, and the Evolving Role of Trust. Family Business Review. n. 4, v. 14, p. 353-368, 2001.
WERNER, R. A. Familia e Negócio. Um caminho para o sucesso. São Paulo: Manole, 2004.
YIN, R. Estudo de Caso: planejamento e métodos. 3ª ed. Porto Alegre: Bookman, 2005.

TRANSGENIC SEED INDUSTRY HISTORICAL TRAJECTORY, CURRENT AND FUTURE TRENDS – MORE OPEN BUSINESS MODELS?

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Abstract
The aim of this paper is to investigate the history, describe the most important features, and point future trends of the transgenic seed industry, willing to verify if companies' business models within that industry have showed a tendency to be more open. Throughout the description of the transgenic seed industry historical trajectory, we have focused on the restructuring of industries involved with research, development and commercialization of transgenic seeds, in which mergers and acquisitions and intense alliance activity are two broad patterns among companies. We agree and understand that nowadays, a single trait transgenic seed contains several technologies that are owned by different companies, generating complex intellectual property rights (IPR) issues, which influence competition among companies. Besides that, we believe that, since in technology intensive environments knowledge necessary for innovation may lie outside a firm's core competence, continuous innovation and product launch depend on strategic partnerships and more open business models, corroborating the idea about the growing division of innovation labor observed in many industry sectors in the present. Data collection was based upon documental and bibliographical references, and in-depth interviews, analyzed through the content analysis technique, carried out with directors and managers from the six largest global agricultural biotechnology companies operating in Brazil: Monsanto, DuPont/Pioneer, Bayer CropScience, BASF, Syngenta, and Dow Agrosciences. This paper analyzed examples such as some of BASF Plant Science, Syngenta and Monsanto's partnerships to access new knowledge and generate innovation. Results showed that companies within the transgenic seed industry have taken steps towards creating more open business models, where companies have sought knowledge outside of their borders to create new products, or, other than that, technology that is developed within innovative companies is not taken to the market by the innovator, which might, instead, be done through IP licensing agreements.

Key words: agricultural biotechnology, open business models, transgenic seed industry

TRANSGENIC SEED INDUSTRY HISTORICAL TRAJECTORY, CURRENT AND FUTURE TRENDS – MORE OPEN BUSINESS MODELS?

1. Introduction

Agriculture is one of the world's oldest industries with a long history of innovation and adaptation as new practices and technologies are implemented.

In the end of the 20th century, agricultural biotechnology emerged as a potential tool to solving social problems, such as the growing demand for food (world production will have to increase 50% until 2030), and the need for alternative energy sources (LUTZ KC, 2010; UNITED NATIONS, 2004; UN NEWS CENTRE, 2008; FAO NEWSROOM, 2006; WOODS et al., 2010), once it allows farmers to increase crop productivity in more environmentally sustainable ways.

In that context, studies such as the one developed by Brookes and Barfoot (2010), show that genetically engineered, or genetically modified (GM) crops, enhanced with traits such as the Roundup Ready (RR) trait, and the Bacillus thurigiensis (Bt) trait, have contributed to a significant reduction in the environmental impact associated with insecticide and herbicide use on the areas devoted to biotech crops. For instance, from 1996 to 2008, the use of pesticides on the biotech crop area was reduced by 352 million kg of active ingredient (BROOKES & BARFOOT, 2010).

GM crops might indeed be considered revolutionary (WU & BUTZ, 2004), and the global area of biotech crops has grown every single year since its first commercialization in 1996, from 1.7 million hectares of GM crops in 1996 to 148 million hectares in 2010 (JAMES, 2010). Seeking to capitalize on the opportunities afforded by new biotechnology techniques, companies have accelerated their research and development programs, and developed new business models to commercialize their discoveries and profit from the results (KING et al., 2002).

However, biotechnology is a complex business which involves high costs and high expectations towards continuous innovation, and large companies have acquired research firms and seed companies to expand their ability to develop and distribute genetically modified seed, taking industry merger and acquisition activity to rise sharply in the 1990s, peaking in 1996 (KING et al., 2002). In addition, according to King et al. (2002) firms have sought strategic alliances to better manage research and development and marketing costs.

Besides that, competition in the field of agriculture, which was based upon breeding programs until the 1970s, has also changed and become much more complex due to the fact that a single trait transgenic seed, for instance, has a number of different proprietary technologies that are not owned by a single company, generating many intellectual property rights issues (SEHGAL, 1996).

Changes in competition, witnessed in the transgenic seed industry, are characteristics of high technology industries, where companies willing to innovate will have to do more than outsource for external knowledge, they will have to open up their business models – the way a company creates and captures value (CHEBROUGH, 2006).

Open business models have enabled companies to create and capture value by letting more external ideas flow in from the outside and more internal knowledge flow to the outside, through intellectual property licensing, for instance (CHESBROUGH, 2006). In that sense, intense inter-firm alliance can be observed among agricultural biotechnology, seed, chemical, and a number of other companies not directly related to agriculture, willing among other things, to license and cross-license transgenic seed traits, and enhance competencies through business models that are more open.

This phenomenon can be observed in strategic partnerships, such as the one between Monsanto – a multinational agricultural biotechnology company – and Embrapa (*Empresa Brasileira de Pesquisa Agropecuária* / Brazilian Agricultural Research Institute) – a public research institution with plant breeding expertise and proprietary germplasm – where Monsanto is funding nine of Embrapa's research projects, involving popular crops in Brazil, such beans, rice and sugar-cane, with resources derived from the sharing of the intellectual property rights, payable as royalties, over the commercialization of Embrapa's soybean varieties containing Monsanto's RR technology (MONSANTO, 2011).

Regarding the changes in competition, such as the growing division of innovation labor, and the need of establishing collaboration agreements in order to deliver value to customers, this paper's main objective is to investigate the history, describe the most important features, and point future trends of the transgenic seed industry, willing to verify if firms' business models for creating and capturing value from the innovation of transgenic seeds have showed a tendency to be more open.

We believe that understanding the evolution of agriculture and the changes in the competitive landscape caused by the application of biotechnology to agriculture will help managers and researchers broaden their perception about the future of the transgenic seed industry and strategies of firms involved.

This paper has been divided into five parts. The second section presents the theoretical perspectives which guided this study, approaching the transgenic seeds and business opportunities afforded by them, as well as the concept of open business models. The third section presents the research methodology which was used for developing this paper. The fourth and fifth sections present the results and discussion and the main conclusions of this study.

2. Theoretical perspectives

This section defines the genetically modified, or transgenic, seeds, and some business opportunities afforded by these products, as well as the concept of open business models that constitute a construct through which companies can boost innovation in many industries.

2.1 Transgenic seeds and business opportunities

With the application of new biotechnologies to agriculture, since the mid 1990s, genetically engineered, or transgenic, seeds have enabled companies to create new markets and redefine industry sectors.

The biotechnologies can be classified into three categories (NOSELLA et al. 2004): i) traditional biotechnologies – are thousands of years old, fermentation is an example; ii) modern biotechnologies – were developed after the industrial revolution, examples might be the biological processes used to obtain vaccines, enzymes and hybrids; and iii) new biotechnologies – have been developed since the 1970's, with the discovery of DNA recombination and cell fusion.

The application of biotechnology to agriculture created products that can not only benefit producers, but also offer benefits to processors and consumers (KRUEGER, 2001).

However, if on the one hand supporters of biotechnology and genetically modified organisms, such as GM crops, assert that those crops can revolutionize world agriculture, particularly in developing countries, in ways that would reduce malnutrition, improve food security, increase rural income, and in some cases, even reduce environmental pollutants (WU & BUTZ, 2004), on the other hand GM crops have engendered a lot of controversy and many social reactions from the public opinion (KLEBA, 1998).

Public acceptance of agricultural biotechnology was investigated by Oda and Soares (2001), who observed that in Europe, for instance, the introduction of biotechnology in the agricultural sector was followed by a strong reaction from end users and Non-Governmental Organizations (NGOs).

Despite the lack of public acceptance, the new biotechnologies applied to agriculture allow scientists to select a single gene for a desired trait, incorporate it into plant cells, and grow plants with that desired trait, and since the mid-1980s, researchers have been transplanting genes across species to produce engineered crops with pest or disease resistance, tolerance to drought, among other desirable features (WU & BUTZ, 2004).

Genetically modified crops can be classified into one of three generations (FERNANDEZ-CORNEJO, 2004). According to Kalaitzandonakes (2000), first-generation biotechnology products in agriculture have been crops with improved agronomic or input properties, such as herbicide tolerance and insect resistance. Second-generation bioengineered crops are those with enhanced quality or output traits, such as corn with high oil lysine content, developed to target feed and edible oil markets (KALAITZANDONAKES, 2000). Third generation biotech crops are crops that produce pharmaceuticals, bio-based fuels, and products beyond traditional food and fiber (FERNANDEZ-CORNEJO, 2004).

Vanhaverbeke and Cloodt (2006) argued that before the advent of agricultural biotechnology, agriculture was characterized by a standardized production of low-priced commodity-like food and feed, and that competition was based on price and economies of scale. Besides the benefits of the first-generation bioengineered crops, such as the productivity increases and farmers' profit from time and cost savings, those enhancements of agronomic traits did not change the commodity nature of crops like corn, and competition was still based upon price (VANHAVERBEKE & CLOODT, 2006).

On the other hand, according to the authors, genetically modified crops can lead to completely different ways to create value, depending on the firms' business models. Contrary to the first-generation of biotechnology products, second-generation products focusing on value enhanced traits, are designed for specific needs of end-users in industries that may not have been previously related to agriculture, some examples would be the intent of biotech companies to improve the fiber quality of cotton such as polyester-type traits with superior insulating qualities. In that sense, biotechnology has enabled agriculture to shift from low-priced commodity like food and feed to high-priced specialized plant-derived products that can be applied in a number of industries and enable companies to set up new value creating systems (VANHAVERBEKE & CLOODT, 2006).

Companies can create value from the application of biotechnology to agriculture if they implement business models that identify sources of value creation or 'value drivers', four of which might be efficiency, convenience, enabling properties, and complementary products (VANHAVERBEKE & CLOODT, 2006). Efficiency enhancements of agribiotechnology are, for instance, the purpose of the first-generation of engineered crops, to improve farm productivity. Considering convenience, insect resistant and herbicide tolerant crops also increased convenience for farmers, as they reduced the need for tillage and spraying. The enabling property of biotechnology is important for customers once it enables them to have access to value propositions that were previously unknown, such as nutraceuticals that reduce the risk of health problems. Complementary products are value drivers because they allow companies to bundle complementary goods, especially when costs of bundled products are lower than when they are delivered separately.

On way companies within the transgenic seed industry could innovate and deliver new value propositions to customers would be through the creation of business models that were more open. The next section presents the concept open business models.

2.2 Open business models

Chesbrough (2006) argued that in the current competition environment we have been witnessing a shift in the innovation paradigm, from a "closed innovation" model to an "open innovation" model.

The logic of open innovation is based on a landscape of abundant knowledge, where knowledge that a company uncovers in its research cannot be restricted to its internal pathways to market, and similarly, its internal pathways to market cannot be restricted to using the company's internal knowledge (CHESBROUGH, 2003a).

Examples of open innovation strategies would be licensing and cross-licensing technologies and patents, and generating or crafting the right business architecture, a modular architecture, for instance, where complementary innovations can be connected to each other enabling companies to manage interdependency (CHESBROUGH, 2003a; CHESBROUGH, 2003b).

According to the new open innovation paradigm, a company willing to innovate has to do more than search externally for new ideas or license more of the ideas it has developed, it must also innovate its business model – the way a company creates value and captures a portion of that value (CHESBROUGH & ROSEMBLOOM, 2002).

A business model is a set of activities – articulating the value proposition, identifying a market segment, defining the structure of the value chain required to create and distribute the offering, estimating the cost structure and profit potential of producing the offering, describing the position of the firm within the value chain, and formulating the competitive strategy – through which a technology is transformed into value (CHESBROUGH & ROSEMBLOOM, 2002).

Without a business model, technology can't be translated into economic value (VANHAVERBEKE & CLOODT, 2006). Chesbrough and Rosembloom (2002) explained that new technological developments can only generate value if the firm is capable of commercializing it through a suitable business model, which is the tool that mediates the technology one the input side and the economic value on the output side.

The open business model approach can be better understood through the shift that can be observed in the process of industrial innovation, which despite working well during the 20th century, assuming that corporations would be able to innovate by conducting basic research activities internally, and by carrying the results of that research to the market alone, has been considered obsolete in many industries (CHESBROUGH, 2003b).

Developments, such as the increasing ability of more actors to innovate, the rising cost of technology development in many industries, the rising quality of university research, the growth in quality and quantity of international research, as well as the complexity of products, which makes it impossible for firms to develop a new product alone, among other events, have rendered that closed innovation model obsolete (CHESBROUGH, 2003b; CHESBROUGH, 2006; CHESBROUGH, 2007; GASSMANN et al., 2010; GAWER & CUSUMANO, 2002).

An open business model uses the new division of innovation labor, leveraging many more ideas to create value, due to the inclusion of a variety of external concepts, and captures greater value by using resources not only in the company's own business, but also in other companies' businesses (CHESBROUGH, 2006). The next section presents the methodology that was used for developing this study.

3. Data and research methodology

This study can be characterized as a qualitative research (STRAUSS & CORBIN, 1990). Data collection was based upon documental and bibliographical references, as well as

in-depth interviews with semi-structured questionnaires (ALENCAR, 2003), analyzed through a content analysis technique (BARDIN, 1979): the thematic analysis (MINAYO, 1992).

Eight (8) in-depth interviews were carried out with one director and seven senior managers from the six largest multinational agricultural biotechnology companies operating in Brazil: Monsanto (2); Syngenta (2); DuPont/Pioneer (1); BASF (1); Bayer CropScience (1); and Dow Agrosciences (1).

The selection of the interviewees was based on convenience judgment, where the interviewees were chosen through personal contacts or references from colleagues, as long as they had knowledge about their companies' historical trajectory and strategic alliances, as well as the relevance of biotechnology to their companies' businesses.

During the process of analysis and interpretation of the research data through the thematic analysis (MINAYO, 1992), the main categories identified were organized under the following topics: 1) the history of the transgenic seed industry: evolution of agriculture and the emergence of agricultural biotechnology; 2) impacts of agricultural biotechnology on companies' competitive landscape; and 3) current and future trends regarding the transgenic seed industry's companies: more open business models?

The next section will present the study's results and discussion.

4 Results and discussion

Before approaching the question regarding the current and future trends of the transgenic seed industry and a possible tendency of more open business models, we describe the evolution of agriculture, the emergence of agricultural biotechnology, and impacts of agricultural biotechnology on companies' competitive landscape.

4.1 The history of the transgenic seed industry: evolution of agriculture and the emergence of agricultural biotechnology

The practice of agriculture emerged around ten thousand years ago (VIEIRA et al., 2004), and since then, it has undergone a number of significant changes. Over the past 80 years biological innovations embodied in the seeds, such as hybridization, and the new biotechnologies, especially genetic engineering, have led to unprecedented increase in crop yields (FERNANDEZ-CORNEJO, 2004).

Modernization process of agriculture owes much to the application of science to modern plant breeding (FERNANDEZ-CORNEJO, 2004), which is the science of improving plants to make them better suited to humankind, impelled along the 19th century with the development of fundamental knowledge such as Mendel's laws and plant selection (BORÉM et al., 2002).

It was Mendel's work on the laws of heredity that gave rise to scientific research into the inheritance of traits, focusing on corn and corn hybridization (FERNANDEZ-CORNEJO, 2004). With hybridization, a traditional breeding process in which inbred lines are crossed to create plant varieties with greater yield potential than exhibited by either parent, and the development of hybrid corn, in the United States in the 1930s, seeds and plants became objects of exchange and commercialization (PRINGLE, 2003; FERNANDEZ-CORNEJO, 2004; KLOPPENBURG, 2004).

Despite its major role in plant breeding, limitations of the hybrids – the development of hybrids through interbreeding may require up to 12 years to develop market seeds, and those hybrids may still generate only limited desired traits or, possibly, unwanted characteristics (FERNANDEZ-CORNEJO, 2004) – and limitations of the hybrids to certain species, assured the maintenance of the public sector's strategic position, where some crops

unable to hybridize became the target of ambitious international breeding programs (KLOPPENBURG, 2004; PRINGLE, 2003).

Later on, other scientific discoveries in the field of genetics, beginning with Watson and Crick's postulate on the double helix model for DNA in 1953 and continuing with the development of the first genetically engineered plant in 1982, significantly reduced the unwanted characteristics that often resulted from traditional plant breeding crosses (FERNANDEZ-CORNEJO, 2004). In addition, the new biotechnologies could be applied to every type of crop (PRINGLE, 2003; FERNANDEZ-CORNEJO, 2004; KLOPPENBURG, 2004).

The transgenic seed industry emerged with the application of the new biotechnologies to agriculture, and since the mid 1990s, transgenic seeds have redefined companies and industry sectors.

Biotechnology is considered to be a toll of great relevance for the sustainability and strategic position of companies operating in the transgenic seed industry in the present, as we can observe from the next interviewee's opinion:

(1) "Syngenta started working with biotechnology because we believe that the most important factor… The factor that will be decisive concerning sales will be the seed. The seed will be a decisive factor, and we truly believe that the market for seeds and biotechnology is a growing, promising market."

Agricultural biotechnology has had many impacts on companies, markets and products, once powerful technologies and valuable traits have led to linkages between agriculture and a broad spectrum of non-conventional sectors (SHIMODA, 1998), and also it has led to the restructuring of industries related to agricultural production processes, which will be discussed in the next section.

4.2 Impacts of Agricultural Biotechnology on Companies' Competitive Landscape

The emergence of agricultural biotechnology in the 1970s has influenced and dramatically changed competition rules among firms involved in the agricultural production processes for a number of reasons, among which are the following: i) companies realized that many sectors' core competencies could be complementary (KLOPPENBURG, 2004; PRINGLE, 2003); ii) the introduction of legislation that enabled developers to privatize intellectual property rights (IPRs) in agricultural biotechnology, leading agricultural research to gradually shift from public to private institutions (MORRIS et al., 2006; BLAKENEY, 2010); iii) complexity of products that have many proprietary technologies not owned by a single company and consequently the complexity of relationships among companies (SEHGAL, 1996); and iv) companies became dependent on external knowledge and other companies' core capabilities in order to innovate (GAWER & CUSUMANO, 2002; FREITAS et al., 2010).

Regarding the perceived complementarities among companies from different industry sectors, it is relevant to keep in mind that biotechnology made it possible to have manipulative access to the basic molecular building blocks of life itself, and the practical utility, integrated into agricultural production processes was provided by the seed, that was the material link between research and the market (KLOPPENBURG, 2004). Therefore, control over the seed became a matter of considerable importance.

In that context, many studies have highlighted that the history of agriculture is marked by extensive structural change and transition (HAYENGA, 1998; KALAITZANDONAAKES, 2000; FULTON & GIANNAKAS, 2001; FERNANDEZ-CORNEJO, 2004).

Many companies engaged in mergers and acquisitions as we can observe in the following text of one of the interviewees:

(2) “Syngenta was formed by the merger between Novartis and AstraZeneca’s agribusinesses. Novartis and Zeneca themselves resulted from mergers of other companies. Zeneca had in its history the merger between ICI and Stauffer. And Sandoz and Ciba merged to form Novartis. When Syngenta was created Novartis and AstraZeneca separated the agribusinesses piece which originated Syngenta.”

Fulton & Giannakas (2001) observed that in the 1990s, seed and chemical industries saw a substantial number of mergers and acquisitions and an increase in vertical as well as horizontal integration. Besides that, the major biotechnology companies increasingly purchased seed companies as a source of seed material in which to insert genes, seeking to gain knowledge from those companies in many countries that had, over the years, developed seed for specific geographical markets.

The next interviewee’s text talks about the intense merger and acquisition activity in which many companies engaged in the mid 1980s:

(3) “In the mid 1980’s many agrochemical companies acquired seed companies. Dow acquired Cargill in the United States, Monsanto acquired a number of different seed companies, and DuPont acquired Pioneer, and companies began to understand that in their chemical product portfolio, seeds, especially corn and cotton, were also good businesses.”

In that context, Monsanto led the way with massive investments in biotechnology research, and with seed and biotechnology company mergers and acquisitions (HAYENGA, 1998). According to next interviewee’s text, in the 1990s Monsanto acquired many seed companies so it could a means to develop new products using the technologies it had discovered:

(4) “In the 1990s Monsanto strengthened its activities within the biotechnology field and acquired a number of different companies such as Calgene, Asgrow, Braskalb and Agroceres.”

In addition, the seed industry has been much more concentrated since the second half of the 1990s, as a result of major chemical companies vertically integrating into the seed and biotechnology industries, willing to better capture profits from biotechnology innovations, which in some cases are also complementary to their chemical technology (HAYENGA, 1998).

Structural changes, mergers and acquisitions, resulted in industry consolidation and also in intense interfirm-alliance activity (KING et al., 2002).

Interfirm alliances are a response from companies that have realized they can’t integrate every competency to produce every product internally, isolated from other companies as the following text of one of the interviewees:

(5) “… Companies get specialized in specific areas, and they don’t have resources to get specialized in every area. Therefore, I think doing partnerships with different suppliers is an alternative. There are companies that have seed and traits. Nevertheless, every day we see news such as: ‘Company A engaged in a partnership or licensed its technology to company B’, even among competitors, among the six largest companies in this area. For I am not going to have every solution!”

In order to deal with the complexity of products or the difficulty to profit from agricultural production and sustain competitive advantage, during the last twenty years, a growing number of strategic alliances and partnerships has taken place among the largest agricultural biotechnology companies and many other companies from different sectors, willing, among other things, to share risks and costs of research and development and regulatory approval, enhance competences, through licensing and cross licensing traits, access

crop protection chemical treatment and quality germplasm, and create new markets (BJORNSON, 1998; HINTERHUBER, 2002; KING et al., 2002; HOWARD, 2009).

The changes witnessed in industries related to agricultural biotechnology are in fact a common characteristic of a new competitive landscape, where high technology companies willing to innovate have implemented new business models. This trend will be approached in the next section.

4.3 Current and future trends regarding the transgenic seed industry's companies: more open business models?

Biotechnology firms are very dynamic and their business models – or the logic of a company to create and capture value (CHESBROUGH & ROSEMBLOOM, 2002) – attempting to respond to the rapidly changing scientific and commercial environment, tend to gradually evolve (WHITTLE, 2002). In that sense, agricultural biotechnology firms, have gone through several transformations since the 1980's. Since the second half of the 1990's, seeking to decrease costs or increase efficiency, companies started developing open innovation strategies, such as partnerships for licensing and cross-licensing technologies that enable companies to share complementary competences**.**

As it is possible to observe in the following interviewee opinion, more than two companies might share their core capabilities to create new products, such as the 'stacked-trait' seeds. Trait stacking involves inserting multiple genetically engineered traits into a single plant variety:

(6) "We [Monsanto] have a partnership of collaboration with Dow, and it's actually introducing a new generation of corn seeds called SmartStax®. What it does is it takes Monsanto's best insect resistance traits along with Roundup Ready, it takes Dow's best insect traits along with the herbicide tolerance from Bayer to which Dow has a license, and it puts them together. We call it SmartStax technology. Both companies have rights to it. But what it does is… It does two things. It increases the spectrum of disease resistance against pests that harm the crop productivity. The second is it adds two different herbicide tolerances Roundup Ready and Liberty Link. So it gives growers more options, it provides a more sustainable agricultural system."

Biotechnology allows bundling a number of diverse enabling technologies, or attributes together to create new value propositions.

In that sense, scientific discoveries such as the first and second generation of agricultural biotechnology crops have taken firms to seek strategic alliances as it can be seen in the inter-firm alliance which involves technologies from Monsanto, Dow Agrosciences, and Bayer CropScience (DOW AGROSCIENCES, 2008) (Figure 1).

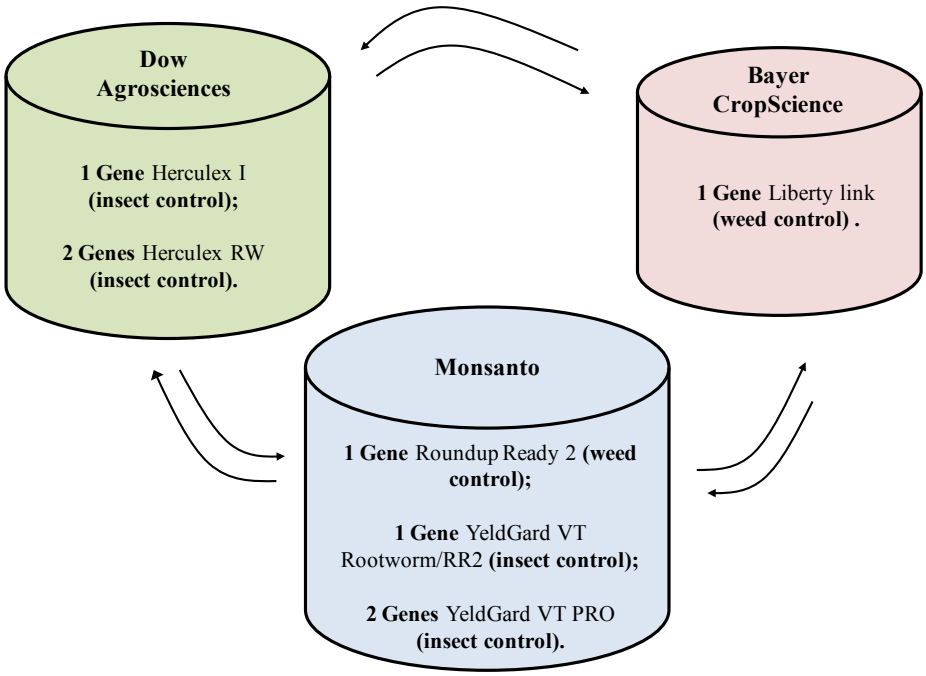

Figure 1: Core capabilities from Monsanto, Dow Agrosciences and Bayer CropScience shared in the strategic alliance for developing the SmartStax corn seed
Source: Developed by the authors

The SmartStax partnership is one of the many collaboration agreements for cross-licensing seed traits observed in the agricultural biotechnology industry in the present. It has bundled technologies that have many 'value drivers': efficiency, convenience, enabling properties, and complementary products (VANHAVERBEKE & CLOODT, 2006).

Another partnerships relevant to this sector includes an strategic partnership between Monsanto and Embrapa for the research, development and commercialization of better adapted new varieties of Roundup Ready herbicide tolerant soybean to Brazilian regions, where Monsanto has benefited from plant varieties developed by Embrapa and the know-how on soybean varieties, while the partner has had access to Monsanto's RR technology (Monsanto, 2011). Nevertheless, the RR trait developed by Monsanto will find its way to the market through Embrapa's plant varieties. And, on the other hand, Embrapa's customers can benefit from new value propositions.

And there are many other examples of strategic partnerships such as the one shared by Monsanto and Embrapa between companies that have developed better adapted plant varieties and companies which have patented traits to license. An example is the strategic alliance between Embrapa and BASF for the research, development and commercialization of the herbicide-tolerant soybean branded Cultivance® (EMBRAPA, 2011). BASF collaborates with the herbicide-tolerant trait, and Embrapa collaborates with the plant variety, as shown by the interviewee's text below:

(7) "For instance, we [BASF] have a partnership with Embrapa for soybean... And we have other examples of partnerships around the world, where BASF collaborates with the gene and with our experience, and our partner collaborates with the genetics."

In the mentioned partnership, between BASF and Embrapa, the two companies have created a new product that both companies license to seed growers, according to the interviewee's text:

(8) "… For instance, COODETEC is a seed company located in Paraná, it has a license to our product. TMG, which is a another seed company, also has a license.

So this is a model where two companies [BASF and Embrapa], have combined their expertise and created a commercial product. And then, COODETC and TMG they have their customers [farmers].

So far we have seen strategic alliances that present different combinations of companies' expertise, such as the bundling of different traits within the same seed (SmartStax) for cross-licensing, or exchanging different technologies, agreements between agricultural biotechnology private and public companies (Monsanto X Embrapa) and (BASF X Embrapa), for accessing germplasm, or quality plant varieties, and high quality traits, and creating new value propositions for farmers (Cultivance). These examples seem to be proof that the complex solutions offered to customers in the present are not possible without sharing distinct capabilities within collaboration agreements, and that the context of growing innovation labor has taken companies to share their assets and competencies to innovate, or to take their new technologies to the market through more open business models.

Within the inter-firm alliance between BASF and Embrapa these two companies are not the ones to deliver the innovation (Cultivance) to the market. Other companies such as COODETEC and TMG are the ones who deliver the innovation.

Analysis of the interviews that were carried out corroborates the fact that innovation in the present in high-tech industries such as the transgenic seed industry depends on collaboration and outsourcing of new ideas and technologies as shows the next two interviewees' perceptions:

(9) "What we are trying to do is we are trying to avoid searching for things that already are part of Syngenta's core business… Our goal is to look for things that are linked to our businesses, because we have expertise in agriculture, we know our customer [the farmer]… We look for things that are not part of our core business and transform it into business."

(10) "When BASF decided ten years ago to invest in biotechnology, it created a new company, BPS - BASF Plant Science, which is a research and development platform. So the idea was to create a gene platform and then look for seed companies."

The interviewees' opinions show that major players in the transgenic seed industry have within strategic inter-firm alliances their means to access knowledge assets, generate innovation, and take new products to the market, and present some hints on how their business models will be, at least in the near future. They will certainly keep opening up their business models to create and capture value from their innovations.

5. Concluding remarks

The literature review as well as the interviews carried out made it possible for us to analyze the evolution of agriculture and the impacts that the new biotechnologies applied to agriculture have caused in many industries involved with developing the transgenic seed.

As we could observe, transgenic seed took competition to a new level that seems to highlight the relevance of collaboration, even with competitors for creating and capturing value.

In that context, the concept of open innovation and open business models might help managers make sense of the competitive environment, and complexity of innovative activity within high-technology industries.

We believe that the renewed role of knowledge and the redefinition of competitive rules made companies involved with developing the transgenic seed implement new strategies, establishing partnerships to enable the value creation.

As we expected, having witnessed strategic alliances that present different combinations of companies' expertise, such as the bundling of different traits within the seed, and agreements between two companies for sharing expertise regarding quality traits and germplasm, willing to create complex solutions to customers, it is possible to observe that firms have opened their business models.

Also, we believe other studies may help analyze new theoretical frameworks of open business models such as the value constellations or the business platforms for managing the complexity of innovation, increasing interdependency between products and innovations and the growing number of industry actors with the ability to innovate.

Other studies must be carried out in the transgenic seed industry involving other major players, which are also relevant for the innovation process. In Brazil, for instance, public research institutions, and public universities are fundamental elements in the innovative environment of the agricultural biotechnology industry. Also, we believe that seed growers must be heard, so that we can also have other points of view besides the ones from the world's largest multinational companies.

Our study may help researchers and managers understand that not only industries related to agriculture will experience restructuring or new business models, such as more open business models, which allow corporate mosaics such as the one formed around the agricultural biotechnology, with the bundling of products that help companies offer better value propositions to their customers, but also other sectors might change to better respond to new challenges of competition.

6.Acknowledgement

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7.References

ALENCAR, E. **Pesquisa social e monografia**. Lavras: UFLA/FAEPE, 2003.

BARDIN, L. **Análise de conteúdo** (L. A. Reto & A. Pinheiro, Trad.). São Paulo: Edições 70, Livraria Martins Fontes (Obra original publicada em 1977), 1997.

BJORNSON, B. Capital market values of agricultural biotechnology firms: how and why? **AgBioForum**, v. 1, n. 2, 1998, p. 69-73.

BLAKENEY, M. Recent developments in intellectual property and power in the private sector related to food and agriculture. **Food Policy**, 2010, doi: 10.1016/j.foodpol.2010.10.011.

BORÉM, A.; GUIMARÃES, E. P., FEDERIZZI, L. C. & TOLEDO, J. F. F DE. From Mendel to genomics, plant breeding milestones: a review. **Crop Breeding and Applied Biotechnology**, v. 2, n. 4, 2002, p. 649-658.

BROOKES, G.; BARFOOT, P. Global impact of biotech crops: environmental effects, 1996-2008. **AgBioForum**, v. 13, n. 1, 2010, p. 76-94. Retrieved September 28, 2010, from http://www.agbioforum.org/v13n1/v13n1a06-brookes.htm

CHESBROUGH, H. **Open innovation: the new imperative for creating and profiting from technology**. Boston, MA: Harvard Business School Press, 2003a.

CHESBROUGH, H. Open platform innovation: creating value from internal and external innovation. **Intel Technology Journal**, v. 7, n. 3, August, 2003b.

CHESBROUGH, H. O**pen business models: how to thrive in the new innovation landscape**. Boston, MA: Harvard Business School Press, 2006.

CHESBROUGH, H. Why companies should have open business models? **MIT Sloan Management Review**, v. 48, n. 2, 2007, p. 21-29.

CHESBROUGH, H. & ROSENBLOOM, R. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. **Industrial and Corporate Change**, v. 3, n. 11, 2002, p. 529-555.

DOW AGROSCIENCES. **Monsanto, Dow agreement paves the way for industry's first-ever, eight-gene stacked offering in corn**, 2008. Retrieved September 20, 2008, form: http://www.dowagro.com/newsroom/corporatenews/2007/20070914a.htm

EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA (EMBRAPA). **Soja Cultivance® recebe aprovação para cultivo comercial no Brasil**, 2010. Retrieved August 01, 2010, form: http://www.embrapa.br/imprensa/noticias/2010/fevereiro/1a-semana/soja-cultivanceae-da-basf-e-da-embrapa-recebe-aprovacao-para-cultivo-comercial-no-brasil/

FAO NEWSROOM. **FAO sees major shift to bioenergy**, April, 25, 2006. Retrieved September 20, 2010, from http://www.fao.org/newsroom/en/news/2006/1000282/index.html

FERNANDEZ-CORNEJO, J. **The seed industry in the U.S. agriculture**: an exploration of data and information on crop seed markets, regulation, industry structure, and research and development. US Department of Agriculture, Economic Research Service, Agriculture Information Bulletin 786: Washington, 2004.

FREITAS, I. M. B.; CLAUSEN, T. H.; FONTANA, R.; VERSPAGEN, B. Formal and informal external linkages and firms' innovative strategies. A cross-country comparison. **Journal of Evolutionary Economics**, v. 21, 2010, p. 91-119.

FULTON, M. & GIANNAKAS, K. Agricultural biotechnology and industry structure, **AgBioForum**, v. 4, n. 2, 2001, p. 137-151.

GASSMANN, O., ENKEL, E. & CHESBROUGH, H. The future of open innovation. **R&D Management**, v. 40, n. 3, 2010, p. 213-221.

GAWER, A. & CUSUMANO, M. A. **Platform Leadership: How Intel, Microsoft and Cisco Drive Industry Innovation**, Boston, MA: Harvard Business School Press, 2002.

HAYENGA, M. L. Structural change in the biotech seed and chemical industrial complex. **AgBioForum**, v. 1, n. 2, 1998, p. 43-55.

HINTERHUBER, A. Value chain orchestration in action and the case of the global agrochemical industry. **Long Range Planning**, v. 35, 2002, p. 615-635.

HOWARD, P. H. Visualizing Consolidation in the global seed industry: 1996-2008. **Sustainability**. v. 1, 2009, p. 1266-1287.

JAMES, C. **Global status of commercialized biotech/GM crops: 2010**. [Brief 42]. International Service for the Acquisition of Agri-Biotech Applications [ISAAA], 2010. Retrieved June 1, 2011, from http://www.isaaa.org/resources/publications/briefs/42/executivesummary/default.asp

KALAITZANDONAKES, N. G. Agrobiotechnology and competitiveness. **American Journal of Agricultural Economics**, v. 82, n. 5, 2000, p. 1224-1233.

KING, J. L., WILSON, N. L. W. & NASEEM, A. A tale of two mergers: what we can learn from agricultural biotechnology event studies. **AgBioForum**, v. 5, n. 1, 2002, p. 14-19. Retrieved September 20, 2010, from http://www.agbioforum.org/v5n1/v5n1a04-king.htm

KLEBA, J. B. Riscos e benefícios de plantas transgênicas resistentes a herbicidas: o caso da soja RR da Monsanto. **Cadernos de Ciência & Tecnologia**. Brasília, v. 15, n. 3, 1998, p. 9-42.

KLOPPENBURG, J. R., JR. **First the seed – the political economy of plant biotechnology.** Wisconsin: The University of Wisconsin, 2004.

KRUEGER, R. W. The public debate on agrobiotechnology: a biotech company's perspective. **AgBioForum**, v. 4, n. 3 & 4, 2001, p. 209-220.

LUTZ, W. & KC, S. Dimensions of global population projections: what do we know about future population trends and structures? **Philosophical Transactions of the Royal Society**, v. 365, September, 2010, p. 2779-2791. Retrieved Sepetember 28, 2010, from http://rstb.royalsocietypublishing.org/content/365/1554.toc

MINAYO, M. C. S. **O desafio do conhecimento: pesquisa qualitativa em saúde**. São Paulo: Hucitec, 2000.

MONSANTO. **Monsanto repassa R$ 5.9 mihões a Embrapa**, January 7, 2011. Retrieved May 01, 2011, from: http://www.monsanto.com.br/sala_imprensa/sala_imprensa.asp

MORRIS, M.; EDMEADES, G.; PEHU, E. The global need for plant breeding capacity: what roles for the public and private sectors? **HortScience**, v. 41, n. 1, February, 2006, p. 30-39.

NOSELLA, A., PETRONI, G. & VERBANO, C. Characteristics of the Italian industry and business models: the initial results of na empirical study. **Tchnovation**, v. 25, n. 8, 2004, p. 841-855.

ODA L. M.; SOARES, B. E. C.. Biotecnologia no Brasil – aceitabilidade pública e desenvolvimento econômico. **Parcerias estratégicas**, v. 3, n. 10, 2001, p.1-12.

PRINGLE, P. **Food, Inc. Mendel to Monsanto** – the promises and perils of the biotech harvest. New York: Simon & Schuster Paperbacks, 2003.

SEHGAL, S. "IPR Driven Restructuring of the Seed Industry." **Biotechnology and Development Monitor**, n. 29, 1996, p. 18-21.

SHIMODA, S. M. (1998), Agricultural biotechnology – master of the universe? **AgBioForum**, v. 1, n. 2, 1998, p. 62-68.

STRAUSS, A. & CORBIN, J. **Basics of qualitative research: grounded theory procedures and techniques**, London: Sage Publications, 1990.

UNITED NATIONS. **World population to 2300**. New York, NY: United Nations, Population Division, 2004.

UNITE NATIONS (UN) NEWS CENTRE. **UN agency calls for rise in farm production to combat global food crisis,** September 17, 2008. Retrieved September 20, 2010, from http://www.un.org/apps/news/story.asp?NewsID=28093&Cr=food&Cr1=crisis

VANHAVERBEKE, W. & CLOODT, M. **Open innovation in value netwoks**. In: Chesbrough, H.; Vanhaverbeke, W; West, J. *Open innovation: researching a new paradigm.* New York: Oxford University Press, 2006, p. 258-284.

VASIL, I. K. (2008). A history of plant biotechnology: from the Cell Theory of Schleiden and Schwann to biotech crops. **Plant Cell Report**, 2008, p. 1423-1440.

VIEIRA, M. L. C., VELLO, N. A. & SILVA, M. C. DE, FILHO. **Genética e melhoramento vegetal**. In: Luis Mir. (Org.). Genômica. São Paulo: Atheneu, 2004, p. 679-703.

WHITTLE, N. **Entrepreneurial business models in the UK biotechnology sector**. Dissertation (Master od Business Administration Degree) Cambridge School of Business. University of Cambridge, 2002, 47 p.

WOODS, J., WILLIAMS, A., HUGHES, J. K., BLACK, M. & MURPHY, R. Energy and the food system. **Philosophical Transactions of the Royal Society**. v. 365, September, 2010, p. 2991-3006. Retrieved Sepetember 28, 2010, from http://rstb.royalsocietypublishing.org/content/365/1554.toc

WU, F. & BUTZ, W. P. The future of genetically modified crops: lessons from the green revolution. **RAND Corporation**, 2004.

INNOVACIÓN EN LA GESTIÓN DE LOS AGRONEGOCIOS: DISEÑO DE UN BALANCED SCORECARD EN PYMES AGROPECUARIAS

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Abstract
Las empresas PYMES (pequeñas y medianas empresas) poseen una importancia fundamental dentro del sector agropecuario argentino. No obstante, este tipo de organizaciones se han caracterizado tradicionalmente por deficiencias a nivel de la planificación estratégica y de la gestión empresaria. Resulta pertinente, luego, analizar la posibilidad de incorporar nuevas herramientas de gestión que permitan mejorar su performance. En este sentido, el presente trabajo se propone analizar la factibilidad de aplicar el Tablero de Comando Balanceado (BSC) en los procesos de gestión de las PYMES agropecuarias, una metodología ampliamente difundida a nivel de las grandes empresas industriales, pero con escasa presencia en organizaciones de menor escala. Para ello, se presenta la herramienta desde un punto de vista teórico, se identifican las limitantes más frecuentes de las PYMES agropecuarias a nivel de la gestión y se presenta la estructura general de un BSC diseñado por los autores para un caso de estudio (una empresa PYME argentina productora de papas), en base a objetivos estratégicos e indicadores considerados por la Alta Dirección como centrales para el desarrollo del negocio.

Key words: sector agropecuario, Tablero de Comando Balanceado, PYMES, gestión

INNOVACIÓN EN LA GESTIÓN DE LOS AGRONEGOCIOS: DISEÑO DE UN BALANCED SCORECARD EN PYMES AGROPECUARIAS

1. Situación problemática

El sector agropecuario posee una importancia fundamental dentro de la economía argentina, explicando en gran medida los ciclos de crecimiento económico en los distintos momentos históricos. En particular, este sector[89] constituye aproximadamente el 10% del PBI nacional (datos de INDEC de 2010) y el 57% de las exportaciones del país (entre productos primarios y manufacturas de origen agropecuario, INDEC, 2011). Asimismo, se estima que el empleo total generado por las cadenas agroindustriales asciende a 5,2 millones de puestos de trabajo, representando el 37,4% del total de ocupados en Argentina (Llach *et al*, 2004).

Desde el punto de vista de su organización, la actividad agropecuaria en Argentina es llevada a cabo por unas 333 mil empresas (INDEC, 2002). Específicamente, la empresa agropecuaria puede ser considerada como un sistema de producción conformado por un complejo conjunto de elementos estructurales (factores de la producción, inserción en el medio, etc.) relacionados estrechamente entre sí para cumplir objetivos precisos, que genera bienes agrícolas, pecuarios o forestales destinados al mercado y posee una dirección que asume la gestión y los riesgos de la actividad productiva (Ghida, 2009).

En particular, las empresas agropecuarias del tipo pequeñas y medianas (PYMES) poseen una relevancia fundamental en la estructuración y la dinámica del sector primario. A pesar de los altos niveles de informalidad en esta actividad, se estima que el 99% de las organizaciones formales del sector primario son del tipo PYME (Claves, 2008).

Desde el punto de vista de la gestión de estas empresas, éstas se han caracterizado tradicionalmente por presentar una fuerte orientación de los recursos humanos, físicos y financieros hacia las actividades de producción, no existiendo un esfuerzo análogo para el desarrollo de áreas de administración integral con sistemas acordes al mundo globalizado y la velocidad actual de los negocios. Sin embargo, los contextos cambiantes, el mayor nivel de incertidumbre que con llevan las decisiones a tomar y la gran cantidad de información disponible para analizar, hacen cada vez más necesaria la adopción por parte de los productores de herramientas que mejoren el gerenciamiento de sus explotaciones (Ghida, 2009).

En particular, el negocio agropecuario comprende una actividad productiva compleja, donde el ciclo operativo se desarrolla en una "fábrica sin techo" -el campo- y por ende se encuentra sujeto a riesgos climáticos que se suman a los riesgos operacionales tradicionales de las empresas manufactureras.

En este marco, es necesario destacar que los tiempos de aprendizaje de las actividades agropecuarias resultan comparativamente más extensos respecto de las industrias tradicionales, pues la organización agropecuaria está acoplada, como característica distintiva,

[89] Incluyendo las actividades de agricultura, ganadería, pesca y silvicultura.

a los procesos biológicos de los cultivos y/o animales de producción (Fellner, 2004). En consecuencia, frecuentemente no existe la posibilidad de corregir errores sino hasta la campaña o el ciclo siguiente, lo cual puede insumir lapsos considerables y se genera un factor extra que debe ser considerado dentro del proceso de planeamiento.

La importancia económica de las PYMES dentro del sector agropecuario justifica, luego, orientar los esfuerzos de investigación al desarrollo y la factibilidad de implementación de nuevas herramientas de gestión a la administración tradicional.

En este sentido, desde el ámbito de la academia, numerosos autores han destacado la importancia de la planificación estratégica como parte fundamental de la gestión empresarial (Gibb & Scott, 1985; Bamberger, 1980 in Gibbs & Scott, 1985; Schwenk & Schrader, 1993), proponiendo una correlación positiva entre la existencia de una planificación estratégica más o menos formal y el crecimiento y la performance de la firma. En particular, el Tablero de Comando Balanceado (BSC; Kaplan & Norton, 1992) se presenta como una herramienta de amplia validez para el proceso de planificación estratégica.

Brevemente, el Tablero de Comando Balanceado está conformado por un conjunto de indicadores basados en los objetivos estratégicos de la empresa íntimamente conectados entre sí. Los indicadores, por su parte, se asocian a un sistema de alarmas cuando los resultados obtenidos se encuentran por debajo de los niveles esperados o deseados por la Alta Dirección. Por este motivo, el BSC es una herramienta ágil que le proporciona a la Alta Dirección una visión rápida e integral del negocio a medida que éste se está desarrollando y permite generar medidas correctivas a tiempo.

De esta forma, al permitir una clara visualización de los objetivos y metas estratégicas de la empresa y también de los indicadores que evalúan el grado de consecución de los mismos, el BSC puede constituir una herramienta de gran utilidad para el proceso de planificación estratégica y, en consecuencia, para la gestión. En efecto, el Tablero de Comando es una herramienta de administración de negocios difundida a nivel de las grandes empresas industriales a nivel mundial (Los Grobo S.A., Danone S.A., Kraft S.A., por nombrar sólo algunas) pero con escasa presencia en el mercado agroindustrial de la Argentina y, en particular, con prácticamente nula existencia en las PYMES agropecuarias.

En base a lo expuesto anteriormente, el objetivo del presente trabajo es analizar la factibilidad de implementar el BSC en las PYMES agropecuarias. Específicamente, se propone:

1) identificar las características principales de las empresas PYMES agropecuarias en Argentina, con énfasis en las principales limitaciones a nivel de la gestión y su posible incidencia en la adopción del BSC; y

2) exponer la estructura general de un BSC en base a los objetivos estratégicos e indicadores de una PYME agropecuaria argentina productora de papas, analizando posibles limitaciones para su implementación.

2. Metodología

El enfoque epistemológico empleado en la presente investigación ha sido el conocimiento fenomenológico, propuesto por Peterson (1997) para el abordaje de estudio de

los agronegocios, en virtud del cual los fenómenos de la realidad son esencialmente inseparables del contexto.

En este marco, se recurrió al método de estudio de caso para exponer la estructura de un BSC para su utilización específica en el sector agropecuario. El estudio de caso es uno de los métodos más frecuentemente empleados para llevar a cabo una investigación con enfoque fenomenológico. Según Yin (1989), el estudio de caso surge como método potencial de investigación cuando se desea entender un fenómeno social complejo, que presupone un elevado nivel de detalle de las relaciones dentro y entre los individuos y organizaciones, y de sus intercambios con el entorno. La extensión de los resultados del caso hacia conclusiones más generales ha de requerir un análisis criterioso por parte del investigador.

En particular, la empresa seleccionada como caso de estudio fue Esperanza Sud, dedicada a la producción de papas de la localidad de Balcarce (provincia de Buenos Aires, Argentina). En base a los objetivos e indicadores preexistentes en la organización (seleccionado aquellos considerados como centrales por la Alta Dirección para el desarrollo exitoso de su negocio), se diseñó una propuesta de BSC para la empresa, sistematizando y estructurando tales conceptos en base a la metodología propuesta por Kaplan & Norton (1996), descripta en Marco Teórico.

Las fuentes de información utilizadas este trabajo son primarias, secundarias e internas. En particular, la exposición de los conceptos del BSC y la caracterización de empresas PYMES se basan en investigaciones bibliográficas acerca de la temática. Por su parte, los objetivos estratégicos e indicadores utilizados para sus operaciones por Esperanza Sud fueron obtenidos en base a entrevistas con los Directivos de las áreas de Administración y Producción y a documentos internos de la empresa estudiada.

3. Marco Teórico

Según la definición de Kaplan & Norton (1992), el Tablero de Comando Balanceado constituye una herramienta de gestión empresarial y de planificación estratégica orientada a ordenar los objetivos y planes estratégicos de una organización y traducirlos en acciones concretas. Esta herramienta incluye aspectos adicionales a los indicadores financieros con que los directivos suelen evaluar el desempeño de las empresas para proveer una visión más balanceada de la performance empresarial (Kaplan & Norton, 1996).

Para conectar la estrategia[90] de la empresa con la visión, el Tablero de Comando Balanceado utiliza dos elementos: el Mapa de la Estrategia y el Tablero de Comando. El Mapa de la Estrategia (Fig. 1) proporciona un marco para ilustrar de qué forma la estrategia de la empresa vincula los activos intangibles con los procesos de creación de valor, por medio de la definición de los objetivos más importantes de la organización y las relaciones causales entre ellos. Tales objetivos se dividen en al menos cuatro perspectivas: Aprendizaje y Crecimiento, Procesos Internos, Clientes y Económico-Financiera. El concepto subyacente es que una mejora en los objetivos de Aprendizaje y Crecimiento ha de impactar positivamente en los objetivos de los Procesos Internos, lo cual permitirá un mejor posicionamiento en la perspectiva de los Clientes y, en consecuencia, en la perspectiva Económico-Financiera. Los elementos más importantes de cada perspectiva son (Kaplan & Norton, 1992):

[90] Según Kaplan & Norton (2000), la estrategia describe de qué forma la empresa tiene la intención de crear valor sostenido para sus accionistas.

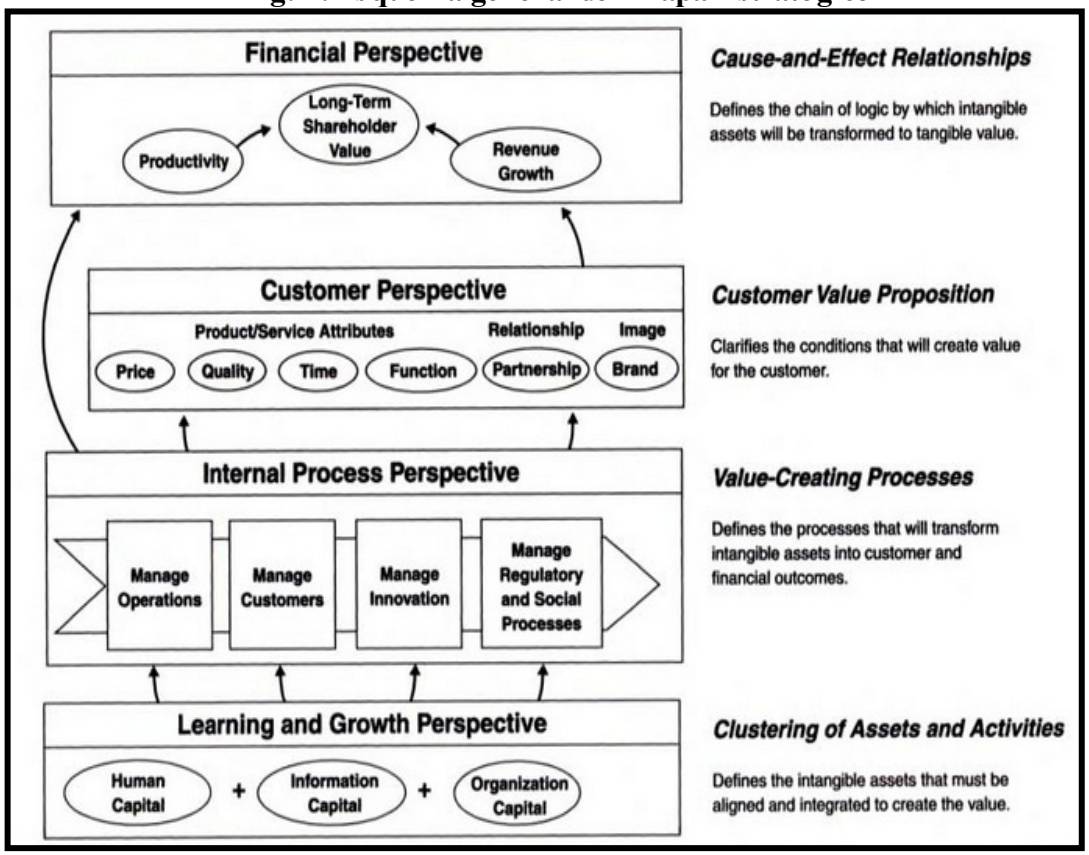
1) económico-financiera: incluye los aspectos económicos y financieros de la empresa, cuyo análisis resulta imprescindible en toda actividad comercial.

2) de los clientes: la literatura más reciente acerca de la gestión empresaria destaca la importancia de la satisfacción de los clientes, sosteniendo que si éstos no están conformes eventualmente buscarán otros proveedores, lo que a su vez comprometerá los resultados financieros futuros.

3) de procesos internos: contempla las operaciones internas de las empresas que llevan a la obtención de los productos y servicios.

4) de aprendizaje y crecimiento: abarca la capacitación de los recursos humanos y el desarrollo de una cultura organizacional orientada al mejoramiento individual y corporativo entendiendo que, en los contextos actuales de rápidos cambios tecnológicos, resulta prioritaria la formación continua de las personas.

Fig. 1. Esquema general del Mapa Estratégico



Fuente: Kaplan & Norton, 2004

En el Tablero de Comando (Fig. 2), por su parte, se supervisan cuatro aspectos:

1) objetivos importantes para la empresa.

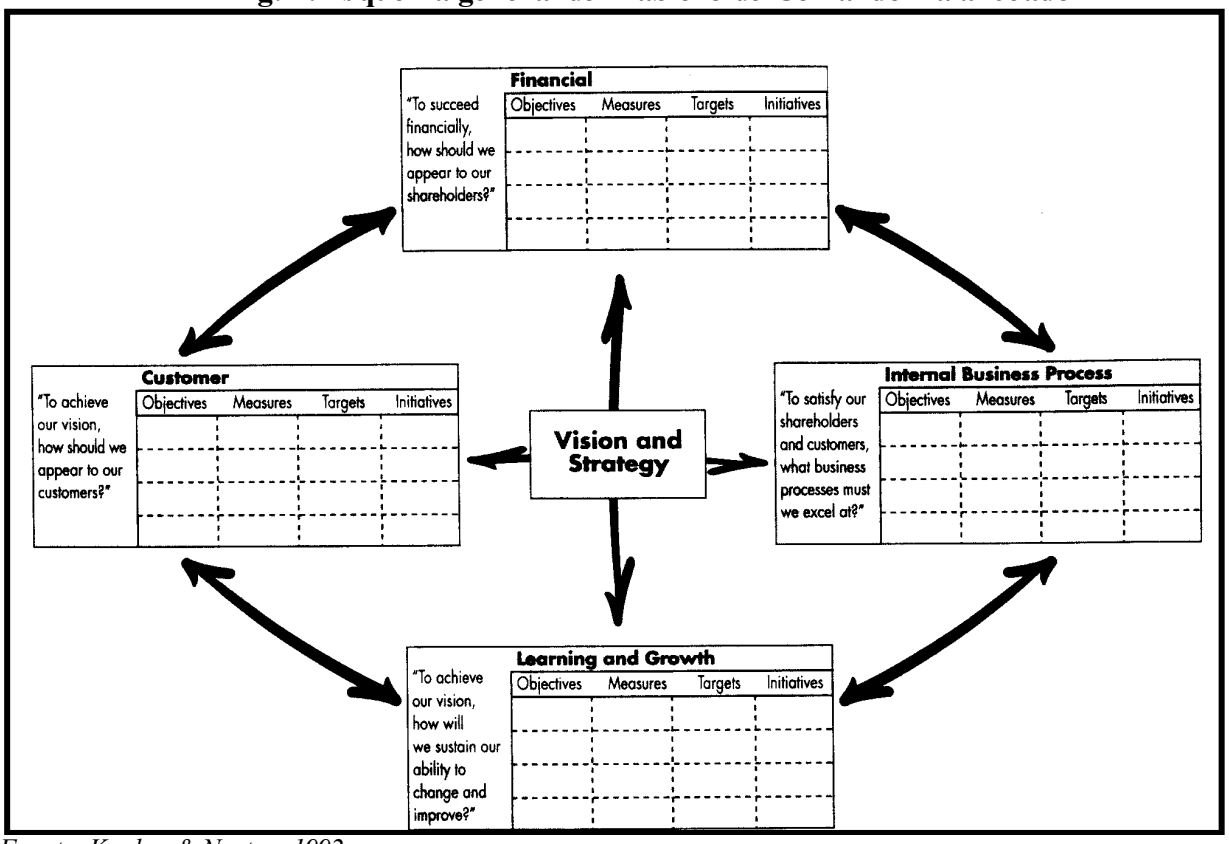
2) indicadores, que son los parámetros observables que serán utilizados para medir el progreso hacia los distintos objetivos.

3) metas, que son los valores específicos de los objetivos a alcanzar. Para mayor detalle, pueden establecerse rangos de valores de los indicadores, para analizar el grado de proximidad al cumplimiento de las metas.

4) iniciativas, que son los proyectos o programas que se iniciarán para alcanzar los objetivos propuestos.

Como se observa en la Fig. 2, los cuatro aspectos mencionados se interrelacionan con la visión y la estrategia de la empresa.

Fig. 2. Esquema general del Tablero de Comando Balanceado



Fuente: Kaplan & Norton, 1992

Finalmente, desde el punto de vista teórico, las ventajas de esta herramienta derivan de centrar a la organización entera en unas pocas variables dominantes necesarias para superar brechas en el desempeño, de ayudar a integrar varios programas de la empresa y de analizar las medidas estratégicas hacia los niveles inferiores, de modo que gerentes, operadores y empleados conozcan cuál es el desempeño que la empresa espera de ellos. De esta forma, por hacer hincapié en aspectos tecnológicos y organizacionales de las empresas, el Tablero de Comando Balanceado resulta de gran utilidad para analizar la performance de las empresas sobre la base del cumplimiento de objetivos estratégicos y de la evolución de indicadores.

4. Principales deficiencias a nivel de la gestión en las PYMES agropecuarias

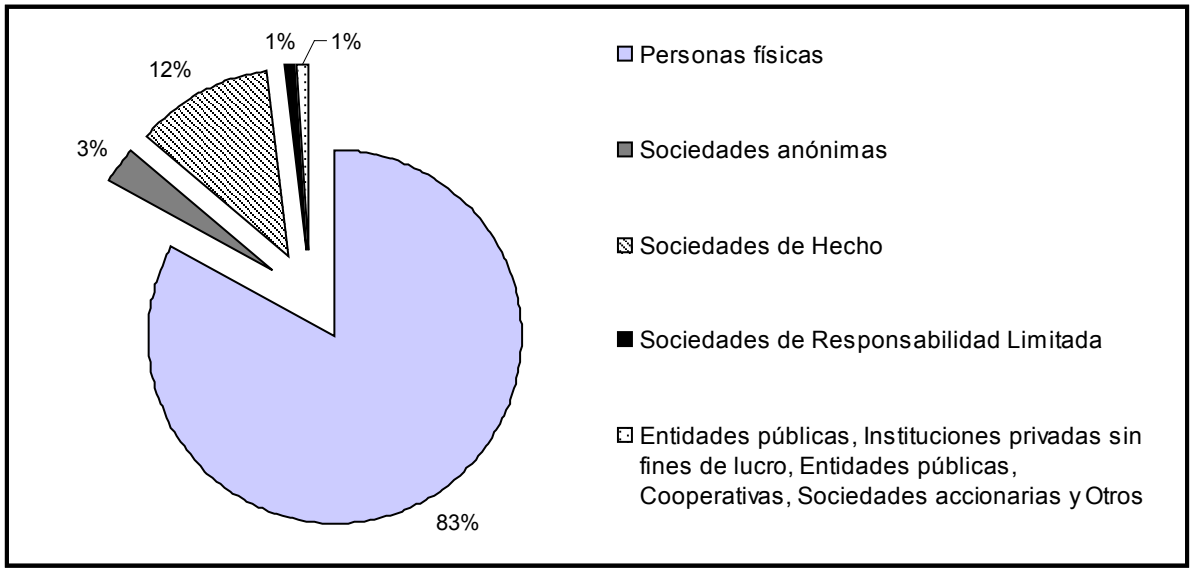
La empresa agropecuaria puede ser considerada como un sistema de producción conformado por un complejo conjunto de elementos estructurales (factores de la producción, inserción en el medio, etc.) relacionados estrechamente entre sí para cumplir objetivos precisos, que genera bienes agrícolas, pecuarios o forestales destinados al mercado y posee una dirección que asume la gestión y los riesgos de la actividad productiva (Ghida, 2009).

En particular, en Argentina la actividad agropecuaria es llevada a cabo por unas 333 mil empresas (INDEC, 2002). Entre ellas, las empresas del tipo pequeñas y medianas (PYMES) poseen una relevancia fundamental, dado que se estima que el 99% de las organizaciones formales del sector primario son del tipo PYME (Claves, 2008).

Si bien el universo de las empresas PYMES agropecuarias presenta una elevada heterogeneidad -en cuanto a los rubros productivos, el tamaño, las formas organizacionales, el grado de integración, las estrategias empresariales y el nivel tecnológico (Gibb & Scott, 1985)- estas firmas suelen presentar rasgos en común.

En primer término, las PYMES en la Argentina son en un alto porcentaje empresas de tipo familiar. Los datos del Censo Nacional Agropecuario de 2002 revelan que las empresas unipersonales son la forma de organización jurídica predominante en el sector, no existiendo prácticamente figuras jurídicas de tipo societario (Fig. 3, INDEC, 2002). En las PYMES familiares, se presenta una débil estructuración de la organización, basada en el núcleo familiar, con una escasa división funcional de tareas y con una fuerte centralización de la toma de decisiones en la figura del propietario, quien asume las funciones de gestión, administración y control de la empresa y cuyas características personales inciden de manera significativa en las estrategias de las firmas (Ghezán, 2003).

Fig. 3. Formas jurídicas de las empresas agropecuarias en Argentina



Fuente: elaboración propia en base a INDEC (CNA, 2002).

En segundo término, y asociado con lo recién expuesto, puede decirse que la capacidad de gerenciamiento es limitada en este tipo de empresas, fundamentalmente en temas relacionados con la comercialización o la gestión administrativa (Ghezán, 2003). Esta característica a su vez suele relacionarse íntimamente con dos factores: la ausencia de procesos de planificación y las deficiencias en la recolección de la información (Ghezán, 2003; Dapena & Dapena, 2003; Ghida, 2007; Perossa, 2007).

En cuanto a la planificación, la mayoría de las PYMES no dispone de procedimientos formales para la planificación estratégica al modo en que lo realizan las grandes empresas. Las PYMES suelen fallar en la definición de las metas empresariales y en las proyecciones a mediano y largo plazo (Ghezán, 2003). Asimismo, no se realiza una programación respecto de cómo se han de alcanzar los objetivos, ni evaluaciones de cumplimiento de lo planificado (Dapena & Dapena, 2003). La predominancia de personal escasamente calificado o sin formación profesional en administración y el desbordamiento de los recursos humanos a causa de las tareas cotidianas dificultan la generación de los espacios y tiempos necesarios para las tareas de planificación en este tipo de organizaciones.

En cuanto al problema de la información, las empresas PYMES suelen carecer de una metodología sistematizada para la recolección y el análisis de la información interna y externa (Daponte & Daponte, 2003), lo que a su vez dificulta los procesos de autoevaluación de la performance y la planificación. Como se mencionara anteriormente, en las PYMES agropecuarias el foco está colocado en las actividades de producción, en detrimento del área administrativa, descuidándose la información financiera para terceros y también la referida a uso interno (Perossa, 2007), lo que dificulta la realización de un adecuado análisis financiero.

En este sentido, al máximo responsable de la empresa PYME (generalmente el propietario), la información llega demorada, dependiendo del tipo de tecnología con que cuenta; en grado insuficiente y analizada a través de una multiplicidad de criterios subjetivos. Esto provoca la pérdida del conocimiento de la información esencial para conducir el negocio desde una perspectiva integral y hacia el logro de resultados económicos-financieros y comerciales que le permitan un crecimiento sustentable.

Finalmente, observando las características de las PYMES respecto de los recursos humanos individualistas y el débil rol de la Administración Estratégica, la existencia del Tablero se plantea como una fuerte necesidad para mejorar la performance de las PYMES en el acelerado ritmo de los negocios actuales.

5. Diseño de un BSC en una empresa PYME agropecuaria: el caso de Esperanza Sud SA

Abajo se presentan los resultados de la formalización de objetivos estratégicos e indicadores en un Tablero de Comando Balanceado para la empresa Esperanza Sud SA.

5.1 Descripción de la empresa: Esperanza Sud SA

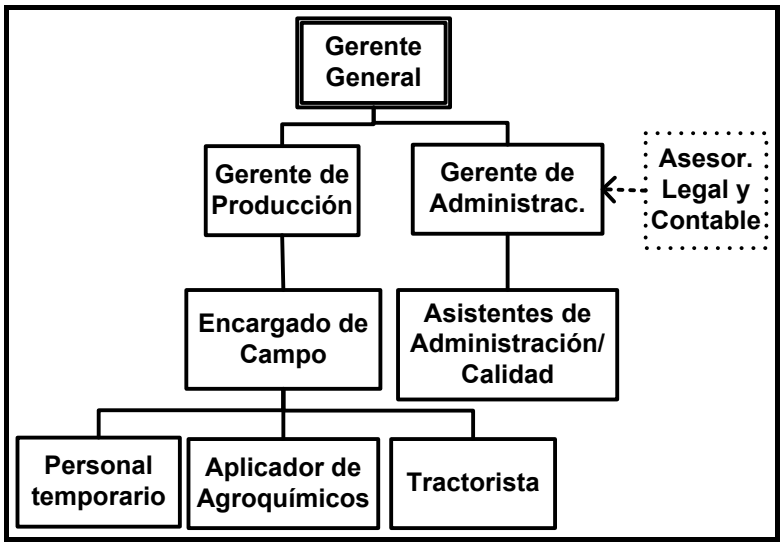
Esperanza Sud SA es una empresa PYME familiar de capitales argentinos fundada en 2007 y radicada en la ciudad de Balcarce, en el sudeste de la provincia de Buenos Aires. Desde el punto de vista comercial, la actividad principal de la empresa es la producción de papas para las industrias procesadoras más importantes de Argentina (con destino a papa prefrita congelada, puré deshidratado y chips). El volumen de producción ronda las diez mil toneladas anuales. Como actividad secundaria, Esperanza Sud SA realiza prestaciones de servicios especializados en el cultivo de papa.

Desde el punto de vista de la estructura interna (Fig. 4), Esperanza Sud cuenta con ocho empleados, organizados en dos áreas: el Área de Producción y el Área de Administración. La primera está integrada por tres empleados permanentes que trabajan en el campo (encargado, tractorista y pulverizador), bajo la dirección y supervisión del Gerente de Producción, que es uno de los socios. El Área de Administración está dirigida por el Gerente de Administración y socio, quien trabaja en conjunto con dos asistentes, también de la planta permanente de la Empresa. El Gerente General de la empresa es también miembro de la familia y el tercer socio fundador de la empresa.

En la actualidad Esperanza Sud SA es una empresa que, a diferencia de muchas PYMES agropecuarias, confecciona presupuestos al inicio de cada campaña, realizando un tarea de planificación de corto plazo. Adicionalmente, la organización opera bajo normas de calidad; particularmente, se encuentra certificada para la producción de papa bajo las normas GlobalGAP y Rainforest Alliance, dos protocolos internacionales enfocados en la inocuidad alimentaria y en la sustentabilidad socioambiental, respectivamente. El alcance de las

certificaciones abarca todos los procesos productivos y la totalidad de la producción de papa comercializada por la empresa. Con entusiasmo afirma el Gerente de Administración que *"fuimos la primera empresa de toda la Argentina en alcanzar la certificación de Rainforest y uno de los primeros productores de papa argentinos certificados para GlobalGap"*.

Fig. 4. Organigrama de Esperanza Sud SA



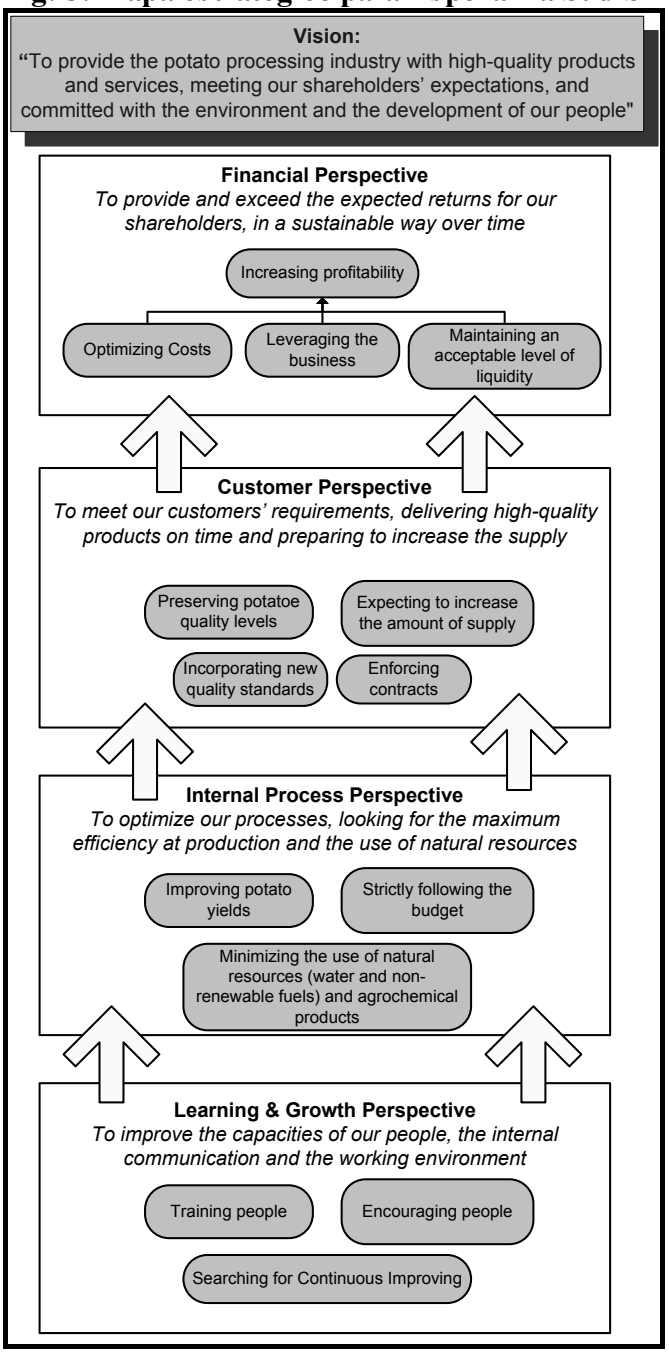
Fuente: elaboración propia en base a entrevistas

De cara al futuro, y expresando la visión de la empresa, Esperanza Sud se propone ser uno de los proveedores más importantes para la industria de papa procesada, consolidando su propio crecimiento de la mano de las necesidades y el crecimiento de sus clientes industriales.

5.2 Mapa Estratégico y Tablero de Comando en Esperanza Sud SA

A continuación se presenta el resultado de la elaboración del Mapa Estratégico (Fig. 5) y el Tablero de Comando (Fig. 6) para Esperanza Sud SA. Como se menciona en la Metodología, los objetivos estratégicos y los indicadores eran preexistentes en la Organización, pero no se encontraban formalizados ni sistematizados en un BSC. Adicionalmente, obsérvese que la mayoría de los indicadores se relaciona con lo establecido en el presupuesto.

Fig. 5. Mapa estratégico para Esperanza Sud SA



Fuente: elaboración propia en base a entrevistas

Como se indicara, a partir de los objetivos estratégicos de cada perspectiva, se sistematizaron los indicadores más relevantes empleados por la Alta Dirección (Tabla 1), los cuales permiten cuantificar el grado de consecución de las metas propuestas y visualizar rápidamente la performance general de la organización.

Tabla 1. Tablero de Comando para Esperanza Sud SA

	Objective	Measure	Formula	Freq	Target - Alarms		
Financial Perspective	Increasing profitability	EBITDA	Earning before interest, taxes, depreciations and amortizations ($)	A	>Budget	Budget	<Budget
		Return on equity	Net income / average shareholders equity	A	>Bud-et	Budget	<Budget
	Optimizing Costs	Total cost / ha	(Direct costs + Indirect costs)/Total surface ($/ha)	M	<Budget	Budget	>Budget
		Gross margin	Gross profit / net sales	M	>Budget	Budget	<Budget
	Maintaining Liquidity	Current ratio	Currents assets / current liabilities	M	>Budget	Budget	<Budget
		Percentage of Compliance of projected dividend payment	(Real dividend payment / Projected dividend payment) x 100	A	90-100%	85-90%	<85%
	Positive Leverage	Average collection period	Number of days for collection	M	<30 days	30-45 days	>45 days
		Average payment period	Number of days for payment	M	>45 days	30-45 days	<30 days
Customer Perspective	Enforcing contracts	Percentage of Contract compliance	(Delivered potato amount / contracted potato amount) x 100	A	95-100%	90-95%	<90%
	Preserving potato quality levels	Average potato dry matter	(Weight of dry matter / total potato weight) x 100	M	>18.5%	18-18.5%	<18%
		Percentage of Rejected consignments	(Number of rejected consignments / number of total consignments) x 100	W	0-1%	1-5%	>5%
		Customer complaints	Number of customer complaints	M	0	1-5	>5
		Percentage of Obtained prices	(Real obtained prices / projected average prices) x 100	M	>95%	90-95%	<90%
	Increasing amount of supply	Percentage Change of contracted amount of potato	(Contracted potato amount for the next year - Contracted potato amount for the present year)/Contracted potato amount for the present year x 100	A	>10% /year	0-10% /year	0% or negate-ve
	New quality standards	Quality Certifications	(Number of New quality certifications/ Number of required new certifications) x 100	A	100%	<100%	<100%

Tabla 1 (cont.). Tablero de Comando para Esperanza Sud SA

	Objective	Measure	Formula	Freq.	Alarms		
Process Perspecti	Improving potato yields	Average potato yields	Total Potato Amount / Total production surface (ton / ha)	M	>45 ton	43-45	<43
		Potato variety	(Yield of a specific variety/ Average yield)	M	>Bud-get	Budget	<Budget

		performan-ce	x 100				
	Following budget	Seeding efficiency	(Number of sown seeds/Number of seeds in budget) x 100	W	**95-100%**	**90-95%**	**<90%**
		Crop spraying efficiency	(Number of effective herbicide sprayings / Number of planned herbicide sprayings) x 100	W	**95-100%**	**90-95%**	**<90%**
			(Number of effective fungicide sprayings / Number of planned fungicide sprayings) x 100	W	**95-100%**	**90-95%**	**<90%**
			(Number of effective insecticide sprayings / Number of planned insecticide sprayings) x 100	W	**95-100%**	**90-95%**	**<90%**
	Minimizing use of natural resources	Energetic efficiency	Total Fuel / Total production surface (lit/ha)	M	**<10 lit/ha**	**10-12 lit/ha**	**>12 lit/ha**
		Irrigation efficiency	Total water on crops (irrigation + rain)	A	**1550 mm/ year**	**1450-1550 mm/year**	**<1450 mm/year**
Learning & Growth Perspective	Training people	Internal training	Number of internal training courses /employee/year	A	**4**	**1-4**	**0**
		External training	Number of external training courses /employee/year	A	**3**	**1-3**	**0**
	Encourag-ing people	Awards & bonus	Amount of bonus / employee ($)	A	**Budget**	**< Budget**	**No bonus**
		Working environ-ment	Bad - Good - Very good	A	**Very good**	**Good**	**Bad**
	Continuous improving	Compliance of internal audits	(Number of non-conformities / Total audited aspects) x 100	A	**0-5%**	**5-10%**	**>10%**
		Internal communica tion	Number of formal meetings between managers and employees	M	**4**	**2-4**	**0-2**

Referencias: **Budget:** el valor del indicador se toma del presupuesto. La información financiera no fue revelada por los directivos. **Freq.**: Frecuencia del indicador. **A**: annualy; **M**: monthly; **W**: weekly. **En Verde**: óptimo cumplimiento; en **Amarillo:** aceptable; en **Rojo**: necesidad de tomar medidas correctivas. (*Fuente: elaboración propia en base a entrevistas)*

Al analizar el BSC de Esperanza Sud, se desprende que la elaboración de los indicadores necesarios para el seguimiento de la performance requiere una serie de elementos fundamentales. En primer lugar, el correcto relevamiento de la información correspondiente. En este sentido, la implementación concreta del BSC en cualquier empresa ha de requerir –además de una decidida convicción por incorporarlo por parte de la Alta Dirección- de una capacitación específica de los empleados para relevar los datos correctamente.

Para el caso particular de Esperanza Sud, los empleados de producción se encuentran entrenados para registrar datos de todos los procesos productivos, dado que esto es requerido

por los protocolos de calidad que aplica la empresa. Esta característica facilitaría la implementación de la herramienta en esta organización, pero en el marco de las limitaciones del acceso a la información propio de las PYMES, esto podría convertirse en una restricción importante para empresas que no cuentan con sistemas de calidad.

En segundo lugar, la implementación del BSC requiere de una interacción dinámica entre las áreas organizativas de la empresa, resultando necesaria cierta formalización de los canales de información dentro de la organización y algún tipo de soporte de los datos.

Análogamente, por contar con sistemas de calidad, Esperanza Sud exhibe un elevado dinamismo en el flujo de información entre sus áreas organizativas, dado que los registros de las actividades de producción se centralizan en la Administración para ser auditados formalmente. Adicionalmente, la Administración cuenta con un software de gestión que permite manejar información productiva y también contable, facilitando la integración de los datos y, en consecuencia, la implementación de la herramienta en el caso estudiado.

Por otra parte, la implementación de la herramienta en el caso particular de Esperanza Sud podría implicar una serie de beneficios. En primer término, señalan los directivos que la elaboración del BSC contribuye a esclarecer los objetivos estratégicos y las metas a alcanzar para los máximos responsables de la organización, quienes pudieron formalizar la visión y a su vez conectarla con las estrategias en cada una de las perspectivas analizadas.

En segundo término, desde el punto de vista práctico, los directivos de la empresa señalan como una ventaja del BSC que el cumplimiento de los objetivos fijados puede visualizarse rápidamente y a la periodicidad adecuada, brindando una idea rápida y dinámica del desempeño de la organización. Adicionalmente, la herramienta puede actuar como un soporte didáctico para la difusión de los objetivos estratégicos desde la Alta Dirección al resto de los empleados de la empresa, unificando las percepciones y las expectativas.

Por último, y no obstante los beneficios potenciales hallados, los directivos de Esperanza Sud destacan la influencia de la actividad sobre el grado de dinamismo del BSC. Específicamente, muchos de los indicadores de la empresa son anuales, dado que están condicionados por el ciclo del cultivo; por este motivo, el BSC puede no resultar tan ágil y dinámico como en otras industrias que realizan procesos de ciclos más cortos (ejemplo: industria manufacturera). Los condicionamientos determinados por el ciclo de cultivo no son exclusivos del cultivo de papa sino que pueden hacerse extensivos a todas las producciones agropecuarias.

5. Consideraciones finales

A pesar de su importante participación dentro del sector agropecuario argentino, las PYMES agropecuarias suelen presentar un rasgo en común que es la baja capacidad de gerenciamiento. Por este motivo, resultan de relevancia los estudios orientados a analizar herramientas de gestión que permitan mejorar la performance de estas organizaciones.

En particular, el Tablero de Comando Balanceado es un cuerpo de objetivos estratégicos e indicadores que facilitan la evaluación periódica del desempeño de las empresas, permitiéndole a la Alta Dirección un mayor conocimiento del negocio y de los factores relevantes para obtener los resultados financieros esperados.

En el presente trabajo se analizan las limitaciones de las PYMES agropecuarias en cuanto a la gestión, destacándose principalmente la ausencia de planificación estratégica y las fallas en el relevamiento de información tanto externa como interna. Tales características están asociadas al carácter predominantemente familiar de las PYMES agropecuarias en Argentina.

Específicamente, a partir de un estudio de caso de una empresa PYME argentina productora de papas se ha propuesto un modelo de BSC, sistematizando su visión, sus objetivos estratégicos y algunos indicadores de relevancia para el análisis de la performance de la empresa, agrupados en las cuatro perspectivas de Kaplan & Norton (1992). La propia estructura del BSC revela que es necesario recolectar la información en forma pertinente y elaborar los indicadores en los plazos estipulados para que el sistema de alarmas resulte eficiente en la generación de medidas correctivas. De este modo, la implementación efectiva estará condicionada por la calidad final de la información, relacionada con la capacitación a los responsables de las tareas de relevamiento de datos, la formalización de canales de información entre las áreas organizativas de las empresas y el soporte para un adecuado manejo de los datos.

Para el futuro, se propone profundizar en la implementación efectiva de la herramienta del BSC y también extender su estudio a otras áreas del sector agropecuario, con el propósito de analizar su aplicabilidad y utilidad en otros sectores productivos.

6. Referencias

ARRIETA, D. 2009. **Empresas familiares:** ***cuando llegan los terceros.*** Revista Antiguos de la Universidad del IAE. 16, *68-71.*

BALLVÉ, A. 2000. **Tablero de control:** ***organizando información para crear valor.*** Buenos Aires: Macchi

CONSULTORA CLAVES. 2008. **Informe: Estructura Productiva de las PYMES.**

DAPENA, J.P. & DAPENA, J.L. 2003. **Sistemas de información en PYMES y acceso al crédito en contextos de asimetría de información**. In: http://www.ucema.edu.ar/

DURÁN, R. 2003. **Tablero de comando:** ***una herramienta para el control de gestión de empresas agropecuarias.*** Buenos Aires: Osmar Buyatti.

PEROSSA, M. L. 2007. **La crisis del crecimiento en las PYMES argentinas:** ***la adaptación de la empresa familiar a los nuevos escenarios competitivos.*** In: **http://www.eumed.net**

FELLNER, A. 2004. **Pequeño productor agrícola:** ***Informe de Costos y Aplicación del tablero de control.*** *XXVII Congreso Argentino de Profesores Universitarios de Costos*. Buenos Aires, noviembre.

GIBB, A. & SCOTT, M. 1985. **Strategic awareness, personal commitment and the process of planning in the small business.** In: *Journal of Management Studies.* 22 (6), 597–631

GHEZÁN, G.; VITERI, ML. & CENDÓN, ML. 2003. **Estrategias Organizacionales en PYMES Agroalimentarias.** ***Las fábricas de chacinados del sudeste bonaerense.*** In: www.inta.gov.ar

GHIDA DAZA, C. 2009**. Indicadores económicos para la gestión de empresas agropecuarias.** ***Bases metodológicas.*** Buenos Aires: INTA Ediciones.

HAX, A. & MAJLUF, N. 1993. **Gestión de empresa: con una visión estratégica.** Santiago de Chile: Dolmen.

INDEC (NSTITUTO NACIONAL DE ESTADISTICA Y CENSOS DE LA REPUBLICA ARGENTINA). 2002. Censo Nacional Agropecuario. In: http://www.indec.mecon.ar

KAPLAN, R & NORTON, D. 1992. The Balanced Scorecard – Measures that drive performance. In: *Harvard Business Review*, *January-February*, 71-79.

KAPLAN, R & NORTON, D 1996. **The balanced scorecard:** ***translating strategy into action.*** Boston: Harvard Business School Press

KAPLAN, R & NORTON, D. 2000. **El Cuadro de Mando Integral.** Barcelona: Gestión.

KAPLAN, R & NORTON, D. 2004. **Strategy maps:** ***converting intangible assets into tangible outcomes.*** Boston: Harvard Business School Press

KOSACOFF, B. & LÓPEZ, A. 2000. **Cambios organizacionales y tecnológicos en las pequeñas y medianas empresas.** ***Repensando el estilo de desarrollo argentino.*** In: http://economicas2.unlam.edu.ar

LLACH, J.J.; HARRIAGUE, M. & O`CONNOR, E. 2004. **La generación de empleo en las cadenas agroindustriales.** Buenos Aires: Fundación Producir Conservando.

ORDÓÑEZ, H. 2002. **La Nueva Economía y Negocios Agroalimentarios.** Material de clases para la Maestría en Agronegocios y Alimentos, PAA. FAUBA. Buenos Aires: Facultad de Agronomía de la Universidad de Buenos Aires.

PETERSON, H. C. 1997. **La epistemología de los agronegocios:** ***pares, métodos y rigor.*** Trabajo presentado en el *Foro de Investigación en Agronegocios*. Missouri, Estados Unidos. Septiembre 26.

PORTER, M. 1990. **New global strategies for competitive advantage.** *Planning Review, 18* (3), 4-14.

SCHWENK, C.R. & SCHRADER, C.B. 1993. **Effects of formal strategic planning on financial performance in small firms:** ***A meta-analysis.*** In: *Entrepreneurship: Theory and Practice*, *17*(3), 53-61.

YIN, R. 1989. **Case Study Research:** ***Design and Methods.*** Newbury Park: SAGE Publications.

YOGUEL, G. & BOSCHERINI, F. 1996. **La capacidad innovativa y el fortalecimiento de la competitividad de las firmas:** ***el caso de las PYMES exportadoras Argentinas.*** In: http://www.cepal.org

INNOVATION AS A DETERMINING FACTOR IN THE ACCESS TO NEW AGROBIOTECHNOLOGICAL BUSINESSES: THE BIOCERES CASE

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Abstract
The emergence of agricultural biotechnology resulted in a disruptive change in Argentine agriculture. In only ten years since the commercialization of herbicide-resistant soybean, production of soybean increased 300%, and an additional 20 billion dollars were generated and later distributed among the productive sector, seed producers, herbicide producers and the federal state.
Yet, this change did not take place by mere chance but resulted from a previous innovation process in the technological field (no till, fertilization, agrochemicals, geo-referenced systems, etc.), in the organizational field (service economy, contracts, the network of networks), and in the institutional field (creation of CONABIA).
Argentine producers had become the second users of biotechnology six months after the United States.
The competitiveness of the Argentine agricultural sector reached amazing levels, and a considerable part of this competitiveness depended on technological innovation. Thus, in order to remain competitive, it was essential to be able to develop new technologies locally rather than implementing new ones developed abroad.
The biotechnology business is a complex, long-term and high-cost business, and so far it had only been in the hands of multinational companies, which made the challenge even harder. Organizational innovation was the key in order to access this business, and later on attention should be paid to any transformation taking place so as to adapt to changes and make further innovations, whether at the organizational, technological or institutional levels.
The networking culture that developed within the Argentine agricultural sector in the 90s triggered the notion that it was possible to access the biotechnological business from another approach, and that is how Bioceres was born.
A knowledge-society company, focused on creating and capturing biotechnological value through networking and contract management and the creation of social capital among the diverse actors involved in the network of value creation and capture of agrobiotechnology.

Key words: innovation, biotechnology, networks, social capital, Bioceres

INNOVATION AS A DETERMINING FACTOR IN THE ACCESS TO NEW AGROBIOTECHNOLOGICAL BUSINESSES: THE BIOCERES CASE

1. INTRODUCTION

In 1996, with the approval of the first genetically-modified herbicide-resistant soybean (RR soybean), a dramatic change took place involving production capabilities: this technology enabled the production of wheat-second-crop soybean under no tillage, and a total herbicide could be used after sowing of wheat without affecting soybean.

From this on, in only ten years (1996-2006) soybean went from 6.7 million hectares (14.82 million acres) planted and 11 million tons produced to 15.3 million hectares (37.80 million acres) planted and 40 million tons produced. (Trigo et al, 2006)

This was possibly one of the disruptive changes that built on previous efforts carried out for years and helped find the necessary tools for expressing their whole potential. Moreover, it enabled producers to increase their efficiency and efficacy and contributed to an additional 20 billion dollars being generated in the country in the first ten years since the implementation of biotechnology through the introduction of RR soybean, as all the other areas had already been innovated.

This technological innovation was possible as Argentina had carried out an institutional innovation through the creation of the National Advisory Commission on Agricultural Biotechnology (CONABIA) in 1991. This commission was created by a regulatory decree with the aim of ensuring that genetically-modified organisms (GMOs) used for carrying out experimental trials initially and those getting marketing authorization are safe both for the agro-ecosystem and for human and animal consumption.

This institutional innovation enabled Argentina to be the second country in the world (6 months after the United States) to approve glyphosate-resistant soybean, which was sown for the first time in Argentina in the 1996 planting season.

In line with these changes, the Argentine agricultural sector underwent further changes: more and more training and specialization were needed for agricultural tasks, while efficiency was essential for preventing loss. That is the beginning of what we know today as contract-based economy: agricultural producers no longer took care of everything, and instead started specializing in what they could do best and most efficiently while outsourcing everything else. Many producers became not only service users but also service providers.

The 90s were indeed a decade of great innovation in all three levels: institutional, technological and organizational. Producers who understood this new situation and took advantage of opportunities by adapting to changes achieved a new level of competitiveness.

Quite often, ignoring what technological innovations entail generates fear and mistrust, and this was the case with biotechnology as well. In the initial years, little knowledge was available of what biotechnological products meant, and many groups took advantage of this ignorance and sowed fear in society by referring to a variety of negative impacts that biotechnology could have. For this reason, and with the aim of adding insight and knowledge on this innovation, the priority was finding mechanisms to generate more information on technology and make it available for society.

One of the main efforts was the Biotechnology seminars organized by the Argentine No Till Farmers Association (AAPRESID) jointly with Professor Otto Solbrig (currently Emeritus Professor at Harvard University) and the David Rockefeller Center for Latin American Studies Foundation at the University of Harvard. These seminars, carried out in two consecutive years (2000 & 2001) as part of the annual AAPRESID conferences, were attended by Argentine authorities (CONABIA), CONICET and INTA scientists, producers, regulation body representatives and exporters of Mercosur countries, among others.

Juan Enríquez Cabot and Franceso di Castri participated in these conferences, and both widened and enriched attendees' vision beyond agriculture itself.
The conclusions of these meetings were submitted to the National Congress, and later led to the creation of the Biotechnology Group, formed by representatives of institutions such as the Crop Exchange of Buenos Aires, the Rosario Commodities Exchange, the Argentine Biotechnology Forum, ACTA and other agriculture-related sectors.

These conclusions were the starting point for analyzing the situation of the country at the moment:

- Many of the Argentine scientists who studied in the country went abroad to pursue their PhDs and had no chance of returning;
- Argentine scientists are world-renowned for their academic background and their valuable contributions;
- Argentina is the only developing country with three Nobel prizes in biological science areas:
    - Bernardo Alberto Houssay, Nobel Prize in Physiology or Medicine 1947
    - Luis Federico Leloir, Nobel Prize in Chemistry 1970
    - César Milstein, Nobel Prize in Physiology or Medicine 1984
- Science was not acknowledged as a business opportunity;
- The competitiveness of the Argentine agricultural sector was in line with technological innovation, which had generally been developed abroad.

Then, within this context, a group of producers asked themselves: Why can't we do it ourselves?

- Considering there is a scientific-technological system widely developed along with CONICET, INTA and universities
- Considering there are innovative producers willing to lead the changes
- Considering there are entrepreneurs willing to make an effort in order to jointly create a company capable of turning inventions and developments achieved by the public sector into innovations.

At that time, the Argentine macroeconomic context was not auspicious whatsoever: the country was on edge, the discontinuation of the Argentine currency board arrangement with peso and dollar operating at 1:1 ratio was imminent, and the country was undergoing social unrest. President De la Rúa resigned and Argentina had five presidents in fifteen days. However, in spite of the national context, a group of people looked ahead to the future and dreamt of a competitive Argentina, not only in terms of technologies adopted but also as for their development; a country where farmers could produce beyond raw materials for food in their own land. As Enrique Cabot puts it:

> Instead of producing grains,
> farmers will be able to produce more valuable products
> such as medicines, plastic, energy)
> as long as they can have access
> to new technologies and
> know how to use them."

Thus, the challenge was not only exporting products but also knowledge, with the public and private sectors working jointly in order to optimize their strengths and create a solid synergy.

The challenge was huge, and in order to face it the decision was to create a company for everybody, a company where anyone who shared the dream could join, and where everybody could contribute to a great company.

That is how the 12th of December, 2001 saw the birth of Biopampa, a company formed by agricultural producers to turn inventions and developments in the public sector into innovation so as to reach the producer or end client.
Biopampa, later Bioceres, was born as a networked company. The aim was that biotechnology should mirror what was being done in agriculture: it was no longer necessary to have assets of one's own, but everything could be contracted or outsourced instead. Bioceres was seen as a "contract manager" among the different agents: public-private, private-private, etc.

The aim of this paper is to describe and analyze the case of Bioceres S.A. and assess how different innovations enable or not the access to new businesses such as biotechnology. The paper is organized by innovations. As every innovation is relevant based on the phase the company is going through, the social capital is analyzed as well as a main source of success for this challenge, and the public-private link is appraised as a source of synergy and construction of social capital.

2. CASE STUDY AND DATA COLLECTION PROCEDURES

2.1. Data Collection Procedures

The present materials are the result of my own research after working 9 years in the companies of Bioceres Group, based on the contact and interviews with shareholders, managers, staff and stakeholders, as well as on information about the history of biotechnology in Argentina collected from various authors and related web pages.

2.2. Theoretical Framework

The approach will be based on the conceptualization of the new economy and agri-food businesses (Ordoñez 1999), which is a new paradigm of study and intervention in the agricultural and food sectors resulting from restrictions posed by traditional approaches for understanding the complex network of interactions which determine the performance of agri-food businesses.

The construction of this new paradigm has two major sources: on the one hand, the concept of *firm* posed by Coase in 1937, and on the other, the concept of *agribusiness* proposed by David and Goldberg in 1957. The paradigm had further contributions including those by Zylberstajn and Farina, who define the Coasian agribusiness model, extending the Coasian concept of firm to the whole agribusiness system.

The Coasian agribusiness model helps approach the issue of adapting to change by means of institutional, organizational and technological designs, as aligned with governance structure, business strategy, arrival on the market and clients' preference.

The **institutional environment** is defined as the set of formal rules of conduct (laws, contracts, political systems, organizations, markets, etc.) and informal rules of conduct (regulations, traditions, customs, system of values, religions, sociological trends, etc.) which help coordinate or rule the relations among individuals or groups (Kherallah and Kirsten, 2001), bringing about a higher degree of certainty to human interaction (North, 1990). It is the set of written (formal) rules and unwritten (informal) rules which provide a framework for human actions. Institutions were created by man in order to establish a certain order and reduce the uncertainty in transactions.

In consequence, and as there exist design opportunities, the concept of first order economy makes full sense. The aim of this kind of economies is the transparency and validity of the rules of the game. Despite its importance for the productivity of an economy, redesigning the institutional environment is a slow task, involving decades or centuries.

Another approach is the **organizational environment**, where the focus is on the governance of contractual relations. In the organizational environment the key is players themselves: companies, public bodies and NGOs that run the economical-social activities and do business. These are the players of production, exchange and distribution, and they reflect the very practice of the game. In this environment, it is important to define the characteristics of transactions, the exchange, the structure of governance, and the business strategy. Focus is on the influence exerted by the institutional framework and the individuals' actions on organizations.

In this sense, the basic unit in a contractual relation is the transaction. The economy of transaction costs does not only support the idea that the transaction is the basic unit of analysis, but also that governance is an effort aimed at creating order and thus mitigating conflict and achieving mutual benefits. Transaction costs are ex ante costs of negotiation and the different safe-conducts, and mostly the ex post costs of bad adaptation and adjustment resulting from the deviations of the execution of a contract as a consequence of omissions, errors and unforeseen changes. In global terms, they are the operating costs of the economic

system. Interestingly, governance structures are susceptible to design, with second order economy defined as the achievement of the right governance structures.

In the **technological environment**, the aim is to improve productivity and quality, leading to third order economies. These economies are of the marginalist kind: they result from reducing the costs of transformation, increasing productivity and the continuous improvement including higher quality and differentiation. Reference is made to the reduction of fixed and variable costs, i.e., it is only at this level of analysis (and having considered all previous levels) that neoclassical economy is taken as the main tool for analyzing reality.

The new institutional economy leaves open the possibility that technological, organizational or institutional designs may be carried out. In order words: man, with his limited rationality and his opportunism as characteristic traits, is capable of analyzing at least part of the information of his environment in order to design and manage the technological, organizational and institutional environments. And that is, precisely, the increasing order of complexity which different environments will have so as to be modified and intervened by man in terms of business management.

In the era of the knowledge society –which Castells refers to as "the information-based society", the society of services and knowledge and of the network organizations (Castells, 1996)–, new paradigms govern the social and economy activity, and what matters in these cases is understanding the situation and adapting to change.

Hayek states that in the real world of business, the main problem of economy is adaptation (Hayek, 1945). In turbulent economies and uncertain business scenarios, adaptation is key. In short, adapting to changes is decided based on institutional, organizational and technological designs in line with the governance structure and the business strategy, focused on the access to the market and the clients' preferences (Ordoñez, 2003).

3. CASE ANALYSIS

3.1. Introduction

The emergence of the first genetically-modified organisms (GMOs) in the seed market in the mid 1990s produced a disruptive change which has rarely been seen in modern agriculture. A new paradigm was born: not only could genes be exchanged between the same species, but also between different species. Moreover, the gene to be introduced could be accurately identified to produce the desired effect without including other unwanted genes. This was also possible thanks to the invention of processes by means of which a new gene could be introduced in other species or other individual with no modifications beyond the expected.

These inventions led to the new business of agricultural biotechnology, a business requiring major investment, with developmental phases from invention to innovation taking more than 10 years, and involving multiple risks related to intellectual property and scientific, technical, regulatory, and –naturally– financial aspects.

The agricultural biotechnology business is a world business which, from its very origins, has been in the hands of multinational companies, the ones capable of undertaking a business of such nature.

The implementation of organizational approaches has made it possible for new agents to enter the business. Such is the case of Bioceres, in which a group of Argentine producers who understood the importance of these technological innovations for their productive competitiveness and decided to be more than mere technology adapters or users and commit themselves to their development to help Argentina participate again as inventor of the new businesses.

3.2. Organizational Innovation

December 12th 2001 was a landmark in the history of Argentine biotechnology: a group of producers who were members of Aapresid decided to create an enterprise to support the public sector and to make it possible for the inventions started in this field to develop and eventually become a true innovation.

This was a huge challenge. They decided to start a business in a field which was unknown for most of them –a business that, until then, had only been controlled by multinational companies, and the existing technologies in the market had been developed in the United States. However, they believed they could be successful if they created a new model of company -one that was highly innovative from the organizational perspective-, based on some of the models developed in Argentine agricultural sector during the 90s.

That is how the 12th of December, 2001 saw the birth of Biopampa, later Bioceres –a company formed by a group of 23 Argentine agricultural producers whose main principles were that Bioceres should be:

- An *open company*, that is, a company where anyone who shared the dream and vision of its founders could join;
- A company conceived to strengthen the public-private links as they constitute the major source of synergy to be able to access to the existing inventions and to develop future ones with the contribution of every player's know-how and the construction of shared value.
- A networked company with no assets of its own. They believed it was possible to mirror what was being done in agriculture –it was no longer necessary to have assets of one's own, but everything could be contracted or outsourced instead. Bioceres would be a "contract manager" among service providers, research centers, developers, technicians, financial agents, among others.

At the beginning, Bioceres had a simple, light and flexible structure that allowed being efficient at analysis, diagnosis and decision making. According to Mintzberg, innovative organizations usually go into action without defining their formal intentions, and Bioceres, at its origins, had a lot of all this – "as it goes" construction, "just in time" planning, continuous learning and adaptation. We could say that, at the beginning, Bioceres was almost an operating adhocracy –that is, an organization with *ad hoc* work teams for specific projects that split up after the goals were achieved. Those teams were formed by both the company

staff and specialized outsourcers, conferring flexibility to the company. The company simplicity was a consequence of its little hierarchical levels whereas its lightness was given by the little resources required for its maintenance.

An honorary board of directors represents the governance of the company. The members devote time and knowledge, and forge relationships. Even most important, they create Social Capital that, as Putnam and Zamagni define it is the capacity of bonding, bridging and linking. The board of directors counts with a team that is in charge of the company management.

Learning and strategy evolutions produced changes in the funding method. At the first stages, the funding was project-based. Many of the shareholders and members of the agricultural network invested on a project; they knew that they could lose all the money they had invested or that they could receive a royalty fee in case the project succeeded. Lately the focus was buying shares as a way of reducing risk, which allowed the investor to participate in all the projects of the company. At the same time, the company intended to obtain government funding as a way of co-financing the development.

The funding strategy –increasing the social capital and selling shares-, improved year by year, mostly, since the strategy was changed so as to have own assets, which will be described later. In less than 10 years, the company grew from 23 to 220 shareholders.

The table below shows the increasing number of shareholders since the beginning of the company –none of them having more that 5% of the share capital.

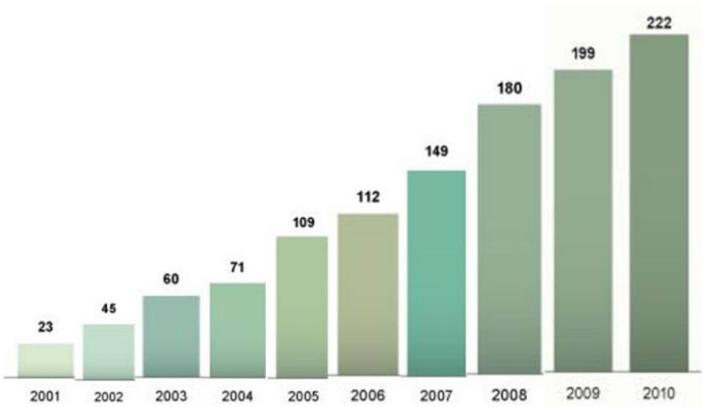

Table 1. Source: The author, based on the data provided by the company.

Its first premise was fulfilled successfully. The structure not only allowed establishing a biotechnology company that can dream of developing biotechnological projects, but also gave the company an unprecedented competitive advantage: having **many** partners (producers) being able to invest only **little** money to support and work jointly with the public sector, which is politically correct from a conceptual perspective and ideal from a commercial perspective, since it allows the future users of these technologies to invest on and commit themselves to their development.

Since the creation of Bioceres, the challenge was to build networks that allow to access to the business and to develop it. The following strategic guidelines were defined based on that challenge:

- Constructing competitive and sustainable value based on the creation, implementation and management of networks focused on developing knowledge, products and services for the agrifood systems and related areas
- Creating, starting and coordinating networks of scientists, technicians, public agencies, private investors, financial agents and strategic outsourcers
- Identifying, capturing and assigning human and financial resources to different sustainable agri-biotech solutions
- Exercising Intellectual Property rights to obtain benefits in the market and distribute them fairly among all the participants of the network.

Within this context, linking public-private sector has always been one of the main sources of synergy. At first, Bioceres celebrated technological and joint development agreements and was responsible for the general coordination and financing of the project, the intellectual property management and the development of the project with or without outsourcing. The public sector researchers, on the other hand, were usually the creators of the inventions at the first phases and then, for the later phase, Bioceres was responsible for finding proper outsourcers. The projects included property, license and profit participation agreements, among others.

At first, the structure of a networked company with no assets of one's own seemed to be suitable, and allowed starting with the first projects; however, as the company grew, difficulties started to arise - many services could not be offered due to the lack of proper equipment or the necessary know-how, or because of the infringement of patents. Yet the biggest problem was that this organizational structure did not allow capitalizing failures, which are very frequent in biotechnology, because the investment in human talent development for a particular project was gained only by an outsourcer, which meant that for every new project it was necessary to start the learning process again.

3.3. Technological Innovation

Technologies, events and/or knowledge invention in the agri-biotech sector involves developing a complex, multidisciplinary, high risk, high cost and long term process that had generally only been in the hands of multinational companies. The table below shows the main phases and timeframe involved in every phase.

Phase	Gene Discovery	Proof of Concept	Initial Development	Advanced Development	Pre-launch and Regulatory	Commercial
Timeframe	1 to 2	1 to 2	2	2	2 to 3	

Table2. Source: The author.

At the beginning, Bioceres selected projects of agronomic interest that were carried out by Argentine scientists and that required the synergies with the private sector to advance to the following development phases until obtaining the product. Also, Bioceres celebrated research and collaboration agreements with research centers, managed research processes, audited the project evolution, gathered investors interested in financing every project and aimed at commercializing and/or licensing the developments and distributing the profits obtained thereof among the different participants in the network.

In this context, different technological transferring agreements were celebrated, not only for the development of new transgenic events but also for the development of new wheat varieties as the agreement signed with INTA. The table below lists the first projects, their purpose, and the institutions the agreement was celebrated with.

Agreement	Parties Involved	Purpose	Cellebration Date	Duration
Scientific Research Subvention Agreement	Bioceres / Fundación Cs. Exactas y Naturales	Soybean transformation with antifungal genes	June 2002	3 years
R&D Agreement	Bioceres / INTA	To produce and evaluate MRCV-tolerant transgenic plants germoplasm	November 2002	5 years
Technological Transferring Agreement	Bioceres / INTA	To create, multiply and commercialize bread wheat	August 2003	10 years
R&D Contract	Bioceres / Conicet / UNL	To optimize a system to obtain drought-tolerant transgenic plants	September 2003	1 year
Framework Agreement	Bioceres / CONICET	To patent and license the new inventions	November 2003	3 years
Framework Agreement	Bioceres / Estación Experimental Agropecuaria Obispo Colombres	To cooperate in R&D issues of common-interest	November 2003	5 years
R&D Contract	Bioceres / Conicet / UNL	To carry out studies, analysis and trials in order to generate tools for plant biotechnological transformation	July 2005	2 years
Framework Agreement	Bioceres / Facultad Cs. Agrarias	To define coordinated actions	July 2005	4 years

Table3. Source: The author, based on the data provided by the company.

3.4. Organizational Innovation from Initial Learning.

After some time, the organizational structure of a networked company with no assets of one's own started losing its value, not only because of the lack of proper outsourcers, but also because of the impossibility to capitalize mistakes from those who offered the services, since they were not company employees.

This led to reconsider the organizational structure and to understand that if Bioceres wanted to develop a biotech event in Argentina, it would be necessary to invest on infrastructure, equipment and, especially, on human talent development. The operating adhocracy-type structure of the first years started to be replaced by a new structure that was bigger, less flexible and, certainly, more expensive.

As a result, in 2004 there arose the idea of building the own infrastructure and INDEAR S.A., *Instituto de Agrobiotecnología Rosario S.A*. (Institute of Agricultural Biotechnology of Rosario) was born. The first phases were carried out jointly with a strategic partner that provided its knowledge and expertise in the area, later, Bioceres acquired the entire share capital and became the company with majority control.

INDEAR is built on some land owned by the *National Scientific and Technical Research Council* (*Consejo Nacional de Investigaciones Científicas y Técnicas*, CONICET) within the Technological and Scientific Centre of Rosario (*Centro Científico Tecnológico de Rosario*), thanks to a gratuitous bailment contract celebrated between INDEAR and Conicet in 2004. This agreement is another example of both the emphasis placed on the development of synergies between the public and private sectors and the creation of social capital. This agreement not only envisages the concession of the land for 30 years but also provides the possibility that INDEAR is considered an associated institute of Conicet, with all the opportunities that implies.

INDEAR became a Research and Development company of Grupo Bioceres, focused on molecular breeding (crop breeding) and molecular farming (plant production of industrial enzymes). INDEAR laboratories –inaugurated in 2010- have one of the most state-of-the-art technological platforms in Latin America.

Once Bioceres understood that the only way to capture the value of the technologies and knowledge generated by the Group companies is through seeds, it decided to create the own seed company, participating in the different nodes of Value Creation and Capture Network of Agrobiotechnology. That's how Bioceres Semillas S.A. was born, created and headed by agricultural producers and seed vendors.

The strategy of Bioceres Semillas is based on creating, developing, licensing and trading high agronomic value germoplasm and technology of the five major crops –wheat, soybean, corn, sunflower and sorghum- so that farmers can access to quality seeds that allow them increase yields through a sustainable management and maximize value creation in the different agroecological niches in Argentina and bordering countries. The combination of expertise, contacts, management capability and available infrastructure turns Bioceres Semillas network into a unique player in Argentine seed market.

At the same time, the social purpose of Bioceres changed –it was no longer a company that managed research projects on agrobiotechnology and related sciences, it became a company that invests on companies and/or projects related to agrobiotechnology. The graphic below shows the current structure where Bioceres has the majority control over both companies.

Bioceres aims at being a competitive company capable of capturing the value of new genetically modified seeds, combining scientific capacities of Argentina –universities, Conicet, INTA- with INDEAR's scientific and developmental capabilities, and the commercial capabilities of Bioceres Semillas and its strategic national and international partners.

3.5. Institutional Innovation

At the beginning of the work, I mentioned the deciding role that the institutional innovation carried out in Argentina in 1991 had for new technologies and new businesses in Agrobiotechnology to be able to develop in the country. Argentina knew which turn to take and adapted it self, creating CONABIA, which today may be the State organization that, in a lower rank, has obtained the best economic results in the national history. A simple resolution by a Secretary of State has enabled to increase soybean production about 300% in just the first 10 years, and thus generated an additional 20 billion dollars for the country.

Whereas this adaptation was transformative, many changes have taken place since then in the global context, and that first-time leadership has got lost. Brazil, who accepted biotechnology several years later than Argentina, has had a much more aggressive politics of event approval since 2005, and in 2010 it surpassed Argentina in amounts of hectares sowed with GMOs, holding the second place after the United States, position held by Argentina since 1996 (Clive, J., 2010).

In a historical perspective, apart from specific cases, the time elapsed from the material launching until their trading approval has not been substantially different between both countries. However, the recent presence of several events related to cotton, soybean and corn that are only approved in the Brazilian regulatory system may be consequence of certain differences in the criteria applied for the evaluation of combined events. The regulatory development in biosecurity which Brazil has had over the last years also seems decisive, as are the existence and compliance with the legislation about copyrights of plant materials and the state support for technological innovation promotion.

Nowadays in Argentina, a whole institutional innovation is essential, not only in a formal aspect, adapting laws, rules and regulations so that they allow combining public politics with competitive and innovative business strategies, but also from an informal point of view. It is necessary to promote a change in culture; the opportunism attitude before the lack of recognition of technology value generates a paralysis in investment in research and development that is starting to be noticeable, mainly if we compare it to what happens in

bordering countries. Brazil is soon expected to commercially launch the new event in herbicide-and-insect-tolerant soybean, much earlier than Argentina gets ready.

Among the main formal institutional innovations, we can mention Argentine regulatory system adaptation, mainly focused on shortening process deadlines, and the elimination of politics Argentina mirrors from Europe.

"Mirrored politics" was created in the late 90s as a reaction to the change of direction in the European Economic Community's politics, which resulted in the modification of rules and the emergence of labelling for GMO. Since then, Argentina has implemented a system of impact evaluation on exports, which is part of the approval mechanism of genetically modified materials. Therefore, the ultimate decision on GMO's evaluation does not result from a technical analysis but from a political decision.

Undoubtedly, big changes have taken place in Argentina over the last years: the creation of the Ministry of Sciences, Technology and Productive Innovation as well as the upgrade of the Secretary of Agriculture, Cattle and Fishing to Ministry status, which gives an idea of the acknowledgement of the sector contribution to the country. Likewise, public and private sectors are working together to update the regulatory system; thus everything appears to be a question of time and agreements.

Apart from the regulatory aspects, what requires institutional innovation is the area of copyright protection and the mechanisms of business value capture. Nowadays, the most important laws regarding protection are Seeds and Phytogenetic Creations Law - *Law: 20.247/73 PEN Date: 03-30-73 that modifies Law No* 12.253 and Inventions Patents and Utility Models Law *(Law 24.481 modified by Law 24.572 T.O. 1996 - B.O. 03/22/96)* Modified by Law No 25.859, sanctioned on 12-4-2003 and enacted on 01-08-2004. Both laws, in turn, are inserted in a scenario of international agreements and treaties, regulations and resolutions that eventually define the present rules of the game, which, in the specific case of Seeds Law, it is a law prior to the existence of biotechnology, therefore some aspects are not considered.

In the Seeds from The Americas Association (SAA) declaration, it is recognized that copyrights protection is essential to the good development of seed industry in the Americas. The level of investment in seed industry is directly related to the efficiency of copyrights protection available.

Considering this scenario, it is essential to adapt the current system to consider provisional patents, for users to recognize the business value created, and to drastically reduce the black market of seeds.

Undoubtedly, there are other interesting aspects, but they may be less important than the ones mentioned above. Argentina needs to innovate at an institutional level so as to take advantage of future technological innovations and to continue maintaining and increasing competitiveness and agricultural sustainability.

3.6. Organizational Challenge: The need of Innovating Again

Moving on to new technological project phases has established new needs and adaptations, as in the project to obtain transgenic plants that are tolerant to drought that is currently under the development phase (practising field trials on wheat, soybean and corn) and starting the regulatory phase for each crop.

This advance suggests a new scenario for the company: provided these technologies are for the global market, the challenge implies an organizational innovation that will surely be related to adapting the company to new markets by the hand of strategic partners. The goal will be to create a multilocal network of networks with a global strategy that allows that knowledge and technologies developed in the country to be commercialized not only locally but also all over the world.

4. FINAL CONSIDERATIONS

Bioceres S.A. is a true example of the new economy of agrifood business, where innovation, alteration and adaptation take place permanently in the technological and organization fields, and is also working hard so that these phenomenons can also occur in the institutional field.

One of the strengths -and maybe the biggest competitive advantage- Bioceres has is the construction and consolidation of social capital. And social capital has to do with the capability people have to work together (in groups or organizations) on shared projects.

Bioceres is a knowledge-based society company and its added value is directly related to the agreements signed and executed, to the people involved, and to the institutions that participate in the projects.

The numerous links with both the private and public sectors, and the creation of synergy networks with a shared vision, mission and goals make it possible for a company formed by a group of agricultural producers to access to new businesses in the knowledge-based society. Undoubtedly, the social capital created in Bioceres has allowed to reduce transaction costs and to design proper governance structures so as to achieve the goals proposed.

As challenges are many and changes are constant, the company needs to adapt to every situation modifying and adjusting its structure, innovating, and working to lead in the change of written or unwritten rules to allow for the proper context for Argentina to be competitive not only in terms of technologies adopted but also as for their development.

5. REFERENCES

Castells, M.,The rise of the Network Society", Blackwell Publishers, Oxford. 1996
Clive, James., Global Perspective of Biotech/GM Crops: 2010 the 15th Anniversary of Commercialization. Press Conference. Buenos Aires, Argentina, 23 February, 2011
Coase, R. H., "The Nature of the Firm: Origin, Meaning, and Influence". Journal of Law, Economics, and Organization. 4 (1): 3-59. 1988

Davis J. & R. Goldberg. Concept in agribusiness. Division of Research. Graduate School of Business Administration. Harvard University. Boston. 1957.
Enriquez Cabot, Juan, El Reto de México: Tecnología y Fronteras en el siglo XXI. Editorial Planeta. 2000
Enriquez Cabot, Juan, As the Future Catches you. Crown Business, New York. 2001
Hayek, F., The Use of Knowledge in Society. American Economic Review 3. September 1945.
Ministerio de Agricultura, Ganadería y Pesca, www.minagri.gob.ar
North, D. C., Institutions, Institutional Change, and Economic Performance. Cambridge: Cambridge University Press. 1990
Ordoñez, Héctor, "Aportes Metodológicos de estudio e Intervención en los Agronegocios" Una teoría, tres modelos, tres casos; Cátedra de Comercialización – Facultad de Agronomía – UBA. 2003
Ordoñez, Héctor A. "La nueva economía y negocios agroalimentarios", Editorial Facultad de Agronomía – UBA. 2009
Ridner et al., "Alimentos Transgénicos. Mitos y realidades", Editorial Nutrición y Salud. 2008
Trigo, Eduardo et al, "10 Años de cultivos genéticamente modificados en la Agricultura Argentina". 2006
Trucco, Víctor, Academia Nacional de Agronomía y Veterinaria, "AAPRESID: Recuerdos de una gesta innovadora". 2011
Williamson O. The Economic Institutions of Capitalism: Firms, Markets, Relational Contracts. The Free Press. New York. 1985.
Williamson O. The Mechanism of Governance. Oxford University Press. NY. 1996.
Zylbersztajn D. & Farina E. Agrisystem Managment: Recent Developments and Applicability of the Concept. Anais do I Workshop sobre AgriChain Management. Faculdade de Economia, Administracao e Contabilidade da Universidade de Sao Pablo. Riberao Preto. Novembro 1997.
Zylbersztajn D.Governance structures and Agribusiness Coordination: A transaction cost economics based approach. research in domestic and International Agribusiness Mangement. Editor Ray Goldberg. JAI Press.Volume 12. 1996.

Corporate Governance




STRATEGIC CONTROL OF AGRO-INDUSTRIAL COOPERATIVES: A STRATEGIC MAP PROPOSAL

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Abstract

This article discourses about strategy management in agro-industrial cooperatives. Based on the concepts of Balanced Scorecard – BSC and Systems Dynamics, considering the corporate features of agro-industrial cooperatives as societies made of people and not of capital, the article proposes a strategic map, which presents up variables that represent the critic processes in strategy management for these organizations, as well as identifying causal relations hypothesis between the variables. From the concepts of BSC, the map is built with the four traditional perspectives: financial; customers; internal process; growth and learning; and adding two other important perspectives in agro-industrial cooperatives: the social perspective and the member relationship perspective. From the concepts of System Dynamics, the map is qualitatively built, predicting the complexity of strategic management in agro-industrial cooperatives, in accordance to the need of conciliation and balance of economic goals between the cooperative and its members. From the proposed strategic map, the goal is to proceed with the research, defining new indicators of each variable in the map, as well as its adaptation and application towards agro-industrial cooperatives, through the action-research method.

Key words: Strategic management, agro-industrial cooperatives, Dynamic Scorecard

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1. Introduction

Cooperative societies present several differences in relation to the mercantile societies or investor owned firms – IOF, and so they demand the adaptation of specific management tools. Being constituted as societies of people instead of societies of capital, the strategic administration of cooperatives depends significantly on the relationship they maintain with their members. The members view a cooperative as an intermediary organization between their individual ventures and the market and are stimulated to maintain and strengthen their commercial relationships with the cooperatives through economical advantages for their own individual enterprises. In this context, strategic management of agro-industrial cooperatives depends on the development of new models that consider the conciliation and the balance among the cooperatives and members distinct goals.

In this paper, core concepts of strategic management and particular characteristics of agro-industrial cooperatives are discussed. A strategic map is proposed, based on the Balanced Scorecard concept and associated to the vision and resources of the Dynamic Systems. These tools have been applied aiming to improve the strategic analysis model proposed, considering the complexity inherent to cooperative management.

2. Research Problem and Objective

Cooperative societies show peculiarities in their legal constitution and adopt principles and doctrines that exert significant influence in their structuring and organizational governance, delegation and use of power and, consequently, in the way how decision process happens. Cooperatives are societies of people who unite themselves seeking for the satisfaction of common needs. In opposition of IOF, where the power is proportional to the invested capital, in cooperatives the power is egalitarian, because of each member exerts the right of a single vote independently of the owned capital. In a cooperative the financial result is not the only objective. The decisions about re-investment or distribution of the financial surpluses to members are taken in assembly formed by the peers. The financial surpluses share returns to the members proportionally to their work with the cooperative, instead of the amount of capital owned. (BIALOSKORSKI, 2001).

In cooperative societies, an ambiguous relationship among the members happens. They are at the same time customers, suppliers and owners of the society. Due to that, the emergence of conflicting goals is verified, especially in the case of highly competitive markets. Among the causes of these conflicting goals, one of the most important are the difficulties to balance the pressure for decreasing the prices of final products, coming from market, with the pressure for increasing the price paid for supplies, coming from members – who are the suppliers of the cooperative. (BIALOSKORSKI, 2001).

Cooperatives face different pressures influencing their decision process at a strategic level. On one hand, the internal environment is composed by members who seek their satisfaction and corporative goals that are barely convergent, due to the homogeneity of the social boards and the kind of relationship between members and cooperatives. On the other hand, cooperatives work in high competitive markets, including the more industrialized ones, demanding the need for development of effective management practices that can provide the necessary competitiveness for the business success. From the internal environment, corporative pressures, that may cause the political behavior of the decision makers emerge

and, from the external environment emerges competitive pressures demanding a rational behavior of these decision makers (BARREIROS, 2005).

Within this framework it is possible to highlight the following research statement: The members of an agro-industrial cooperative, as independent economic agents, not always have a convergent behavior with the collective goals of the cooperative. In this sense, the development of a strategic management model for this type of organization depends on adaptations that adequately consider the effect and influences of the member's behavior in relation to the decision process of cooperatives – as commitment, degree of capitalization acceptance and degree of technological innovations acceptance.

Based on the concepts of the Balanced Scorecard and System Dynamics, the purpose of this paper is to present a strategic map, adapted to the peculiar characteristics of agro-industrial cooperatives, and that provides conditions for future development of management strategy modeling in this type of organization

3. Strategic Control, Balanced Scorecard and Dynamic Scorecard

When studying performance assessment and control systems for implementation of business strategies, Simons (2000) conceived a model of strategic control levers that involve four dimensions. These dimensions are partially related with the 5 Ps of strategy (MINTZBERG et al., 2000): strategy as perspective, strategy as positioning, strategy as plan and strategy as pattern. Only the fifth P of Mintzberg – strategy as ploy – is not considered in this model. The model of control levers developed by Simons (2000) took advantage of some concepts and formulations of strategy developed previously. The first one was the analysis of the Design's School (ANDREWS, 1996), which establishes that the strategy formulation should be done according to the analytical study of threats and opportunities of the external environment and of strengths and weaknesses of the internal environment – SWOT analysis. In order to position the businesses in the external environment, the dynamic of market competition is also used – 5 strengths model of Porter (PORTER, 1998). In order to recognize and to develop resources and competences of the enterprise, the vision based on resources of Barney (1991) and on essential competences of Prahalad and Hamel (1998) have been considered as well.

Strategy as perspective involves the consideration of values, beliefs and ideals as the organization's master guide. Essential values are beliefs that define basic principles, purposes, as well as the organization's course. These values create the principles that must guide the relationship and responsibilities with customers, employees, local communities and suppliers. Strategy as perspective depends on the establishment of belief systems that communicate, give support and establish commitment from the individuals who are part of the organization, with the goal of establishing the culture that reproduces the values of the company's mission.

Strategy as positioning involves the consideration of boundaries that must guide behaviors and management decisions, according to the risks that must be avoided. The establishment, communication and monitoring of these limits must be done through boundaries systems, such as codes of conduct, limits on decision-making autonomy and internal and external compliance norms, which are stated by firms, laws or external regulatory departments. This strategy also considers the limits originated by the strategic positioning in the market intended by the organization, according to the pressures and competitiveness of the industrial segment.

After defining the mission and the strategic positioning, through the analysis of the competitive dynamics of the market, resources, competences and internal capabilities, the dimension of the strategy as plan emerges. In this phase, formally the goals are expressed, communicated and distributed for the whole organization, and also the necessary resources

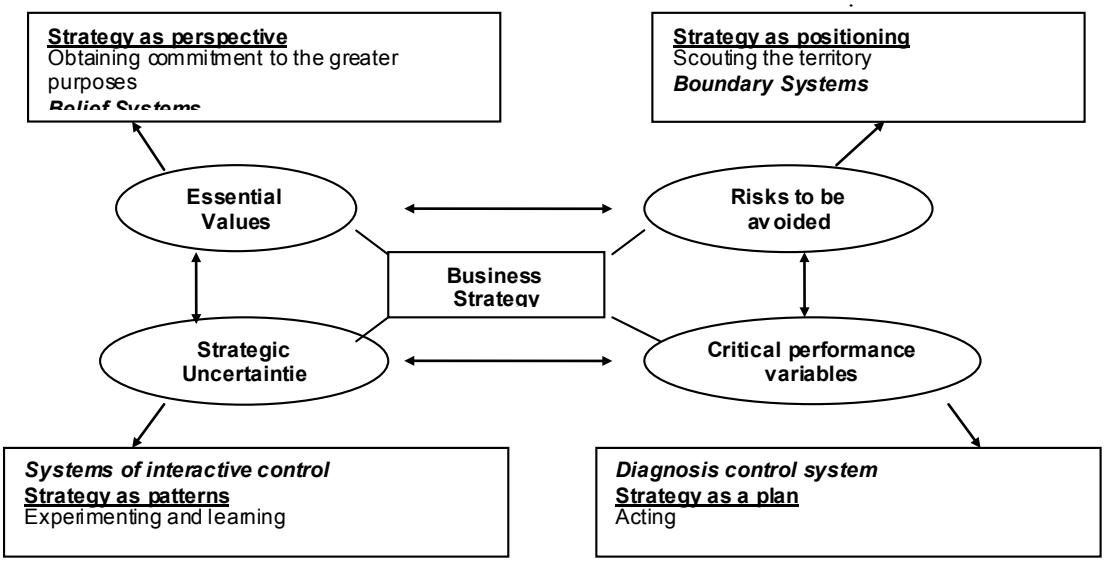
are estimated and coordinated in order to actually reach the goals. In this phase are also defined the measures of performance and the necessary procedures to reach the goals.

The hierarchy "mission >> strategy >> goals >> measures of performance >> actions" defines a concept in a cascade way that begins at a general inspiring mission towards a specific quantitative measure of performance. This hierarchy is supported by strategic plans based on analytical techniques, such as SWOT. However, according to Simons (2000) this is an incomplete frame of the strategic formulation process. Complementing this process, Mintzberg and Quinn (2001) studied the emergent strategies that define the strategy as pattern and are the origin of the organizational learning process. This strategy considers that ideas emerge from people, who are part of the organization, and those may become good strategies for the organization.

Simons (2000) considers that in the implementation of strategies, in order to reach the financial goals, managers must deal with the following tensions that are inherent to organizations seeking high performance: a) Tensions among profit, growing and control; b) Tensions among deliberate and emerging strategies; c) Tensions among unlimited opportunities to limited attention; d) Tensions among self-interest and the desire for contributing.

It is a managers' duty to know how to use the several techniques of measure of performance along with the four control levers, shown in figure 1, in order to cope with these tensions. CEOs also may use the control levers to inspire commitment with the organization's purposes, to recognize the competition environment of the market, to coordinate and monitor the execution of strategies at an operational level and to stimulate and guide creation and control of emergent patterns, which may be used as future strategies.

Figure 1 – STRATEGIC CONTROL LEVERS (Source: Simons, 2000)



The control levers allow managers to have an effective coordination and business administration when used along with techniques of performance measurements, such as budget plans, measures of corporative performance, balanced scorecards and systems of resource allocation – which are considered in Simons' model as systems of diagnosis control and systems of interactive control. In other words, they provide conditions for the appropriate strategic management of a firm. In a global approach, these tools of performance measurement provide the necessary motivation, mensuration, learning and control for efficiently achieving goals, for creative adaptation and for profitable growth during the life cycle of a firm.

The way of converting strategy into practical actions throughout the firm, detailing guidelines and goals, creating tools for monitoring and for measurement of strategies' results and creating a favorable environment for strategic alignment and learning has been one of the greatest challenges for the strategic management field. Seeking this goal, several methods have been developed, such as Tableaux of Board, Administration by Goals (developed by Peter Drucker), the Method of Management by Guidelines and, recently, the Balanced Scorecard method, created by Kaplan and Norton (FERNANDES, 2003).

According to Kaplan and Norton (1997), the BSC is structured as a set of indicators and is a system of strategic management aiming at: a) Clarifying and obtaining consensus about the strategy; b) Communicating the strategy throughout the firm; c) Aligning departmental and personal goals with the strategy; d) Connecting strategic objectives with long-term goals and budgets; e) Identifying and aligning initiatives, investment programs and strategic action; f) Accomplishing periodic and systematic revisions; g) Getting feedback in order to increase the knowledge about strategy, to improve it and to develop strategic learning.

The BSC seeks to translate the vision and the strategy of a firm into a broad set of goals and performance measures, having as structure a modeling based on four basic perspectives of a firm: financial, customers, internal processes and also growth and learning. This modeling is expressed through a map, known as strategic map, that must tell the history of the firm's strategy.

Goals have to be stated on each of the four perspectives along with indicators that allow monitoring these goals. Besides, relations of cause and effect must be identified between the goals and indicators of the four perspectives of the map. In that way, the firm's strategy is concentrated within a set of assumptions about the relations of cause and effect, which have to be tested throughout the result assessment process .

The BSC's main presupposition is the idea that strategic management surpasses the financial dimension and reaches other perspectives, such as customers, internal processes as well as growth and learning. Thus, a BSC map must make explicit the relations among goals within these perspectives, making strategy management possible. Every indicator chosen for a scorecard must be an element of a chain of relations of cause and effect, which communicate the meaning of a firm's strategy (KAPLAN and NORTON, 2004). To Kaplan and Norton (2001), the most innovative aspect of BSC is its capacity for creating strategic learning, specially because the monitoring of performance indicators can assume the form of hypothesis tests of the relations of cause and effect modeled on the strategic map.

Despite the improvement caused by BSC on the strategic management field, there are some criticisms regarding BSC's limitations: a) The relations of cause and effect are one way, or, in other words, feedback among goals is not made explicit; b) The map is not operational, because it does not consider delays among relations of cause and effect; c) The map cannot be experimented with, in other words, it is impossible to use the map in a reliable simulation.

In order to solve these limitations, it is possible to use the System Dynamics method in association with BSC. To Richmond (1999, cited by FERNANDES, 2003) the deficiencies regarding the BSC's strategic map might be solved by using the language of flows and stocks provided by the System Dynamics method. Due to this, the concept of Dynamic Scorecard was developed, where a simulation of the relations of cause and effect is possible, creating strategic learning.

By studying the viability of conjugation of BSC with System Dynamics, Schoeneborn (2003) showed that the relations of cause and effect of the various elements described in literature about the BSC are not suitable enough for the identification of indicators that bring successful results in the long run. Being based on simple views that ignore the delays and possible feedbacks, the strategic maps only show a part of the effects. Overcoming such limitations is possible through the conjugation of the BSC with System Dynamics, in a way

that the delays and feedbacks between variables start being considered and set into parameters, so that model simulation and subsequent strategic learning are made possible.

About the possibility of conjugation of the BSC and System Dynamics techniques, David Norton admitted that the next generation of BSC would use the resources of simulation from System Dynamics.

Systemic thinking has been consolidating itself as a new paradigm in the way of facing organizations, not only through analytical thinking, which treats things as a group of independent variables, but more importantly by acknowledging the complexity of the social systems, in which variables present a behavior of interdependency. It was originated from the studies of Bertalanffy (1977) in biology, who, disagreeing from the Cartesian and reductionist view of the universe, proposed the general theory of systems. In this theory, systems should be studied globally, taking into consideration all the interdependencies of the component variables altogether, because an organism is a more complex whole than the sum of its parts.

System Dynamics, derived from this new way of thinking, which takes into account the complexity and interdependence of the variables that make up the systems, was developed initially through the studies of Jay Forrester. Currently the use of Dynamic Systems is very wide, comprising many different fields and problems, such as: business management, competition and business cycles, ecology, economy and social phenomena. It's possible to say that System Dynamics is useful for the study of the vast majority of problems that have a dynamic nature (PROTIL et al., 2007).

In System Dynamics, there are two basic forms of modeling: soft modeling (qualitative) and hard modeling (quantitative). Soft modeling uses causal maps to identify the structural components of the system and the relations of cause and effect and feedback between the variables. Hard modeling, on the other hand, based on causal maps incorporates the language of flows and stocks, parameterizing the relations between variables and the respective feedbacks and delays, thus adding the possibility of simulations in the system, through the analysis of different scenarios and their consequences on the behavior of the system component variables (STERMAN, 2000).

The conjugation of System Dynamics with the BSC is interesting in that it gives possibilities for overcoming the limitations of this method, as previously reported. By enabling the consideration of delays and feedbacks between different variables of the BSC strategic map, the model overcomes the initial limitations of unidirectionality and operational difficulties. The model then enables more reliable simulations and consequent strategic learning (SCHOENEBORN, 2003). Fernandes (2003) gave the combination of the BSC with System Dynamics the name of Dynamic Scorecard.

4. Management of Cooperatives

Georg Drahein in 1951 introduced the concept of dual nature of cooperative organization (Hanel,1994). On the one hand, the cooperative is primarily an association or a group in the sociological aspect, whose members are the owners and maintainers of the organization. On the other hand, the cooperative is also a joint company of the members' economic ventures and these members are the cooperatives' owners.

To Staatz (1989), until the 1960s, the debate on cooperative organizations, was focused on the discussion if cooperatives would represent a form of vertical organization of farmers, being simply as an extension of individual members' ventures, or if cooperatives could legitimately be analyzed as organizations with self-specific scope and with independent decision-making process, regardless the goals of farmers in their individual ventures. In this sense, the debate was focused on the discussion if the cooperative administration might simply implement the wishes of members, guided by their individual goals, or if they might

look for the achievement of the cooperatives' objectives itself, as an independent organization, assuming the vision of collective goals, not always convergent with the goals of individuals.

Staatz (1989) states that Stephen Enke started a different discussion, but perfectly adherent to real conditions, when he said that on the day by day of a cooperative, its administration is faced with situations in which decisions must be made, based on alternative choices and often antagonistic of what should be maximized between the goals of members and the needs of the cooperative itself. From this discussion emerged the approach to study cooperatives as independent organizations, with their own objectives and as alternative economic firms in face to the conventional IOF.

Enke's model emphasized that to maximize the outcome of members, the cooperative's management had to balance the benefits received from two different sources. Initially, the benefits received by members, derived from their operations with the cooperative, to the extent that it can offer lower prices for purchased inputs and higher prices for products sold by the members. In addition to these primary benefits, as wished by the members when forming the cooperative, another type of benefit might be considered, derived from the cooperative's industrial adding value to the raw materials supplied by the members. That is, industrializing the products delivered by the members and operating under market conditions, the cooperative would offer financial returns derived from profitable business in different markets, that in medium and long terms, could be shared among the members in proportion of their respective financial movements with the cooperative (STAATZ, 1989).

Prioritizing benefits focusing only one of these sources on financial return would tend to reduce the overall returns of members. That is, focusing only on the returns derived from the operations of members with the cooperative, could limit the capitalization of the cooperative in the long run, with consequences on the competitiveness and future returns of their own members. On the other hand, focusing only on the strengthening of the cooperative, at the expense of short-term economic benefits, could significantly compromise the return of the individual members' ventures. Enke, therefore, emphasized an important implication of specific cooperative organizations: the need to balance the benefits of members as users and as owners of the cooperative (STAATZ, 1989).

Reynolds (1997) reports that farmers establish and maintain a cooperative when they can reach their goals in a broader and more comprehensive way when compared to their alternative individual actions as separate economic agents. Cooperatives are voluntary organizations and operate under democratic principles of corporate governance. The cooperatives thus establish themselves as organizations based and dependent on consensus among their members. This author considers that members of cooperatives usually have divergent economic goals, given the differences in size, technological level and type of individual businesses and that the maintenance of cohesion and the creation of incentives for cooperation is much more complex the more different the productive and technological processes are. Thus, in order to meet the goals of the members it is necessary to establish clear policies which consistently sustain and support the relationship between cooperative and members, so that any transaction done with a member can be assessed by all others.

After studying the nature of the decision-making process in agricultural and livestock cooperatives from Paraná, Barreiros (2005) validated a decision-making process model comprised of three basic dimensions: political, economic and administrative. In this model, various internal and external relations existent in cooperatives, which influence their decision-making at strategic levels presented. The external environment influences in different ways the cooperative organization and the body of members. The members, organized into various committees according to the level of diversification of their businesses, exert different

pressures on the cooperative in an attempt to have their individual or corporate goals served. The cooperative, with its technical and administrative structure, tends to imprint as much rationality as possible in their decision making, based on information received from the market. However, given the democratic nature of its corporate governance, the cooperative is highly sensitive to internal pressures, in the search for consensus and coalition between members. In cooperatives, there are two apparently dual structures. On one hand, a technical structure, that seeks rationalization. On the other hand, the structure of power and political order, which influences the decision-making process, based on different individual or corporate goals.

Machado Filho et al. (2003), in turn, argue that in the strategic field, the cooperative model is difficult to manage, due to the need to tend to very diverse demands, leading to a natural increase of the political weight in decision making. Governance becomes very complex, and much of the management effort is concentrated on it. Besides, they reinforce that in Brazilian cooperatives, there usually is no separation between ownership and control, in that, in many organizations, managers come from the body of members, which can lead to management difficulties in that it increases the complexity and the competitive level of businesses. Lacking management professionals, cooperatives move away from the market, focusing on the operational aspect of production. Given the heterogeneity of the member's interest, the agricultural and livestock cooperatives still decentralize their efforts into diversified businesses, with not always sufficient scales of production, to the detriment of effectiveness and good management.

The analysis of cooperative societies from New Institutional Economics perspective takes into consideration five typical problems of these organizations, which are: the horizon problem, the portfolio problem, the incentive problem, the control problem and the influence problem, as described below (COOK, 1995; ZYLBERSZTAJN, 2003).

The horizon problem considers that members tend to reject strategies involving long-term immobilization of capital, when their residual claims on the net income generated by the invested asset are shorter than the productive life of that asset. This problem occurs regarding the inalienability of capital shares. In other words, capital used by the cooperative cannot be sold to third parties, as done in IOF, and is adjusted in a limited way by the cooperative according to its bylaw, regardless of the value increase of the Cooperative. This implicates a preference for short-term projects, rather than long-term investments. The horizon problem implicates the need for the creation of mechanisms to inhibit the exit of the cooperative member, through a penalty in the capital share.

The portfolio problem can be viewed from the cooperative firm's point of view as another equity acquisition problem. The lack of transferability, liquidity and appreciation mechanisms for exchange of residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. Therefore, pressures may emerge from members to maintain the cooperative's investment portfolio, in proportion of their preferred risk level, regardless the cooperative's needs. These limitation may cause problems to the extent that the cooperative will have more difficulty competing in markets with higher added value products , which require heavy investments in technology, marketing and distribution.

The incentive problem considers that the difficulty of monitoring the activities of members may generate opportunistic behavior, in case there is a concentration of the relationships with the cooperative only in situations of commercial benefits. This problem is observed, for example, when a member purchases producer goods from a cooperative, but diverts the product to other market channels, if a higher price is encountered there.

The control problem is related to the agency costs associated with trying to prevent the divergence of goals between the membership, represented by the board of directors (principal) and manager (agent). There is a fundamental difference between cooperatives and investor

owned firms, in the extent that in cooperatives the pressure exerted by publicly traded equity is not present, masking possible management inefficiencies. Moreover, it is common in Brazilian cooperatives, that executive management is exerted by board of directors' members, which may be effective in cases of simple decision-making processes and less complex businesses, but it tends to be a limiting factor for the efficient management of these organizations, and this limitation is stronger the more the cooperative grows and the more complex its businesses become. In such cases, the improvement of corporate governance depends on the specialization and separation between ownership and control of the company.

The influence problems emerge from the goals' diversity among cooperatives' members. Influence activities arise in cooperatives when organizational decisions affect the distribution of wealth among members and when in pursuit of their self-goals. This leads to the emergence of political coalitions among members of the cooperative, in an attempt to take hold of executive positions, which are provided with a high amount of power. In this situation, the definition of the composition of the executive board is not always a function of the efficiency factor, but of influence procedures and political coalitions. The magnitude of influence issues depends on the degree of members' homogeneity.

Emerging from these considerations is the problem of this research, embodied by the apparent need for adaptation of the BSC methodology and consequently of the Dynamic Scorecard for use in cooperative societies, thus possibly incorporating, beyond the four traditional perspectives (financial, customer, internal processes as well as learning and growth), other perspectives, which are shown to be fundamental in this type of organization: the relationship of the cooperative with its body of members, which depends on transparent policies of incentives for the practice of cooperation, leading to fidelity of the members and strengthening of cooperative; and also the social perspective.

5. Methodology and Results

From the arguments aforementioned the following research question is presented: How to insert the Social perspective and the Relationship with members perspective in the Dynamic Scorecard Model of agro-industrial cooperatives, given the need to conciliate and balance the goals of members - who seek for economic outcomes in their own individual ventures - with the goals of the cooperative itself, as an independent organization – that need capitalization, professionalization and investments to sustain sufficient competitiveness in agribusiness markets?

In a first stage, which is this article's object of analysis, a model represented by a generic strategic map applicable to agro-industrial cooperatives has been developed. For the development of this model, which shows the hypothesis of relations of cause and effect of the critical success factors in a qualitative and dynamic way, the Vensim Software has been used.

In order to evaluate the consistency of hypothesis of causal relationships among the variables contained in the generic strategic map, five interviews were conducted with experts of OCEPAR - Organization of Cooperatives of the State of Parana, followed by content analysis of the interviews (thematic analysis) and either by questionnaires to assess the perception of these experts on the intensity of causal relations validated by them.

In later stages, this research will continue with the definition of control indicators, in the different perspectives of the Dynamic Scorecard, that adequately express the critical strategic factors in the agro-industrial cooperatives; followed by the practical application of the proposed model in agro-industrial cooperatives, through the action-research method.

As a result of the analysis, the following is a description, step by step, about the development of the strategic map, in the soft modeling language of Dynamic Systems. These language considers the variables, enclosed in polygons, the relation between variables -

represented by arrows - and delays in these possible relations between variables, represented by double lines across the arrows. The partial versions of the model are represented in figure 2, with the sequential and progressive causal loop diagrams, that represent reinforcement among variables (R) or equilibrium among variables (B).

The first reinforcing loop (R1) designed refers to the hypothesis of the positive effect of technical assistance over the member's capacity, efficiency, production, gross margin and profits. And as a reinforcement loop, the higher the member's profits, the greater the feedback of spending resources in more technical assistance, closing the loop R1. This feedback is a result of members' awareness in relation to the benefits brought by technical assistance.

The second reinforcing loop (R2) designed refers to the hypothesis of the positive effect that the commitment of the members with the cooperative – expressed by the indicator fidelity -, influenced by their profits, exert over the financial surpluses of the cooperative, which in turn, increase the profits of the members through the possibility of surpluses distribution. The hypotheses are that member's profits increases their satisfaction, and so their fidelity, the production delivered to the cooperative and the financial surpluses of the cooperative, which can be distributed back, increasing as a feedback the profit for members, closing the reinforcement loop R2.

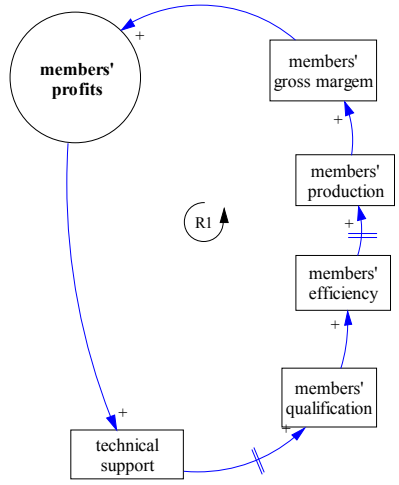
The third loop (B1) is the first balancing loop of the model. It refers to the hypothesis of the positive effect that investment in innovation and experimentation exerts over the member's capacity and consequently over their efficiency, production, gross margin and profits, but at the cost of reducing the financial surpluses of the cooperative itself. Instead of reversing all the potential surpluses to the members, the cooperative can alternatively invest a part in agricultural innovation and experimentation, improving the technology employed by the members in their farms, with positive effects in the medium and long term, over the capacity and consequently over the member's profits.

The fourth loop (B2) is also designed as a balancing one. It considers the hypothesis of the positive effect that the capitalization of the cooperative exerts over its ability to make new investments, required to preserve its competitiveness in the agribusiness markets, with consequent increase of the cooperative's financial surpluses in the medium and long term. The cooperative operates in competitive markets and needs equity for new investments that preserve or expand its competitiveness, with positive effects over agro-industrial efficiency, consequently over the satisfaction of external customers, sales and revenues, providing the increase in the financial surpluses of the cooperative. These investments, however, compete in the short term with the same surpluses that could alternatively be reversed to the members, closing the balancing loop B2.

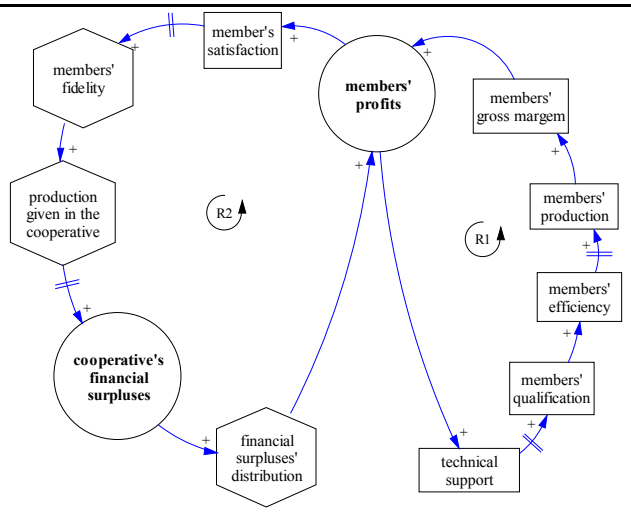
The fifth loop (B3) is also designed as a balancing one. It considers the hypothesis of the positive effect that new investments may also exerts over the efficiency of internal processes of the cooperative and consequently over the member's satisfaction, and then with positive effect over their fidelity, yet with sacrifice, in the short term, of the cooperative's surpluses distribution.

Figure 2 – MODEL DESIGN

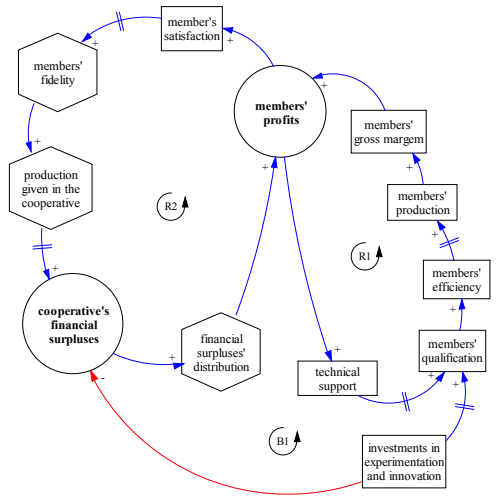
MODEL WITH LOOP R1



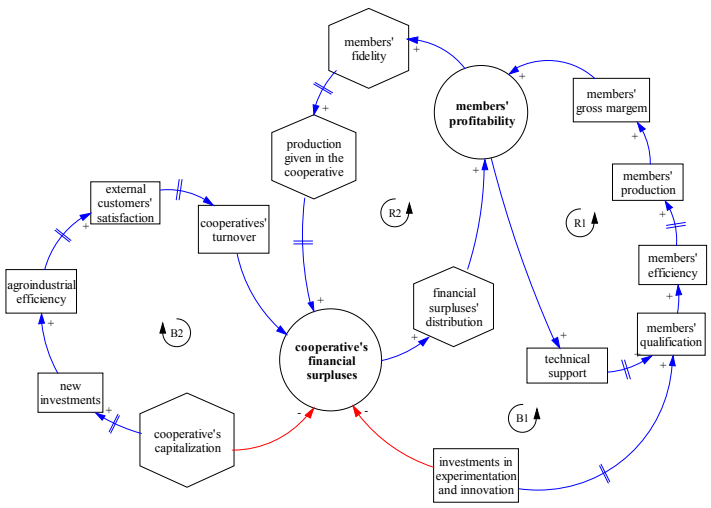
MODEL WITH LOOP R2



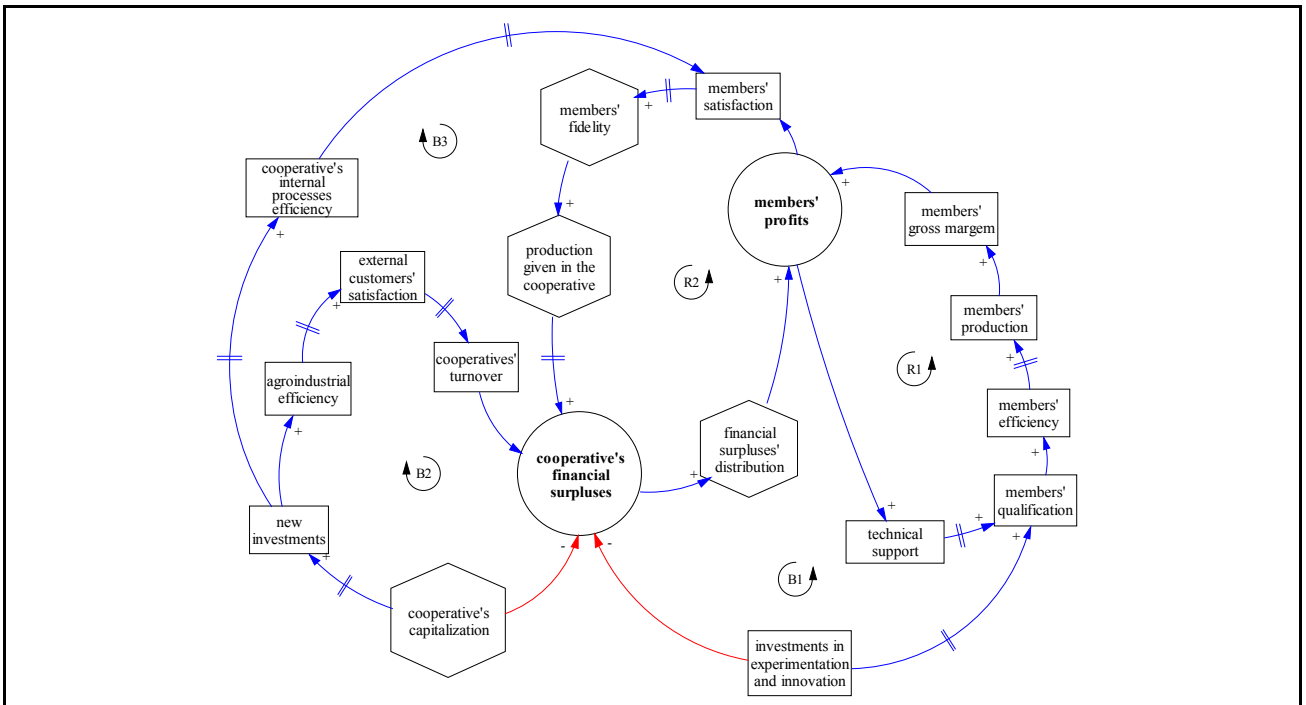
MODEL WITH LOOP B1



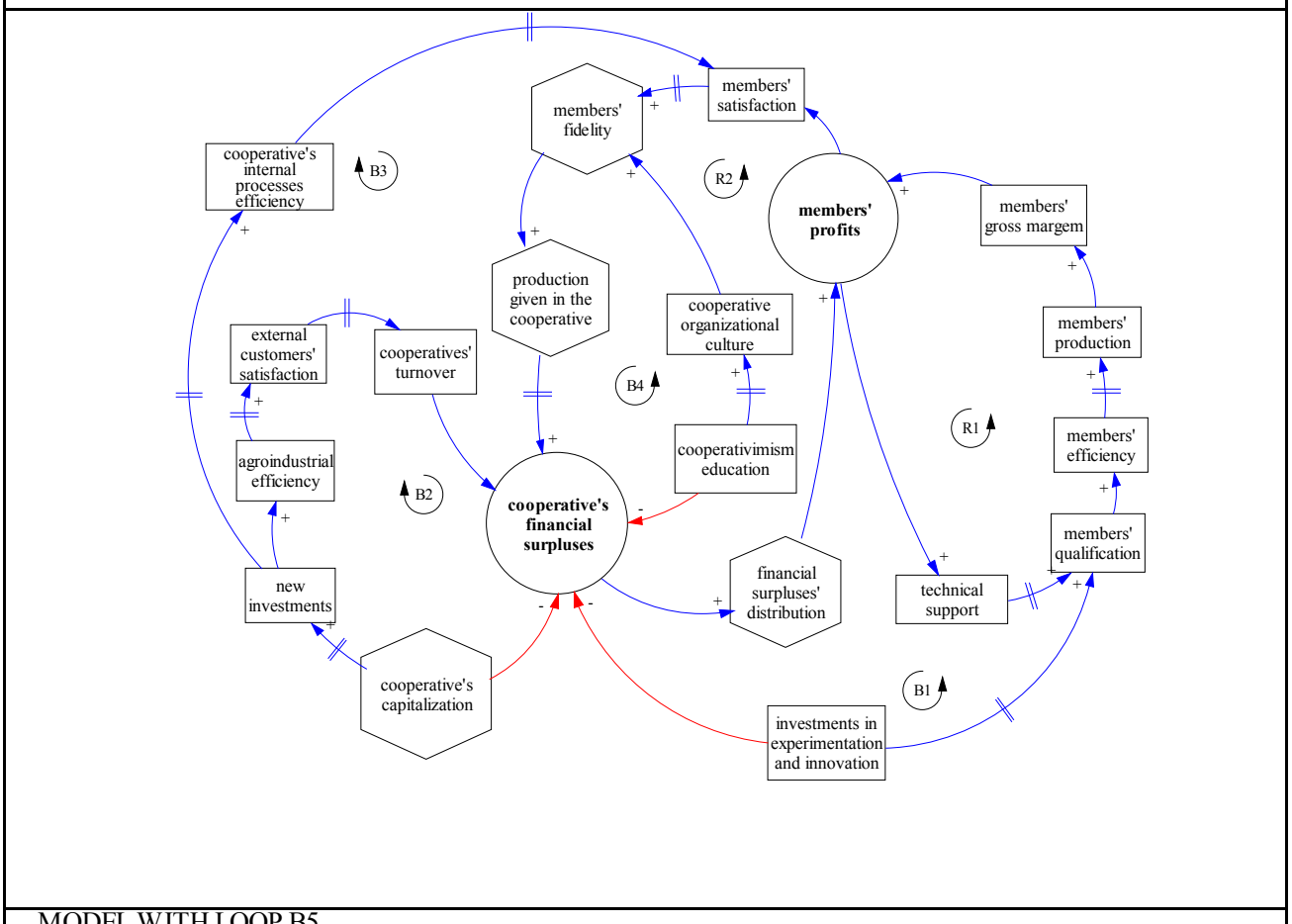
MODEL WITH LOOP B2



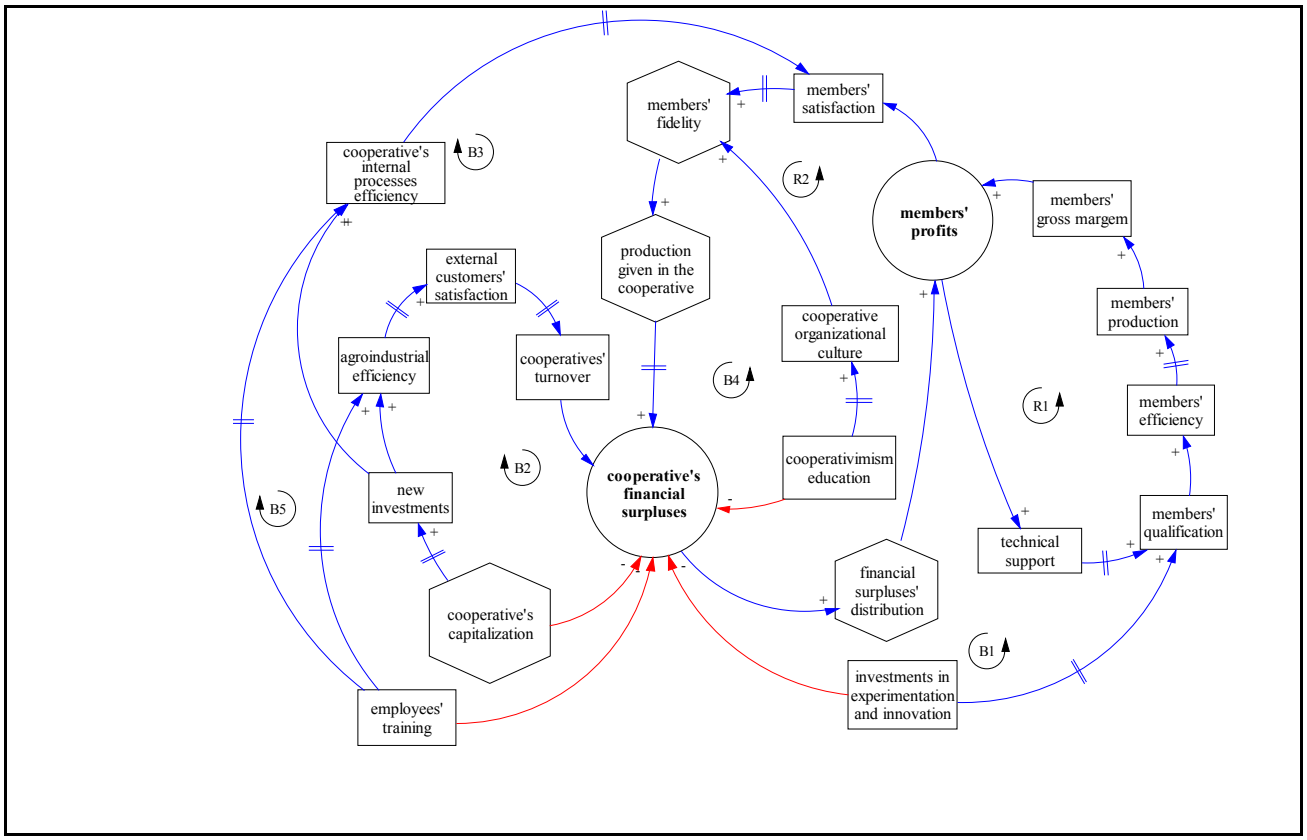
MODEL WITH LOOP B3



MODEL WITH LOOP B4



MODEL WITH LOOP B5



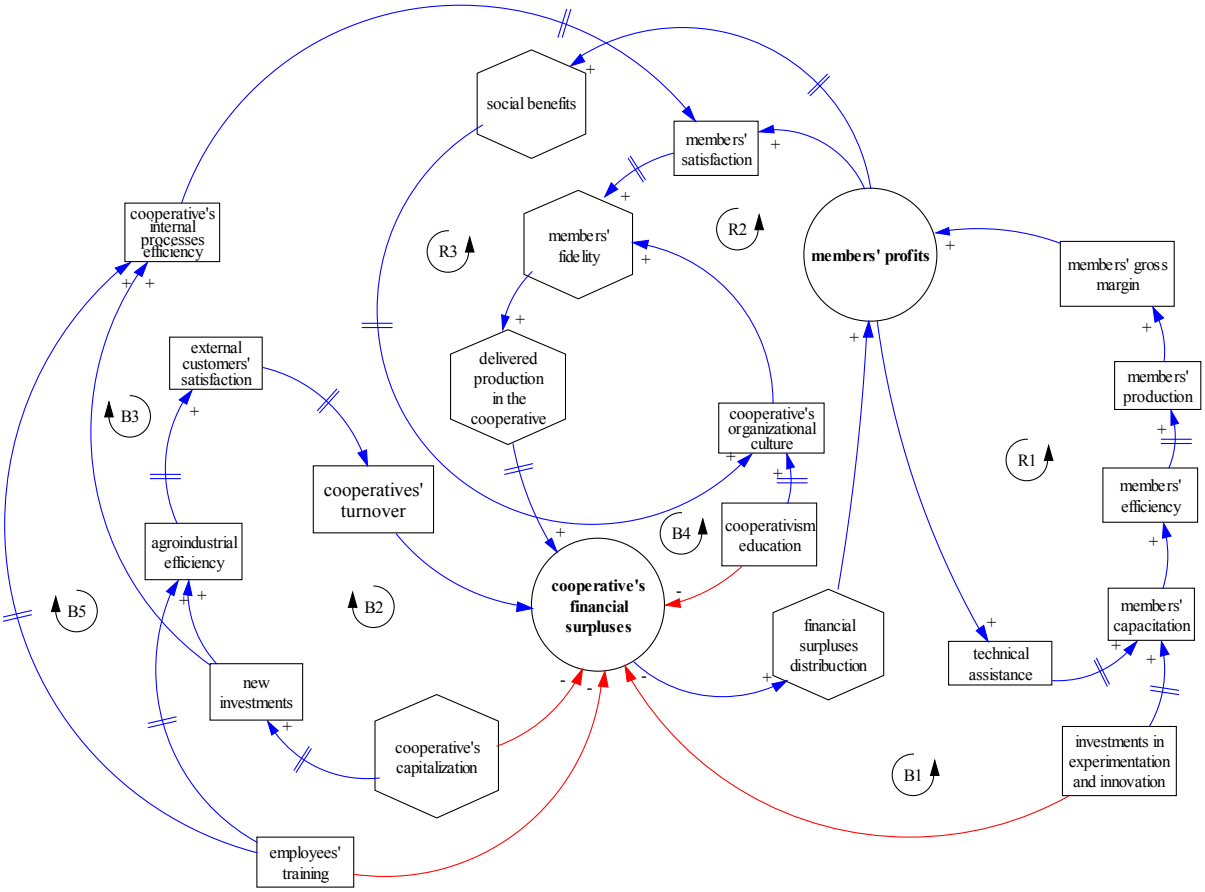
The sixth loop designed as a balancing one (B4) considers the hypothesis of the positive effect that cooperative education exerts over the commitment and fidelity of members, and consequently, in the medium and long terms, over the financial surpluses of the cooperative. The cooperative education increases member's awareness about the benefits of cooperativism, with positive effects on the organizational climate of the cooperative. The member's awareness about the collective objectives of the cooperative associated with the belonging perception to the organization, leads to increased commitment and consequently the increase of the cooperative surpluses in the medium and long term. In the short term, however, there is a cost decreasing the financial surpluses of the cooperative.

The seventh loop designed as a balancing one (B5) considers the hypothesis of the positive effect that employee training exerts over the efficiency of internal processes of the cooperative, both the agro-industrial efficiency, with positive effects in the external environment (customers), and the efficiency of internal processes , with positive effects in the internal environment (members). The staff better trained, aware and able to perform their tasks better, with positive consequences both internally and externally, lead to economic benefits in the medium and long terms, but decreasing the financial surpluses in the short term, in proportion to the cost of training.

The eighth and last loop (R3) is designed as a reinforcing one (R3), and considers the hypothesis of positive effect that profits of member's ventures exerts over social benefits, which in turn feeds the system positively, improving, in the medium and long terms, the organizational culture, the member's commitment and fidelity and also the cooperative's financial surpluses, closing the reinforcement loop R3. This last loop integrated to the other ones result in the proposed strategic map, adapted to agro-industrial cooperatives illustrated in Figure 3.

In the perception of the experts interviewed, this strategic map presents high to very high adherence with the reality of agro-industrial cooperatives in Province of Paraná – Brazil.

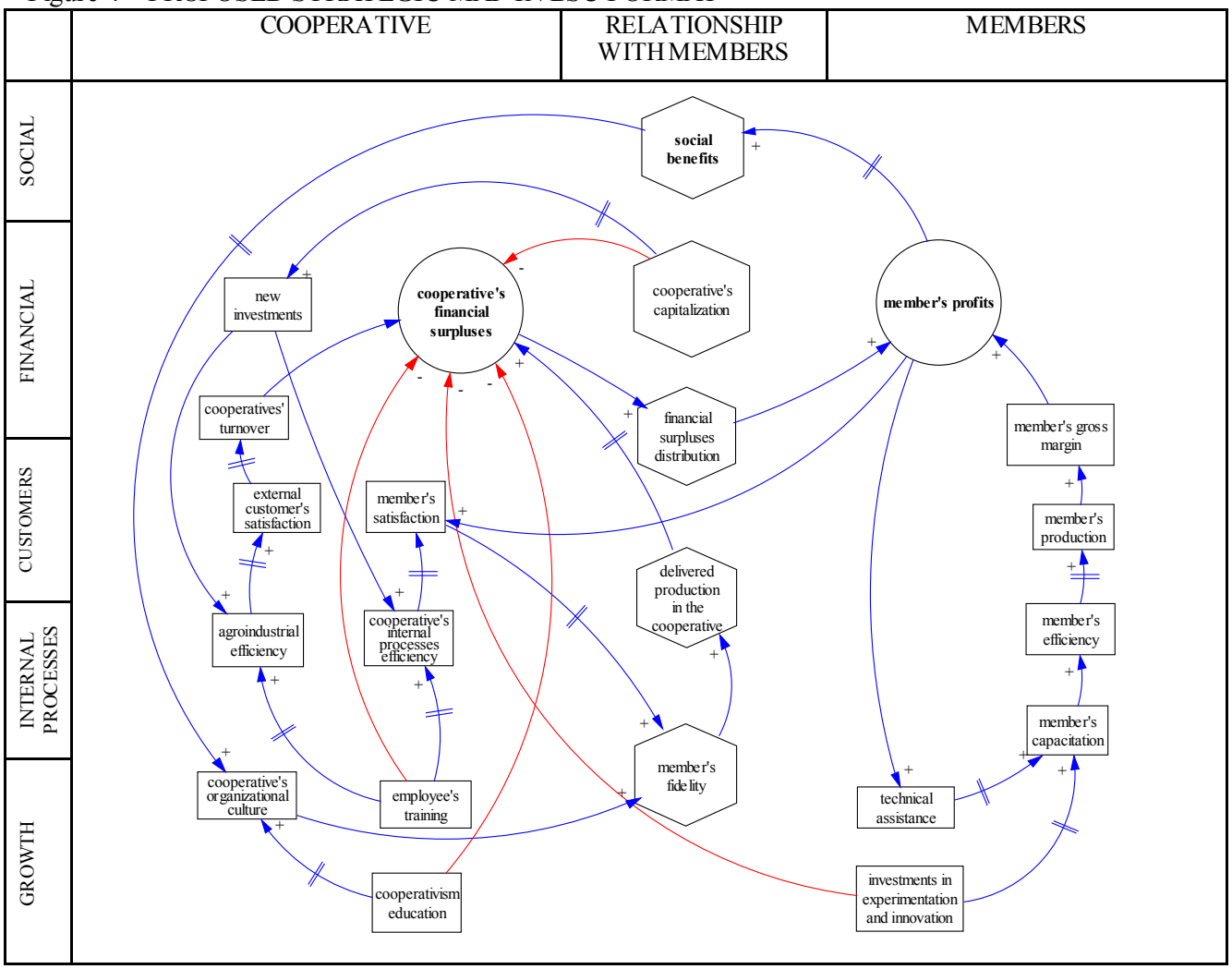
Figure 3 – PROPOSED STRATEGIC MAP IN LOOPING FORMAT



The same strategic map developed is illustrated in Figure 4, but now in the frame of the BSC and considering six basic perspectives. In addition to the traditional four BSC perspectives of *Growth and Learning, Internal Processes, Customers and Financial*, are also considered the perspective of *Relationship with Members* and the *Social* perspective. These six perspectives include two distinct structures. The first represented by the cooperative and the second by all the individual member's ventures, each one with its own goal of economic income. In the case of cooperative structure, the strategic map considers the relations within the internal environment, composed by the members and employees, and also relations with the external environment, composed by the customers. The essence of the map lies in the systemic balance between goals and objectives of the members and the cooperative itself.

The proposed strategic map considers in the perspective *Relationship with Members*, key variables for the balance of goals of the cooperative and the members. These variables are represented by hexagons in the axis of the map, such as members' fidelity, delivered production in the cooperative, cooperative's capitalization and distribution of the cooperative's financial surpluses.

Figure 4 – PROPOSED STRATEGIC MAP IN BSC FORMAT



The strategic map also provides the important issue that the capitalization of the cooperative represents to the generation of resources for new investment in agribusiness. The agro-industrial cooperatives compete in competitive markets, including large competitors with high economic power. To maintain their competitiveness in these markets, agro-industrial cooperatives depend on investments in new industries, distribution structures, and selling and marketing channels.

Another important aspect to be highlighted in the proposed strategic map is its potential for explanation of an important core competence of agro-industrial cooperatives, which lies in the ability to develop strong structure of suppliers of raw materials for agro-industrialization.

6. Conclusions

In this article, a strategic map based on the concepts of BSC and System Dynamics, adapted for agro-industrial cooperatives, is proposed. This is a generic map, which considers critical processes in this type of organization, such as the balance of goals, which are not always convergent, between the cooperative and the members. At the same time that the members operate with the cooperatives, attempting to increase the economic result of their individual ventures; the cooperatives depend on the accumulation of surpluses for their

capitalization, aiming to make further investments that will provide the maintenance of their competitiveness in the competitive markets where they operate.

A proper understanding of the causal relationships between the variables proposed in the strategic map becomes crucial, and its application as a strategy management tool in the agro-industrial cooperatives may prove to be an important management tool, as it makes use of important and well-regarded concepts of strategy management, provided by the BSC associated with System Dynamics.

The possibility of applying the proposed strategic map depends on the deepening of the studies, the definition of indicators to adequately assess each variable envisioned in the proposed strategic map, as well as the adaptation and application to real cases of agro-industrial cooperatives, through the action-research method.

7. References

ANDREWS, K.R. The concept of corporate strategy. In: MCKIERNAN, P. (ed.). **Historical Evolution of Strategic Management**. Vol. I. Brookfield, Darmouth Publishing Company, p.15-44. 1996.

BARNEY, J. Firm resources and sustained competitive advantage. **Journal of management**, v. 17, n. 1, p. 99-120, 1991.

BARREIROS, R. F. **Caracterização do processo decisório em nível estratégico nas cooperativas agropecuárias do Paraná**. Curitiba, 2005. 196 f. Dissertação (Mestrado em Administração) – Pontifícia Universidade Católica do Paraná.

BERTALLANFY, L. **Teoria Geral dos Sistemas**. Petrópolis: Vozes, 1977.

BIALOSKORSKI NETO, S. Agronegócio cooperativo. In: BATALHA, M. O. **Gestão Agroindustrial**, São Paulo: Atlas, 2001, capítulo 12, p 628-655.

COLLAZOS, J. M. Control Integral de Géstion – Caso Compañia Manufacturera Sector Autopartes. **Anais do VI Congresso Internacional de Custos**. Portugal, 1999.

COOK, M. L. The Future of US Agricultural Cooperatives: A Neo Institutional Approach. **American Journal of Agricultural Economics**, n. 77, p. 1153-1159, dez. 1995.

FERNANDES, A. C. **Scorecard Dinâmico: Dinâmica de Sistemas e Balanced Scorecard**. Rio de Janeiro, 2003. 311 f. Tese (Doutorado em Engenharia da Produção). COPPE-UFRJ, Rio de Janeiro.

HANEL, A. Dual or Double nature of cooperatives. In: Dülfer, E. **International Handbook of Cooperative Organizations**. Germany: Vandenhoeck & Ruprecht in Göttingen, 1994. p. 271-273.

KAPLAN, R. S.; NORTON, D. P. **A Estratégia em Ação: Balanced Scorecard**. Rio de Janeiro: Editora Campus, 1997.

_____, **Organização Orientada para a Estratégia – Balanced Scorecard.** Rio de Janeiro: Editora Campus, 2001.

_____, **Mapas Estratégicos: convertendo ativos intangíveis em resultados tangíveis**. Rio de Janeiro: Editora Campus, 2004.

MACHADO FILHO, C. A. P.; MARINO, M.K.;CONEJERO, M.A . **Gestão estratégica em cooperativas agroindustriais**. Disponível em <http://www.fia.com.br/PENSA/>, 2003.

MINTZBERG, H.; AHLSTRAND, B.; LAMPEL, J. **Safári de estratégia:** um roteiro pela selva do planejamento estratégico. Porto Alegre: Bookman, 2000.

MINTZBERG, H.; QUINN, J.B. **O processo da estratégia.** Porto Alegre: Bookman, 3.ed, 2001.

PORTER, M. E. Como as forças competitivas moldam a estratégia. In: MONTGOMERY, C; PORTER, M. (orgs.). **Estratégia: a busca da vantagem competitiva**. Rio de Janeiro: Elsevier, 1998.

PRAHALAD, C. K.; HAMEL, G. A competência essencial da organização. In: MONTGOMERY, C; PORTER, M. (orgs.). **Estratégia: a busca da vantagem competitiva**. Rio de Janeiro: Elsevier, 1998.

PROTIL, R. M.; FERNANDES, A. C. Aplicações da Dinâmica de Sistema (DS) na Modelagem e Análise de Cadeias de Produção e Distribuição de Energia. In: OLIVEIRA, F. V .(Org.). **Tópicos Emergentes e Desafios Metodológicos em Engenharia de Produção: Casos, Experiências e Proposições**. Porto Alegre: ABEPRO, 2007.

REYNOLDS, B.J. Decision making in cooperatives with diverse member goals. **United States Department of Agriculture**. Research Report 155. Washington, 1997.

RICHMOND, B. **Using the balanced scorecard to leverage penetration of systems thinking.** Hanover, High Performance Systems, 1999.

RICHMOND, B. A new language for leveraging scorecard-driven learning. **Harvard Business School Publishing**. Balanced Scorecard Report, 2001.

SCHOENEBORN, Frank. Linking Balanced Scorecard to System Dynamics. **Proceeding 21th International Conference of the System Dynamics Society**, New York, 2003.

SIMONS, R. **Performance measurement & control systems for implementing strategy**. New Jersey: Prentice Hall, 2000.

STERMAN, J. D. **Business Dynamics: System Thinking and Modeling for a Complex World**. Boston:. Irwin Mc-Graw Hill, 2000.

STAATZ, J.M. Farmer cooperative theory: Recent developments. **ACS Research Report n. 84**. Washington D.C.: Department of Agriculture, Agricultural Cooperative Service, 1989.

ZYLBERSZTAJN, D. Quatro Estratégias Fundamentais para Cooperativas Agrícolas**. Série Working Papers** – FEA – USP, São Paulo. Disponível em <www.ead.fea.usp.br/wpapers>,2003.

THE COSTS OF COOPERATIVE GOVERNANCE: DEMOCRATIC AND AGENCY COSTS

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Abstract

The motivation for this study is the observed loss of competitiveness of agricultural cooperatives comparing to investor-owned firms. Not only democratic costs but also agency costs are likely to be more severe in a cooperative than do in an investor-owned firm. The main focus of this study is on how cooperatives can minimize both democratic and agency costs considering different levels of member participation. This study is one of the first studies to empirically examine how cooperatives manage their decision making costs. In the study, we distinguish all conflicts of interests (horizontal, vertical and diagonal) which exist in all levels of cooperative decision making. By doing so, we are able to better understand all the costs of cooperative decision making. We also distinguish between both direct and opportunity costs for both types of decision making costs. By doing so, we draw attention to the fact that mechanisms to increase member participation are not without costs. Frequently, studies focus mainly on the benefits of increased member participation, disregarding some of the costs associated with it. Moreover, we show that there are differences in weighs between direct and opportunity agency costs. With regard to opportunity costs, a further distinction is made between costs associated to over-and underrepresentation. We also show that the relation between member participation at the board of directors and democratic costs is more complex than often assumed in the literature. Compared to previous studies, we focus not only on board size, but also on board composition. Six propositions have been developed. We have chosen agricultural cooperatives to look for evidences for this study. We modeled that: with lower level of member participation, direct democratic costs may be reduced, but opportunity agency costs may rise as fewer members monitor management. In this case, cooperatives should either increase member participation or use additional agency mechanisms (e. g., audits), i. e., increase direct agency costs, to reduce exposure to agency problems. Overall, the results have shown that cooperatives are more oriented towards minimizing opportunity agency costs than opportunity democratic costs.

Key words: Cooperative Governance, Democratic Costs, Agency Costs

THE COSTS OF COOPERATIVE GOVERNANCE: DEMOCRATIC AND AGENCY COSTS

1. Introduction

The motivation for this study is the observed loss of competitiveness of agricultural cooperatives comparing to investor-owned firms in terms of decision making costs (Gorton & Schmid, 1999; Hansmann, 1999; Bijman, 2002). Not only democratic costs (Staatz, 1987; Zylbersztajn, 1994; Bijman, 2002) but also agency costs (Gorton & Schmid, 1999) are likely to be more severe in a cooperative than do in an investor-owned firm. The main constrain of these costs, according to the literature, is the level of member participation in cooperative governance. A key issue for cooperatives is to minimize both democratic and agency costs in the context of different levels of member participation. It may be difficult for cooperatives to reduce them both, because a trade-off between the two types of costs may exist: reducing democratic (agency) cost can increase agency (democratic) costs. For example, delegating more control to the management team may reduce democratic costs, since decision making processes require less input or participation of the members. However, with lower level of member participation, agency costs are likely to increase, as fewer members will monitor management. In deciding about how much control to delegate to management, cooperatives have to take into account that any reduction in democratic costs achieved through less member participation, may be offset by an increase in agency costs. This study examines how the ability of cooperatives to reduce democratic costs without incurring excessive agency costs is related to the level of member participation in cooperative governance (at the general assembly and at the board of directors).

2. The Costs of Cooperative Governance

Decision making costs incurred by agricultural cooperatives encompass the three decision making levels of a cooperative: horizontal (amongst members at the general assembly), diagonal (between members and board members), and vertical level (between members and managers). Costs related to horizontal and diagonal conflicts of interest are associated with *democratic costs*, while costs related to vertical conflicts of interests are associated to *agency costs*.

Besides democratic and agency costs, a third well known internal transaction cost which cooperatives face is the influence cost. *Influence costs* include those costs related to member (group) informal attempts (outside meetings) to influence management decision making for their (group) benefit (see Milgrom & Roberts, 1990; Iliopoulos & Cook, 1999). The concept disregards, for example, the costs of collective decision making at the level of the general assembly.

Democratic costs. The concept of democratic costs has been largely ignored by the cooperative literature until now. Democratic costs are a particular type of decision making costs that agricultural cooperatives incur since they are firms democratically controlled by members-patrons. More specifically, democratic costs are: (1), the costs that result from the need of providing incentives for members to participate in the collective decision making process; (2), the costs that result from the conflict of interest among members having to make decisions that affect the distribution of benefits and costs amongst them at collective governance bodies such as the general assembly and the board of directors; and (3), the costs that result from the cooperative's attempts to manage these conflicts or to prevent them (e. g. increasing/decreasing level of member participation).

Democratic costs result from conflicts of interests that arise in two levels of the cooperative: in the horizontal level, and in the diagonal level. At the horizontal level, the forum for resolving (or not) conflicts of interests amongst members (groups) is the general assembly. Members (groups) attempt to collectively make decisions about the distribution of benefits and costs of the cooperative (groups). At the diagonal level, the forum for resolving (or not) conflicts of interests amongst members (groups) is the board of directors. Members (groups) delegate decision making to a higher level; i.e., the board. Conflicts of interests, resulting in democratic costs, arise when board members do not represent all members (groups). The board benefits some member groups at the expense of other groups, and a conflict of interest exists between these groups and the board.

Agency costs. Agency costs incurred by agricultural cooperatives are the costs which members incur when they delegate control to a manager. More specifically, these costs are the following: (1), the costs of monitoring the performance and behavior of the management; and (2), the costs when management makes decisions which benefit themselves rather than the cooperative (i.e. the members as a whole).

Agency costs result from vertical conflicts of interests (i. e. between members and management) with regard to the governance of the cooperative. Agency costs can be a particular problem in cooperatives, because they lack some of the mechanisms which investor-owned firms use in reducing these costs. For example, public-listed investor-owned firms use external corporate governance principles (equitable treatment, transparency, accountability, and responsibility) and governance mechanisms (e. g., capital markets, takeover risk, market analysts, competitive agencies, among others) in order to control (the performance of) management. In another example, unlisted investor-owned firms, ownership is generally concentrated, which means that each owner has a strong incentive to monitor the performance of the agent. In cooperatives, ownership is much more dispersed. Therefore, each owner has less incentive to monitor the performance of the agent.

The concept of agency costs has emerged in the literature since around the 1970's. Jensen and Meckling (1976), for instance, observe that *agency costs* arise as a consequence of emergence of complex organizations, switching the management of the firm, before assigned to *principals* (owners), to knowledgeable and skilled *agents* (managers) by means of contracts. Jensen and Meckling (1976, p. 308) define an *agency relationship* as "a contract under one or more persons (the *principal*) engage another person (the *agent*) to perform some service on their behalf which involves delegating some decision making authority to the agent." The authors observe that there are two main behavioral assumptions from which *agency problems* are likely to arise. First, the *agent* and the *principal* (as well as other actors, like judges) are limitedly (bounded) rational, meaning that they cannot foresee all future contingencies and thus cannot perfectly calculate their optimal behavior (related to their relationship). Because of bounded rationality, it is not costless to either write or enforce contracts, as limitations on the human abilities of the actors prevent them from doing so. As a result, the *principal* and the *agent* will enter together into an incomplete (and imperfect) contract. Second, both the *principal* and *agent* (but particularly the *agent*) may exhibit opportunistic behavior, meaning that they will act in their self-interest not bound by (incomplete) previous arrangements. Jensen and Meckling (1976) aware that "if both parties to the relationship are utility maximizers there is good reason to believe that the agent will not always act in the best interests of the principal."

According to Condon (1987) economists have proposed a number of objectives a firm's manager might follow if allowed the latitude to do so. Such objectives include the maximization of some form of firm revenue, firm growth rate, or managerial amenities. Jensen and Meckling (1979) and Fama and Jensen (1983a, 1983b) offered a more general theory in which all agent groups within a firm (owners, directors, employees, management,

etc.) will pursue the objective of constrained personal utility maximization. Managers will act so as to maximize the value of their pecuniary and non pecuniary reward. Pecuniary awards are based on salary and contractual performance incentives specified by the firm. Non pecuniary rewards are based on the utility gained from actions that managers perceive will increase their present and future stock of human capital and by such personal amenities as good working conditions, large and cooperative staffs, prestige, etc.

According to Jensen and Meckling (1976), the principal can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs designed to limit the aberrant activities of the agent. Moreover, they observe that "it is generally impossible for the principal or the agent at zero cost to ensure that the agent will make optimal decisions from the principal's viewpoint. In most agency relationships the principal and the agent will incur positive monitoring and bonding costs (non-pecuniary as well as pecuniary), and in addition there will be some divergence between the agent's decisions and those decisions which would maximize the welfare of the principal" (JENSEN; MECKLING, 1976, p. 308).

The general problem of motivating one person or organization to act on behalf of another is known among economists as the *principal-agent problem* (i. e., *agency problem)*. The *principal-agent problem* in cooperatives is seen as the control problem (Vitaliano, 1983; Cook, 1995). From the standpoint of Fulton (2000, p. 4), "because cooperative shares are not traded on the open market, cooperative share values cannot be used as a convenient performance measurement. The result is that operational inefficiencies can go unobserved. As well, owned dispersed ownership, especially in large cooperatives, provides individual members with few incentives to monitor the performance of their cooperative".

The theory of cooperatives has moved from cooperative decision making emanated solely from members to managers acting as agents of principals (Condon, 1987; Cook, 1994). According to Cook (1994), while in the beginning of the cooperative theory authors from management science, organizational behavior and economics consider that there was little or no role of/for management in cooperatives (i.e. the cooperative decision making emanated solely from members), later, another group of authors from the theory of the firm suggest that managers act as agents of principals and attempt to optimize the value of their pecuniary and non pecuniary rewards. In the meantime, a group of authors counter the first wave of authors and consider that cooperative management behavior does affect the economic performance of their organization and the performance of their patron-members' firms.

Types of democratic and agency costs. Democratic and agency costs in cooperatives may arise in the form of direct and opportunity costs (see Table 1).

Table 1 – Definitions of democratic and agency costs and their direct and opportunity forms

Type of Cost	*Definition*
Democratic	Result from horizontal and diagonal conflicts of interest among members with regard to the governance of the cooperative. Result from the exploitation of the minority by the majority.
Direct	They are the costs associated with the members' time, board and executives' time and salary spent with collective decision making process. Direct democratic costs at the general assembly are incurred when members communicate and negotiate about what decision to take; e.g. the costs of cooperative members' time, the costs of executives' salaries and time spent on general and (pre-general) assemblies. Direct democratic costs at the board of directors are incurred when board members communicate and negotiate about what decision to take, e. g., the salary of board members.
Opportunity	They are the costs associated with delayed decisions, or failure to achieve decisions which maximize the benefit of all members. At the general assembly, they arise in situations such as: (1), when each member attempts to influence the collective decision making process to his own benefit; (2), when uninformed

	members make wrong or no decisions; and (3), when decision making takes too much time (which can result in lost opportunities), i. e., time which members could have spent on their farms, and cooperative executives on planning and managing the cooperative effectively. At the board of directors, they are incurred either when membership is underrepresented, or overrepresented at the board of directors. When membership is underrepresented at the board of directors, board members may make uninformed or no decisions or decisions that privilege producer groups who are represented at the board. When membership is overrepresented, board members may take too much time to make decisions (which can result in lost opportunities).
Agency	Result from a vertical conflict of interests between members and management with regard to the governance of the cooperative. Result from the exploitation of the equity holders by the manager.
Direct	They are incurred when board members (or members) monitor the performance of the agent (e.g. the costs of auditing, etc).
Opportunity	They are the costs associated with delayed decisions, or failure to achieve decisions which maximize the benefit of the members. E. g., these costs may result from too little monitoring by (board) members, as the management team may make opportunistic decisions which benefit themselves, rather than the members who have elected them. Furthermore, these costs may result from too much monitoring, as resources used in the monitoring process could have been used for other objectives.

What affects democratic and agency costs. One of the main drivers of democratic and agency costs is the level of member participation in cooperative governance. Increasing this level helps to affect agency costs positively, but may affect democratic costs either positively or negatively. This is the main discussion of the present study. At the present section, we examine the relations between level of member participation and democratic and agency costs separately (see Table 2).

Table 2 – Relations between level of member participation and democratic and agency costs (and their direct and opportunity forms)

Type of Cost	*Relation with the level of member participation*
Democratic	A higher level of member participation may increase *direct* democratic costs in a cooperative, as more members participate in the collective decision making process. Democratic costs are likely to arise also, and in the form of *opportunity* costs. When level of member participation is too small (i. e., lower than it is necessary), i. e., when not all groups of members are represented (i. e., *underrepresented*) *opportunity* costs are likely to be high. Also, *opportunity* costs are likely to be high when the level of member participation is too high (i. e., higher than it is necessary), i. e., when groups of members are *overrepresented*.
Direct	*At the general assembly*, *direct* democratic costs are likely to arise when a cooperative increases time spent on general meetings (e. g. pre-general assemblies at different cities, districts, regions). This means an increasing amount of executives' time (and salary), as well as member' time spent on meetings. Also, with an increasing number of (pre)general assemblies, more money is spent on organizing and hosting these meetings. *At the board of directors*, *direct* democratic costs are likely to arise when a cooperative increases its board size. A larger board means, for example, that salary costs increase.
Opportunity	*At the general assembly*, *opportunity* democratic costs are likely to arise when membership is either under or overrepresented at the general assembly. On the one hand, when membership is underrepresented (e. g., not members from all cities or members who produce all products the cooperative receives are present), members who are present may make either wrong (e. g., uniformed) or decisions that benefit themselves in spite of the membership as a whole. On the other hand, when membership is overrepresented at the general assembly, decision making process may take too much time and, as a consequence, decisions may be frequently delayed (which can result in lost opportunities). *At the board of directors*, *opportunity* democratic costs are expected to arise when a cooperative has either a too small or too large board. A board is too small when not all groups of members (e. g. rice producers, dairy producers) are represented (i. e., underrepresented). When not all different member-groups are represented, the board might make uninformed decisions, or decisions which benefit their constituents rather than the cooperative as a whole. A board is too large when some member-groups are overrepresented. Because membership is overrepresented, the board is likely to make decisions which benefit their constituents rather than the cooperative

	as a whole. In general, opportunity costs are likely to increase when board size becomes excessively large, even if interests of the various groups are aligned, because decision making becomes difficult.
Agency	A higher level of member participation may reduce agency costs, as more members monitor management.
Direct	*Direct* agency costs should increase with lower levels of member participation because the cooperative needs to use more resources in monitoring management.
Opportunity	With low member participation, exposure to *opportunity* costs is higher because management is more likely to make decisions which benefit themselves rather than the cooperative (i.e. the members as a whole).

Balancing democratic costs and usage of agency mechanisms in the context of high (low) member participation. According to Staatz (1987), when the cost of collective decision making is likely to increase with the diversity of the group and level of member participation, cooperatives that delegate greater decision making to management thus may be better able to compete with investor-owned firms, albeit at the cost of less direct member involvement in decision making.

In delegating decision making (i. e., real authority) to management (and the board), cooperatives have to take into account that any reduction in (total) *democratic costs* resulting from a reduced need for member participation, may lead to increased *agency cost,* both *direct and opportunity* agency costs. Direct agency costs are, for example, the design of incentive payments for managers, frequency by which management is audited by the internal board and by external auditors, etc. Opportunity agency costs are the risks that: (1), management may act contrary to the members' wishes, and (2), management captures (non-)pecuniary benefits. The focus in this study is on how cooperatives can balance democratic costs and *opportunity* agency costs.

Direct agency costs are the costs incurred in employing mechanisms to reduce *agency problems*. *Agency problems*, like when management makes decisions which benefit themselves rather than the cooperative, are the source of *opportunity agency costs*. It is likely that reducing *direct agency costs* is a smaller concern for cooperatives compared to the risk of exposure to high *opportunity agency costs*. For example, the cost of an additional internal audit (a direct cost) is small when compared to the cost of fraudulent actions of management (an opportunity costs). Therefore, cooperatives are expected to focus more on reducing *opportunity agency costs*, rather than on minimizing *direct agency costs*.

According to agency theory, it is usually possible by expending resources (i. e., employing 'mechanisms') to alter the risk of high opportunity agency costs. These 'mechanisms' include (internal and external) auditing, formal control systems, budget restrictions, and the establishment of incentive compensation systems (Jensen & Meckling, 1976), the design of institutions to gather information, protect investments, allocate decisions and ownership rights (Milgrom & Roberts, 1992).

According to the literature on cooperatives (e. g., Zylbersztajn, 2002; Henrÿ, 2005), there are several mechanisms (e. g., frequency by which management is audited by the (audit) board, frequency by which management is audited by external auditors, usage of variable compensation for management, frequency by which management and board meet) which cooperatives can use to reduce opportunity costs.

Increase the frequency by which management is audited by the (audit) board. According to Henrÿ (2005), cooperatives which have such organ which acts on behalf of the members seem to function better than those without it. This is because members often lack the necessary qualifications to exercise an effective and continuous control over the board of directors and the management.

Increase the frequency by which management is audited by external auditors. Henrÿ (2005) observes that this dual system of internal control mechanisms (i. e., board of directors and internal auditors) does not replace the obligatory external audit of the cooperative.

Usage of a variable compensation for management. By adding a variable compensation and tying it with the cooperative operational and financial efficiency, the cooperative may be able to align the interests of the management with the cooperative ones. However, variable compensation is also known to increase the risk managers take in controlling the organization, particularly if it is asymmetrically structured (i. e. when bonuses but not penalties are included in the contract, which is almost always the case). This is because possible gains of risk taking flow to both manager and owners, while losses only flow to the owners. This particularly holds true for public listed investor-owned firms, where variable compensation may be a very high portion of the total salary of the management. Therefore, the effect of using variable compensation on reducing opportunity agency costs is not clear.

The usage of these mechanisms to reduce agency problems is particularly important with lower level of member participation, as management will be less intensively monitored by the members.

3. Propositions

Following the discussion presented earlier, 6 propositions can be generated:

Proposition 1: *The lower the level of member participation at the general assembly, the lower the direct democratic costs at the general assembly and the higher the usage of mechanisms to reduce exposure to agency problems.*

Proposition 2: *The lower the level of member participation at the general assembly, the higher the opportunity democratic costs at the general assembly with regard to underrepresentation and the higher the usage of mechanisms to reduce exposure to agency problems.*

Proposition 3: *The higher the level of member participation at the general assembly, the higher the opportunity democratic costs at the general assembly with regard to overrepresentation and the lower the usage of mechanisms to reduce exposure to agency problems.*

Proposition 4: *The lower the level of member participation at the board of directors (i. e., the smaller the board size), the lower the direct democratic costs at the board of directors and the higher the usage of mechanisms to reduce exposure to agency problems.*

Proposition 5: *The lower the level of member participation at the board of directors, the higher the opportunity democratic costs at the board of directors with regard to underrepresentation and the higher the usage of mechanisms to reduce exposure to agency problems.*

Proposition 6: *The higher the level of member participation at the board of directors, the higher the opportunity democratic costs at the board of directors with regard to overrepresentation at the board of directors and the lower the usage of mechanisms to reduce exposure to agency problems.*

4. Research Design

Selection of cases. Evidences from 12 Brazilian cooperatives, from the state of Rio Grande do Sul, have been used to examine the relations proposed above. Rio Grande do Sul (RS) has been the selected location for this study because it has a rich variety of small and large memberships and small and large boards of directors. Also, in RS one can find large

differences in cooperatives with regard to number of nucleuses, number of members per nucleus, board representation, etc. Differences in these attributes are likely to lead to differences in democratic costs across the cooperatives. In addition, in the states' cooperatives one can find large differences in frequency of internal audits, what is necessary for our study. Last but not least, RS has been the selected location because it is an area where the author has a considerable number of connections (e. g., OCERGS, FECOAGRO, FEARROZ, etc.). A general characterization of the researched cooperatives is given by Table 3.

Data generating. Data has been generated thought multiple methods. They include: (1), personal interviews with both elected managers and hired executives of each cooperative; (2), document analysis (in cooperative records, e. g., general and pre-general assembly minutes, balance sheets, etc); and (3) observations (on cooperatives' websites). The data has been generated from July, 2010 till February, 2011.

Operationalization of the concepts. Table 4 gives an overview of the operationalization of the study's key concepts.

Table 3 – General characterization of the researched cooperatives

Cooperative	*Membership Size*	*Member participation at the general assembly (%)*	*Board size*	*Number of members per nucleus*	*Number of nucleuses per city*	*Board Total Salary/Year (R$)*	*Number of products underrepresented at the board*	*Number of products overrepresented at the board*	*Frequency of internal audits*
COOP-A	10,730	5	20	53	10	91,780	3	3	7
COOP-B	8,236	17	19	48	7	109,200	0	1	30
COOP-C	4,946	3	15	101	3	65,126	3	2	15
COOP-D	4,776	7	12	199	5	66,000	3	1	30
COOP-E	4,612	4	9	201	5	65,988	7	1	10
COOP-F	3,760	3	8	60	11	29,376	2	1	30
COOP-G	3,743	2	10	374	1	61,380	1	1	10
COOP-H	3,728	8	12	266	1	56,880	2	0	3
COOP-I	3,254	12	9	121	3	65,124	2	1	30
COOP-J	1,125	41	9	-	-	72,000	0	1	30
COOP-K	1,013	40	20	51	3	106,827	0	1	30
COOP-L	500	4	6	167	0,75	15,000	0	2	30
Mean	*4,202*	*12*	*12*	*149*	*4*	*67,057*	*2*	*1*	*21*
Minimun	*500*	*2*	*6*	*0*	*0*	*15,000*	*0*	*0*	*3*
Maximun	*10,730*	*41*	*20*	*374*	*11*	*109,200*	*7*	*3*	*30*

Table 4 – Operationalisation of the main concepts of the research

Category	*Variable*	*Proxy*	*Meaning*
Member participation	Member participation at the general assembly	Percentage of member participation at the general assembly	Low (high) participation at general assembly is an indicator for low (high) level of member participation at the general assembly
	Member participation at the board of directors	Board size	Smaller (larger) board is an indicator of lower (higher) level of member participation at the board of directors
Democratic costs at the general assembly	*Direct* democratic costs at the general assembly	Number of members per nucleus	Low (high) score on this ratio is an indicator that the cooperative has high (low) direct democratic costs at the general assembly
	Opportunity democratic	Number of nucleuses	A ratio lower (higher) than one is an

	costs at the general assembly	locations per city	indicator of underrepresentation (overrepresentation)
Democratic costs at the board of directors	*Direct* democratic costs at the board of directors	Total board salary per year	Low (high) total board salary/year is an indicator of low (high) direct democratic costs at the board of directors
	Opportunity democratic costs at the board of directors with regard to *underrepresentation*	Absolute rule: all products the cooperative receives should be represented at the board by at least one board member	If not all products are represented at the board, this is an indicator for opportunity costs related to underrepresentation
	Opportunity democratic costs at the board of directors with regard to *overrepresentation*	Proportional rule: products should be represented at the board in the same proportion they are represented in the annual sales of the cooperative	If a product has higher proportional representation in the board than its share of the revenues justifies, this is an indicator for opportunity costs related to overrepresentation
Usage of mechanisms to reduce exposure to agency problems	Frequency of internal audits		Lower (higher) frequency is an indicator of high (low) usage of mechanisms

With regard to usage of mechanisms to reduce exposure to agency problems, the examined variable is frequency of internal audits. A high usage of this mechanism indicates a strong orientation of the cooperative towards reducing agency problems. The study did not examine cooperatives' usage of variable compensation, which is another mechanism to reduce these problems. As is explained previously, the effect of variable compensation on reducing exposure to agency problems is uncertain.

Rules for validation of the propositions. The focus of the empirical part of the present study is therefore mainly on examining how the usage of mechanisms to reduce agency problems (i.e., agency mechanisms) differs across cooperatives. To validate the propositions, usage of agency mechanisms will be compared across various groups of cooperatives. Cooperatives will be placed into groups based on two dimensions: (1), level of member participation; (2), level of (direct or opportunity) democratic cost. Table 5 presents the rules for validation for all propositions.

Table 5 – Rules for validation of the propositions

Propositions	*Which groups are compared?*	*When are the propositions validated?*
1: The lower the level of member participation at general assembly, the lower the direct democratic costs at the general assembly and the higher the usage of mechanisms to reduce exposure to agency problems.	Group 1: Cooperatives with high member participation and high direct democratic costs Group 2: Cooperatives with low member participation and low direct democratic costs	If Group 2 uses more agency mechanisms than Group 1.
2: The lower the level of member participation at the general assembly, the higher the opportunity democratic costs at the general assembly with regard to underrepresentation, and the higher the usage of mechanisms to reduce exposure to agency problems.	Group 1: Cooperatives with high member participation and low opportunity democratic cost of underrepresentation Group 2: Cooperatives with low member participation and high opportunity democratic cost of underrepresentation	If Group 2 uses more agency mechanisms than Group 1.
3: The higher the level of member participation at the general assembly,	Group 1: Cooperatives with high member participation and high	If Group 2 uses more agency mechanisms

the higher the opportunity democratic costs at the general assembly with regard to overrepresentation, and the lower the usage of mechanisms to reduce exposure to agency problems.	opportunity democratic cost of overrepresentation Group 2: Cooperatives with low member participation and low opportunity democratic cost of overrepresentation	than Group 1.
4: The lower the level of member participation at the board of directors (i. e., the smaller the board size), the lower the direct democratic costs at the board of directors and the higher the usage of mechanisms to reduce exposure to agency problems.	Group 1: Cooperatives with high member participation and high direct democratic costs Group 2: Cooperatives with low member participation and low direct democratic costs	If Group 2 uses more agency mechanisms than Group 1.
5: The lower the member participation at the board of directors, the higher the opportunity democratic costs at the board of directors with regard to underrepresentation and the higher the usage of mechanisms to reduce exposure to agency problems.	Group 1: Cooperatives with high member participation and low opportunity democratic cost of underrepresentation Group 2: Cooperatives with low member participation and high opportunity democratic cost of underrepresentation	If Group 2 uses more agency mechanisms than Group 1.
6: The higher the level of member participation at the board of directors), the higher the opportunity democratic costs at the board of directors with regard to overrepresentation at the board and the lower the usage of mechanisms to reduce exposure to agency problems.	Group 1: Cooperatives with high member participation and high opportunity democratic cost of overrepresentation Group 2: Cooperatives with low member participation and low opportunity democratic cost of overrepresentation	If Group 2 uses more agency mechanisms than Group 1.

5. Research Results and Analyses

Results for member participation at the general assembly

Results for proposition 1: Cooperatives with high member participation and high direct democratic costs VS. Cooperatives with low member participation and low direct democratic costs. Cooperatives are regarded as having low member participation when less than 12% of their members participate at the general assembly. 'Number of members per nucleus' is taken as a proxy for direct democratic costs at the general assembly. The lower the number of members per nucleus the higher the direct democratic costs at the general assembly, since more resources are spent per member on organizing meetings. High direct democratic costs at the general assembly, means less than 149 members per nucleus. 149 is the median number of members per nucleus of the researched cooperatives. Table 6 compares the usage of agency mechanisms across the two groups of cooperatives. These relations are also depicted in Figures 1.

Table 6 – Direct democratic costs at the general assembly and usage of mechanisms to reduce exposure to agency problems of cooperatives with high/low levels of member participation at the general assembly

Cooperative	*Level (%) of member participation at the general assembly*	*Direct democratic costs at the general assembly (number of members per nucleus)*	*Usage of agency mechanisms*
COOP-K	High	51	30
COOP-I		121	30
COOP-B		48	30
COOP-H	Low	266	3
COOP-D		199	30
COOP-E		210	10
COOP-L		167	30
COOP-G		374	10

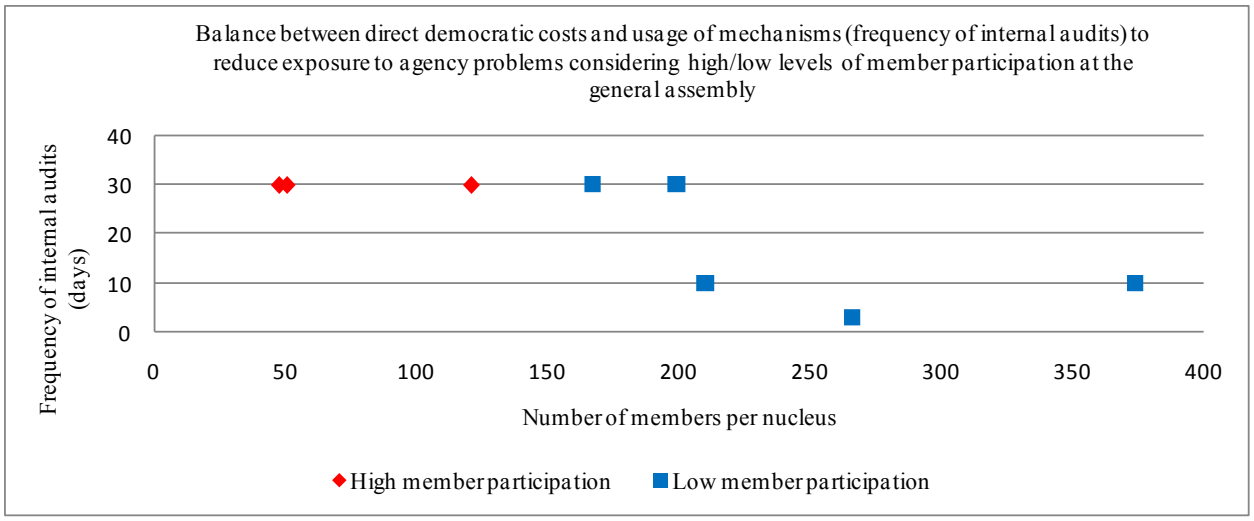

Figure 1 - Balance between direct democratic costs and usage of mechanisms to reduce exposure to agency problems considering high/low levels of member participation at the general assembly

In support of Proposition 1, cooperatives with low member participation and low direct democratic costs generally do have more internal audits than cooperatives with high member participation and high direct democratic costs. Cooperatives from the former group seem to compensate the lack of member participation with more frequent auditing. For instance, COOP-H has a lower level of member participation at the general assembly (8%), and a high number of members per nucleus (266). By offering members less opportunity to participate in nucleus meetings (when compared to other cooperatives; see the number of members per nucleus ratio), the cooperative may save on some democratic costs. However, reduced member participation also means that less members are monitoring the management, which may increase agency problems. To prevent that, the cooperative has a high frequency of internal audits (once every 3 days). Therefore, part of the cost savings related to democratic costs may be negotiated by an increase in direct agency costs

Propositions 2 and 3 could not be validated because no comparisons between groups could be made. With regard to proposition 2, underrepresentation at the general assembly is not (or hardly) an issue for almost all cooperatives. With regard to proposition 3, almost all cooperatives with high member participation incur opportunity costs of overrepresentation at the level of the general assembly.

Results for member participation at the board

Results for proposition 4: Cooperatives with high member participation and high direct democratic costs VS. Cooperatives with low member participation and low direct democratic costs. Cooperatives are regarded as having low member participation at the board, when their board size has less than 12 members (note that those which have 12 or more are considered with higher member participation). Cooperatives are regarded as having high direct democratic costs at the board, when the total annual salary costs are higher than 67,056 Reais (R$). This amount is the average board total salary per year. Table 7 compares the usage of agency across the two groups of cooperatives. These relations are also depicted in Figure 2.

Table 7 – Direct democratic costs at the board of directors and usage of mechanisms to reduce exposure to agency problems of cooperatives with high/low levels of member participation at the board of directors

Cooperative	*Level of member participation at the board of directors (board size)*	*Direct Democratic cost at the board of directors (Board total salary/year- in R$)*	*Usage of agency mechanisms*
COOP-B	High	109,200	30
COOP-K		106,827	30
COOP-A		91,780	7
COOP-E	Low	65,988	10
COOP-I		65,124	30
COOP-G		61,380	10
COOP-F		29,376	30
COOP-L		15,000	30

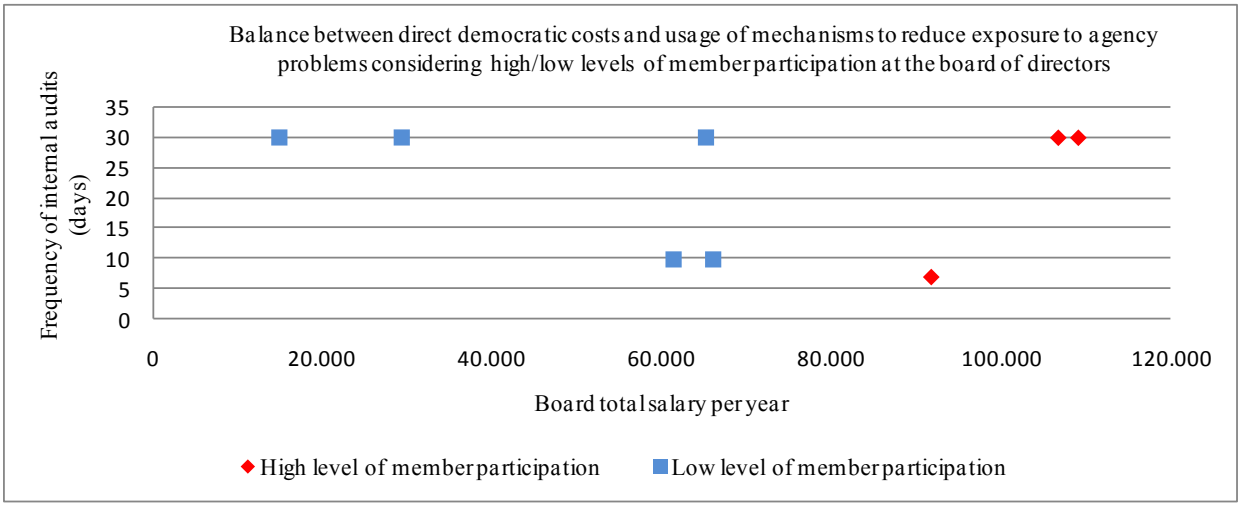

Figure 2 - Balance between direct democratic costs and usage of mechanisms to reduce exposure to agency problems considering high/low levels of member participation at the board of directors

The results partially support the proposition. Cooperatives that have a small board do not have more internal audits than those cooperatives with a large board. Note, this does not necessarily mean that the underlying logic of the proposition is not supported (i.e. that cooperatives with low member participation should use more agency mechanisms), it can also mean that some of the cooperatives incur high costs in their decision making process.

According to the proposition, cooperatives which have lower level of member participation should increase the frequency by which they are audited, since member participation is low, which can increase the risk of agency problems. Cooperatives with small board size and low frequency of audits may therefore incur high opportunity agency costs. This applies to COOP-I, COOP-F and COOP-L, which all have low member participation and a low frequency of internal audits. Particular COOP-I seems to incur high costs related to its internal decision making. Besides an increased risk to agency problems, and thus potentially high opportunity agency costs, COOP-I also has relatively high annual salary costs for a small board, and also significant direct democratic costs.

Results for proposition 5: Cooperatives with high member participation and low opportunity democratic costs VS. Cooperatives with low member participation and high opportunity democratic costs. Cooperatives are regarded as having low member participation at the board, when their board size has less than 12 members (note that those which have 12 or more are considered with higher member participation). Cooperatives are regarded as having high opportunity democratic costs at the board, when they have products underrepresented at the board. Table 8 compares the usage of agency mechanisms across the two groups of cooperatives. These relations are also depicted in Figure 3.

Table 8 – Opportunity democratic costs at the board of directors (underrepresentation) and usage of mechanisms to reduce exposure to agency problems of cooperatives with high/low levels of member participation at the board of directors

Cooperative	*Level of member participation at the board of directors (board size)*	*Opportunity democratic costs at the board of directors, underrepresentation (number of products underrepresented)*	*Usage of agency mechanisms*
COOP-K	High	0	30
COOP-B		0	30
COOP-G	Low	1	10
COOP-E		7	10
COOP-I		2	30
COOP-F		2	30

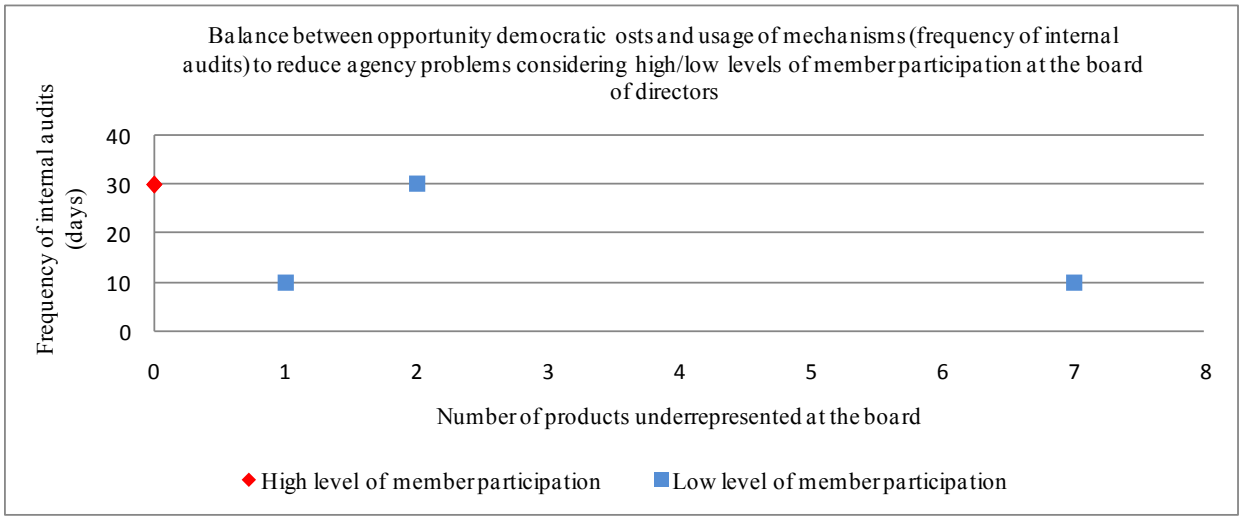

Figure 3 - Balance between opportunity democratic costs and usage of mechanisms to reduce agency problems considering high/low levels of member participation at the board of directors

Figure 3 shows that cooperatives that have lower level of member participation at the board of directors, COOP-G, COOP-E, COOP-I, COOP-F have higher frequency of internal audits, in accordance with the proposition 4.

Results for proposition 6: Cooperatives with high member participation and high opportunity democratic costs VS. Cooperatives with low member participation and low opportunity democratic costs. Cooperatives are regarded as having low member participation at the board, when their board size has less than 12 members (note that those which have 12 or more are considered with higher member participation). Cooperatives are regarded as having high opportunity democratic costs at the board when they have either 2 or more products overrepresented at the board. Table 9 compares the usage of agency mechanisms across the two groups of cooperatives. These relations are also depicted in Figure 4.

Table 9 – Opportunity democratic costs at the board of directors (overrepresentation) and usage of mechanisms to reduce exposure to agency problems of cooperatives with high/low levels of member participation at the board of directors

Cooperative	*Level of member participation at the board of directors (board size)*	*Opportunity democratic costs at the board of directors, overrepresentation (number of products overrepresented)*	*Usage of agency mechanisms*
COOP-A	High	3	7
COOP-C		2	15
COOP-G	Low	1	10
COOP-E		1	10
COOP-I		1	30
COOP-J		1	30
COOP-F		1	30

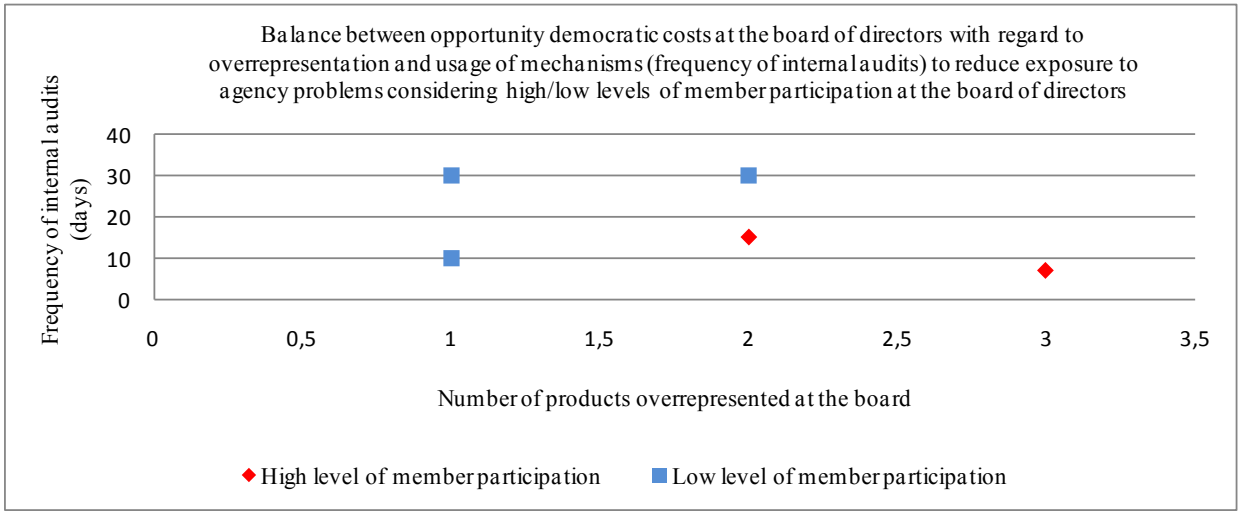

Figure 4 - Balance between opportunity democratic costs at the board of directors with regard to overrepresentation and usage of mechanisms to reduce exposure to agency problems considering high/low levels of member participation at the board of directors

Figure 4 shows that some of the cooperatives (COOP-I, COOP-J, COOP-F) that have lower level of member participation at the board of directors (i. e., the small board size) have the lowest frequency of internal audit. According to the proposition, they would be expected to have higher frequency of internal audits (i. e., higher usage of mechanisms to reduce exposure to agency problems), since they have smaller board (i. e., fewer members monitoring management), that is the case of COOP-G and COOP-E. The figure shows also that cooperatives that have high level of member participation at the board of directors have higher frequency of internal audits. As a result, they are incurring in democratic costs and unnecessary (direct) agency costs.

6. Conclusion

This study has examined how cooperatives can control both democratic and agency costs considering different levels of member participation. It is a key issue for cooperatives since, at the same time, member-democratic control makes decision making process slower and more costly in cooperatives in contrast with investor-owned firms and cooperatives lack some of the mechanisms which investor-owned firms use to control agency costs. Insufficient research has examined both democratic and agency costs in agricultural cooperatives.

Overall, the results have shown that cooperatives are more oriented towards minimizing opportunity agency costs than opportunity democratic costs. Opportunity

democratic costs arise, amongst others, when cooperative decision makers make decisions which benefit some member groups at the expense of other groups. Opportunity agency costs arise when cooperative decision makers make decisions which benefit themselves rather than the members. Therefore, although cooperative decision makers are unlikely to make decisions which benefit themselves (because they are frequently audited etc.), they may make decisions which benefit certain interest groups within the cooperative. This is because some interest groups are underrepresented at board level.

Theoretical contributions. The present study has examined a much broader range of decision making costs than most studies. It has examined both democratic and agency costs. Additionally, the study distinguished between both direct and opportunity costs for both types of decision making costs. With regard to opportunity costs, a further distinction has been made between costs associated to over-and underrepresentation. Furthermore, these costs have been examined both at the general assembly and at the board of directors. Moreover, the study distinguished between the various conflicts of interests which form the sources of these costs. A clear distinction was made between horizontal, vertical and diagonal conflicts of interests. Previous studies do not distinguish between these different sources of conflicts of interests. In particular, often diagonal conflicts of interests are often lumped together with either horizontal or vertical conflicts of interests. Without examining the sources of decision making costs, it is difficult for studies to examine what types of mechanisms are necessary for controlling these costs. Besides, the study presents the differences amongst democratic, agency and influence costs.

The present study has shown the difficulties cooperative face in minimizing both democratic and agency costs. This topic has received insufficient attention in the literature, with most studies examining only certain types of democratic costs or agency costs, but not examining these costs jointly. The present study has shown that with lower level of member participation, direct democratic costs may be reduced, but opportunity agency costs may rise as fewer members monitor management. In this case, cooperatives should increase either member participation or use additional agency mechanisms (e. g., audits) to reduce exposure to agency problems.

Managerial implications. The study has revealed that rather than increasing member participation, cooperatives could consider other strategies for improving cooperative governance, for example, more representative boards and skilled management teams, and increased use of agency mechanisms to control management (e. g., frequent audits), as members are apparently unwilling to get involved in cooperative governance, other mechanisms are necessary to monitor and control the cooperative.

7. References

BIJMAN, J. (2002) *Essays on agricultural cooperatives: governance structures in fruit and vegetable chains.* **ERIM Ph.D. Series Research in Management.** Erasmus University of Rotterdam. Rotterdam.

CONDON, A. M. (1987) *The methodology and requirements of a theory of modern cooperative enterprise. In:* ROYER, J. S. ***Cooperative theory:*** *new approaches.* USDA/ACS, Cooperative Management Division, p. 1-32.

COOK, M. L. (1994) *The role of management behavior in agricultural cooperatives.* **Journal of Agricultural Cooperation,** p. 42-58.

COOK, M. L. (1995) *The future of U.S. agricultural cooperatives: a neo-institutional approach.* **American Journal of Agricultural Economics,** v. 77, p. 1153-59, Dec.

FAMA, E. F; JENSEN, M. C. (1983a) *Separation of ownership and control.* **Journal of Law and Economics.** v. 26.

FAMA, E. F; JENSEN; M. (1983b) *Agency problems and residual claims*. **Journal of Law and Economics**, v. 26, p. 327-49.
FULTON, M. (2000) *New generation cooperatives*. **Unpublished Working Paper**. 12 p. November.
GORTON, G; SCHMID, F. (1999) *Corporate governance, ownership dispersion and efficiency: empirical evidence from Austrian cooperative banking*. **Journal of Corporate Finance,** v. 5, p. 119-140.
HANSMANN, H. (1999) *Cooperative firms in theory and practice*. **The Finnish Journal of Business Economics**, v. 4, p. 387-403.
HENRŸ, H. (2005) **Guidelines for cooperative legislation.** 2nd. revised ed., Geneva, International Labour Office.
ILIOPOULOS, Constantine; COOK, Michael L. (1999) *The efficiency of internal resource allocation in decisions in costumer-owned-firms: the influence costs problem*. **Paper presented at the 3rd annual conference of the International Society for New Institutional Economics.** Washington, DC, Sep.
JENSEN, M. C; MECKLING, W. H. (1976) *Theory of the firm: managerial behavior, agency costs and ownership structure*. **Journal of Financial Economics,** v. 3, p. 305-360.
JENSEN, M. C; MECKLING, W. H. (1979) *Rights and production functions: application to labor-managed firms and codetermination*. **Journal of Business,** v. 52, p. 469-506.
MILGROM, P. R; ROBERTS, J. (1992) **Economics, organization & management.** Englewood Cliffs, NJ: Prentice-Hall.
STAATZ, J. M. (1987) *Farmer cooperative theory: recent developments*. **Research Report,** n. 84. Washington, D. C.:, Agricultural Cooperative Services, http://purl.umn.edu/52017
VITALIANO, P. (1983) *Cooperative enterprise: an alternative conceptual basis for analyzing a complex institution*. **American Agricultural Economics Association,** p. 1078-1083, Dec.
ZYLBERSZTAJN, D. (1994) *Organização de cooperativas: desafios e tendências*. **Revista de Administração,** v. 29, n. 3, p. 23-32, Jul/Set.

MECANISMOS DE GOBIERNANZA CORPORATIVA Y RENDIMIENTO: UN ESTUDIO EN EL SECTOR AGROINDUSTRIAL

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Abstract
La agroindustria es una parte importante de la economía brasileña. El desarrollo del sector está en parte relacionada con la participación de las empresas que cotizan en bolsa. La búsqueda de mejores prácticas de gobierno corporativo de las empresas en este sector de la economía es un diferenciador clave para atraer nuevos inversores. El objetivo de esta investigación es examinar la influencia de las buenas prácticas de gobierno corporativo en la eficiencia de la empresa. La eficiencia de las empresas se midió mediante la técnica de Análisis Envolvente de Datos. Se analizaron los datos de tres años de las empresas que cotizan en bolsa en los sectores de la agricultura y la pesca, la alimentación y bebidas y los cigarrillos y el tabaco. Los resultados mostraron que el hecho de figurar o no en el segmento específico no interfiere directamente en la eficiencia productiva de las empresas.

Palabras clave: gobierno corporativo, la agroindustria, la eficiencia, el análisis envolvente de datos.

MECANISMOS DE GOBIERNANZA CORPORATIVA Y RENDIMIENTO: UN ESTUDIO EN EL SECTOR AGROINDUSTRIAL

1. Introducción

Brasil es un proveedor líder de productos agrícolas en el mundo. Actualmente, el país envía alimentos a 215 destinos en 180 países. El modelo de agricultura sostenible y competitiva, es una empresa pionera en el apoyo a programas para reducir las emisiones de gases de efecto invernadero, la balanza comercial de la agroindustria mayo 2011 publicado por el Ministerio de Agricultura, Ganadería y Abastecimiento muestra que las exportaciones del agronegócio brasileño alcanzó la cifra récord de $ 82.62 mil millones en doce meses, acumulando en el período comprendido entre junio de 2010 y mayo de 2011. Esta cantidad representa un crecimiento de las exportaciones del 20,2% en el período. El valor de las importaciones fue también un récord de doce meses, con EE.UU. $ 15,30 millones, es decir, un incremento del 36,6% en el período. Como resultado, el superávit comercial acumulado de agronegocios en los últimos 12 meses fue de $ 67310 millones.

El informe "Brasil - Pronósticos Agronegocios 2010/2011 a 2020/2021", Ministerio de Agricultura, Ganadería y Abastecimiento, en colaboración con la Empresa Brasileña de Investigación Agropecuaria (Embrapa), se presentan estimaciones para la agricultura brasileña en los próximos diez años . En términos de ingresos de exportación de la soja en 2010 alcanzó los 19,27 mil millones dólares EE.UU., mientras que la carne complejo EE.UU. $ 14,57 mil millones. El estudio también muestra que la productividad seguirá velando por mayores cosechas. Sin embargo, las exportaciones de soja de los puntos de influencia en el orden del 25,9% y 26,5% de carne. Destacando la relevancia del segmento y la necesidad de realizar más estudios en el sector.

De acuerdo con Cepea-USP/CNA (2011) la participación del agronegócio brasileño representa 22,34% del PIB de Brasil. Aprovechando la industria se debe, en parte, la expansión de las empresas que cotizan en bolsa. El cambio impulsado el negocio de comercialización de productos agrícolas que se establece un grado de urgencia para el ajuste de las estructuras económicas, bajo la constante amenaza de una pérdida significativa y permanente de las condiciones básicas de competitividad.

En este sentido, es esencial para la búsqueda de las mejores prácticas en gobierno corporativo, después de todo, esto está directamente relacionado con los problemas de agencia que se producen en los negocios. Echemos un vistazo a la perspectiva de relación de agencia de la relación de los accionistas de gestión como se observa en países como Estados Unidos y Gran Bretaña, es la relación entre los accionistas mayoritarios, accionistas minoritarios, que cuenta con modelos de gobierno corporativo en otros países europeos, América Latina y el también en Brasil.

En el contexto nacional e internacional, lo que vemos es que el gobierno corporativo es extender el poder de los accionistas minoritarios y llevar a las empresas a actuar con la máxima transparencia, en relación con sus accionistas, el mercado, el gobierno o la sociedad. Las buenas prácticas de gobierno corporativo, aumentar la eficiencia de gestión, reducir los costos de capital, atraer nuevas inversiones y permitir el crecimiento del negocio y controles más estrictos estándares éticos más altos y ampliar los ingresos fiscales. Los interesados se benefician de una mayor capacitación, mejores productos y servicios, protección del medio ambiente, etc.

Por lo tanto, como resultado de estos hallazgos e hipótesis con el fin de cubrir una serie de lagunas, el problema de esta investigación se puede resumir en la siguiente pregunta: Los impactos de gobierno corporativo en la eficiencia financiera de las empresas en el sector agroindustrial?

El objetivo de esta investigación es examinar la influencia de las buenas prácticas de gobierno corporativo en la eficiencia de la empresa. Este estudio muestra las diferencias de la investigación anterior, acerca de la relación entre la GC y la eficiencia.

2. Gobierno Corporativo y Análisis Envolvente de Datos

Estudios sobre Gobierno Corporativo (GC) ha adquirido mayor importancia con la aparición de las corporaciones modernas, y el centro de los debates ha estado siempre relacionado con la estructura de propiedad y control de conflictos de intereses. El trabajo de Berle y Means (1932), que es considerado por muchos como el punto de partida de la gestión empresarial, es la teoría que se ocupa de cuestiones relacionadas con el problema clásico de la teoría de la agencia.

Saito y Silveira (2008) subrayan la importancia innegable de la obra de Jensen y Meckling (1976, 2008), que desde el punto de vista de la economía financiera, es un punto de inflexión desde el que se han desarrollado y ha generado numerosos estudios empíricos modelos teóricos nuevos. Este trabajo también ha contribuido a la definición del término gobernabilidad corporativa como "un conjunto de mecanismos internos y externos de control y de incentivos, que tienen como objetivo minimizar los costos del problema de agencia" (p. 79). Ya que el trabajo de Morck, Shleifer y Vishny (2008) complementa el trabajo de Jensen y Meckling (2008), la presentación de evidencia empírica de que el valor de una empresa se incrementa debido a la propiedad de acciones por los administradores de alto, considerada una convergencia de intereses entre accionistas y ejecutivos.

Lo que se busca mediante el establecimiento de un marco de KM en la práctica para mitigar los problemas derivados de la relación de agencia, que se encuentra en las empresas. Estos problemas en casi todos los países de la asimetría de la información, ya sea en la posesión de los directores o accionistas de control, en el primer caso que conducen a la expropiación de los accionistas en su conjunto, y en segundo lugar en la expropiación de los accionistas minoritarios.

El "buen gobierno" y "buen gobierno" están asociados con la garantía de los derechos de propiedad y la promoción de un entorno favorable para la inversión privada,

> [...] "Los derechos de propiedad son la base para el crecimiento económico sostenido en el mercado y para la reducción de la pobreza. Sin embargo, se necesita mucho más. Las empresas necesitan un ambiente que induce a asignar recursos de manera eficiente, aumentar la productividad y la innovación" (WORLD BANK, 1997, p. 45).

La literatura presenta diferentes formas recurrentes de las estructuras de gobierno corporativo, en el que las relaciones de propiedad y el control son los factores determinantes y características. Las dos economías se han desarrollado modelos estilizados (Siffert Filho, 1998): el Nipo-Alemán, en el que el control corporativo es principalmente a través de los mecanismos internos formados por participaciones cruzadas de capital extranjero en la banca, las compañías de seguros e incluso otros corporaciones, y el anglosajón, cuyo carácter sea la pulverización de una participación de control, y el mecanismo de control externo a través del mercado de capitales. En este último modelo, el precio de las acciones refleja un estudio de mercado, sin embargo, puede ser subjetiva, con respecto a la eficiencia de los gerentes y las empresas que dirigen.

El modelo brasileño de gobierno difiere en muchos aspectos de estos dos modelos, teniendo más cerca de lo que se denomina modelo latinoamericano de gobierno corporativo y europeas modelo latinoamericano de gobierno corporativo. Lo que caracteriza a estos dos

modelos es la concentración de los activos, la presencia de la familia privada grande un mercado de capital a corto plazo. Tiene una escasa protección jurídica de los accionistas minoritarios. Las empresas suelen utilizar la deuda como una forma de financiación (Andrade y Rossetti, 2004).

En Brasil, la discusión de gobierno corporativo se ha convertido en los últimos años de la década pasada. Se podría decir que se ha creado un modelo especial de gobierno corporativo, la creación de normas adaptadas a sus necesidades, dedicada a luchar contra el enemigo principal: el control concentrado de la capital, el principal elemento para proteger a los accionistas minoritarios. En el modelo de GC Brasil pone de relieve el derecho de las minorías a elegir libremente a sus representantes en las juntas y los impuestos para la adquisición de votación sobre las cuestiones pertinentes y de conflicto de interés, vender sus acciones, ordinarias o preferidas, a un posible comprador de la empresa para mismo precio del controlador (tag along); recibir dividendos del 10% más altos que los que distribuye a los derechos de voto, tienen una junta de arbitraje para resolver los problemas rápidamente en conflicto con el controlador (Azevedo, 2002).

Destaca Leal (2007) hay en la parte de las instituciones que promueven las mejores prácticas de GC y también la creencia de los directivos que conducen a mayor valor de la empresa. Varios estudios demuestran que tanto en mercados desarrollados y emergentes existen relaciones empíricas entre el inversionista protección ¬ ción y valor de la empresa. En este sentido, la investigación por Lameira, Ness Junior y Macedo Soares (2007) trató de responder si existe evidencia empírica de que la mejora de prácticas de gobierno corporativo promovidas impacto positivo sobre el valor de las empresas brasileñas público. Los resultados estadísticos fueron significativas, lo que sugiere que la mejora de las prácticas de gobierno corporativo promovidas impacto en el valor de las empresas que cotizan en un stock fijo de liquidez y la volatilidad de los precios.

Ehikioya (2009) examinaron la relación entre la estructura y el funcionamiento de GC 107 empresas que cotizan en la Bolsa de Valores de Nigeria durante los años 1998 a 2002. Los resultados indicaron que la concentración de la propiedad tiene un impacto positivo en el rendimiento y el tamaño de la empresa y el impacto en el rendimiento de apalancamiento. A su vez La Porta et al. (2002) utilizaron un conjunto más amplio de datos, que incluyó una muestra de 539 empresas de 27 países entre 1995 y 1997. Como resultado encontró evidencia de valor de la empresa mayor en países con una mejor protección de los accionistas minoritarios y las empresas donde se controla el flujo de efectivo por el accionista mayoritario. También concluyeron que la mejor protección de los accionistas es empíricamente asociados con niveles más altos de los activos de la empresa.

Demsetz y Lehn (1985) discute si la estructura de propiedad de las empresas varía sistemáticamente de una manera que sea consistente con la maximización del valor. Mediante el análisis de 511 empresas de los sectores principales de la economía de EE.UU. concluyó que la estructura de propiedad de las empresas varía sistemáticamente de una manera que sea consistente con la maximización del valor. Del mismo modo Smith (2004) utilizando una muestra de 225 empresas que cotizan en el Bovespa en 2000 examinó los efectos de la estructura de propiedad y el control del valor de mercado, estructura de capital y la política de dividendos. Los resultados mostraron que existe una relación, a menudo estadísticamente significativa, entre la estructura de poder y valor de mercado, el apalancamiento y la política de dividendos de las empresas brasileñas.

Los resultados apuntan en la misma dirección se encuentran también en el trabajo de Demsetz y Villalonga (2001), Gorriz y Furnas (2005) y Lameira, Ness Junior y Macedo-Soares (2007) entre otros. Sin embargo, si no hay unanimidad en los mecanismos de GC impacto en el desempeño de las empresas. Por ejemplo, Bhagat y Bolton (2008) analizó el relación entre la GC y las interrelaciones entre el rendimiento y la CG, el rendimiento del

negocio, estructura de capital y estructura de la propiedad.Los datos utilizados en la encuesta fueron compilados a partir del Inversor Responsabilidad Centro de Investigación (RICR) y la Corporate Library (TCL). Se encontró una correlación positiva significativa entre la propiedad de acciones por los miembros del consejo y la separación de la función de consejero delegado-presidente con el rendimiento. Sin embargo no hubo correlación entre los mecanismos de gestión y el funcionamiento del mercado. Silveira (2004) evaluaron los mecanismos de gobierno son exógenos y ejercer influencia sobre el valor de mercado y la rentabilidad de las empresas. Se analizó información de 161 empresas que cotizan en bolsa en Brasil, de 1998 a 2002. Aunque no es concluyente econométricamente, los resultados indican una relación generalmente positiva entre el gobierno corporativo y el desempeño.

La relación entre la independencia del consejo y el rendimiento era el objetivo de la investigación llevada a cabo por Santos (2002), como los datos de empresas que cotizan en el índice de Spencer Stuart Consejo de Administración de 1996 a 2000.A la conclusión de los autores del estudio no encontró ninguna relación entre la independencia de la junta y el rendimiento de la empresa.Tampoco fue posible identificar una estructura directiva ideal o adecuado a la realidad brasileña y para mejorar el rendimiento del negocio.

Se podría decir que trata de demostrar que los mecanismos de GC influir en el desempeño de las empresas es un tema central en los estudios de GC. Además de los trabajos citados, que se caracterizan por el uso exclusivo de métodos econométricos se encuentran en la literatura de investigación KM con los otros enfoques como complemento de los métodos econométricos. El Análisis Envolvente de Datos - DEA es una técnica que ha sido ampliamente utilizado. Zheka (2005), con la DEA a través del modelo orientado a los insumos, examinó los efectos de diferentes estructuras de propiedad y la calidad del gobierno corporativo en las empresas que cotizan en bolsa en Ucrania. Los resultados encontraron evidencia de que la propiedad de la empresa a través de la capital del país pone de manifiesto la eficiencia de la mayoría, la propiedad de acciones por la administración tiene un efecto negativo en la eficiencia, las empresas con capital extranjero son relativamente ineficientes, pero tiene un efecto positivo y significativo sobre la calidad del gobierno empresarial, la concentración de los derechos de propiedad, incluido el Estado, la ineficiencia aumenta, lo que refleja los posibles factores específicos de cada país y la calidad del gobierno corporativo tiene un impacto positivo en la eficiencia de las empresas propiedad de capital nacional.

Macedo y Corrar (2009) realizaron un estudio comparativo de la contabilidad y el desempeño financiero de las empresas con buenas prácticas de GC con las empresas sin esta característica. 26 empresas brasileñas, empresas distribuidoras de electricidad en el período 2006 a 2007. Para el año 2005 y el promedio de rendimiento durante todo el período, las empresas con buenas prácticas de GC de la contabilidad y los resultados financieros son estadísticamente superior. Sin embargo, para los años 2006 y 2007, la actuación de dos grupos (con y sin GC) es estadísticamente igual al nivel del 5% de significación.

La DEA también se utilizó en la investigación llevada a cabo por Lehmann, Warning e Weigand (2004), que prueba la hipótesis de que las empresas con estructuras más eficientes GC tiene la más alta rentabilidad. Huang, Lai y Hsiao (2007) que analizaron la estructura de propiedad y de influir en el rendimiento GC. Destefani y Sena (2007) que trataba de demostrar si existe una relación entre el sistema de GC y la eficiencia técnica y Hardwick, Adams y Zou (2003) que investigó la relación entre los mecanismos de CG y la eficiencia de costes.

De acuerdo a Hardwick, Hong y Adams (2003) los avances recientes en la medición de la eficiencia se ha logrado mediante el uso de métodos matemáticos para no paramétricas de programación lineal, tales como Análisis Envolvente de Datos - DEA. Citando Sengupta (2002) argumentan que los métodos no paramétricos permiten el desempeño de cada empresa en un sector determinado se calcula con respecto a un conjunto de empresas

eficientes, con características similares. La DEA estima que la eficiencia de las empresas con múltiples entradas y salidas. Sin embargo, es menos exigente que los métodos paramétricos, en términos de grados de libertad, por lo que la función de producción y asumir los términos de error.

La DEA ofrece un índice de eficiencia en los pesos asociados con las entradas y salidas se determinan endógenamente a través de la programación lineal. La DEA define una frontera de producción en la que todas las empresas se encuentran Pareto eficiente. Este límite incluye todas las demás empresas que se observan los llamados ineficiente. Las empresas que no están en la frontera están dominados por lo menos una empresa o una combinación de empresas que definen la frontera. La distancia entre las empresas y las empresas ineficientes se determina mediante un punto de referencia radial, lo que indica el nivel de eficiencia (Lehmann et al., 2004).

Hay dos modelos clásicos de la DEA, que se resumen en la Figura 1, el CCR (Charnes, Coopery y Rhodes, 1978) y BCC (Banker, Charnes y Cooper, 1984). El modelo CCR (conocido como CRS - rendimientos constantes a escala) construye una superficie lineal a trozos, no paramétrico, que incluya datos y trabaja con rendimientos constantes a escala, por lo que cualquier variación en las entradas (*inputs*) produce una variación proporcional en los resultados (salidas). El modelo BCC (también conocido como VRS - rendimientos variables a escala) rendimientos variables a escala, es decir, sustituye el axioma de la proporcionalidad entre las entradas y salidas del axioma de convexidad.

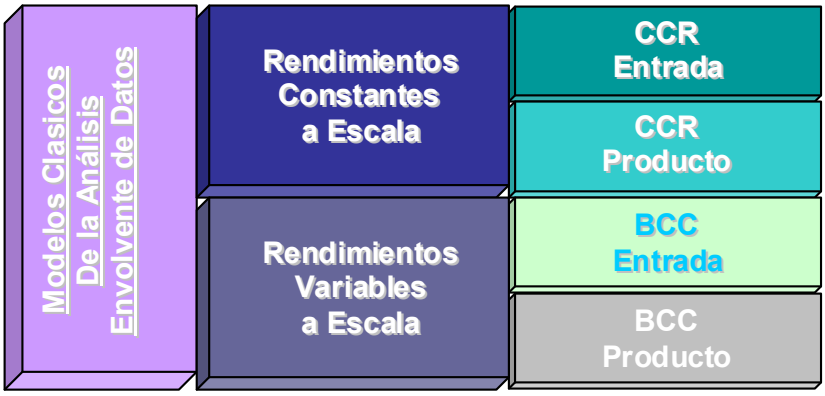


FIGURA 1-Análisis Envolvente de Datos Clásico
Fuente: Adaptado Charnes, Cooper, Lewin (1997) citado en Ferreira (2005)

La formulación matemática de estos clásicos por lo tanto se puede representar:

TABLA 1 - La formulación matemática de los modelos clásicos DEA.

Escala de Eficiencia	La Eficiencia Productiva			Sujeto a:
		CCR-I (Entrada)	Maximizar $h_k = \sum_{r=1}^{s} u_r y_{rk}$	$\sum_{r=1}^{m} u_r y_{rj} - \sum_{i=1}^{n} v_i x_{ij} \le 0$ $\sum_{i=1}^{n} v_i x_{ij} = 1$
		CCR-P (Producto)	Minimizar $h_k = \sum_{i=1}^{n} v_i x_{ik}$	$\sum_{r=1}^{m} u_r y_{rj} - \sum_{i=1}^{n} v_i x_{ij} \le 0$ $\sum_{r=1}^{m} u_r y_{rk} = 1$

La Eficiencia Técnica	**BCC-I** (Entrada)	Maximizar $\sum_{r=1}^{m} u_r y_{rk} - u_k$	$\sum_{i=1}^{n} v_i x_{ij} = 1$ $\sum_{r=1}^{m} u_r y_{rj} - \sum_{i=1}^{n} v_i x_{ij} - u_k \leq 1$
	BCC-P (Producto)	Minimizar $\sum_{i=1}^{n} v_i x_{ik} + v_k$	$\sum_{r=1}^{m} u_r y_{rk} = 1$ $\sum_{r=1}^{m} u_r y_{rj} - \sum_{i=1}^{n} v_i x_{ij} - v_k \leq 0$

Donde:

$u_r, v_i \geq 0$

$y = productos; x = entradas; u, v = pesos$

$r = 1,\ldots,m; i = 1,\ldots,n; j = 1,\ldots,N$

h_k= *indicador de eficiencia*

Fuente: adaptado Kassai (2002)

4. Metodología

4.1 Tipo de investigación

Debido a que existe una gran complejidad en la estructura y dinámica de los negocios y para cumplir con los objetivos propuestos en este estudio, se optó por la investigación cuantitativa sobre la metodología de diseño. Este tipo de investigación es someter un caso a juicio en condiciones de controlar y disfrutar de ella constantemente, con criterios de rigor, constancia medir el impacto y sus excepciones, y suponiendo que sólo el conocimiento de que puede ser aprehendido en una posición de controlar la legitimidad de la prueba y probado por la medida. Se trata de recoger y analizar datos numéricos mediante la aplicación de pruebas estadísticas (Collins, Hussey, 2005), sin embargo, en cuanto a su propósito, se puede decir que la encuesta se clasifica como exploratoria. Porque aunque hay estudios sobre la GC, no hay registros de la investigación sobre el tema, especialmente los estudios sobre la eficiencia. Aunque la investigación está formado por una pequeña muestra, lo que impide una inferencia estadística sea posible, la investigación todavía puede ser clasificada como descriptiva, ya que describe en detalle las características cuantitativas de la información que se presenta en los estados financieros, el año fiscal 2007, 2008 y 2009, las empresas estudio.

4.2 Objeto de la investigación y el muestreo

Dependiendo del alcance definido para esta investigación pone de relieve que la población se compone de empresas que cotizan en bolsa con acciones negociadas en la Bovespa, que pertenecen a los sectores de la agricultura, el azúcar y el alcohol, diversos alimentos, productos lácteos, café, carne y productos cárnicos; granos y sus derivados, cigarrillos y tabaco. La clasificación sigue el patrón establecido por la BOVESPA.

Los datos de la encuesta Economática secundaria obtenida de la CVM y la página a través del sistema de información externa - Divext. El universo entiende que se debe buscar 27 empresas. Porque no tenemos los datos necesarios para la investigación se excluyeron 8. Mediante el uso de criterios no probabilístico, una muestra fue extraída 21 las empresas. La técnica de muestreo no probabilístico se adoptó en la búsqueda de la comodidad, porque las empresas fueron seleccionadas de acuerdo a la viabilidad de acceso a la información. Dentro de 02 muestra las empresas que componían la muestra final y su industria.

Tabla 02 Muestra no probabilística

Sector|Economática	Nombre			
Agro y Pesca	Rasip Agro	Renar		
Alimentos e Bebidas	SLC Agrícola	JBS	Minerva	Marfrig
	Cacique	Josapar	Minupar	Iguazu Café
	Caf Brasilia	Laep	Oderich	
	Excelsior	M. Diasbranco	Sao Martinho	
Otros	Souza Cruz			

Fuente: elaborado por los autores

4.3Investigación método

De acuerdo con el método utilizado por Hardwick, Hong y Adams (2003), Delmas y Tokat (2005), Huang, Lai y Hsiao (2007) y Destefani y Sena (2007) el estudio se realizó en dos etapas. En un primer momento se calculó la eficiencia de las empresas que utilizan la técnica DEA. Se utilizó el DEA-VRS orientado a los insumos.En la segunda etapa se utilizaron modelos de regresión de la MCO - OLS y Logit para demostrar que la estructura de gobierno corporativo afectan el desempeño corporativo.

4.4 Definición y selección de variables para el análisis

Para Meza y Lins (2000), el número de variables del método DEA analizable debe serlo más compacto posible con el fin de mejorar el poder discriminatorio de análisis envolvente. En este sentido, la selección de variables puede tener en cuenta exclusivamente las opiniones de los interesados, especialmente teniendo en cuenta la relevancia, la fiabilidad, el alcance y la contribución de la variable a la aplicabilidad de la técnica. Los autores también afirman que:

> "En el caso actual supone que una baja disponibilidad de grandes cantidades devariables y observaciones (Unidades de Toma de Decisiones - DMU), la preocupación no se justifica en el uso de alguna técnica para seleccionar las variables [...] [y los suplementos] [. ..] donde el número de DMU es pequeño en relación con el número de posibles entradas y salidas, los autores en general, no han puesto de relieve la necesidad de un procedimiento de selección de variables ". (Linsy Meza 2000, p.39)"

De acuerdo con Meza y Lins (2000) el poder discriminatorio de *Data Envelopment Analysis* (DEA) de los problemas que contiene un gran número de variables, puede ser muy débil, lo que dificulta el uso de la DEA como una herramienta. Esta interpretación cuenta con el apoyo de Zhu (1996), que establece que en gran parte de la literatura de los autores no consideran la existencia de un amplio conjunto de variables candidatas. Limita únicamente a seleccionar las variables que mejor describen el desempeño de la DMU bajo análisis. Por lo tanto, para la selección de las variables, se optó por adoptar el método desarrollado por Meza y Lins. Compactadas al máximo número de variables posibles a fin de mejorar el poder discriminatorio de análisis. En el proceso de selección de variables (Tabla 3) se tuvo en cuenta sólo la opinión de la investigadora y alguns indivíduos envolvidos na pesquisa, considerando a relevância, a confiabilidade, abrangência e a contribuição da variável para a aplicabilidade da técnica. Os autores definem que o capital envolve as edificações, os equipamentos e os inventários. Assim, as variáveis foram discriminadas:

Tabla 3 – Variables para la aplicación de la DEA

INPUT *(X)* = insumo	⟶	**OUTPUT *(Y)* = producto**
Activo Fijos Totales		
Gastos de Funcionamento	⟶	Ingresos Brutos Acumulados

Fonte: elaborado por los autores

***Input* (x)**

- Activos fijos o x1 - Representa la aplicación permanente o un conjunto de recursos de la empresa que normalmente no están destinados a la venta o realización. En general, lo que representa el capital invertido en activos fijos por los socios en la construcción o adquisición de la propiedad.
- Gastos de funcionamiento o x2 - representan los valores fuera del costo de producción de bienes o servicios, sino que están conectados directamente a las actividades de la empresa.

Output (y)

- Los ingresos brutos acumulados o y1 - Representa a la bruta acumulada en el sector agroindustrial adquirida a través de ejercicio, una medida de resultado global de la DMU.

5. Resultados y discusión

En la Tabla 4 los valores de la estadística descriptiva planteadas en relación con las entradas y salidas utilizadas para el cálculo de la DEA. Se muestra el promedio de los tres años analizados. Es evidente en la Tabla 1 que los valores se presentan con la media de todas las empresas de la muestra también están mostrando los medios de las empresas cuyas acciones cotizan en el mercado tradicional (T) y las medianas empresas que tienen acciones negociadas en Bovespa Novo Mercado (NM). Los datos fueron esenciales para identificar y comparar la eficiencia entre las empresas y el nuevo mercado que hace que el mercado tradicional.

Se puede observar en la Tabla 1 que los activos fijos, gastos operativos y los ingresos brutos de las empresas que cotizan en el Novo Mercado tienen mayores valores medios de las empresas que cotizan en el mercado tradicional. Al analizar los valores mínimos de las variables que parece que están relacionados con empresas en el mercado tradicional. Por otro lado los valores máximos son empresas en el Novo Mercado. De ello se deduce que las empresas Nuevo Mercado son las empresas más grandes que las empresas que cotizan en el mercado tradicional.

TABLA 4 - Número medio de las variables utilizadas en la DEA - 2007-2009

	Inmobilizado	**Desp. Operacionales**	**Ingresos Bruto**	**Média**
GENERAL				
Média	1.099.697,67	433.845,85	3.657.156,28	1.730.233,27
Desvio Padròn	2.281.170,07	714.604,98	7.225.376,61	3.407.050,55
Mínimo	6.811,00	5.763,00	16.800,00	9.791,33
Máximo	13.292.503,00	3.285.067,00	35.195.479,00	17.257.683,00
NM				
Média	2.240.536,79	702.517,54	6.630.826,21	3.191.293,51

Desvio Padrón	3.078.578,83	886.341,91	9.669.113,79	4.544.678,18
Mínimo	68.937,00	6.124,00	34.541,00	36.534,00
Máximo	13.292.503,00	3.285.067,00	35.195.479,00	17.257.683,00
T				
Média	187.026,37	218.908,50	1.278.220,33	561.385,07
Desvio Padrón	233.914,06	450.202,25	2.844.267,35	1.176.127,89
Mínimo	6.811,00	5.763,00	16.800,00	9.791,33
Máximo	766.561,00	1.597.773,00	12.121.286,00	4.828.540,00

Fuente: datos de la investigación

Muestra final de dieciocho empresas, ocho están listados en el Novo Mercado (DMU 1, 6, 9, 10, 11, 15, 16 y 17), o cumplir con las expectativas de los inversionistas de una mayor transparencia de la información sobre los actos realizados porcontroladores y gerentes de empresas. Diez empresas han de acciones negociadas en el mercado tradicional (DMU 2, 3, 4, 5, 7, 8, 12, 13, 14 y 18).

Los índices de eficiencia productiva se presentan en la Tabla 5. La eficiencia productiva y la orientación técnica se encontraron con los productos. La construcción de estos niveles permite comprobar la homogeneidad de la gestión económica y financiera de las empresas y asignar, para las empresas "ineficientes", nuevos estándares de eficiencia, lo que contribuye en el mediano y largo plazo, para el desarrollo eficiente del mercado.

Inicialmente se identificaron las DMUs eficientes. Hay rendimientos constantes a escala, cuando el incremento en los resultados de consumo de insumos en un aumento proporcional en la cantidad de productos obtenidos, en otras palabras, las entradas y salidas de proporcionalidad. Ya que sólo se utilizó una salida (ingresos brutos) y el modelo utilizado fue orientada al producto, la empresa demuestra la ineficacia de la cantidad que puede aumentar el producto sin la necesidad de entrada, salvo en las DMU que ya están en la frontera eficiente.

En 2007, tres empresas se clasifican en dos eficiente, de la NM y un mercado tradicional. En 2008 una empresa en cada mercado se clasificó como eficiente. En el año 2009 las cuatro empresas se clasifican en dos eficiente, en cada mercado. JBS sólo (Nuevo Mercado) se obtuvo una eficiencia total (h = 1) en los tres años fiscales. El Excelsior (mercado tradicional) se hizo efectiva a partir de 2008, mientras que Mafrig (Nuevo Mercado), Sao Martinho (Nuevo Mercado) y Souza Cruz (mercado tradicional) entró en vigor en 2009. Para la DMU otros, que han ineficiencia productiva (h <1), se sugiere que la investigación futura se realizará en el cálculo de la BCC. Este modelo ayuda a identificar el origen de esta ineficiencia se basa en una eficiencia en la producción técnica o la escala.

TABLA 5 - puntuación de eficiencia de la producción de DMU, la aplicación del método CCR-P

MERCADO	DMU	2007	2008	2009	Média
NM	BRF Foods	0,530	0,667	0,498	0,565
T	Cacique	0,636	0,505	0,632	0,591
T	Caf Brasilia	0,302	0,045	0,181	0,176

T	Excelsior	0,448	**1,000**	**1,000**	0,816
T	Iguacu Café	0,754	0,805	0,837	0,799
NM	JBS	**1,000**	**1,000**	**1,000**	**1,000**
T	Josapar	0,626	0,938	0,672	0,745
T	Laep	0,285	0,590	0,551	0,475
NM	M. Diasbranco	0,418	0,504	0,507	0,476
NM	Marfrig	0,848	0,793	**1,000**	0,821
NM	Minerva	0,731	0,615	0,794	0,713
T	Minupar	0,756	0,678	0,684	0,706
T	Oderich	0,505	0,538	0,668	0,570
T	Rasip Agro	0,611	0,780	0,742	0,711
NM	Renar	0,599	0,454	0,413	0,489
NM	Sao Martinho	**1,000**	0,359	**1,000**	0,679
NM	SLC Agricola	0,371	0,531	0,633	0,511
T	Souza Cruz	**1,000**	0,807	**1,000**	0,807

Fuente: Resultados de la investigación

En el Tabla 6 se presenta un análisis descriptivo de las puntuaciones de eficiencia en los tres años analizados. No hubo marcadas diferencias en la eficiencia media de las empresas del mercado tradicional de la lista y empresas que cotizan en el Novo Mercado. Es de destacar que en los años 2008 y 2009 la eficiencia media de las empresas que cotizan en el mercado tradicional es mayor que el promedio de eficiencia de las nuevas empresas en el mercado. Sin embargo, el mínimo de eficiencia de las empresas que cotizan en el mercado tradicional está muy por debajo de los mínimos enumerados en la eficiencia del mercado.

Tabla 6. Promedio de índices de eficiencia anual

	2007	**2008**	**2009**	**Média**
GENERAL				
Nº empresas eficientes	3	2	4	
Média	0,561	0,624	0,654	0,647
Desvio Padrón	0,173	0,230	0,214	0,187
Mínimo	0,285	0,045	0,181	0,176
Máximo	1,000	1,000	1,000	1,000
NM				
Nº empresas eficientes	2	1	2	
Média	0,583	0,560	0,641	0,657
Desvio Padrón	0,183	0,144	0,220	0,185
Mínimo	0,371	0,359	0,413	0,476
Máximo	1,000	1,000	1,000	1,000
T				
Nº empresas eficientes	1	1	2	
Média	0,547	0,668	0,663	0,640

Desvio Padrón	0,175	0,273	0,223	0,198
Mínimo	0,285	0,045	0,181	0,176
Máximo	1,000	1,000	1,000	1,000

Fuente: Resultados de la investigación

Se puede observar en la Tabla 7 en los tres años las empresas encuestadas cotizan en el New relacionadas con el mercado variables tienen una estructura de buen gobierno que diferencian a las empresas en el mercado tradicional. Se puede ver queel derecho de control del accionista de control (DCont), teniendo en cuenta todas las empresas, que alcanza una participación en la compañía de alrededor del 62%. Enlas empresas que cotizan en el mercado tradicional es casi el 71% y las empresas que tienen acciones negociadas en el mercado este porcentaje es del 51,17%.

Tabla 07. Composición accionarial y consejo - Promedio 2007-2009

	DCONT %	DSFC %	DISP	Total de miembros del consejo	Consejeros Externos
Todas	61,95	50,90	11,05	5,72	4,44
Mercado tradicional	70,58	50,69	19,89	5,10	3,80
Nuevo Mercado	51,17	51,17	0,00	6,50	5,25

Fuente: Resultados de la investigación

De acuerdo con la regulación de Novo Mercado de Bovespa deberían tener una mayor fragmentación de la capital, lo que no hubo concentración de los accionistas de control. Estos porcentajes confirman estas hipótesis. Sin embargo, el mismo no es cierto con respecto a los derechos de los controladores en el flujo de caja(DSFC). Muestra una mayor participación de los controladores de la empresa. Pero no hay ninguna diferencia entre el capital votante y total de capital. Parece que las empresas que tienen acciones negociadas en el mercado tradicional de esta diferencia llega a casi el 20%.

Tabla 07 también se muestra la composición de los consejos de administración. La Ley 6404/1976 recomienda por lo menos tres directores. Las reglas del Novo Mercado sugieren por lo menos cinco consejeros. Mercado tradicional de la empresa en promedio tienen cinco y seis directores del Nuevo Mercado. Lo que destaca es la presencia de consejeros externos. No existe una norma, pero se recomienda una mayor presencia de consejeros externos. Parece que las empresas en el Novo Mercado aproximadamente el 81% de los directores son externos. Desde las otras empresas este porcentaje es del 74%.

Se esperaba para demostrar que las empresas que se enumeran en los diferentes niveles de gobierno superiores de eficiencia a las empresas presentes en el mercado tradicional. Sin embargo, los resultados mostraron que el hecho de figurar no en el segmento específico no interfiere directamente en la eficiencia productiva de las empresas. A pesar de que las empresas Nuevo Mercado cuentan con mecanismos de gobierno corporativo conforme a las disposiciones de la legislación y códigos de buenas prácticas.

6. Conlusiones

A pesar de la DEA es relativamente nuevo y poco explorado en Brasil en el ámbito de la gestión, la consolidación presenta características multidisciplinares y contribuye a los criterios de la gobernanza como "joven" en el desarrollo teórico. Se ha intentado a través de esta investigación no sólo plantean las empresas económico-financiera, sino también para

identificar y comparar la eficiencia productiva de las empresas del sector agroindustrial en el Bovespa, comprobar la consistencia de la eficiencia en la gestión de las empresas incluidas en el nuevo mercado y tradicional .

Para identificar esta frontera eficiente, trabajamos con datos secundarios económica y financiera. La presentación de la muestra pequeña (18 DMU) para el análisis, la investigación muestra que esta limitación. El corte en la escena era esencial para obtener resultados satisfactorios en la aplicación de modelos DEA.Sin embargo, la medida de la eficiencia técnica mostraron algún déficit. Cuando se aplica por sí sola no explica todas las posibilidades, ya que indica deficiencias estrechamente vinculado exclusivamente variables seleccionadas. Por lo tanto, se puede argumentar que la clave para obtener buenos resultados en la DEA es la selección de variables, después de todo, los valores presentados modelo matemático sin estudios de viabilidad, análisis de la capacidad real de DMUs cambio, la adaptación y el ajuste de las normas asignadas . ¿Qué impide que ciertos puntos de referencia, por ejemplo.

Debido a las medidas de eficiencia basado en la premisa de la comparación entre los DMU, si las puntuaciones obtenidas en las DMU fueron todos iguales a 1 indicaría que el mercado es bastante homogénea Agroindustrial. Sin embargo, el ratio de eficiencia en la muestra no representa, de manera similar, la máxima eficiencia de los productos ofrecidos. Incluso llegó a 100% de eficiencia, la empresa no puede ofrecer el estándar ideal, total. La DEA se utiliza para guiar las tendencias.
En lo que respecta al riesgo de las empresas, la situación de la CAF Brasilia es delicado y merece una atención especial en el corto plazo de la situación económica y financiera de la JBS. Sin embargo, estos factores no han fomentado las diferencias entre los niveles de requisitos y prácticas de gobierno corporativo adoptados, que se caracteriza que en el corto plazo, cambios en la legislación con el fin de promover la transparencia y la participación generalizada de la bolsa de valores no refleja la eficiencia productiva las empresas.

El análisis proviene de un segmento pobre de la investigación, donde el universo de posibilidades es aún desconocida y los resultados se obtuvieron a partir de los parámetros generados por la propia muestra y no por un modelo absoluto e incondicional.

7. Bibliogafía

ANDRADE, A.; ROSSETTI, P. **Governança corporativa**: fundamentos, desenvolvimento e tendências. São Paulo: Atlas, 2004.

BANKER, R. D.; CHARNES, A.; COOPER, W. W. Some Models for EstimatingTechnical and Scale Inefficiencies in Data Envelopment Analysis. **Management Science**. v. 30, n. 9, 1078-1092. 1984.

BERLE, A.; MEANS, G. **The modern corporation and private property**. New York: MacMillan, 1932.

BHAGAT, S.; BOLTON, B. Corporate governance and firm performance. **Journal of Corporate Finance**, v. 14, n. 3, June 2008, p. 257-273.

BINGER, B.R.; HOFFMAN, E. **Microeconomics with calculus.** 2. ed. New York: Addison-Wesley \Educational Publishers Inc., 1998. 633 p.

COLLINS, Jill; HUSSEY, Roger. **Pesquisa em administração:** um guia prático para alunos de graduação e pós-graduação. Trad. Lucia Simonini. 2. ed. Porto Alegre: Bookman, 2005, 349 p.

CHARNES, A;. COOPER, W.W; RHODES, E. Measuring the efficiency of decision-making units, Eur. J. Operat. Res. 2 (1978) 429–444.

CENTRO DE ESTUDOS AVANÇADOS EM ECONOMIA APLICADA – CEPEA/USP. **PIB do agronegócio – dados de 1994 a 2010.** Disponível em: <http://www.cepea.esalq.usp.br/pib>. Acesso em: 24 jun. 2011.

DELMAS, M.; TOKAT, Y. Deregulation, governance structures, and efficiency: the U.S. electric utility sector. **Strategic Management Journal***, v.* 26, 2005, p. 441–460

DEMSETZ, H.; LEHN, K. The Structure of Corporate Ownership: Causes and Consequences. **The Journal of Political Economy**, v. 93, n. 6, dec., 1985, p. 1155-1177.

DEMSETZ, H.; VILLALONGA, B. Ownership structure and corporate performance. **Journal of Corporate Finance**, v. 7, jun, 2001, p. 209-233.

DESTEFANIS, S.; SENA, V. Patterns of Corporate Governance and Technical Efficiency in Italian Manufacturing. **Managerial and Decision Economics**. v. 28, 2007, p. 27-40.

EHIKIOYA, B. I. Corporate governance structure and firm performance in developing economies: evidence from Nigeria. **Corporate Governance**, v. 9; n. 3, 2009, p. 231-243.

FERREIRA, M. A. M. **Eficiência técnica e de escala de cooperativas e sociedades de capital na indústria de laticínios do Brasil.** 2005. 159 f. Tese (Doutorado) – Universidade Federal de Viçosa, MG, 2005.

GÓRRIZ, C. G.; FUMÁS, V. S. Family Ownership and Performance: the Net Effect of Productive Efficiency and Growth Constraints. **ECGI Working Paper Series in Finance** - Working Paper N°. 66/2005, February 2005.Disponível em: <www.ecgi.org/wp>. Acesso em: 16.01.2010.

HARDWICK, P.; ADAMS, M.; ZOU, H. Corporate Governance and Cost Efficiency in the United Kingdom Life Insurance Industry. **European Business Management Scholl**, EBMS, Working Paper EBMS, 2003, 1

HUANG, L.; HSIAO, T.; LAI, G.C. Does Corporate Governance and Ownership Structure Influence Performance? Evidence from Taiwan Life Insurance Companies, **Journal of Insurance Issues**, v. 30, n. 2, 2007, p. 123-151.

JENSEN, M. C.; MECKLING, W. H. Teoria da firma: comportamento dos administradores, custos de agência e estrutura de propriedade. **Revista de Administração de Empresas**, São Paulo, v. 48, n. 2, p. 87-125, 2008.

JENSEN, M. C.; MECKLING, W. H. Theory of the firm: managerial behavior, agency costs and ownership structure. **Journal of Financial Economics**, Amsterdã, v. 3, n. 4, p. 305-360, 1976.

KASSAI, S. **Utilização da análise por envoltória de dados (DEA) na análise de demonstrações contábeis.** 318 f. Tese (Doutorado em Contabilidade e Controladoria) – Universidade de São Paulo, São Paulo, SP, 2002.

LA PORTA, R.; LOPEZ-DE-SILANES, F.; SHLEIFER, A.; VISHNY, R. Investor Protection and Corporate Valuation. **The Journal of Finance**, v. 57, n. 3, jun., 2002, pp. 1147-1170.
LEAL, R. P. C. Práticas de governança e valor corporativo: uma recente revisão da literatura. In: SILVA, A. L. C. da.; LEAL, R. P. C. **Governança corporativa**: evidências empíricas na Brasil. São Paulo: Atlas, 2007.

LAMEIRA, V. J.; NESS, Jr., W.L.; MACEDO-SOARES, T. D. L. V .A. Governança Corporativa: impactos no valor das companhias abertas brasileiras. **Revista de Administração USP**. FEA/USP. São Paulo. 2007.

LEHMANN, E; WARNING, S.; WEIGAND, J. Governance Structures, Multidimensional Efficiency and Firm Profitability**. Journal of Management and Governance,** v. 8, 2004**,** p. 279–304.

MACEDO, M. A. S.; CORRAR, L. J. **Análise comparativa do desempenho contábil-financeiro de empresas com boas práticas de governança corporativa no Brasil**. In: XXXIII ENANPAD - Encontro Nacional da ANPAD, São Paulo, 2009.

MEZA, L. A.; LINS, M. P. E; **Análise Envoltória de Dados:** perspectivas e integração no ambiente de apoio a decisão. Ed. COPPE/UFRJ, Rio de Janeiro (2000).

MORCK, R.; SHLEIFER, A.; VISHNY, R. W. Participação acionária da administração e valoração no mercado: uma análise empírica. **Revista de Administração de Empresas**, São Paulo, v. 48, n. 2, p. 126-143, 2008.

Charnes, A.;. Cooper, W.W, Rhodes, E. Measuring the efficiency of decision-making units, Eur. J. Operat. Res. 2 (1978) 429–444.

SAITO, R.; SILVEIRA, A. Di M. da. Governança corporativa: custos de agência e estrutura de propriedade. **Revista de Administração de Empresas,** v. 48, n. 2, abril/junho 2008. p. 79-86.

SANTOS, G. Z. dos. **Independência do conselho de administração e sua relação com o desempenho da empresa**. 2002. Dissertação (Mestrado em Administração) – Universidade Federal do Rio Grande do Sul, Porto Alegre, 2002.

SIFFERT FILHO, N. Governança corporativa: padrões internacionais e evidências empíricas no Brasil nos anos 90. **Revista do BNDES**, n.9, 1998.

SILVA, A. L. C. da. Governança corporativa, valor, alavancagem e política de dividendos das empresas brasileiras. **Revista de Administração de Empresas**, v. 39, n. 4, 2004, p. 348-361.

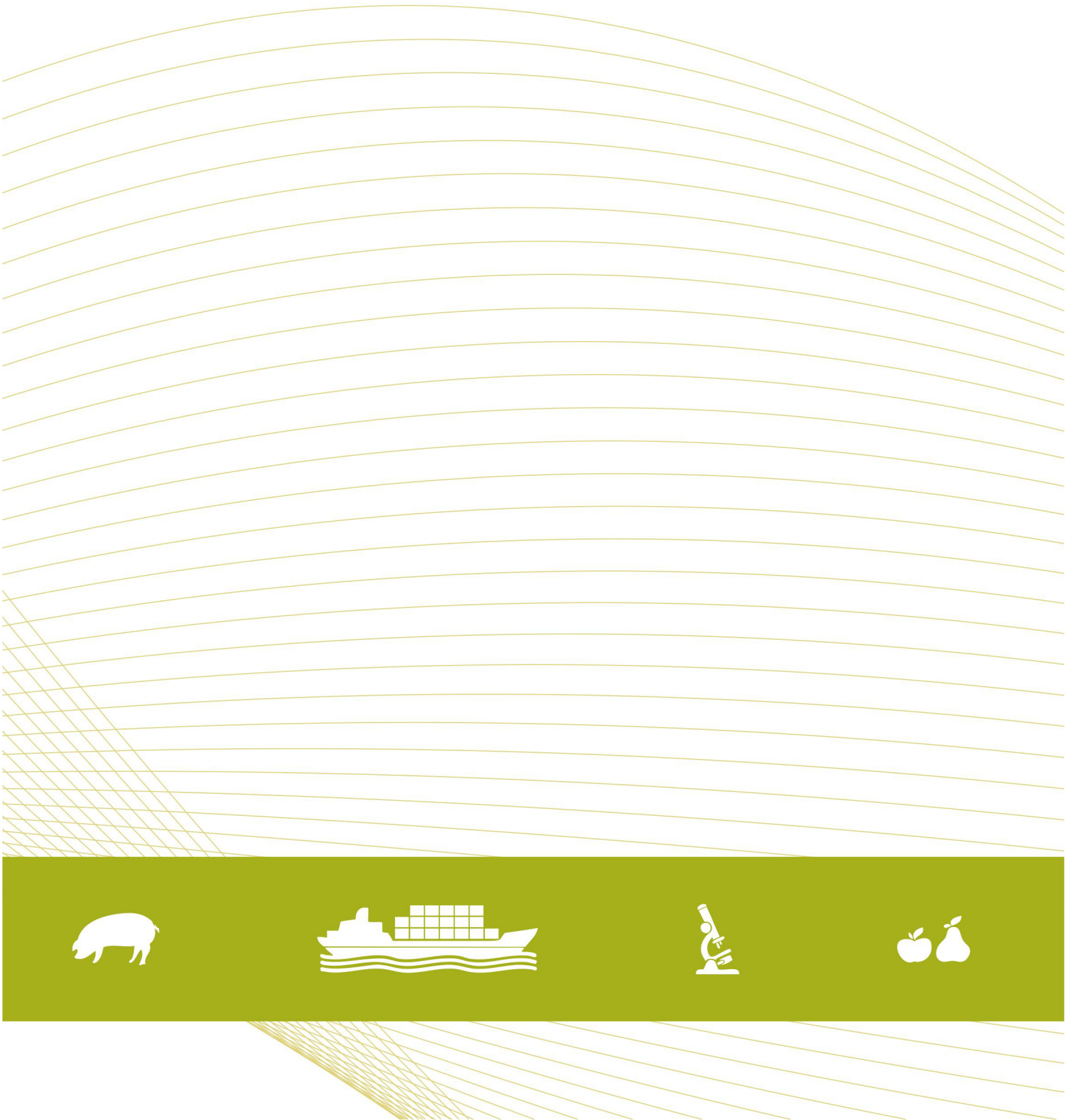
SILVEIRA, A. Di M. da. **Governança Corporativa e Estrutura de Propriedade:** determinantes e relação com o desempenho das empresas no Brasil. 2004. Tese (Doutorado em Administração) - Universidade de São Paulo, São Paulo, 2004.

WORLDBANK. World development report: the State in a changing world. Washington: Oxford University Press. 1997. Disponível em: <http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/1997/06/01/000009255_3980217141148/Rendered/PDF/multi0page.pdf>. Acesso em 13.10.2008.

ZHEKA, V. Corporate Governance, Ownership Structure and Corporate Efficiency: The Case of Ukraine. **Managerial and Decision Economics**, v. 26, 2005, p. 451-460.

ZHU, J., 1996, **"DEA with Preference Structure"**, Journal of the Operational Research Society", vol. 47, pp. 136-150.

Sustainability



CONSUMER ATTITUDES TOWARDS GREEN FOOD IN EUROPE: A VALUES-ATTITUDES HIERARCHICAL MODEL

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Abstract

Through a hierarchical values-attitudes model, the paper examines the degree to which attitudes towards green food are determined by European consumers' values and their general attitudes towards environment and nature (affective) and technological progress (cognitive). The research objectives are fulfilled through data collected in four EU countries (N=1,931 consumers in total). The link between collectivism, (affective) attitudes towards environment and nature, and attitudes towards green food is the strongest link of the hierarchical model. However, individualistic value orientations also relate to attitudes to green food, due to the significant relationship between individualism and (cognitive) attitudes towards technological progress, and the latter's significant and positive (albeit weak) correlation with attitudes to green food. This finding points towards a belief held at least by a part of EU consumers that technology can be an additional, secondary in magnitude but positive in direction, determinant of relevant aspects of green foods. This result offers face validity to the selection of attitudes towards environment and technology as *join* determinants of attitudes to green food. It seems that perspectives for a greener future have changed a lot from just being idyllic, back-to-nature thoughts to one where environmental protection and new technology go hand in hand. Robust invariance tests should be run in future applications on the here-postulated conceptual model per studied country to essentially justify the existence of differences in the way consumers in Europe (and beyond) develop attitudes towards sustainable food products.

Key words: Green food, hierarchical model, personal values, attitudes, sustainability

CONSUMER ATTITUDES TOWARDS GREEN FOOD IN EUROPE: A VALUES-ATTITUDES HIERARCHICAL MODEL

1. Introduction

The tendency of over-consumption that has been observed the last 2-3 decades is nowadays becoming alarming and highly prioritized in the political and social agenda. Research underlines the concerns about the consequences of unmonitored consumption practices within a "throw-away" society, which are able to lead to environmental, social and economic degeneration (Hume, 2009). At the same time, attempts are increasingly made by various stakeholders to engage citizens in more sustainable behavioral practices and embody those practices in their everyday consumption behaviour. Social scientists contribute to this effort by examining consumers' motivations behind diverse behaviours and their outcomes pertaining to the economic activities with the highest environmental impact, such as transportation, energy use, construction and food production (Tukker et al., 2008). Particularly the role of food production (and consumption) is central in the debate on environmental sustainability. Recent research provides empirical insights into the influence of processes involved in the entire life-cycle of food, from production to disposal, and its enormous negative impact on the environment (Tanner et al., 2004).

The development of agricultural and food production in the second half of the 20th century focused on providing enough and safe food to Western populations, with production system intensification being one of the driving forces behind this task (Brom et al., 2007). However, the increase in agricultural efficiency had a drawback: the economic rationale behind it created unwanted environmental consequences. For many years, this trade-off did not constrain intensive food production systems, and many consumers seemed to give little thought to the links between their consumption behaviours and the process of food production (de Boer et al., 2009). Nowadays, citizens' awareness and concern related to its consequences is growing, at least in parts of the Western world (see European Commission, 2006). At the same time, however, a distance between producers and consumers is mentally and physically created, mainly caused by urbanization (Brom et al., 2007). Stimulated by mass media news coverage and advertisements, modern consumers often have a romantic view of agriculture and food production and, when confronted with the intensive, technology-driven agricultural production systems, negative attitudes towards agriculture, food production and technology emerge (e.g. Frewer et al., 2005; Grunert, 2006; Kanis et al., 2003; Søndergaard et al., 2005).

Against this background, the objective of the present work is to comprehensively analyze European consumers' attitudes towards "green" food production. The contradiction between Western consumers' environmental concerns and their demand for amble, steady (and affordable) food supply offers fertile ground for further research into the relationship between attitudes specific to green food and its hypothesized direct antecedent, namely attitudes towards environment. On the other hand, it is plausible to assume that attitudes towards technology (reflecting consumer perceptions about the industrial food production systems that prevail as source of food supplies to Western societies) would also have a (possibly negative) influence on consumers' attitudes towards green food. Further, any effort to study consumer perceptions about green food should incorporate personal values that motivate general attitudinal constructs, such as attitudes towards the environment and towards technology (i.e. egalitarian/collectivistic and selfish/individualistic values respectively), creating a hierarchical values-attitudes model.

What makes researching this hierarchical values-attitudes relationship particularly challenging is the fact that the two general attitudinal constructs (towards environment and technology respectively) are contradictory in nature and they should "normally" not coincide

as determinants of consumer attitudes towards green products, mainly because food-relevant attitudes of "affective" nature – i.e. appealing on emotions – and of "cognitive" nature – i.e. appealing on rational thinking – tend to oppose each other (Rozin et al., 1999; Sparks et al., 1992). For instance, people liking food for its sensory qualities (a component of affective nature) will tend to dislike foods that are good for health (a component of cognitive basis) and vice versa (Dubé et al., 2003). In a similar vein, food resulting from "green" production methods (e.g. organic/low input agriculture) will be perceived as opposite to food that is the outcome of technology-driven, intensive production systems (e.g. genetic modification), making attitudes towards technology counteracting as predictors of attitudes specific to green foods. Moreover, affective or cognitive attitudes will in their turn be determined by different subsets of consumer personal values (Thøgersen, in press): egalitarian, self-transcendence values guide environmental attitudes more than technological attitudes, whereas the opposite should be the case with selfish, self-promoting values. In sum, the "egalitarian values - attitude towards environment" relationship seems much more meaningful hierarchical orientation than the "selfish values - technology attitudes" link when green food is the attitude object.

Following this line of thought, the present paper builds on a hierarchical values-attitudes model with the aim to examine the degree to which consumers' *attitudes towards green food* are *jointly* determined by a combination of consumers' *personal values* (egalitarian or selfish) and their general attitudes towards *environment and nature* (affective attitude) and *technological progress* (cognitive attitude). Furthermore, the paper aims to examine whether the direction of the relationships between relevant value-attitude dyads and attitudes towards green food is as it would be expected from Western empirical evidence-based point of view (see following section for a detailed description of the postulated direction of the relationships).

2. Literature review

Attitude represents a disposition to respond favourably or unfavourably to an object, person, institution or event and it is considered to be a construct of evaluative nature (Ajzen, 1988), i.e. individuals can have a positive or negative attitude towards the outcome of a specific behaviour. Attitudes are crucial because of their assumed relation to behaviour that has been discussed continuously in the social and behavioural sciences over the past 50 years or so. Over the last 20 years there has been a significant shift away from the view that attitudinal constructs are uni-dimensional, in favour of the discrimination between the affective vs. cognitive - or utilitarian vs. hedonic - bases on which attitudes are formed and changed. The affective component pertains to the sensations, feelings and emotions that one experiences in response to an attitude object. For food attitudes, for instance, these may be the hedonic element of consumption, the pleasure of sharing it with friends or the ethical considerations of food production methods. The cognitive component of attitudes contains the positive and negative attributes and beliefs about the target. In the food domain, these relate to attributes like nutritional value, health consequences, or convenience of use. Since then, to assess affective and cognitive bases there has been a rich diversity of multi-item scales that have been developed in the consumer (e.g. Badin et al., 1994; Batra & Ahtola, 1990; Leclerc et al., 1994) and psychology literature (Crites et al., 1994; Millar & Millar, 1990).

As it was described in the Introduction and will be further explained in the following sub-sections, of special interest to the present study are two types of attitudes that pertain to the issue under study: a) attitudes towards environment and nature; and b) attitudes towards technological progress. We postulate that the former constitute affective attitudes, appealing on emotional/ethical long-term consequences of food consumption (i.e. environmental

sustainability), and the later constitute cognitive attitudes, more elaborated, with almost "automatically" assumed consequences (i.e. improved nutritional value or consumption safety). Especially in relation to the claim that technology-related attitudes are of cognitive nature, it is true that such attitudes cover a broad range of issues that relate to technology, some highly cognitive and some highly affective, the latter especially for those citizens who have a negative attitude to technology (e.g. use of nuclear power). Nevertheless, in the context of food production it is quite meaningful to see technology attitudes as mostly of cognitive nature, due to the sophistication of technological interventions in food production and the nature of their short to medium-term impact, requiring rational, elaborated cognitive process on behalf of consumers to be fully understood.

Construction of the hierarchical value-attitudes model and study objectives

Research dealing with consumers' interest in and choice of green food in Western contexts is not rare (e.g. Baker et al., 2004; Beckmann et al., 2001). Several early works (e.g. Grunert, 1993; Grunert & Juhl, 1995; Hopper & McCarl, 1992; Schwartz, 1992) concluded that personal values influence people's environmental attitudes, which in turn affect (usually positively) attitudes, buying intentions and behaviour towards green (e.g. organic) food.

Given the profound impact of cultural values on food-related attitudes of consumers (e.g. Thøgersen & Beckmann, 1997), their possible influence on the green purchase behaviour will form the starting point in this study's conceptual model as depicted in Figure 1. As a direct outcome of past studies, the model first postulates direct causal relationships between: a) egalitarian values of European consumers and their affective attitude towards environment and nature ("Collectivism - AttEnvir"); and b) self-promoting values and cognitive attitudes towards technological progress ("Individualism - AttTechn").

Then, since the study's objective is to examine the join effect of affective and cognitive attitudes as contributors to the development of an individual's attitudes towards green food production methods, attitudes towards environment and nature, and towards technological progress are assumed to *jointly* influence consumer attitudes towards green food ("AttEnvir - AttGreen" and "AttTechn - AttGreen" respectively). This assumption is particularly important, since it reflects the (postulated) contradictory impact of pro-environmental and pro-technological attitudes on European consumers' attitudes towards green food.

Finally, our model precludes the existence of value-attitude hierarchical relationships that would reflect the synergetic influence of values and attitudes on lower-abstraction, affective and cognitive attitudes – similarly to the way the latter are assumed to jointly influence attitudes to specific products types (i.e. green foods). Thus, two further links are tested in the model: a) one between egalitarian values and cognitive attitudes ("Collectivism - AttTechn"); and b) one between self-promoting values and affective attitudes ("Individualism - AttEnvir"). The strength and direction of those relationships will allow us to compare the values-attitudes hierarchy of consumers among the EU countries selected in the study (see following section).

3. Methodology

To test the relationships in the above postulated conceptual model, data was collected through a consumer survey in four European countries: Belgium, Denmark, Germany and Poland. The participants were randomly selected by a professional research agency from representative on-line panels that are nationally representative and consist of people who have been recruited by means of off-line methods. The target population in the four countries was intentionally specified as individuals between 20 and 70 years of age, with specific quotas (half the sample in the 20-44 age group; and the other half in the 45-70 age group). A total

number of N=1,931 respondents completed the questionnaire (approximately 480 respondents in each of the four countries).

The questionnaire used included three sections: a) the first section included higher-order, affective and cognitive attitudes towards *environment and nature* and *technological progress* respectively, as well as lower-abstraction consumer attitudes towards *green food* (in total 13 items; see details bellow); b) the second section included the 21-item version of Schwartz's Portrait Value Questionnaire (PVQ, 21 items); and c) the third section included socio-demographic characteristics of the respondents (10 items).

The higher abstraction, affective attitude towards environment and nature is measured using a reduced 5-item version of the New Environmental Paradigm scale (Dunlap, 2000). The higher abstraction, cognitive attitude towards technological progress is measured with 5 items used by Hamstra (1991). Moreover, the lower abstraction attitude towards green food is measured with a 3-item scale obtained from Lindeman and Väänänen (2000). The scales described above have been tested in many countries and found to exhibit stability and cross-cultural validity. All the attitudinal items are measured on 7-point Likert-type agreement scales, with end-points 1= "*strongly disagree*" to 7= "*strongly agree*". The PVQ value items are measured on a 6-point similarity scale with end-points 1 = "*not like me at all*" to 6= "*very much like me*" (Schwartz, 1992). The exact phrasing and descriptive statistics of the 34 items of the model and their postulated organization in latent constructs can be seen in Table 1.

The master questionnaire was developed in English and translated into individual EU country languages through the process of back-translation. All contact and questionnaire administration procedures were carried out electronically through sending out invitations to selected people asking for their participation in the on-line survey. Questionnaire completion was self-administered without involvement from interviewers.

4. Analysis and results

The data set was first checked for outliers and missing values. The internal consistency of the various constructs was assessed by Cronbach Alpha coefficients (SPSS 15.0). Confirmatory Factor Analysis (CFA) was performed (LISREL 8.72) to confirm the factorial pattern suggested in the structural model for the values and the attitudes parts of the model. Structural Equation Modelling (SEM) is then performed (LISREL 8.72) to investigate the hypothesised relationships among attitudes towards green food and their antecedent general attitudes and values.

Cronbach alpha scores for the 11-item collectivistic value factor and the 10-item individualistic value factor were high, ranging between 0.733 and 0.817 (see Table 1). Moreover, all alpha-if-item-deleted scores for the respective items of the two value factors were lower than those scores, indicating that no value items should be excluded from further analyses. Cronbach alpha scores for the three attitudinal scales were satisfactory to very high (i.e. 0.634 to 0.698 for the attitudes towards environment and nature, 0.663 to 0.782 for the attitudes towards technological progress; and 0.903 to 0.922 for attitudes towards green food).

CFA analysis on the PVQ value domains took place first, in order to configure the postulated factors of collectivism and individualism (results available from authors upon request). The fit of the CFA model was acceptable. The standardized factor loadings were also much lower than the cut-off value of 0.95, assessing convergent validity (Kline, 2005). Moreover, the estimated correlation between the two value factors was also bellow the cut-off value of 0.85, satisfying discriminant validity (Kline, 2005) (Table 2).

CFA analysis on the attitudinal domains took place after, in order to configure the postulated factors of general and specific attitudes (results available from authors upon request). The fit of the CFA model was very good. The standardized factor loadings were also

lower than the cut-off value of 0.95, assessing convergent validity. Moreover, the estimated correlations among the three attitudinal factors were also bellow the cut-off value of 0.85, satisfying discriminant validity (see Table 2).

Structural Equation Modelling results

SEM analysis on the postulated values-attitudes hierarchical model as described above took place last. The fit of the SEM model in all four EU countries was acceptable (a) Denmark: Normal Theory Chi-Square $_{[510]}$ = 1749.94, p<0.001, CFI = 0.89, NNFI = 0.88, RMSEA = 0.071; b) Germany: Normal Theory Chi-Square $_{[513]}$ = 1734.01, p<0.001, CFI = 0.86, NNFI = 0.85, RMSEA = 0.071; c) Belgium: Normal Theory Chi-Square $_{[509]}$ = 1759.45, p<0.001, CFI = 0.90, NNFI = 0.89, RMSEA = 0.071; d) Poland: Normal Theory Chi-Square $_{[511]}$ = 1800.94, p<0.001, CFI = 0.88, NNFI = 0.87, RMSEA = 0.073). In the measurement models, all standardized factor loadings were lower than the cut-off value of 0.95, assessing convergent validity as in the CFA models (Figure 2). Similarly in the structural model, the estimated correlations between the two value factors (X-model) and among the three attitudinal factors (Y-model) were also bellow the cut-off value of 0.85, satisfying discriminant validity.

5. Discussion and conclusions

Validating past results, the model postulated here supports the view that particular value orientations are associated with consumer attitudes towards green food. Specifically, the indirect link between collectivistic values and attitudes towards green food is the strongest one, constituted by two strong and positive correlations between collectivism and (affective) attitudes towards environment and nature (correlations ranking between 0.43 and 0.63 across the four EU countries under study, see Table 2); and between attitudes towards environment and nature and attitudes towards green food (correlations ranking between 0.49 and 0.61). In this respect, general attitudes to environment are the clearest determinants of specific attitudes towards green food, as also postulated by past research.

However, the most striking finding of the present work is the fact that individualistic value orientations seem to also relate to attitudes to green food. As one would expect, such a result is not due to the link between individualistic values and attitudes towards environment (i.e. relevant correlations in all four countries are either non significant or negative), but due to the (usually) significant relationship between individualism and (cognitive) attitudes towards technological progress (correlations ranking between 0.17 and 0.37 in three of the four countries). Attitudes towards technological progress, in turn, correlate significantly and positively (albeit weakly) with attitudes to green food (correlations ranking between 0.13 and 0.16 in three of the four countries).

This finding points towards a belief - at least by a part of EU consumers - that technology can be an additional, secondary in magnitude but positive in direction, determinant of relevant aspects of green foods. Which exactly aspect of green foods is implied here to be positive influenced by technology cannot be ascertained. Past research in emergent societies (i.e. China) has shown cognitive, technology-related attitudes of consumers to have a positive influence on the perceived safety of green foods (Perrea et al, submitted). Whether or not such a hypothesis holds in more developed societies such as the European ones is difficult to say, yet it seems plausible to assume that cognitive, technological attitudes here do not relate to green foods' consumption safety (since this issue is not prioritized in the social agenda around green food in Europe), but possibly to another sustainability-related aspect (e.g. environmental friendliness). In any case, the finding emerged in past research that interest in technology steams mainly from selfish (not egalitarian) predispositions (i.e. correlation

between collectivism and technology attitudes are either non significant or negative for three of the four countries) is re-confirmed in the present work.

Taking individual country differences under consideration, it is interesting to note that the four EU countries examined here can reflect three different modes in the way European consumers develop attitudes towards green food (see Figure 2). In one mode (reflected by the Polish model), egalitarian values (i.e. collectivism) are the only predictors of attitudes towards green food, not only through their - expected - influence on affective (i.e. environmental) attitudes, but also through their strong and positive impact on cognitive (i.e. technology-related) attitudes, revealing the socially beneficial role seen for technology, and the latter's join role in shaping food sustainability-related attitudes. In a second mode (reflected by the German and the Belgian models), technology can still shape food sustainability attitudes jointly (but in a much weaker way) with environmental attitudes, yet the role played by values is clearer: egalitarian values influence environmental (affective) attitudes; and selfish values influence technology (cognitive) attitudes. Finally, in another mode (reflected by the Danish model), relevant values-attitudes relationships are even more straightforward than in the previous mode, yet technology does not play any role in shaping food sustainability attitudes, which is the task of solely the affective (i.e. environmental) attitudes. Whether or not the above three modes depict different evolution stages in consumers' development of attitudes towards green food is hard to say with certainty. One can hypothesize that a certain inverse relationship exists between an overall positive role assigned to technology and the degree of green food market maturity (as at least shown from past evidence in China and this work's evidence in Poland and Denmark), yet this hypothesis must be rigorously tested in subsequent research designed for that task.

The study findings are of particular academic value, since they add further and more elaborated empirical evidence about the exact relationships that govern how values and general attitudes influence attitudes towards green food in the European food consumption context. The present results (i.e. particularly the relationship between attitudes towards technological progress and attitudes towards green food) also offer face validity to the selection of attitudes towards environment and technology as *join* determinants of attitudes to green food (with the role of affective, environmental attitudes being much stronger), reflecting a certain "peculiarity" of green food comprising certain attributes that could possibly be influenced positively by technology (i.e. environmental friendliness). One possible interpretation is that perspectives for a green future have changed a lot from just being idyllic, back-to-nature thoughts, to one where environmental protection and new technology go hand in hand (e.g. renewable energy has become a high-tech matter).

Future research should try to incorporate more types of attitudinal constructs (e.g. attitudes towards the food industry) that have the potential to determine European consumer attitudes towards green food, as well as intentions and behaviour. In a different direction, robust invariance tests should be run on the here-postulated conceptual model per studied country to essentially justify the existence or not of differences in the way consumers in Europe (and beyond) develop attitudes towards sustainable food products. Especially the positive link between cognitive, technological attitudes and attitudes towards green food merits further testing and validation in an invariance analysis.

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7.References

Ajzen, I. (1988). Attitudes, personality, and behavior. Dorsey Press, Chicago

Brom, F.W., Visak, T., & Mejiboom, F. (2007). Food, citizens and the market: the quest for responsible consuming, in: Frewer, L., Van Trijp, H. (eds.). *Understanding consumers of food products*. Woodhead Publishing, CRC Press, Cambridge, pp. 610-623.

Babin, B.J., Darden, W.R., & Griffin, M. (1994). Work and/or fun: Measuring hedonic and utilitarian shopping value. *Journal of Consumer Research,* 20, 644– 656 (March).

Baker, S, Thompson, E.K., Engelken, J. & Huntley, K. (2004). Mapping the values driving organic food choice: Germany vs the UK. *European Journal of Marketing*, 38, 995 – 1012.

Batra, R, & Ahtola, O.T. (1990). Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters,* 2(2), 159– 170.

Beckmann, S.C., Brokmose, S, & Lind, R.L. (2001). *Danish Consumers and Organic Foods*. Copenhagen: Copenhagen Business School.

Crites, S.L., Fabrigar, L.R., & Petty, R.E. (1994). Measuring the affective and cognitive properties of attitudes: Conceptual and methodological issues. *Personality and Social Psychology Bulletin*, 20, 619–634.

Dube´, L., Cervellon, M.C., Jingyuan, H., 2003. Should consumer attitudes be reduced to their affective and cognitive bases? Validation of a hierarchical model. *Intern. J. of Research in Marketing* 20 (2003) 259–272.

Dunlap, R.E., Van Liere, K.D., & Mertig, A.G. (2000). Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. *Journal of Social Issues*, 56(3), 425-442.

European Comission (2006). Special Eurobarometer 238. Risk Issues. February. Available at: <http://www.bfr.bund.de/cm/221/risk_issues_executive_summary_on_food_safety.pdf> Accessed 10 March 2007.

Frewer, L. J., Kole, A., Van de Kroon, S.M.A., & De Lauwere, C. (2005). Consumer attitudes towards the development of animal-friendly husbandry systems. *Journal of Agriculture & Environmental Ethics,* 1, 1-23.

Grunert, K.G. (2006). Future trends and consumer lifestyles with regard to meat consumption. *Meat Science*, 74, 149-160.

Grunert, S.C. (1993). Green consumerism in Denmark: Some evidence from the Oko foods-project. *Der Markt*, 32(3), 140-151.

Grunert, S.C., & Juhl, H.J. (1995). Values, environmental attitudes, and buying of organic foods. *Journal of Economic Psychology*, 1995, 16, 39-62.

Hamstra, A.M. (1991). *Biotechnology in food stuffs – Towards a model of consumer acceptance*. The Hague: The SWOKA Institute

Hopper, J.R., & McCarl N. (1991). Recycling as altruistic behavior. Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*. 23,195-220.

Hume, M. (2009). Compassion without action: Examining the young consumers consumption and attitude to sustainable consumption. *Journal of World Business,* 45, 385-394.

Kanis, E., Groen, A. F., & De Greef, K.H. (2003). Societal concerns about pork and pork production and their relationships to the production system. *Journal of Agriculture and Environmental Ethics,* 16, 137-162.

Kline R. (2005). *Principles and Practice of Structural Equation Modeling. 2nd ed.* New York: Guilford Press; 2005.

Leclerc, F., Schmitt, B.H., & Dube´, L. (1994). Foreign branding and its effects on product perceptions and attitudes. *Journal of Marketing Research*, 31, 263– 271.

Lindeman, M. & Väänänen, M. (2000). Measurement of ethical food choice motives. *Appetite* 34, 55–59.

Millar, M.G., & Millar, K.U. (1990). Attitude change as a function of attitude type and argument type. *Journal of Personality and Social Psychology, 59*(2), 217–228.

Perrea, T., Grunert, K., Krystallis, A., Zhou, Y., & Hu, Y. (submitted). Chinese consumers' attitudes towards green food production: a test of the values-attitudes hierarchy. *Journal of Economic Psychology*

Rozin, P., Fischler, C., Imada, S., Sarubin, A. & Wrzesniewski, A. (1999). Attitudes to food and the role of food in life in the USA, Japan, Flemish Belgium and France: possible implications for the diet-health debate. *Appetite*, 33, 163–180

Søndergaard, H.A., Grunert, K.G., & Scholderer, J. (2005). Consumer attitudes to enzymes in food production. *Trends in Food Science and Technology*, 16, 466-474.

Satorra, A., & Bentler, Q.M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. Von Eye & C. C. Clogg (Eds.), *Latent variable analysis: applications for developmental research* Thousand Oaks, CA: Sage Publications, 399 – 419.

Sparks, P., Hedderley, D., & Shepherd. R. (1992), An Investigation into the relationship between Perceived Control, Attitude Variability and the Consumption of Two Common Foods. *European Journal of Social Psychology* 22:55-71.

Schwartz, S.H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In M. Zanna (Ed.) (pp.1-65), *Advances in experimental social psychology*. New York: Academic Press, Vol. 25.

Thogersen, J. (in press). Green shopping: for selfish reasons or the common good? *American Behavioral Scientist*

Thøgersen, J., & Beckmann, S.C. (1997). Values and attitude formation towards emerging attitude objects: from recycling to general waste minimizing behavior. In Brucks,M. and MacInnis,D.J.(Eds)(pp.182-189). *Advances in Consumer Research*, Vol.24 No.2.

Tanner, C., Kaiser, F.G., & Wolfing Kast, S. (2004). Contextual conditions of ecological consumerism - a food-purchasing survey. *Environment and Behaviour*, 36, 94–111.

Tukker, A., Emmert, S., Charter, M., Vezzoli, C., & Sto, E. (2008). Fostering change to sustainable consumption and production: An evidence based view. *Journal of Cleaner Production,* 16, 1218-1225.

8. Tables and Figures

Table 1: Scales' description, reliabilities and mean scores (N = 1,931)

VALUES [a]	DK N=479	GE N=480	BE N=492	PL N=480
Collectivistic values **Cronbach alpha:**	**0.775**	**0.733**	**0.797**	**0.785**
Benevolence				
1. It is very important to him to help people around him. He wants to take care for their well being	4.52	4.50	4.72	4.52
2. Loyalty to friends is very important to him. He wants to devote himself to people close to him	4.96	5.04	4.84	4.68
Universalism				
3. Listening to opinions different from his is important for him. He would try to understand others opinion even if he does not agree with what they say	4.27	4.62	4.46	4.34
4. He thinks it is important that all people in the world gets the same treatment He believes everyone should enjoy equal opportunity in life.	4.56	4.57	4.73	4.76
5. He believes that everyone should care about nature. The protection of ecological environment is rather important for him.	4.68	4.47	4.47	4.68
Security				
6. Living in a secure environment is important for him. He would do his best to avoid anything that will endanger his safety.	3.60	3.87	4.07	3.97
7. It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens.	3.26	3.33	3.95	4.06
Conformity				
8. He believes that people should do as others say and abide by the rules even if no one is watching aside.	3.42	2.76	3.64	3.07
9. Dignified manner is important for him. He would do his best not to do things others think wrong.	3.32	3.11	4.28	3.84
Tradition				
10. Modest is important for him. He would do his best not to arouse others attention.	3.16	3.19	4.37	3.61
11. Tradition is important to him. He tries to follow the customs handed down by his religion or his family.	3.56	3.06	3.31	3.74
Individualistic values **Cronbach alpha:**	**0.800**	**0.781**	**0.803**	**0.817**
Self-direction				
12. Making decisions on one's own is important for him. He likes freedom and independent.	4.54	4.94	4.85	4.75
13. To have new ideas and be innovative is important for him. He likes to do things in his own way.	4.06	4.49	4.29	4.43
Stimulation				
14. He likes surprises and is always looking for new things. He thinks it is important to do many different things in life.	3.74	3.60	4.06	4.25
15. He likes and also often looks for adventurous activity. He hopes to have an exciting life.	3.07	2.83	3.11	3.77
Hedonism				
16. To enjoy happiness is important for him. He favors himself.	4.29	3.93	4.31	2.83
17. He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	4.21	3.50	4.14	3.03
Achievement				
18. To show oneself is important for him. He wants people to admire what he does.	3.67	3.41	3.59	4.17
19. For him, to be successful in career is important. He likes to give others a good impression.	3.17	3.76	3.57	3.66
Power				
20. To be rich is important for him. He wants to possess a lot of money and expensive things.	2.31	2.71	2.65	2.96
21. For him, to gain respect from others is important. He likes others to do as he says.	3.38	3.39	3.69	2.75

Table 1 (continued)

ATTITUDES [b]	DK N=479	GE N=480	BE N=492	PL N=480
Attitude towards environment and nature **Cronbach alpha:**	**0.698**	**0.669**	**0.691**	**0.634**
1. Humans are severely abusing the environment	5.94	5.84	5.21	5.86
2. The balance of nature is strong enough to cope with the impacts of modern industrial nations (R)	2.57	2.52	2.86	3.01
3. The so-called "ecological crisis" facing humankind has been greatly exaggerated (R)	3.40	3.37	3.39	3.17
4. The earth is like a spaceship with very limited room and resources	5.25	5.72	5.07	5.73
5. If things continue on their present course, we will soon experience a major ecological catastrophe	4.96	5.30	4.92	5.35
Mean	**4.42**	**4.55**	**4.29**	**4.62**
Attitude towards technological progress **Cronbach alpha:**	**0.663**	**0.671**	**0.692**	**0.782**
1. The degree of civilization can be measured from the degree of technological development	4.03	3.99	4.26	5.36
2. New technological inventions and applications make up the driving force of progress of society	4.99	5.08	5.06	5.79
3. In (country) we are probably better off than ever thanks to the tremendous progress in technology	5.01	4.47	5.00	5.04
4. Throughout the ages, technological know-how has been the most important weapon in the struggle for life	4.59	4.81	5.02	5.04
5. Because of the development of the technology we will be able to face up to the problems of tomorrow's society	3.92	4.02	3.86	4.79
Mean	**4.50**	**4.47**	**4.64**	**5.20**
Attitude towards green food production **Cronbach alpha:**	**0.922**	**0.910**	**0.905**	**0.903**
1. It is important that the food I eat on a typical day has been prepared in an environmentally friendly way	5.53	5.49	5.55	5.63
2. It is important that the food I eat on a typical day has been produced in a way which has not shaken the balance of nature	5.60	5.56	5.40	5.55
3. It is important that the food I eat on a typical day is packaged in an environmentally friendly way	5.61	5.60	5.73	5.54
Mean	**5.58**	**5.55**	**5.56**	**5.57**

a: 1 = "not like me at all" to 1 = "very much like me";
b: 1 = "strongly disagree" to 7 = "strongly agree";
R: reversed items

Table 2: Correlations between factors, N = 1,931

CFA models

	Collectiv.				Individ.				AttEnv.				AttTech.				AttGreen.			
	DK	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**
Collectiv.	1	1	1	1																
Individ.	**0.56**	**0.43**	**0.52**	**0.40**	1	1	1	1												
AttEnv.									1	1	1	1								
AttTech.									**-0.16**	**-0.02***	**-0.08***	**0.18**	1	1	1	1				
AttGreen.									**0.39**	**0.50**	**0.64**	**0.70**	**0.05***	**0.12**	**0.09***	**0.33**	1	1	1	1

SEM model

	Collectiv.				Individ.				AttEnv.				AttTech.				Inter.			
	DK	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**	**DK**	**GE**	**BE**	**PL**
Collectiv.	1	1	1	1																
Individ.	-	-	-	-	1	1	1	1												
AttEnv.	**0.43**	**0.63**	**0.47**	**0.54**	**-0.12***	**-0.24**	**-0.00***	**-0.12***	1	1	1	1								
AttTech.	**-0.24**	**0.09***	**-0.02***	**0.30**	**0.37**	**0.18**	**0.17**	**0.10***	-	-	-	-	1	1	1	1				
AttGreen.	-	-	-	-	-	-	-	-	**0.50**	**0.49**	**0.61**	**0.58**	**0.06***	**0.16**	**0.13**	**0.14**	1	1	1	1

*: not significant, $p<0.01$

Key:
Collectiv. = collectivistic values, Individ. = individualistic values, AttEnv = attitudes towards environment and nature,
AttTech = attitudes towards technological progress, AttGreen. = attitudes towards "green" food production,
DK = Denmark, GE = Germany, BE = Belgium, PL = Poland

Figure 1: The conceptual values-attitudes model

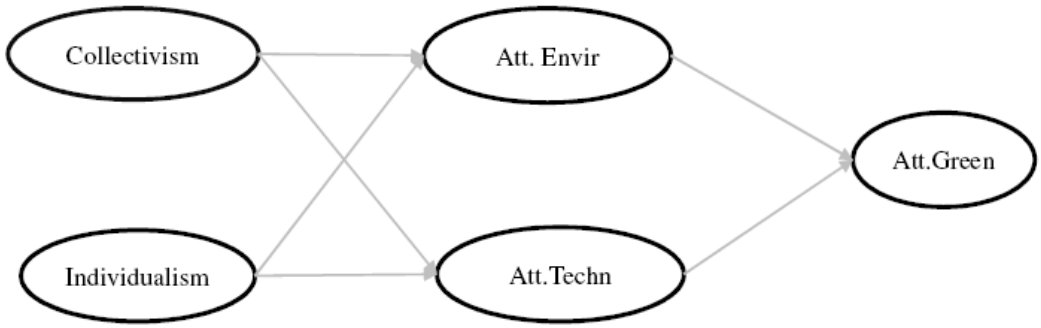
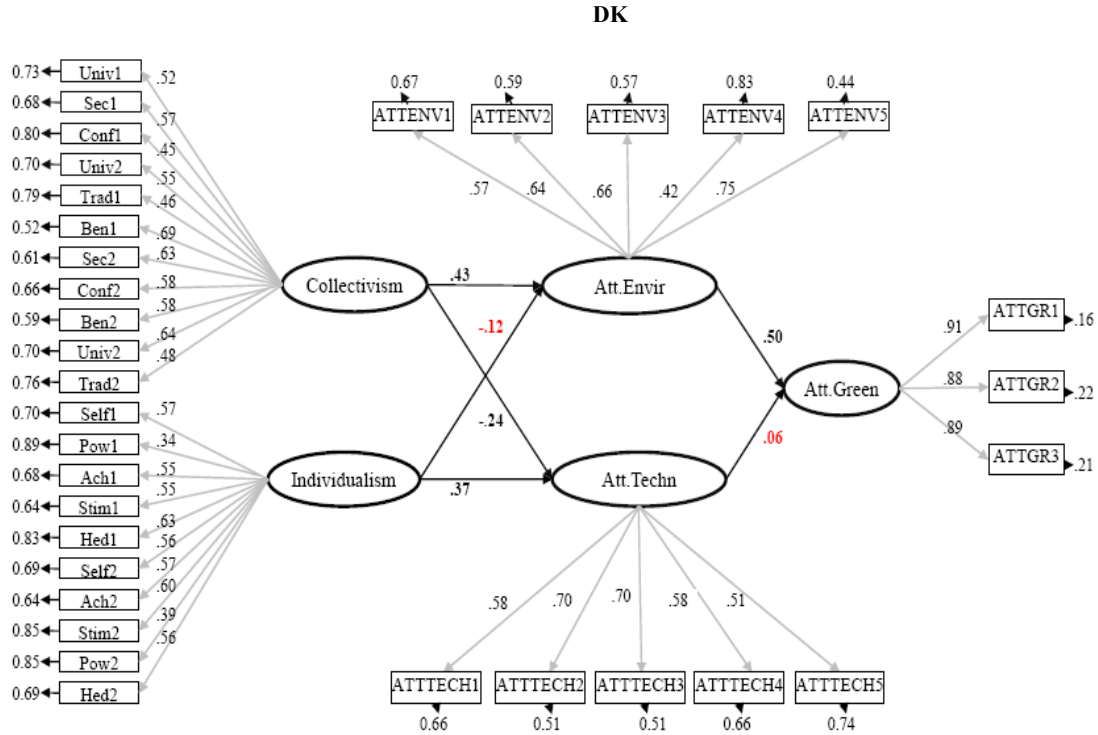
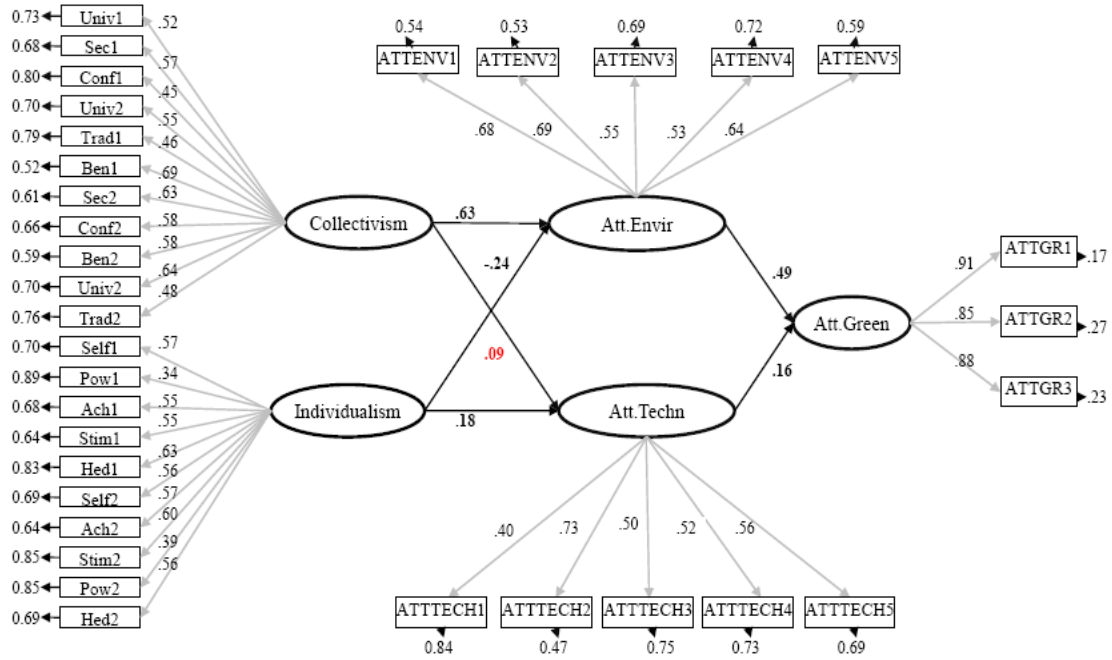


Figure 2: Overall fit of the SEM model and path coefficients of the relationships
Note: values in red characters indicate non statistically significant relationships



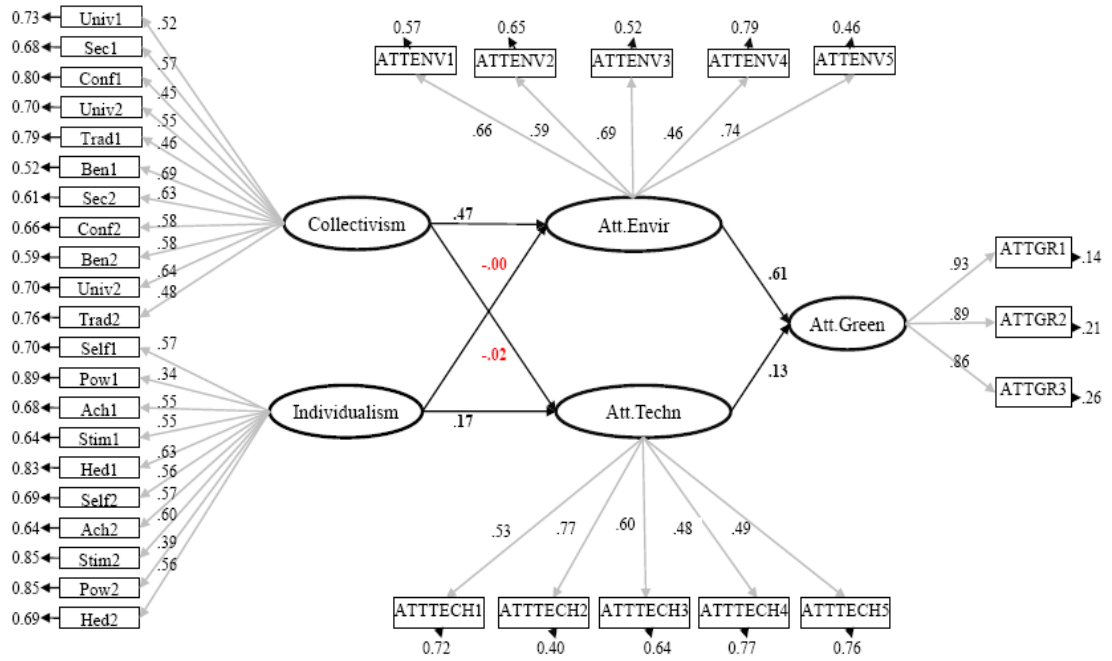
GE



Chi-square=1734.01, df=513, P-value=0.00000,
RMSEA=0.071

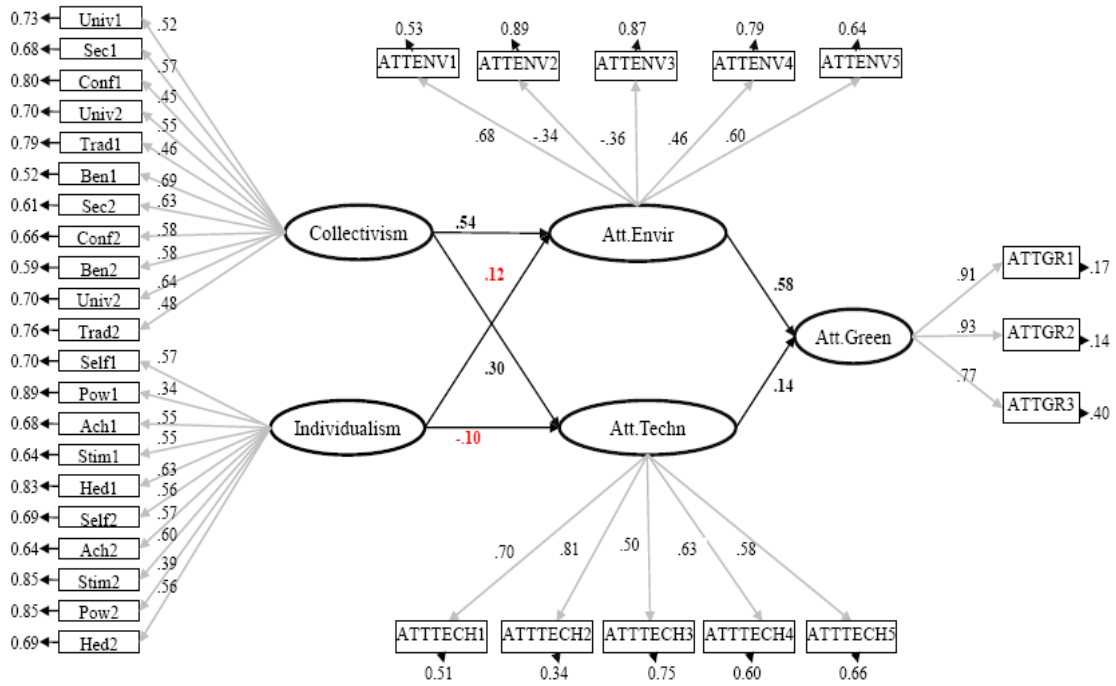
Figure 2 (continued)

BE



Chi-square=1759.45, df=509, P-value=0.00000,
RMSEA=0.071

PL



Chi-square=1800.94, df=511, P-value=0.00000,
RMSEA=0.073

IMPACTS AND EXTERNALITIES OF AGRICULTURAL MODERNIZATION IN BRAZILIAN STATES

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Abstract
This study aimed to analyze the relationship between the levels of agricultural modernization and socioeconomic indicators of the Brazilian federation units. A multivariate approach to data analysis led to the creation of the Index of Agricultural Modernization (IAM). The Spearman correlation test was used to verify the relationship between levels of agricultural modernization and a set of economic and social indicators. As a result of the survey, we obtained the Index of Agricultural Modernization (IAM) which allowed the ranking of Brazilian states in terms of level of modernization. The correlation analysis demonstrated the existence of significant and positive correlation between the agricultural modernization and the following indicators: per capita GDP, trade balance per capita and IFDM. This means that agricultural modernization contributes to increased production, exports and the levels of socioeconomic development of the states. For the variable urbanization rate, test results showed a negative correlation with the IAM, which suggests a contribution of agricultural modernization for fixing people in the countryside. Indicators of inequality in income distribution showed no significant correlation. In conclusion, it can be inferred that the positive relationship of the IAM with indicators of production, exports and socioeconomic development shows the presence of positive externalities and impacts of the agricultural modernization process for the Brazilian states.

Key words: multivariate analysis, agricultural modernization, socioeconomic indicators, externalities, sustainability.

IMPACTS AND EXTERNALITIES OF AGRICULTURAL MODERNIZATION IN BRAZILIAN STATES

1. Introduction

The agribusiness is one of the main sectors of Brazilian economy and has a leading position in foreign trade, accounting for 37.9% in the country's total exports in 2010. According to the Ministry of Agriculture (2011), in 2010, exports in the sector totaled $ 76.4 billion, a record for the sector. Taking into account the values of 2009, exports grew by $ 11.7 billion, representing an increase of 18.1% and exceeding in $ 4.6 billion the previous record of $ 71.8 billion, achieved in 2008 - the record for foreign sales of Brazilian agribusiness until then.

According to Correa and Figueiredo (2006), several instruments were used to allow the Brazilian agribusiness reach this high level of productivity and competitiveness in the international market. For Martine and Beskow (1987), the process of modernization and implementation of technological innovations in Brazilian agriculture began in the 1930s, with the first policies of the government based on import substitution of consumer goods.

Innovations in agriculture, according to its effect on the production process are classified into: mechanical innovations, which modify the intensity and pace of work; physical-chemical innovations, which alter the natural conditions of soil; biological innovations that reduce the production period and enhance the innovations mentioned above; agronomic innovations that permit new forms of organization, allowing the increase of labor productivity in general (Graziano da Silva, 2003). According to Brum (1988), among the main reasons for agricultural modernization are the increase in labor productivity in order to increase profit; the reduction of the unitary cost of production to beat the competition; and to enable the implementation of the agroindustrial complex in the country.

The modernization of agriculture in Brazil occurred basically in three moments. In the first moment, modernization happened with the constitution of the agroindustrial complex of the 1970s, in the second, the process is intensified with the consolidation of the industry related to the manufacture of agricultural machinery and equipment and, finally, in the third moment, with the integration of financial capital in the agricultural sector (Silva 1996).

According to Hoffman and Ney (2004), with the objective of facilitating the access to new technologies in the field, the government has relied mainly on rural credit, in this sense, the distribution of rural credit is placed as being directly linked to the different existing levels of agricultural modernization in Brazil. The policy of modernization of Brazilian agriculture is characterized by the predominance of the policy of abundant and subsidized rural credit, yet available in a very concentrated manner.

Defant et al. (1999) argues that from the 1970s, the government encouraged the national agriculture to modernize, through resources for investments, and from the 1980s, for costing. The resources for costing were certainly destined, for the most part, to large producers, aiming their production to reach, together with the investments made earlier, productivity gains and increase of products to export, contributing by one side to the external competitiveness, but on the other hand it also contributed to increase the levels of inequality.

Given this context we must emphasize the negative impacts the agricultural modernization process developed in the country, which contributed to land concentration and therefore income concentration.

According to Hoffman and Kageyama (1985), there are evidences that the process of modernization occurred in the agriculture of the country has contributed to the income concentration especially in the countryside. For Ehlers (1999), the use of new technologies in

Brazilian rural sector, and the quick way in which the process of agricultural modernization in the country occurred, contributed to the intense process of rural exodus in the country and consequently for the population concentration in the main urban centers of Brazil. In this same direction, Balsan (2006) affirms that the strong rural exodus begins more intensely in the more developed regions, where the process of capitalization and mechanization of agricultural activities occurred first and in a stronger way. Corroborating the arguments presented above, Graziano da Silva (2000) points out that agricultural modernization in Brazil contributed to the evolution of the exclusionary and concentrating land structure, thus hindering access to land by the rural workers.

In relation to socioeconomic indicators, as shown by Graziano Neto (1985), it can be noticed that if on one hand, modernization has brought economic gains and income generation, on the other there were several negative impacts resulting from this process.

Having said that, this work aims to analyze the relationship between levels of agricultural modernization and economic indicators of the Brazilian federation units, that is, it is intended to evaluate the impacts and externalities of the agricultural modernization process in 27 states.

As a contribution, it is hoped that this paper stimulates discussions about agricultural modernization and about strategies that may be useful for reducing the negative effects of modernization on the levels of income concentration, indicators of socioeconomic development and the rural exodus, without letting the country reduce its level of international competitiveness.

2. Methodology

The process of agricultural modernization has a multidimensional character, that is, the magnitude of this process requires the consideration of a set of variables capable of capturing the use of modern technologies associated with it as shown in Hoffmann (1992), Cunha (1995), Meyer (1997), Souza and Lima (2003) and Gasques et. al (2004).

This situation is not exclusive to the Brazilian economy. In international economic literature, there are many works that addressed the conditioning factors of the process of agricultural modernization, as well as disparities in the process. Among the studies that have shown the existence of conditioning factors of agricultural modernization the ones by Schultz (1964), Mellor (1966), Falcon (1970) and Gibbons and Koninck and Hasan (1980) stand out.

Given this multidimensional nature of modernization the present study was based on a multivariate data approach, involving a set of 24 variables related to the use of new technologies in agriculture. The application of multivariate analysis allowed the description of the modernization process in the Brazilian states, allowing also the construction of the Index of Agricultural Modernization (IAM), which allowed to classify the relative performance of the federation units.

2.1. Variables and Data Source

Given the multidimensional nature of the concept of agricultural modernization, it becomes necessary to survey a wide range of variables and indicators capable of capturing the level of agricultural modernization in a region. In order to determine the factors affecting the modernization, 12 variables were selected for each state, representing different dimensions of agricultural modernization, aiming to verify the adoption of new technologies and the productivity growth of production factors.

The selection of variables used in this article was based on several studies that have focused on the analysis of the process of agricultural modernization. To capture aspects related to the use of machinery and equipment, the variables selected were number of tractors

and value of investments in agricultural machinery and tools; to analyze the issues associated with improvements in infrastructure and logistics the variables used were value of investments in facilities and other improvements, value of investments in vehicles and other means of transportation and fuel expenses; the aspects related to the use of inputs were evaluated using the variables costs of fertilizer and correctives, expenses with seeds and seedlings and costs of pesticides, and finally to consider the issues associated with the use of capital the variables used were total investments, total expenditure and production value.

All variables were worked with relative values in the global context of each state, allowing a better comparative analysis between them, expressing, more appropriately, their relative contribution. For the relativization of the variables, all data collected is expressed in relation to the explored area (EA) and man-equivalent (ME). This is because, according to Souza and Lima (2003), the aspect of interest is not the volume but the intensity of the use of modern technology. That said, it is justified the variables being expressed in relation to the labor occupied, in man-equivalent (ME), and in relation to the explored area (EA). The concept of man-equivalent (ME) used in this study refers to the homogenization of the work of men, women and children. The concept of the explored area (EA) refers to the sum of areas with permanent and temporary crops, planted pastures, planted forests, areas with natural pastures and natural woods.

With the relativization of data by EA and EM, the number of variables used in factor analysis doubled. In this sense we used 24 variables to determine the rate of agricultural modernization. All information is available on the Agricultural Census of the Brazilian Institute of Geography and Statistics (BIGS) 2006.

2.2. Factor Analysis

In Brazilian literature there are a vast number of studies that used multivariate approach, specifically the factor analysis to identify and explain the agricultural modernization, among which are: Hoffmann (1992), Meyer (1997), Espirito Santo (1998) Souza and Lima (2003), Cespedes (2004) and Cruz Ribeiro (2006).

According to Hair et al. (2005), factor analysis is used to synthesize information from a large set of variables in a reduced number of variables or factors. For Mingote (2005), the goal of factor analysis is to describe the behavior of a given set of variables, from the dependence structure between them, through a smaller number of variables called factors. The variables most correlated are combined on the same factor, being independent of those that make up the other factor, that is, the factors are not correlated.

The factor model obtained after factor analysis explains, theoretically, the structure of latent factors responsible for the observed correlations between the original variables. Naturally, the model assumes that there are a number of factors below the original number of variables that are able to explain a high percentage of the total variance of the original variables. The rules of the eigenvalue (characteristic root) superior to a Scree-plot are usually used to decide the minimum number of factors needed to explain a considerable proportion of the total variance of the original data. However, these rules only help to select the factors needed to explain the observed variance-covariance, and say nothing about the quality of the factorial model deduced (Maroc, 2007).

To evaluate the validity of factor analysis, we used the criteria Kaiser-Meyer-Olkin (KMO), the Bartlett's test and the percentage of total variance explained by factors. The KMO and the Bartlett's test are two statistical procedures for measuring the quality of the correlations between variables in order to proceed with factor analysis. The KMO near 1 indicates small partial correlation coefficients, while values near zero indicate that factor analysis is an unacceptable option, because there is a weak correlation between the variables.

After obtaining and identifying the factors, and determining the respective factor scores, it is possible to study the stage of agricultural modernization of Brazilian states. Thus, the factor analysis contributes to a view on the process of agricultural modernization, using the values of the factors to obtain the measures of modernization and subsequently the ranking of states. In the next section it is presented the procedures used to create the Index of Agricultural Modernization for the Brazilian states.

2.3. Agricultural Modernization Index (AMI)

From the factors obtained in the factor analysis, it is possible to create an index of intensity of agricultural modernization. The methodology to calculate the indicator follows the procedures used by Cunha et al (2008) to calculate the General Index of Degradation (GID) and Shiki (2010), who estimated the Crude Index of Socioeconomic Development (CISD) for municipalities with sugar cane cultivation in the State of Parana.

To enable the construction of the Crude Index of Agricultural Modernization (CIAM) it is required the aggregation of factors obtained through the equation:

$$IBMA_i = \sum_{j=1}^{p} \frac{\lambda_j}{\sum \lambda_j} F_{ij}, \qquad (1)$$

The $CIAM_i$, represents the Crude Index of Agricultural Modernization for the i-th analyzed state, j is the j-th characteristic root, p is the number of factors obtained through factor analysis, F_{ij} is the j-th factor score of the i-th municipality, and $\sum \lambda_j$ is the sum of characteristic roots referring to the p factors extracted.

Following the procedures adopted by Cunha et al. al (2008), to make all values of the factor scores (F_{ji}), greater than or equal to zero, all the factors were placed in the first quadrant, before construction of the CIAM, using the algebraic expression:

$$F_{ji} = \frac{F_j - F_j^{min}}{F_j^{max} - F_j^{min}} \qquad (2)$$

where F_j^{min} is the lowest score observed for the factor j-th, and, F_j^{max} is the highest score observed for the factor j-th.

Having the CIAM, and by means of weighting, in which the greatest value considered is 100, it was obtained the Relative Index of Agricultural Modernization (IAM) for each Brazilian state, allowing their ranking. All calculations were performed using the SPSS 15.0 (Statistical Package of Social Science), using the licensed version.

2.4. Correlation Analysis

After constructing the IAM, it was analyzed the relationship between the modernization process of agriculture and economic and social indicators of the Brazilian states. For such, we performed the Spearman Correlation Test, which according to Martin (2001) is a technique widely used in empirical studies that seek to evaluate the association between variables. The possible existence of a relationship between variables oriented the analysis, the conclusions and the disclosure of the findings on this investigation.

According to Triola (2008), the Spearman's rank correlation test is a nonparametric test that uses positions of sample data consisting of matched pairs. The test is used to test the

association between two variables so that the null hypothesis and alternative are as follows (where ρ_s designates the coefficient of rank correlation for the entire population):

H0: ρs = 0 (there is no correlation between two variables)

H1: ρs ≠ 0 (there is correlation between two variables)

Also according to Triola (2008), there are several advantages of using the Spearman's rank correlation test. Among them are: (i) the Spearman test can be used in a wider variety of circumstances than the parametric method of linear correlation. Using this test it is possible to analyze paired data that are posted or that can be converted into posts, and (ii) the rank correlation can be used to detect some relations that are not linear.

The Spearman test is also used when data from some of the variables studied shows a very asymmetric distribution or outliers. In this case, the analysis of the coefficient r (commonly used) may be compromised, which justifies the implementation of the non-parametric approach of Spearman, which uses only the ordering of values (Barbette, 2008).

2.4.1. Variables Used in Correlation Analysis

The process of agricultural modernization in Brazil started in the 1960s, as part of the policy of import substitution and as a reflection of the green revolution. It was also during this period that the industry of capital goods for agriculture (tractors, implements, fertilizers and pesticides) was consolidated, and the expansion of processing agroindustries led to profound changes in the technical basis of agriculture.

In this light, we see the contribution that these changes represent to the strong international competitiveness of Brazilian agribusiness. To identify the economic impacts of agricultural modernization in the Brazilian states the variables selected were: trade balance of agribusiness and GDP, both per capita. It is hoped that the levels of agricultural modernization present high positive correlation with the trade balance of Brazilian agribusiness states and GDP per capita, in other words, states with higher rates of modernization have had the highest trade balance and higher values for gross domestic product per capita.

Nevertheless, for some authors as Graziano Neto (1985), Ehlers (1999), Graziano da Silva (2000), Hoffman and Ney (2004) and Balsan (2006) the process of agricultural modernization favored an increase in efficiency, leaving in the second plan, social issues such as inequality of income distribution, regional inequalities, socio-economic development and rural exodus.

In order to analyze the externalities of agricultural modernization on the indicators of inequality in income distribution were used the ratio of the income earned by the richest 10% and poorest 40%, the Gini coefficient. Considering that the process of agricultural modernization has contributed to increased inequality in income distribution, it is expected that the selected indicators present high positive correlation with the IAMs.

From the assumption that the modernization process contributes to the process of income concentration it is feasible to say that their externalities on the level of socioeconomic development of the states present negative and high correlation with the IAM, as it is impossible to think of socioeconomic development in a context of inequality in income distribution. The variable used to analyze the relationship between agricultural modernization and the level of socioeconomic development was the FIRJAN Index of Municipal Development (FIMD) of the Brazilian states. Finally, the impacts on the rural exodus were evaluated from the variable urbanization rate. It is expected that the rate of agricultural modernization presents high and positive relationship with the high migration process from rural to urban areas, given the fact that the use of new technologies in production processes

demand a smaller number of workforce in steps previously demanding, such as planting and harvesting.

The variables GDP per capita and the trade balance of agribusiness per capita were collected in the website of the Institute of Applied Economic Research (IAER) and from the website of the Ministry of Agriculture, Livestock and Supply were obtained the values for export and import of the agribusiness sector. The variables of inequality in income distribution, social and economic development and rural exodus were collected in the website of the Institute for Work and Society (IWS). All data were collected for the year 2006, as well as the data used in factor analysis.

3. Results and Discussion

This section was divided in three subsections. In the first one it is presented the factors for agricultural modernization in the Brazilian states, in the second it is presented the rank of the Index of agricultural modernization (IAM) of the 27 Brazilian states, obtained from the factor analysis, in the third subsection it is presented the results of Spearman correlation test between the levels of agricultural modernization and socioeconomic indicators.

3.1. Factors Agricultural Modernization

Initially, it was performed the factor analysis in order to synthesize the information contained in the 24 original variables. To identify the quality of fit of the model of factor analysis it was used the KMO index, which presented a value of 0.538, which, although low, can still be considered a reasonable measure of suitability. Another method used to analyze the validity of the factor analysis was the Bartlett's test, which showed a value of 1.489, significant at 1% of probability. Thus, both tests have concluded that the sample used is appropriate to the analysis procedure, that is, the use of factor analysis.

According to the results presented in Table 1, the factor analysis generated three factors with characteristic roots (λ) greater than 1. The contribution of the factors 1, 2 and 3 for the explanation of total variance of the indicators used was 39.8, 39.3 and 8.6%, respectively, so that their cumulative contribution is equal to 87.8% of total variance, a very significant percentage. The results of the percentage explained by each factor corroborate the results found by Kageyama and Leone (1992), which draw attention to the association of the modernization process of Brazilian agriculture to a production supported by the combined and intensive use of modern inputs, resulting in high productivity of labor and land.

According to Souza and Lima (2003), to facilitate the interpretation of the factors, it should be made their rotation by the Varimax method. With this procedure, the contribution of each factor to the total variance is altered, without, however, modifying their joint contribution. As an advantage, the factors obtained after the rotation are more closely related to certain groups of variables, allowing a more logical interpretation of them.

After applying the Varimax rotation method, the indicators that are associated with factors had factor loadings with a value greater than 0.60, that is, the highest factor loadings are indicative of higher correlation coefficients between each factor and each of 24 variables and indicators of modernization (Table 1).

Table 1 - Matrix of components after orthogonal rotation

Variables	Factors		
	1	2	3
Number of tractors (EA)	0.899		

Total value of investments (EA)	0.930		
Value of investments in facilities and other improvements (EA)	0.890		
Value of investments in agricultural machinery and instruments (EA)	0.868		
Total amount of funding (EA)	0.856		
Total value of production (EA)	0.925		
Total expenditures (EA)	0.888		
Costs of fertilizers and correctives (EA)	0.782		
Costs of seeds and seedlings (EA)	0.806		
Costs of agricultural defensives (EA)	0.698		
Fuel expenses (EA)	0.951		
Number of tractors (ME)		0.815	
Total value of investments (ME)		0.896	
Value of investments in facilities and other improvements (ME)		0.781	
Value of investments in agricultural machinery and instruments (ME)		0.892	
Total amount of funding (ME)		0.958	
Total value of production (ME)		0.814	
Total expenditures (ME)		0.972	
Costs of fertilizers and correctives (ME)		0.939	
Costs of seeds and seedlings (ME)		0.903	
Costs of agricultural defensives (ME)		0.937	
Fuel expenses (ME)		0.960	
Value of investments in vehicles and other means transport (EA)			0.697
Value of investments in vehicles and other means transport (ME)			0.779
% of Variance explained by the factor	39.83	39.35	8.68

Source: research results.

From the results presented in Table 1, we proceeded to analyze each of the factors obtained.

Factor 1 - Use of new technologies in relation to explored land use

The variables of this factor are more closely related to land use, since all the variables associated with factor 1 were relativized by the explored area. In this sense, it is clear which factor contributes to explain the use of technology applied to a better performance of a given explored area, more specifically, the use of new technologies in order to optimize the use of the land input.

The factor 1 was composed by 11 variables that represent the various dimensions related to agricultural modernization. Thus, it is noticed that the higher the factor scores in this factor, the greater were the incorporations of the guidelines that have oriented the process of agricultural modernization, that is, in states with good performance in this factor, there was probably a greater concern for increasing the productivity of used lands instead of the expansion of farmland. It is emphasized the importance of this factor to explain the phenomenon of agricultural modernization as a whole, this factor was responsible for 39.83% of the explained variance of selected variables to analyze agricultural modernization in the Brazilian states, thus putting the land use as the main responsible for the modernization of agriculture in the area studied.

Factor 2 – The usage of new technologies in relation to labor

The variables that compose the factor use of new technologies in relation to labor are the same which formed the first factor, the difference between the variables from the first and the second factor is the variable used to relativization. All variables of the second factor are relativized by the equivalent-man, that is, the variables were standardized in relation to labors.

From the set of variables that compose the second factor, it is important to notice that if the factor score of factor 2 for a given state is high and positive, it means that it has a high intensity of use of technological resources and less intensive use labor, that is, higher level of modernization in agriculture.

Factor 3 - New Technologies for Logistics and Transportation

It was observed that the third and last factor heavily incorporates the indicators related to technological tools designed to transport and logistics processes (vehicles and other means of transport). Thus, by strongly capturing the use of means of transport, a high value of investments in these processes is related to the needs of a more efficient production flow. Thus, the higher this indicator, the better will be the conditions of logistics and transport of the Brazilian states.

3.2. Index of Agricultural Modernization (IAM)

After the identification of factors associated with agricultural modernization from the factor analysis, it was performed the construction of the index of agricultural modernization (IAM) from factor scores. The motivation for building the index refers to the difficulties faced in the classification of Brazilian states in relation to the level of agricultural modernization using only the values of the factor scores (F1, F2 and F3). By aggregating the three factors, the IAM allowed a more appropriate classification of the states. Table 2 presents the IAM and its ranking for the 27 Brazilian states.

Table 2 – Index of Agricultural Modernization and its ranking for the 27 Brazilian states

Classification	Estate	IAM
1º	Distrito Federal	1.000
2º	São Paulo	0.905
3º	Mato Grosso	0.776
4º	Santa Catarina	0.743
5º	Paraná	0.680
6º	Mato Grosso do Sul	0.677
7º	Rio Grande do Sul	0.609
8º	Goiás	0.509
9º	Espírito Santo	0.424
10º	Minas Gerais	0.382
11º	Pernambuco	0.341
12º	Rio de Janeiro	0.332
13º	Alagoas	0.330
14º	Sergipe	0.292
15º	Tocantins	0.287
16º	Bahia	0.226

17º	Rio Grande do Norte	0.222
18º	Rondônia	0.222
19º	Roraima	0.215
20º	Pará	0.195
21º	Paraíba	0.180
22º	Ceará	0.174
23º	Maranhão	0.168
24º	Piauí	0.164
25º	Amapá	0.153
26º	Acre	0.152
27º	Amazonas	0.142

Source: research results.

The average of the Index of Agricultural Modernization (IAM) obtained by the Brazilian states was 0.389. This low value is the result of poor performance shown by some federation units (FUs), including, Acre, Amapá and Amazonas, confirming the thesis presented in the literature that the main excluded states from the process of agricultural modernization in Brazil were the states of north-northeast.

The results presented by the state of Amazonas confirm the view of Mellor (1966), who points some restrictive factors for agricultural modernization, such as the excessive land concentration and the poor use of land. The condition of the state of Amazonas relates mainly to the high land concentration, for in the state there are high levels of concentration. It is the same situation presented by the state of Pará, which is among the ten worst indexes of agricultural modernization (IAM).

It is noticed that the states of North and Northeast regions had low modernization. Among the main factors responsible for this poor performance, there are the high concentration of land in cases such as the state of Amazonas and the historical differences occurred mainly between the states of North-Northeast and the other federation units.

Among the states with intermediate level of modernization, two belong to the Northeast region, Pernambuco and Alagoas. According to IBGE data (2011), the state of Alagoas is the penultimate in area, but stands out as one of the largest producers of sugar cane in the country, an activity that requires investments in technology and due to the small area available requires a great intensity in the use of these technologies in relation to the explored area.

Regarding the state of Pernambuco, it is noticed that its high performance in relation to the first factor is also credited to historical and cultural factors that favor agribusiness in the state. It is emphasized the importance of Pernambuco for the country economy in the colonial period, especially in relation to the sugar economy. Another aspect that contributes to the prominent position of the state is the investments made in the agriculture of the state through public irrigation projects and other government investments, which enabled the state to achieve great prominence in the production of fruits for the foreign market.

In relation to states with the highest level of modernization, it is noticed their concentration in the South, Southeast and Midwest regions. The high levels in the intensity of agricultural modernization in the states of these regions are credited to historical advantages and to the projects that aimed to improve the economic indicators of the Midwest, an extremely important region for the Brazilian agribusiness. The states of Mato Grosso do Sul and Mato Grosso have had such prominence thanks to the performance achieved in relation to the factor 2, due to the low rates of population density, which makes it necessary the intensive use of new technologies in relation to labor.

The Distrito Federal had the highest rate of modernization due to its performance in relation to the factor 1, since it has the smallest area among the Brazilian states, requiring a great productivity in relation to the explored area, mainly achieved by the use of new technologies. The other states are in that position thanks to the advantages obtained over time, for example, large volume of rural credit received, the need of agro-industries for raw materials, one of the main inducers of agricultural modernization.

The results obtained from the creation of the IAM corroborate the studies of Correa and Figueiredo (2006) who, based in the agricultural census, identified evidence of a pattern of concentration of this phenomenon in some regions and states, particularly in the state of São Paulo, and in states of South and Midwest regions. This study confirms the pattern of concentration indicated by the authors.

3.3. Relationships between Modernization, Inequality, Socioeconomic Development and the Rural Exodus

In this section it will be analyzed the relationships between measures of agricultural modernization, obtained through factor analysis, and some economic and social indicators in the Brazilian states.

As presented in the section of methodological procedures, in order to analyze the relationship between modernization and economic indicators the variables used were: trade balance of agribusiness and gross domestic product, both per capita. To analyze the relationship between the level of agricultural modernization and the inequality in income distribution the variables used were the ratio between the income earned by the richest 10% and the poorest 40%, and the Gini index. To analyze the socio-economic development and the rural exodus the variables used were: the FIMD and the urbanization rate, respectively.

Table 3 presents the results of the Spearman correlation test between the IAM and the selected variables.

Table 3 – Spearman correlation test

	Correlation coefficient	Level of significance
Trade balance of agribusiness per capita	0.485	0.010
GDP per capita	0.412	0.033
Gini Index	0.047	0.818
Ratio between the income earned by the richest 10% and the poorest 40%	-0.201	0.315
FIMD	0.436	0.023
Urbanization rate **(%)**	-0.384	0.048

Source: research results

As presented in the literature, the process of agricultural modernization in Brazil aimed to strengthen the competitive position of agribusiness of country in the international market. From the results presented in Table 3, it is identified empirical evidences that agricultural modernization actually contributes to the trade balance of agribusiness per capita, as the result of the Spearman test indicates the presence of positive and significative correction at 10 %. This result supports the argument that the process of agricultural modernization favored an increase in efficiency as shown by Ehlers (1999), Graziano da Silva (2000), Hoffman and Ney (2004).

Another economic effect of agricultural modernization would be the increase in gross domestic product, since the increase of productivity in the sector has made the agribusiness

one of the main sectors of Brazilian economy. The sector is responsible for generating jobs, being prominent in foreign trade, with significant share in the total of Brazilian exports. The correlation test results also corroborate the importance of modernizing agriculture to generate wealth in the Brazilian states, demonstrating the existence of a positive and significant correlation between IAM and state GDP per capita.

It is also highlighted the relationship between the level of modernization and socioeconomic development, in this study represented by the index FIMD. From the results presented in Table 3, it can be verified that an increase in levels of modernization leads to increased levels of socioeconomic development. The findings from this analysis allows us to disagree with the arguments presented in previous studies, which show that the modernization would be an obstacle to socioeconomic development and quality of life, causing, among other things, a detriment of health conditions, employment and income.

The rural exodus presents itself as an issue that has significant relationship with the studied phenomenon. The results contradict the points elicited by Balsan (2006), which suggest a contribution of the modernization process to the rural exodus. The results of the Spearman correlation test suggest that changes occurred in agriculture, in the sense of the use of new technologies, reduce the flow of migration from the countryside to the city. This situation can be credited to the stabilization of migration flows, but also to the increase of productivity that occurred in the countryside, which decreases the necessity for labor in some phases of production such as planting, but started to require more labor in other steps such as transport and distribution.

Concerning the income concentration, reported by Hoffman and Kageyama (1985), Ehlers (1999) and Graziano da Silva (2000) as being directly linked to processes of agricultural modernization, this study showed different results from the others, since the relationship was not significative. This difference is mainly due to the fact that there was, in the analyzed period, several other mechanisms aimed to prevent the income concentration. In this sense, the effects of modernization levels had no significant relation to the issue of income distribution today as in past decades, when the generation of income in the country was more dependent on the agricultural activity.

4. Final Remarks

This study aimed to analyze the relationship between the levels of agricultural modernization and economic indicators of the Brazilian states. The main factors responsible for agricultural modernization in the Brazilian states were related to the use of new technologies in relation to the use of explored land, use of new technologies in relation to labor and new technologies of transportation and logistics.

Based on the factors responsible for agricultural modernization it was created the index of agricultural modernization (IAM). The analysis of the IAM showed a great heterogeneity among the Brazilian states, this situation also applies to other indicators covered in this study.

The levels of modernization were significantly related to per capita GDP, trade balance of agribusiness per capita, FIMD and urbanization rate. In this sense, this relationship can be considered positive, since the effects from the process of agricultural modernization can enable, among other things, an increase in income and quality of life, and contribute to keep the population in the rural areas. In relation to the indicators of income concentration mentioned in the literature as being negative and directly related to agricultural modernization, this study could not observe such situation, given that the relationship presented was not significant.

The improvement in socioeconomic indicators and in reducing the rural exodus is related to the issue of modernization, due to, among other things, the economic gains brought by the increased competitiveness of Brazilian agribusiness sector, which generates an increase in the production of the country and in trade balance.

It is hoped that the considerations presented in this study contribute to demonstrate the importance of policies of agricultural modernization, and also that their focus should not only be in the increase in levels of productivity and the potential economic gains coming from the same, but they should also take into account the possible impacts and externalities caused by this process.

5. References

BALSAN, R. Impactos Decorrentes da Modernização da Agricultura Brasileira. Campo-território: **Revista de Geografia Agrária**, v. 1, n. 2, p. 123-151, 2006.

BARBETTA, P. A. **Estatística Aplicada às Ciências Sociais.** 7 ed. Florianópolis, SC: UFSC, 2008

BRASIL. Ministério da Agricultura **- Exportações do agronegócio alcançam US$ 76 bi e superam em 18% resultado de 2009**. Available in: <http://www.brasil.gov.br/noticias/arquivos/2011/01/12/exportacoes-alcancam-us-76-bi-e-superam-em-18-o-resultado-de-2009>. Access in: 12/01/2011.

_____**- Estatísticas de Comércio Exterior**. Available in: < http://www.agricultura.gov.br/internacional/indicadores-e-estatisticas> Access in: 15/01/2011.

BRUM, A. J. **Modernização da Agricultura** – Trigo e Soja, Petrópolis: Vozes, 1988.

CESPEDES, J. G. **A Dinâmica da modernização da Agricultura em 157 microrregiões homogêneas do Brasil (versão eletrônica).** Available in: <www.lce.esalq.usp.br/tadeu/juliana.pdf>. Access in: 30/03/2011.

CORRÊA, A. M. C. J; FIGUEIREDO, N. M. S.. Modernização da Agricultura Brasileira no Início dos Anos 2000: Uma Aplicação da Análise Fatorial. **Revista GEPEC**, Cascavel, PR, v. 10, n. 2: p. 82-99. 2006

CRUZ, F. O. ; RIBEIRO, C. G. A modernização agrícola nos municípios da mesorregião Campo das Vertentes: uma aplicação de métodos de análise multivariada. In: VII Congresso Latino Americano de Sociologia Rural, Equador**.** ***Anais*** **.**, Equador.2006

CUNHA *et al.* A Intensidade da Exploração Agropecuária como Indicador da Degradação Ambiental na Região dos Cerrados, Brasil. **Revista de Economia e Sociologia Rural**, Piracicaba, SP, v. 46, n 2, p. 291-323, 2008.

DEFANTE, M. *et. al*. O Papel do Crédito Agrícola Brasileiro e sua Distribuição por Estratos de Produtores. **Teoria e Evidência Econômica,** v. 7, n.12, p.87-110, 1999.

EHLERS, E. **Agricultura sustentável**: origens e perspectivas de um novo paradigma. 2 ed., Guaíba: Agropecuária, 1999. 157 p.

ESPÍRITO-SANTO, E. N. Agricultura no estado de Santa Catarina, no período 1920-1985. **Estudos Econômicos**, São Paulo, SP, v. 28, n. 3, p. 453–73, 1998.

FALCON, W. P. The Green Revolution: generation of problems. **American Journal of Agricultural Economics**, Milwaukee, WI, v. 52, n. 5, p. 689-710, 1970.

GIBBONS, D. S., DE KONINCK, R., HASAN, I. **Agricultural modernization, poverty and inequality: the distributed impact of the Green Revolution in regions of Malaysia and Indonesia.** Inglaterra, Gower Publishing Company Limited, 1980.

GRAZIANO DA SILVA, J. **O novo mundo rural brasileiro**. Campinas: Unicamp, 2000. 151 p. Série Pesquisas.

_____ **Tecnologia e agricultura familiar**. 2 ed. Porto Alegre: UFRGS, 2003.

GRAZIANO NETO, F. **Questão Agrária e Ecologia**: Crítica da Agricultura Moderna, São Paulo: Brasiliense, 1985.

HAIR, J. F. *et. al*. **Análise multivariada de dados.** 5. ed. Porto Alegre: Bookman, 2005.

HOFFMAN, R.; KAGEYAMA, A. A. Modernização da Agricultura e distribuição de Renda no Brasil. **Pesquisa e Planejamento Econômico**. v.15, n.1, p.171-208, 1985.

HOFFMANN, R.. A dinâmica da modernização da agricultura em 157 microrregiões homogêneas do Brasil. **Revista de Economia e Sociologia Rural**. Piracicaba, SP, v. 30, n. 4, p. 271–90, 1992.

HOFFMANN, R; NEY, M, G, Desigualdade, escolaridade e rendimentos na agricultura, indústria e serviços, In: XLII Congresso Brasileiro de Economia e Sociologia Rural, Cuiabá. ***Anais ...***. Cuiabá, 2004.

IBGE - Instituto Brasileiro de Geografia e Estatística. **Censo Agropecuário 2006.**Available:<http://www.ibge.gov.br/home/estatistica/economia/agropecuaria/censoagro/default.shtm> Access in: 15/01/2011.

IETS - Instituto de Estudos do Trabalho e Sociedade. **Dados + Tabulações**. Available: < http://www.iets.org.br/rubrique.php3?id_rubrique=12>. Access in: 30/03/2011.

KAGEYAMA, A.; LEONE, E. Trajetórias da modernização e emprego agrícola no Brasil 1985-1996. Brasília: SOBER. **Revista de Economia e Sociologia Rural**. Piracicaba, SP, v. 40, n. 1, p. 271-290, 1992.

MAROCO, J. **Análise Estatística – Com Utilização do SPSS**. 3. ed. Lisboa: Edições Sílabo, 2007.

MARTINE, G.; BESKOW, P. R.. **O modelo, os instrumentos e as transformações na estrutura de produção agrícola**. In: MARTINE, G.; GARCIA, R. C. Os impactos sociais da modernização agrícola. São Paulo: Editora Caetés, 1987.

MARTINS, G. A.. **Estatística geral e aplicada.** São Paulo: Atlas, 2001.

MELLOR, J.W. **The economics of agricultural development**. Ithaca: Cornell University Press, 1966.

MEYER, L. F. F. **Modernização da agricultura e desenvolvimento sustentado: O caso de Minas Gerais - 1970 a 1985**. Dissertação de Mestrado (Economia Aplicada- Universidade Federal de Viçosa), 1997.

MINGOTI, S. A. **Análise de Dados através de Métodos de Estatística Multivariada: Uma Abordagem Aplicada**. 1 ed. Belo Horizonte:UFMG, 2005.

SANTOS, R. F. Análise critica da interpretação neoclássica do processo de modernização da agricultura. **Revista de Economia Política**. v. 8, n. 3, p. 131-148.1988

SCHULTZ, T. W. **A transformação da agricultura tradicional**. Connecticut, EUA, 1964.

SHIKIDA, P. F. A. Desenvolvimento socioeconômico e agroindústria canavieira no Paraná. **Revista de Política Agrícola**, n. 3, p. 67-82, 2010.

SILVA, J. G. **A nova dinâmica da agricultura brasileira**. Campinas: UNICAMP, 1996. 217 p.

SOUZA, P. M.; LIMA, J. E. Intensidade e Dinâmica da Modernização Agrícola no Brasil e nas Unidades da Federação. **Revista Brasileira de Economia**. v. 57, n. 4, p. 795-824, 2003.

TRIOLA, M. F. **Introdução à Estatística**. 10 ed. Rio de Janeiro: LTC, 2008.

THE ROLE OF LAND USE COMPETITION IN FARMERS' ENGAGEMENT IN RENEWABLE ENERGY PRODUCTION

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Abstract

In German agriculture the renewable energy production from biogas is undergoing a dynamic expansion. However, farmers differ in their decision behavior concerning engagement in the biogas production. A better understanding of decision-making structures at the farm level is particularly important for policy-makers and local authorities to estimate the future investment potential of biogas production. Determinants of decision behavior are identified based on a survey of 160 German farmers. The study focuses on land use competition as a negative impact of the increased biogas production in agriculture. Using a multinomial logit regression we explore this impact on farmers' willingness to invest. Our findings indicate that the future potential of biogas production is determined by socio-economic patterns such as perceived conflict potential. Furthermore intrinsic factors e.g. ecological awareness were overlaid by the extrinsic factor of economical benefits provided by the funding policy. The knowledge of farmers' decision making structures is helpful revising the current funding policy as well as for the development of models forecasting the future potential of biogas production in agriculture.

Key words: Biogas Production, Renewable Energy, Land Use Competition, Decision Behavior

THE ROLE OF LAND USE COMPETITION IN FARMERS' ENGAGEMENT IN RENEWABLE ENERGY PRODUCTION

1. Introduction

In the context world's advancing climate change the expansion of the production of renewable energies (renewables) has become a key factor as an adaptation strategy (IRENA, 2010). In Germany, the policy framework regarding renewables has been gradually improving in recent years. The interest of German entrepreneurs in investing in renewables like wind energy and anaerobic digestion (biogas production, BGP) has significantly increased since then (Reiche and Bechberger, 2006). Especially in the agricultural sector a steady expansion of BGP has been observed since 2000 (Plieninger et al., 2006).

A closer examination of indicates strong impacts on local agriculture through an increased demand for biomass. However, the supply is restricted by limited arable farmland. Consequently, energy and the food producing farmers are in competition which may have an influence on their current and future engagement in this sector. Thus, the expansion of BGP might be threatened. This paper aimed to estimate the impact of land use competition (LUC) on the decision-making behavior in renewables, and particular in BGP. The following questions are discussed:

1. What are the negative effects of BGP perceived by the farmers and to what extent is the level of LUC among farmers related to biogas?
2. To what extent does LUC influence farmers' decision behavior regarding investments in BGP compared to other determinants?

Without a detailed knowledge of this impact the energy and environmental policy are running the risk in over- or underestimation the investment potential. For local stakeholders who are preparing biogas projects, the decision making in this specific context is relevant to estimate farmers' response and investment behavior more accurately. This is particularly important because the German policy has set ambitious goals to increase the bioenergy production in form of biogas in the coming years. The regulation on access to gas supply networks contains objectives for the substitution of natural fossil through biogas. According to § 31, BGP should be expanded to 6 billion cubic meters by 2020 to support this substitution (JURIS, 2011). By the end of 2010 approximately 40,000 cubic meters will have been substituted (DENA, 2011).

2. Diffusion of Renewable Energies and state of the art

Politic measures have improved the economic conditions for the production of energy from renewables in the last decade. The compensation rates for produced energy have been gradually increasing since the introduction of the Electricity Feed Act in 1991 and the several times amended Renewable–Energy-Act, REA, which has been used as an example internationally and adopted in many other European countries. The current REA provides purchase for the produced energy for a period of 20 years for a comparatively high and fix price (§ 21). Thus, energy producers can calculate the revenue side very precisely which creates a strong incentive for investors (DBFZ, 2010).

The first engagement of farmers in the production of renewables was the installation of wind turbines in 1990s. After the millennium, the funding scheme of the REA changed in favor of other renewables, such as energy from biomass and photovoltaic systems. The subsidies of the REA can in principle be accessed by all investors. However, farms have

certain structural advantages for bioenergy production such as land ownership, appropriate existing machinery and storage facilities, access to credits, etc. Farms have existing infrastructure, such as barn roofs for the installation of photovoltaic systems as well as already having access to direct supply with biomass (energy crop cultivation) as a raw material for biogas generation. Farmers have great expectations regarding renewables. Hence, alternative strategies such as diversification by producing energy from renewables have diffused among farms in recent years comparing to other sectors (Heissenhuber and Berenz, 2006; Rosenbaum et al., 2005; Schaper and Theuvsen, 2006).

Considering the changed REA and the structural advantages on farms, this led to greater diffusion of two forms of renewables in German agriculture: energy from biomass in form of anaerobic digestion (BGP) and energy production from solar (photovoltaics) (ibid.). Currently, in Germany there are as of the end of 2009 4,960 operating biogas plants are, almost all of which are located on farms (DBFZ, 2010). The photovoltaic market is more heterogeneous, and the agricultural share of the total produced photovoltaic energy is only 19% (BS and EUPD, 2009). Considering the greater number of qualified enterprises from other sectors, however, this agricultural market share is remarkably high.

The diffusion process of renewables is extremely rapid. The biogas expansion for instance and the strong investment activities of German farmers are closely linked to the changes in REA (Ehlers, 2008; Mendonca, 2007). Therefore the biogas market is not only being subjected by market-based aspects, but rather shaped largely by the policy (Jacobsson and Lauber, 2006; Reiche and Bechberger, 2006).

3. Land use competition at the farm level

Wibberley (1959) investigated the competition for rural land caused by urban growth. However, in recent years the discussion changed into bioenergy as competitive drivers. The production has positive effect on the projections for climate change (Berndes et al., 2003). However, certain negative impacts on nature, economics and social networks are becoming ever more apparent (Domac et al., 2005; Dornburg et al., 2010).

In Germany the increasing expansion of bioenergy production is forced by policy. The REA was created as an incentive to increase bioenergy production in order to achieve the political objectives in renewables production. However, in Germany negative effects are also being perceived more frequently (Dehnhardt and Petschow, 2004; Mautz et al., 2007). Competitive conditions intensify due to differences in interests and limitations of available resources such as environmental goods or production factors and may result in negative social, ecological or economical consequences (DBFZ, 2009; Mautz et al., 2007; SRU, 2007). Within the bioenergy pathways, BGP is the focus of discussions regarding negative effects (DBFZ, 2009). The negative intra-sectoral effects are closely related to the biomass production for digestion process (WBA, 2007). Food and biogas producing farmers are in competition because of the relatively high and secure revenues from the BGP provided by the REA. This is demonstrated by biogas producing farmers having a higher ability to pay for production factors (e.g. farmland) compared to their food producing colleagues, leading to an increase of land lease rates (Berenz et al., 2008; Heissenhuber et al., 2008). An excessive subsidization of BGP compared to food production leads to politically induced competitive distortions between the two (ibid.). We observe farms restructuring their production portfolio in favor of biogas. In some German regions, e.g. North-West, the displacement of cash crop and animal husbandry had meanwhile reached a level that the BGP dominates on some farms. Some of those farms are becoming exclusive energy producers.

We focus on the socio-economic impacts of increased BGP in Germany at the farm level, keeping in mind the global relevance of this topic. However, the contribution of

Germany to the production of renewables in form of biogas is limited, although the European contribution is much bigger. The biogas industry in many European countries and beyond is growing very fast. However, Germany has more than ten years of experience with impacts of increased agricultural BGP in the agriculture.

4. Farmers' decision-making behavior – Developing the model

Approaches to explain entrepreneurs' decision behavior offer complementary normative (prescriptive) and descriptive decision theories. The first aims to understand the decision behavior on the basis of formalized rules and procedures under the assumption of rationally correct (optimal) decisions (Bell at al., 1988). On the other hand, the descriptive approach aims to reflect the realistic decision-making of humans by considering it in a broader context (ibid). Studies from 'behavioral decision research' queried the assumption that humans are rational and show that managerial decisions do not strictly follow the rational goal of economic profit maximization. They can also be influenced by other psychological elements such as intrinsic (e.g. satisfaction or risk-taking) or social factors (e.g. desired behavior) as extrinsic objective (Edwards, 1954; Simon, 1959 and Kahneman and Tversky, 1979). If the decision-making situation is more complicated and complex, the actual decision behavior differs greatly from expected formal normative behavior (Bell et al. 1988; Simon, 1959). An investment in renewables is in fact a multidimensional issue. Therefore the aim of this contribution is not an economic evaluation of the investment decision based on well calculable quantities such as (opportunity-) costs and government-guaranteed payments (subsidies), but rather an appraisal based on behavioral and other influential elements which should be taken into account in a realistic investigation.

A number of studies have examined the general decision-making behavior on farms (see e.g. Kool, 1994 or Willock et al., 1999). They focus mostly on motivations, goals and attitudes of farmers. However, the decision behavior is seen as the result of a combination of motivational and external factors as well as farm structure (Burton, 2004). Within the external dimension Solano et al. (2003) focus on social network structures. The strong social impact on the farmer by other people in her or his work or family environment is characteristic of agricultural behavior and differs significantly from other sectors (ibid.).

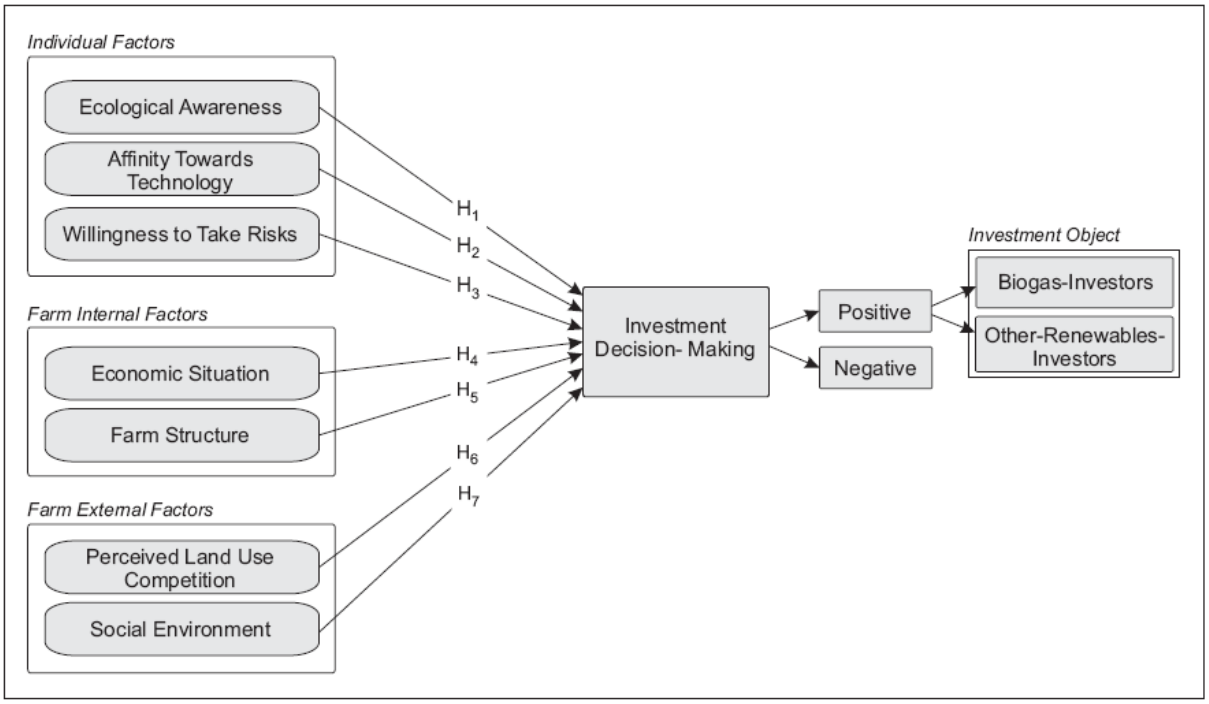
Farms with their primary production are very dependent and close to nature compared to other sectors. Hence, farmers are facing a variety of complex decision situations, which allow only a limited formalization (Nuthall, 1999, 2010). *'As a farmer must deal with most aspects of biology, economics, the weather, organisations, people and so on, they face very complex decision situations with only a modicum of support in an immediate office sense.'* (Nuthall, 1999: 17)

Willock et al. (1999) have developed in their Edinburgh study of decision on farms an essential model to explain farmers' behavior. The authors found that personal factors such as personal character properties influence, through attitudes and objectives, indirectly farmers' behavior. Willock et al. (1999) and Burton (2004) pointed out that in particular decision situations, such as specific investments, the outcome behavior is influenced strongly by external, physical or situational effects in addition to intrinsic drivers.

Based on these theoretical assumptions and considering the LUC issue a basic model explaining farmers' individual decision behavior regarding investments in renewables was created (see Figure 1). There are three core elements: 'Individual', 'Farm internal' and 'Farm external' factors. For each construct, hypotheses (H_1 to H_7) were established. Additionally, the form of renewables is considered in the model because between the renewables technologies are differences in terms of impacts on agriculture. Due to the strong interactions between BGP and effects on agriculture, this technology is considered separately. For this

purpose, biogas (BGP) and other forms of renewables sources (other renewables) as 'Investment Object' are integrated into the model.

Figure 1. Empirical model explaining farmers' decision behavior



Individual factors

Trojecka (2007) found that farmers' ecological awareness influencing their own behavior. They desire for a CO_2-neutral, ecologically friendly renewables production could be a driver for bioenergy investments. Lynne and Rola (1988) refer to the sense of responsibility towards the environment, which has a strong influence on farmers due to its central importance in their mode of production. Therefore, we assume: *A high level of environmental awareness has a positive impact on the probability to invest in renewables (H_1).*

It is well known that farmers adopt new production techniques if they have a high technical interest (Austin et al. 1998). For the selection of an appropriate renewables technology, the construction and the operation of such facilities as well requires an extensive understanding and knowledge. Even the willingness to adopt such technology in an early stage, as a pioneer, has relevance in this context (ibid.). Therefore, we expect: *A high affinity for technology has a positive impact on the probability to invest in renewables (H_2).*

Sauer and Zilberman (2009) state in their studies that some decision-makers are not willing to take risks in order to advance their business and this results in a delay in the uptake of innovations. Therefore, we presume *A high willingness to take risk has a positive impact on the probability to invest in renewables (H_3).*

Farm internal factors

The farm economic situation is also relevant for the decision-making. Farmers differ greatly in their perception of the economic success of their farm. Simon (1955) confirms in his Theory of Satisfaction Behavior that entrepreneurs are not only focused on increasing their returns, even they have good opportunities. Thus, the economic satisfaction is not driven exclusively by monetary reflections. van Rooij (2011) investigated and verified this theory and point out that satisfying behavior has a strong influence on business decisions. Therefore, we hypothesize: *A high level of satisfaction with the economic situation has a negative impact on the probability to invest in renewables (H_4).*

As with any form of reorientation of production methods the production capacity is limited by the structural conditions. Schramm (1977) proves that entrepreneurs among other factors pay a particular attention to the factor endowment of their business. Langert (2007) use the example of energy crops cultivation confirming the importance of structural conditions as a major factor in making farm production decisions. Therefore, we presume *A high quality of farmland (H_{5a}) has a ... / A large amount of farmland (H_{5b}) has a ... / High labor capacities (H_{5c}) have a positive impact on the probability to invest in renewables.*

Farm external factors

Entrepreneurs' behavior is strongly linked to the relationship with other managers in their branch (Fehr and Schmidt, 1999). Kahneman et al. (1986) constitute in this context the presence of fairness expectations in terms of economic behavior. We presume that intra-agricultural effects such as the increasing LUC and politically induced competitive distortions are perceived by many farmers and have a negative impact on their individual decision-making, since they are considered as unfair behavior: *Strongly perceived LUC have a negative impact on the probability to invest in BGP in particular (H_{6}).*

Farmers are key actors in the rural communication network and are in close contact with many non-agricultural groups of people (Retter et al., 2002): *The social environment has a strong impact on the decision-making process in general (H_{7a}).*

Fishbein and Ajzen (1975) describe in their Theory of Reasoned Action the importance of the social environment for behavior. Human behavior is affected by their perception of how others would view them if they performed the behavior, especially when the behavior is socially visible. The opinion of family, friends and local residents concerning a specific situation affects farmers' behavior considerably (Solano et al., 2003): *A negative opinion of the social environment concerning the object of investment (BGP) has a negative influence on the probability to invest in the BG (H_{7b}).*

5. Data and methods

Altogether we interviewed 160 farmers personally with a standardized questionnaire in Germany in September 2009. Hypotheses were operationalized in statements rated by respondents through a five point Likert scale. The survey region was focused on North-West Germany. North-West Germany has a large variety of production branches of farming and a large number of biogas plants have been constructed in these regions.

One anomalous response was detected and excluded from survey. Overall, 159 responses were available for the further analyses. The sample was divided into three types of farmers based on their investment decision (multiple answers): Total sample, 159 Respondents (100%); Non Investors, 37 (23.3%); Biogas-Investors, 58 (36.5%) and Other-RE-Investors, 64 (40.3%). The group of 'Other-RE-Investors' consists of farmers who are not producing biogas, but have chosen to produce other form of renewables. This is mostly photovoltaic technology, rarely wind power.

The socio-demographic and farm structural characteristics of the data set reflect the German average not exactly. The amount of farmland area per farm is on average 173 ha (average in Germany 48.5 ha), with a relatively high standard deviation of 238 ha. 149 farms were managed as a main occupation (full-time) and only ten part-time which differs from the national average. Five farmers produce organically. Around three workers are employed on each farm on average. In terms of the production portfolio on farms, about 9% of all farms are forage growers, 28% cash crop producers, 38% livestock producers, 23% are mixed farms and 2% belonging to other types of farms. The perceived average soil quality on farms is 44.0 points (from 0 to 100, were 100 equals the best quality). The respondents are on average 45 years old and well educated. Only five are female. Seven farms expected to sell the business

in the near future. In 42 businesses the future is still unclear. The remaining farmers had made the takeover recently.

A multiple comparison between the three identified groups of farmers in terms of their perception of the effects caused by BGP in their region was carried out by multivariate analysis of variance. The level of significance was adjusted according to the Bonferroni correction. This post-hoc test identify between which subsamples the differences are statistically proved. For the further validation of the empirical model the data dimension was reduced by an explorative factor analysis. A multinomial logistical regression reveals the direction and strength of independent variables on the decision behavior.

6. Empirical results

First, farmers' perceived negative effects caused by the BGP previously described. The majority of the interviewed farmers are highly aware of BGP in their region. For 86% of all respondents, an average of 4 biogas plants are located within 10 kilometers of their farm.

Significant differences in farmers' perceived effects of BGP on the local agriculture were identified between the groups in Table 1. Non- and Other-RE-Investors see them especially confronted with increasing land rental rates and land scarcity. Thus, Non-Investors perceive an increasing level of competition with their biogas producing colleagues. Farmers, however, do not see BGP in the region posing the risk of increasing regional feed prices.

Table 1. Farmers' perceived dimensions of impacts concerning biogas production

	Total Sample		Non-Investors (A)		Biogas-Investors (B)		Other-Renewables-Investors (C)		F-Statistics
	N=159		n=37		n=58		n=64		
	M[1]	SD[2]	M	SD	M	SD	M	SD	
In my area…[3]									
…biogas plants force up land lease rates.	0.70	1.18	1.31	0.79	-0.12	1.07	1.10	1.04	30.77 $^{AB***; BC***}$
…biogas plants lead to problems complying with nutrient limits.	-0.39	1.11	-0.17	1.06	-0.86	0,92	-0.10	1.16	8.97 $^{AB**; BC***}$
How do you assess the potential impacts caused by biogas plants located in your area on your farm as mentioned below?[4]									
Land scarcity.	0.27	1.33	0.84	1.34	-0.17	1,18	0.36	1.35	6.23 $^{AB**; BC**}$
Increasing of land lease rates.	0.37	1.31	0.78	1.26	-0.21	1.26	0.69	1.20	9.29 $^{AB**; BC**}$
Increasing feedstuff rates.	-0.53	1.14	-0.24	1.24	-0.78	0.10	-0.44	1.18	2,34
Problems with the utilization of manure.	-1.01	1.10	-0.67	1.24	-1.41	0.73	-0.80	1.22	6.22 $^{AB**; BC+}$
Increasing competition between farmers.	0.25	1.18	0.68	1.14	-0.23	1.02	0.47	1.20	8.12 $^{AB***; BC**}$
The energy crop cultivation in my area will lead to…[3]									
…an increased level of competition with livestock farmers.	0.36	1.37	0.69	1.40	-0.07	1.25	0.56	1.38	4.81 $^{AB*; BC*}$
…an increased level of competition with cash crop farmers.	0.54	1.18	0.67	1.15	0.14	1.22	0.81	1.08	5.48 $^{AB+; BC**}$
…an increased level of competition with nature conservation.	-0.37	1.06	-0.11	0.89	-1.00	0.78	0.05	1.12	19.83 $^{AB***; BC***}$
Biogas plants…[3]									
…are bothering non biogas producers in my area.	0.21	1.26	0.89	0.95	-0.54	1.14	0.50	1.16	21.61 $^{AB***; BC***}$
…are crucially important for my area.	0.06	1.06	-0.29	1.10	0.58	0.89	-0.22	1.02	12.50 $^{AB***; BC***}$

[1] Mean | [2] Standard Deviation | [3] rated on a scale '-2 = fully disagree' to '2 = strongly agree' | [4] rated on a scale '-2 = very low' to '2 = very high' | $p \leq 0{,}001$: very highly significant***; $p \leq 0.01$: highly significant**; $p \leq 0.05$: significant* | [+] non-significant trend | [AB] significance between the groups A and B | [BC] significance between the groups B and C

In a further item, all respondents were asked how they would view a biogas plant being built in close proximity to their farm. The very highly differentiated responses suggest that the different regional conditions and individual situations of farms play a greater role in the conflict perspective.

Comparing the structural and socio-demographic characteristics of the three groups no significant differences were observed except among the labor capacities. The Biogas-Investors have with a mean of 4.13 (full-time) employees more employees than the Other-RE-Investors, which operate with 2.37 employees. The significant difference (F-value: 3.88, $p < 0.05$) can be explained by the high demand for labor in the cultivation of energy crops as raw materials for the BGP.

To reduce the data dimension and for aggregation of variables, an exploratory factor analysis was carried out. Following the theoretical model (see Figure 1), all recorded and appropriate variables that explain the differentiated decision behaviors are included in the analysis. In the final factor analysis, 18 variables form five factors (see Table 2). With the exception of the fifth factor 'Affinity towards technology', all constructs have satisfactory indicator values concerning validity and reliability (Cronbach's alpha > 0.6; MSA > 0.6) (Field, 2009).

Table 2. Results of explorative factor analysis

Factors or items	M[1]	SD[2]	R[3]
Factor 1: Perceived land use competition (LUC)[4] explains 23.8% of variance, Cronbach's α: 0.87			
Biogas plants push up land lease prices in my area.	0.68	1.18	0.81

The cultivation of energy crops increased the competition with livestock production my area.	0.36	1.37	0.80
Biogas plants are bothering non biogas producing farmers.	0.20	1.26	0.79
There are already far too many biogas plants in my area.	-0.25	1.15	0.72
Biogas plants cause problems with the compliance of nutrient input limits in my area.	-0.40	1.10	0.70
The energy crops cultivation leads to an increased competition with the cash crop cultivation in my area.	0.54	1.18	0.68
The energy crops cultivation leads to an increased competition with the material usage of renewable resources in my area.	0.04	1.07	0.67
The energy crops cultivation leads to an increased competition with nature conservation.	-0.37	1.06	0.63
Factor 2: Economic situation[3] explains 10.8% of variance, Cronbach's α: 0.68			
Our farm income enables greater investments.[4]	0.57	1.17	0.87
I am satisfied with the current overall situation of my farm.	0.67	1.03	0.77
My farm will still exist in 20 years time.	0.89	0.99	0.66
Factor 3: Social influence[5] explains 9.7% of variance, Cronbach's α: 0.61			
How important is the opinion of your employees for your investment decision.	-0.03	1.15	0.78
How important is the opinion of your shareholders for your investment decision.	0.61	1.49	0.75
How important is the opinion of local residents for your investment decision.	-0.64	1.04	0.73
Factor 4: Ecological awareness[6] explains 8.8% of variance, Cronbach's α: 0.67			
I personally make sure, to produce sustainable respecting aspects of nature and environment.	1.49	0.71	0.85
As a farmer I have a special responsibility towards the environment.	1.45	0.71	0.85
Factor 5: Affinity towards technology[7] explains 7.4% of variance, Cronbach's α: 0.40			
I am very interested in new technologies.	0.81	0.78	0.75
I am the first who is investing in new technologies.	-0.55	0.78	0.73
Annotations: MSA = 0.713 | R^2 = 60.56% | N = 159 | [1] Mean | [2] Standard Deviation | [3] Factor Loading | [4] Scale from -2 'totally disagree' to +2 'totally agree' | [5] Scale from -2 'does not apply at all' to +2 'completely applies' | [6] Scale from -2 'not important at all' to +2 'very important' | [7] recoded			

The factor 'Perceived' reflects the negative socio-economic pressure between farmers in the course of increased BGP. The dimension 'Economic situation' is the economic self-assessment. In addition, the assessment of farms' viability is included in this factor. The construct 'Social influence' reflects the influence of entrepreneurs' social environment on decision-making. These are business people as well as external contacts from the area surroundings the farm, such as local residents. The family of the entrepreneur is not included in this factor. We aimed to have two dimensions in this construct: First, a general idea of the importance of people from farmers' social environments for him or her when making investment decisions (H_{7a}). For this we asked the farmers directly about the importance of other people for their decision-making. Second, we consider the phenomena of driving or inhibiting impacts on decision behavior (H_{7b}). However, only the first dimension is reflected by the factor, therefore further analysis focused only on hypothesis H_{7a}. The aggregation 'Environmental awareness' reflects farmers' attitudes towards the environment and ecological orientation of the entrepreneur. The factor 'Affinity towards technology' represents individual attitudes towards new technologies. The willingness of an early adoption of innovations is integrated in this factor.

The factor analysis does not represent all constructs of the explanatory model. Therefore, based on proper logical considerations individual items are included in addition to further analysis. The following variables represent the outstanding constructs:

- Willingness to take risk: 'The improvement of existing branches on the farm is less important to me than investing in unknown areas.' (This variable was recoded)
- Farm structure: soil quality rated in points, cultivated farm land area in ha and labour capacity in full time employees (family employees included)

The multinomial logistic regression reveals the direction and strength of independent variables on decision behavior. Farmers' actual taken investment decision (groups of farmers) is used as dependent variable in the logit model. The indentified factors and the additional items as covariates were used as explanatory variables. Despite the limited reliability of the

factor 'Affinity towards technology', this was integrated in the model because of its theoretical relevance on behavior (Austin et al., 1998).

142 respondents from the total sample were included in the regression analysis, due to missing values in the socio-demographic and farm structure variables. The regression model fulfils the required quality criteria concerning reliability and validity (see Table 3). The overall explanatory power of the model with 53.0% of total variance (Nagelkerkes R^2) can be evaluated as good. 45.7% of Non-Investors, 66.1% of Other-RE-Investors, and even 79.2% of Biogas-Investors are correctly predicted. Overall, in the model 66.5% of the cases classified correctly and is with well above the proportional (34.7%) and maximal random probability (41.6%) (Field, 2009). Table 3 shows how the odds ratio of belonging to a certain group changes, if the value of the dependent variable increases by one unit.

Table 3. Influencing factors on farmers' decision behavior

		Investment decision				Investment object	
		Biogas-Investors vs. Non-Investors[1]		Other-RE-Investors vs. Non-Investors[1]		Biogas-Investors vs. Other-RE-Investors[2]	
		B	exp(B)	B	exp(B)	B	exp(B)
Individual	**Ecological awareness**	0.20	1.23	0.41	1.51	-0.21	0.81
	Affinity towards technology	1.01**	2.76	0.46^{+}	1.58	0.56^{+}	1.75
	Willingness to take risks	0.37	1.45	0.18	0.84	0.55*	1.73
Farm internal	**Economical situation**	1.03***	2.81	0.93***	2.54	0.10	1.10
	Farm Structure: Soil quality	-0.38*	0.96	-0.01	0.99	-0.03*	0.97
	Farm Structure: Cultivated farm land area	-0.00	1.00	0.00	1.00	-0.00	1.00
	Farm Structure: Labor capacity	0.19	1.21	-0.07	0.94	0.25^{+}	1.29
Farm external	**Perceived land use competition**	-1.85***	0.16	-0.56^{+}	0.58	-1.30***	0.27
	Social influence	0.41	1.50	-0.07	0.93	0.48^{+}	1.61
	Absolute term	1.64		1.11		0.54	

Annotations: n=142 (Biogas-Investors=48; Other-Renewables(RE)-Investors =59; Non-Investors=35) | ***p≤ 0.001, **p≤ 0.01, *p≤0.05 |$^{+}$ non-significant trend |$^{1;2}$reference group | Chi-Square=88.67 (p<0.001) | Cox&Snell-R^2=0.46 | Nagelkerkes-R^2=0.53

When comparing the statistical significance of regression coefficients between the farmers who have invested in renewables (biogas and the other renewables) with those who have not invested show that three factors have an influence on the group affiliation. The satisfaction with the economic situation and a positive assessment of farm viability are strong predictors for the two groups of investors of renewables. Compared to the Non-Investors (reference group) the likelihood of investing in renewables (i.e. to be assigned in one of these two groups) increases 2.8 respectively 2.5 times if the economic satisfaction increases by one unit (H_4 rejected). The potential influence of other variables on which group a farmer belongs to, have to be considered differentially between the two groups of investors. The probability of an investment in BGP increases by 2.8 times if the farmer has a high technological interest (H_2 confirmed). The negative coefficient of soil quality, but especially of 'Perceived LUC' means a reduction of the probability to be in the group of biogas investors. An increasing soil quality means that the probability of being an investor decreases. This might be due to high opportunity costs of good farmland (H_{5a} rejected). An increase in the perception of the negative impacts of BGP by one unit results in farmers being 6.3 times less likely to be willing to invest in BGP.

This repressive investment effect is caused by the focused political financial promotion of biogas which leads to higher competition between farmers (rising land rental rates) and shows the relevance of these side effects of diffusion of renewables on individual

decision behavior (H_6 confirmed). Interestingly, this effect is only slightly significant for the other forms of renewables.

The impact of farmers' social environment on the decision-making is not significant (H_{7a} confirmed). However, the opinion of people from the farmers' network (not tested in our model) may have an influence on the decision behavior (cf. H_{7b}).

The differences in decision-making between the forms of technology/investments, Biogas- and Other-RE-Investors, were considered in a second step of the logit regression where the Other-RE-Investors were chosen as the new reference group. In Table 3, this second step estimation is entitled 'Investment object'. The Biogas- and Other-RE-Investors are different from each other in terms of the factor 'Perceived LUC' on a significant level (-1.30***). Farmers, who perceive such negative effects, are less likely to invest in BGP, which is considered as a reason for these negative effects. These farmers are engaging in other forms of renewables, which are under less criticism.

Furthermore, an increasing level of soil quality (-0.03*) has a slight positive effect on the probability of investment in other renewables. Unlike, the factor 'Willingness to take risks': Farmers, who are less risk-averse, are 2.7 times more likely to belong to the group of biogas producers (H_3 confirmed).

A comparison of the three groups of farmers in terms of the factors 'Ecological awareness', 'Labor capacity' and 'Cultivated farm land area' found no significant differences (H_1, H_{5b}, H_{5c} rejected).

7. Discussion

The findings of the multigroup comparison reveal a strong impact of biogas extension on agriculture. The farmers we asked were very concerned about the biogas expansion. BGP thus contributes to an increase in the already high level of competition between German farmers. Farmers perceived the effects of increasing expansion of BGP through a higher competitive pressure with other local farmers. The threat potential for food producing farms is obviously high, revealing very high conflict potential.

Furthermore, the results show that a large number of different factors influence farmers' decision behavior for investments in renewables. Thus, the findings by Willock et al. (1999) and Burton (2004) are confirmed.

Farmers' decision behavior is not only affected by intrinsic motives and the farm internal factor 'Economic situation', but rather primarily by perceived and use competition. This confirms the current controversial debate about the usefulness of BGP on farms (WBA, 2007). The considerable investment-inhibiting effect of LUC can be explained by several factors.

First, considering the increased demand for farmland for biomass production (energy crop cultivation) and limited land supply, the higher competition leads to rising costs for productive land. Thus, in many regions with intensive agriculture prices on the land lease market have increased (Bahrs and Held, 2007; Heissenhuber et al., 2008). The progressive LUC is problematic, because farms have a high proportion of leased farmland on average. Hence, they are very sensitive to changing land lease prices.

Second, energy production has a high added value compared to food production which results in a higher willingness to pay for land leases for biogas producing farmers with respect to their food-producing colleagues (Bahrs and Held, 2007). The agricultural energy producers establish themselves on the land market. Therefore the competitiveness of existing branches on farm (food production) is at risk. Food producers have a critical perception of the short and medium term effects, so that they decide not to invest in the BGP, leading to problems seen in the bioenergy market. Furthermore, the investment-inhibiting effect of LUC can be explained

by social effects. The intra-agricultural resource conflict is problematic, because less competitive farms are not willing to sell their farms. For the common family owned farms the farm income is directly used to ensure farmers' family household income.

Furthermore, many farmers are very closely emotionally and traditionally connected with the agriculture (Roessingh and Schoonderwoerd, 2005). This results in a 'willingness to survive' of family owned farms which is compared to other sectors on a high level (Inhetveen and Schmitt, 2010). The farm business is continued even when their primary economic circumstances no longer permit. This irrational behavior, from an economical point of view, is also observed in other production braches on farms. For instance, the price decline in the German dairy production in recent years and the resulting lack of profitability of such farms has not resulted in extreme abandonment of dairy farming (BMELV, 2009). This could be explained by the 'willingness to survive' on farms, highlighting the urgency of competition between farmers. A reduction of pressure on the land lease market through more available farmland from farm sales therefore does not exist. In the case of increased competition, there is a higher potential for conflict in the long-term (Mautz et al., 2007). This has an explosive nature particularly if resource conflicts change into relationships conflicts, which are more complex (Feindt et al., 2004). Under these conditions, farmers choose other forms of renewables that have a lower conflict potential (e.g. photovoltaics).

In addition, many farms have close relationships with other local farms from which they mutually profit both from this constellation. An example for those positive network externalities is the joint purchase of machinery. If some of these farms are restructuring from food to energy production on farm, the new operating structure could result in a loss of cooperation partners in the network. Consequently, transition costs will increase.

8. Implications and conclusions

The findings contribute to the research of farmers' entrepreneurial behavior in general. In the context of renewables, we point out the high relevance of socio-economic patterns (level of competition) concerning BGP in agriculture. Our findings help to determine the future development of bioenergy production and the market potential more realistic. For energy and environmental policies, therefore, decision-making variables such as socio-economic patterns should be incorporated in the design of forecasting models.

The study confirms the occurrence of LUC in the context of expanded bioenergy production. The externalities are strongly linked to the funding scheme. In many European countries similarly funding mechanisms were adopted. In these countries, especially with strong agricultural characters such as France or Spain, LUC may occur after a time-delay. The findings should be considered for the optimization of the funding policy in order to indicate or prevent externalities.

However, the policy has established in its biomass allocation roadmap objectives for the further expansion of BGP (BMU and BMELV, 2009). Our findings imply that the further diffusion of BGP is overestimated and not realizable under present conditions. The policy-makers would be well advised to restructure the German REA so that competitive distortions are reduced among farmers. In this context a slight reduction of the compensation for energy from biogas may be able to decrease the economic profitability of BGP. An amendment is even necessary in terms of the structure of compensation rates. The present additional compensation for using biomass from farmland (energy crops) is forcing competition.

The policy has focused exclusively on the extrinsic factor of economic investment incentives, to motivate farmers to invest in the last decade. Our findings show that farmers have little scope for the creation of intrinsic motivations such as ecological awareness. This is in some respects problematic, because non-economic dimensions such as ecology become less

important. The policy and the agricultural advisory services should therefore be required to provide better ecological guidance and not only to focus on economic incentives.

However, interpreting the findings some limitations should be taken into account. First, the study is limited representative because of the regional focus on North-West Germany and the limited sample size. In Germany, the diffusion of BGP has so far been rapid and wide-reaching. This is different in many other countries where the BGP is only in its infancy. Accordingly, the level of competition between farmers is different.

Furthermore, the findings of our explorative study imply possible approaches for further research. The lack of influence of the intrinsic factor 'Environmental Awareness' on the investment decision-making process is surprising in view of the climate change debate and should be validated in a large sample study. So far, the decision influencing factors have been considered separately from each other. However, there are indications that even among the factors themselves path dependency exists (e.g. between factors 'Social influence' and 'Perceived LUC'.

9.References

Austin, E. J., Willock, J., Deary, I. J., Gibson, G. J., Dent, J. B., Edwards-Jones, G. & Morgan, O. (1998). Empirical models of farmer behaviour using psychological, social, and economic variables - Part I: Linear modeling. *Agricultural Systems*, 58 (2), 203-224.

Bahrs, E. & Held, H. (2007). *Steigende Nachfrage auf den Energie- und Agrarrohstoffmärkten – Konsequenzen für die niedersächsische Landwirtschaft, die Bodenmärkte und die Agrarpolitik.* Retrieved March 12, 2011, from http://www.ml.niedersachsen.de/download/3269.

Bell, D. E., Raiffa, H. & Tversky A. (1988). *Descriptive, normative, and prescriptive interactions in decision making.* Cambridge: Cambridge University Press.

Berenz, S., Hoffmann, H., & Pahl, H. (2008). Konkurrenzbeziehungen zwischen der Biogaserzeugung und der tierischen Produktion. In T. Glebe, T., A. Heissenhuber, L. Kirner, S. Pöchtrager, & K. Salhofer (Eds.), *Agrar- und Ernährungswirtschaft im Umbruch - Schriften der Gewisola* 43 (pp. 497-516). Münster-Hiltrup: Landwirtschaftsverlag.

Berndes, G., Hoogwijk, M. & van den Broek, R. (2003). The contribution of biomass in the future global energy supply: a review of 17 studies. *Biomass and Bioenergy,* 25 (1), 1-28.

BMELV (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz) (2009). *Ergebnisse der Viehbestandserhebung Nov. 2009 Rinder - Weiter stagnierender Rinderbestand.* Retrieved March 22, 2011, from http://berichte.bmelv-statistik.de/WBB-3800001-2010.pdf.

BMU (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit) & BMELV (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz) (2009). *Nationaler Biomasseaktionsplan für Deutschland. Beitrag der Biomasse für eine nachhaltige Energieversorgung*. Berlin.

BS (Bundesverband Solarwirtschaft e.V.) & EUPD (EUPD Research) (2009). *Solarstandort Deutschland 2009 - Pressekonferenz Intersolar München 2009.* Retrieved March 15, 2011, from http://www.solarwirtschaft.de/fileadmin/content_files/Intersolar_BSW_EuPD.pdf.

Burton, R. J. F. (2004). Reconceptualising the ´behavioural approach` in agricultural studies: a sociopsychological perspective. *Journal of Rural Studies*, 20 (3), 359-371.

DBFZ (Deutsches Biomasse-Forschungs-Zentrum) (2009). *Identifizierung strategischer Hemmnisse und Entwicklung von Lösungsansätzen zur Reduzierung der*

Nutzungskonkurrenzen beim weiteren Ausbau der energetischen Biomassenutzung. Zwischenbericht. Leipzig.

− (2010). *Monitoring zur Wirkung des Erneuerbare-Energien-Gesetz (EEG) auf die Entwicklung der Stromerzeugung aus Biomasse*. Zwischenbericht. Leipzig.

Dehnhardt, A. & Petschow, U. (2004). Nobody is perfect! Erneuerbare Energien, externe Effekte und ökonomische Bewertung. *Ökologisches Wirtschaften*, 2004 (5), 24-25.

DENA (2011). *Biogaspartner - Marktentwicklung in Deutschland*, Retrieved March 15, 2011, from http://www.biogaspartner.de/index.php?id=11871&L=1\.

Domac, J., Richards, K., & Risovic, S. (2005). Socio-economic drivers in implementing bioenergy projects. *Biomass and Bioenergy*, 28 (2), 97-106.

Dornburg, V., van Vuuren, D., van de Ven, G., Hans Langeveld, H., Marieke Meeusen, M., Banse, M., van Oorschot, M., Ros, J., van den Born, G. J., Aiking, H., Londo, M., Mozaffarian, H., Verweij, P., Lyseng, E. & Faaij, A. (2010). Bioenergy revisited: Key factors in global potentials of bioenergy. *Energy & Environmental Science*, 3 (3), 258-267.

Edwards, W. (1954). The theory of decision making. *Psychological Bulletin*, 51 (4), 380-417.

Ehlers, M.-H. (2008). Farmers' reasons for engaging in bioenergy utilisation and their institutional context: A case study in Germany. In T. Glauben, J. H. Hanf, M. Kopsidis, A. Pieniadz & K. Reinsberg (Eds.), Agri-food business: Global challenges – Innovative solutions. *Studies on the Agricultural and Food Sector in Central and Eastern Europe* 46 (pp.106-117). Halle (Saale).

Fehr, E. & Schmidt K. M. (1999). A Theory of Fairness, Competition, and Cooperation. The *Quaterly Journal of Economics*, 114 (3), 817-868.

Feindt, P. H., Canenbley, C., Gottschick, M., Müller, C. & Roedenbeck, I. (2004). *Konflikte des Agrarsektors - Eine Landkarte. Empirische Ergebnisse einer konflikttheoretischen Fundierung der Nachhaltigkeitsforschung*. BIOGUM Forschungsbericht Nr. 12. Retrieved March 28, 2011, from University of Hamburg. Research Centre for Biotechnology, Society and the Environment Web site: http://www.uni-hamburg.de/onTEAM/grafik/1107511876/biogum_fb_2004_13.pdf.

Field, A. P. (2007*). Discovering Statistics Using SPSS*. London: Sage Publications.

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior*: An introduction to theory and research. Reading (MA): Addison-Wesley.

Heissenhuber, A. & Berenz, S. (2006). Energieproduktion in landwirtschaftlichen Unternehmen. In I. Darnhofer, H. K. Wytrzens & C. Walla (Eds.), *Alternative Strategien in der Landwirtschaft* (pp. 135-144). Wien: Facultas.

Heissenhuber, A., Demmler M. & Rauh, S. (2008). Auswirkungen der Konkurrenz zwischen Nahrungsmittel und Bioenergieproduktion auf Landwirtschaft, Gesellschaft und Umwelt. *Technikfolgenabschätzung - Theorie und Praxis*, 17 (2), 23-31.

Inhetveen, H. & Schmitt, M. (2010). Prekarisierung auf Dauer? Die Überlebenskultur bäuerlicher Familienbetriebe. In A. D. Bührmann & H. J. Pongratz (Eds.): *Prekäres Unternehmertum - Unsicherheiten von selbstständiger Erwerbstätigkeit und Unternehmensgründung* (pp. 111-136). Wiesbaden: VS Verlag.

IRENA (Preparatory Commission for International Renewable Energy Agency) (2010). *Our Mission*. Retrieved March 10, 2011, from http://www.irena.org/ourMission/index.aspx?mnu=mis.

Jacobsson, S. & Lauber, V. (2006). The politics and policy of energy system transformation - explaining the German diffusion of renewable energy technology. *Energy Policy*, 34 (3), 256-276.

JURIS (2011). *Verordnung über den Zugang zu Gasversorgungsnetzen* (Gasnetzzugangsverordnung - GasNZV), Retrieved March 10, 2011, from http://www.gesetze-im-internet.de/bundesrecht/gasnzv_2010/gesamt.pdf.

Kahneman, D., Knetsch, J. L. & Thaler, R. (1986). Fairness and the Assumptions of Economics. *Journal of Business*, 59 (4), S285-S300.

Kool, M. (1994). *Buying behavior of farmers*. Wageningen: Wageningen Academic Publishers.

Langert, M. (2007). *Der Anbau nachwachsender Rohstoffe in der Landwirtschaft Sachsen-Anhalts und Thüringens - Eine innovations- und diffusionstheoretische Untersuchung*. Dissertation. University of Halle- Wittenberg.

Lynne, G. D. & Rola, L. R. (1988). Improving Attitude-Behavior Prediction Models with Economic Variables: Farmer Actions toward Soil Conservation. *The Journal of Social Psychology*, 128 (1), 19-28.

Mautz, R. (2007). The Expansion of Renewable Energies in Germany between Niche Dynamics and System Integration – Opportunities and Restraints. *Science, Technology & Innovation Studies*, (3) 2, 113-131.

Mendonca, M. (2007). *Feed-in tariffs: accelerating the deployment of renewable energy*. London: Earthscan.

Nuthall, P. L. (1999*). The psychology of decision making in farm management*. Retrieved March 15, 2011, from Lincoln University, Farm Management Group Web site: URL: http://researcharchive.lincoln.ac.nz/dspace/bitstream/10182/51/1/fhmg99-03.pdf.

− (2010). *Farm Business Management: The Human Factor*. Oxfordshire: CABI.

Plieninger, T., Bens, O. & Hüttl, R. F. (2006). Perspectives of bioenergy for agriculture and rural areas. *Outlook on Agriculture*, 35 (2), 123-127.

Pongratz, H. (1992). Die Bauern und der ökologische Diskurs. München: Profil Verlag.

Reiche, D. & Bechberger M. (2006). Policy differences in the promotion of renewable energies in the EU member states. *Energy Policy*, 32 (9), 843-849.

Retter, C., Stahr, K. & Boland, H. (2002). Zur Rolle von Landwirten in dörflichen Kommunikationsnetzwerken. *Berichte über Landwirtschaft*, 80 (3), 446-467..

Roessingh, C. & Schoonderwoerd, A. (2005). Traditional farmers or modern businessmen? Religious differentiation and entrepreneurship in a Mennonite Community in Belize. *Journal of Developmental Entrepreneurship*, 10 (1), 65-77.

Rosenbaum, W., Mautz, R. & Byzio A. (2005). *Die soziale Dynamik der regenerativen Energien – am Beispiel der Fotovoltaik, der Biogasverstromung und der Windenergie. Zwischenbericht*. University of Goettingen, Social Research Institute, SOFI.

Sauer, J. & D. Zilbermann (2009, September). *Innovation Behaviour at Farm Level – Selection and Identification*. (Paper presented at the 49th Annual Meeting of the German Association of Agricultural Economics and Sociology, GEWISOLA, Kiel).

Schaper, C. & Theuvsen, L. (2006). Die Zukunft erneuerbarer Energien: Eine SWOT-Analyse. In S. Pöchtrager (Ed.), *Ländliche Betriebe und Agrarökonomie* (pp. 15-16). Vienna: Facultas.

Schramm, R. (1977). The Influence of Relative Prices, Production Conditions and Adjustment Costs on Investment Behaviour. The Review of Economic Studies, 37 (3), 361-376.

Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics*, 69 (1), 98–118.

− (1959). Theories of Decision-Making in Economics and Behavioral Science. The American Economic Review, 49 (3), 253-283.

Solano, C., Leon, H., Perez, E. & Herrero, M. (2003). The role of personal information sources on the decision-making process of Costa Rican dairy farmers. *Agricultural Systems*, 76 (1), 3-18.

SRU (Sachverständigenrat für Umweltfragen) (2007). *Klimaschutz durch Biomasse – Sondergutachten*. Berlin.

Trojecka, A. E. (2007). *Landwirte als Energiewirte? Bedingungen einer ökologischen Modernisierung der Landwirtschaft am Beispiel der Biogaserzeugung*. Dissertation, University of Osnabrück.

van Rooij, R. (2011). Revealed preference and satisficing behavior. Synthese, 179 (S1), 1–12.

WBA (Wissenschaftlicher Beirat für Agrarpolitik beim Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz) (2007). *Nutzung von Biomasse zur Energiegewinnung – Empfehlungen an die Politik*. Berlin.

Willock J., Deary, I. J., McGregor, M. M., Sutherland, A., Edwards-Jones, G., Morgan, O., Dent, B., Grieve, R., Gibson, G. & Austin, E. (1999). Farmers' Attitudes, Objectives, Behaviors, and Personality Traits: The Edinburgh Study of Decision Making on Farms. *Journal of Vocational Behavior*, 54 (1), 5-36.

RESTRICCIONES AL DISEÑO E IMPLEMENTACIÓN DE PROYECTOS MDL FORESTALES EN ARGENTINA

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Abstract

El cambio climático se puede evidenciar de diferentes maneras. Este cambio se expresa esencialmente en el aumento de la temperatura media, la modificación de los patrones de precipitación, el incremento del nivel oceánico, la reducción de los glaciares y la modificación de los patrones de los eventos extremos. Consecuentemente, la Organización de las Naciones Unidas (ONU) tomó cartas en el asunto, buscando el compromiso de los países para mitigar los efectos nocivos del cambio climático, a través de la reducción de emisiones de gases de efecto invernadero y la absorción de emisiones que se puede llevar a cabo por medio de los proyectos del mecanismo de desarrollo limpio (MDL) concebidos como sumideros de carbono, siendo este el caso de los proyectos forestales. Argentina participa en la lucha contra el cambio climático. No obstante la ejecución de proyectos MDL forestales, ha tenido un escaso desempeño debido a la no conjunción de diversas restricciones que se analizan a nivel institucional, organizacional y tecnológico. Esto deja entrever la necesidad de rediseño a partir de la innovación para fomentar la correcta expansión de esta actividad en un marco de sostenibilidad.

Key words: Cambio climático, Protocolo de Kioto, forestales, restricciones

RESTRICCIONES AL DISEÑO E IMPLEMENTACIÓN DE PROYECTOS MDL FORESTALES EN ARGENTINA

1. Introducción

El cambio climático constituye uno de los grandes desafíos para la humanidad en los últimos años (CEPAL, 2010). En este sentido, la Convención Marco de las Naciones Unidas sobre el Cambio Climático de 1992, inició las acciones para comprender mejor la problemática del cambio climático y sus impactos potenciales (Nuñez, 2010). Las partes de esta Convención generalmente se reúnen anualmente en una Conferencia (COP). Así, durante su tercer encuentro llegaron a acordar el Protocolo de Kioto en diciembre de 1997, aunque finalmente entraría en vigor en febrero de 2005 (Eguren *et al*, 2006). Este acuerdo constituye la mayor institución en el ámbito de la política climática, en términos geográficos y de tamaño potencial de mercado, es el Protocolo de Kioto (Woerdman, 2004). Su objetivo central establece el compromiso legal de 39 países desarrollados por reducir las emisiones de gases de efecto invernadero (GEI), en un promedio de 5.2% con relación a los niveles de emisiones de 1990 durante el "Primer Período de Compromiso" que comprende los años 2008 – 2012 (Aukland *et al*, 2002).

El Protocolo adicionalmente establece los mecanismos de flexibilidad que están diseñados para ayudar a las partes Anexo I, a lograr sus objetivos nacionales de mitigación. Uno de estos mecanismos, es el mecanismo de desarrollo limpio (MDL) que permite la implementación de proyectos de reducción de emisiones en las Partes no Anexo I (en desarrollo) (Eguren *et al*, 2006). De este modo, el MDL admite 15 clases de actividades de proyecto, dentro de las cuales se incluyen los proyectos forestales de forestación y reforestación exclusivamente (Salinas *et al*, 2008).

Sin embargo, el sector forestal ha tenido una expansión incipiente dentro del MDL. De hecho, en Argentina existe un solo proyecto que ha conseguido el registro de la Junta Ejecutiva del MDL. Esto puede ser una consecuencia de varios aspectos que influyen especialmente en este tipo de actividades. Dados estos antecedentes, es necesario estudiar las principales restricciones al diseño e implementación de proyectos MDL forestales en Argentina. Los objetivos secundarios se enfocan en: a) estudiar las restricciones institucionales, b) estudiar las restricciones organizacionales, y c) estudiar las restricciones tecnológicas.

2. Métodos de investigación

La presente investigación es de carácter descriptivo. En este sentido se estudia el problema desde un punto de vista general y otro específico. Las restricciones generales se dilucidan a partir de la investigación de literatura referente al tema. Mientras que las restricciones específicas se esclarecen a partir del análisis de archivos que sustentan el proceso de diseño e implementación del único proyecto forestal en la Argentina que ha conseguido el registro de la Junta Ejecutiva del MDL.

3. Marco teórico

3.1 La Nueva Economía Institucional

La NEI constituye un programa de investigación alternativo al neoclásico (Arias y Caballero, 2003) que se interesa en estudiar las instituciones sociales, políticas y económicas contemporáneas (Klein, 1999). Se focaliza en el surgimiento de las instituciones, su operación y modificación (Ménard y Shirley, 2005), y en todo caso cómo se deberían reformar (Klein, *op. cit.*), si se tiene en cuenta la evaluación de la eficiencia económica de las instituciones (Nabli y Nugent, 1989).

En un contexto económico y político que se caracteriza por costos de transacción positivos (Arias y Caballero, 2003), las instituciones cobran importancia (Matthews 1986). Esto se debe a la influencia de las instituciones en los costos de transacción y posibilidades de coordinación, facultando o retardando el crecimiento económico (Kherallah y Kirsten, 2001). En un nivel macro los costos de transacción estarán determinados por las reglas de juego de una sociedad. Entonces, una mayor competitividad, resultado de menores costos de transacción, es consecuencia de una baja incertidumbre institucional, instituciones claras, un alto cumplimiento de las mismas y un Estado de Derecho, concretamente de derechos de propiedad (North, 1990).

Adicionalmente, la NEI estudia la interacción de las instituciones con los mecanismos organizacionales. Estos mecanismos son los diferentes modos de gobernancia implementados por los agentes para facultar la producción y el intercambio. Dentro de estos modos se encuentran el mercado, la firma y otras combinaciones que facilitan las transacciones y acuerdos contractuales que proveen un marco para organizar las actividades (Ménard y Shirley, 2005). Entender los factores que determinan qué tipo de transacciones son mediadas a través de los mercados y las firmas, constituye el tema fundamental de trabajo para la NEI (Joscow, 2005).

La NEI no deja de lado la teoría económica neoclásica (Ménard y Shirley, 2005). De esta manera el análisis neoclásico tiene la finalidad de crear condiciones marginales adecuadas que determinan las economías de tercer orden (Williamson, 2000). Este nivel hace referencia a la operación del día a día de la economía, considerando que las instituciones están dadas y definidas en los niveles precedentes. Precios, salarios, costos, cantidades compradas y vendidas se determinan aquí como consecuencias del monopolio, oligopolio y otras imperfecciones del mercado neoclásico. Williamson incluye la teoría de la agencia y la alineación de incentivos dentro y entre las organizaciones (Joscow, 2004).

3.2 Análisis Estructural Discreto

El análisis estructural discreto es estudio minucioso de los entornos institucional, organizacional y tecnológico. En el entorno institucional se analizan las instituciones formales e informales. Por otro lado, en el ambiente organizacional se destacan los jugadores. En este ambiente es importante analizar las características de las transacciones, el intercambio, la estructura de gobernancia, la estrategia del negocio. En el entorno tecnológico se especifican las tecnologías de proceso y de producto. El abordaje teórico de la NEI en este ambiente parte de la economía neoclásica y la teoría de la agencia orientada a la asignación de recursos y empleo (Ordóñez, 2000).

A través del análisis estructural discreto se **puede desarrollar un proceso de rediseño** que logre mayor eficiencia (Ordóñez, *op. cit.*). Para tal efecto, es recomendable

siempre estudiar primero los efectos de primer orden (estructuras discretas) antes que examinar los refinamientos de segundo orden (marginalistas). En este sentido, el análisis estructural discreto comparado de las instituciones y de las estructuras de gobernancia alternativas, facilita la comprensión del desperdicio y permite llevar adelante las economías de primer orden. Sin embargo el conjunto de restricciones para el cambio en los entornos institucional, organizacional y tecnológico, conlleva a explorar los conceptos de remediabilidad y dependencia de la trayectoria con su aplicación en la economía y los negocios (Ordóñez, *op. cit.*).

4. Los proyectos forestales en los mercados de carbono

4.1. Mercados para los Derechos de Carbono

El mercado de carbono surge por la necesidad de implementar medidas a consecuencia del calentamiento global acelerado propiciado por la actividad humana (Eguren, 2004). En este sentido, la comunidad internacional eligió esta alternativa financiera que se sustenta en una teoría elaborada por Ronald Coase en 1960 (Bernier, 2009). En efecto, el economista consideró que la contaminación del medio ambiente tenía su explicación en la pobre definición de los derechos de propiedad (Brohé *et al*, 2009). De este modo, si se asignan los derechos de propiedad a los bienes públicos, se produciría un uso socialmente eficiente de los recursos, incluso con la presencia de externalidades. Con la asignación de los derechos de propiedad, las partes pueden negociar a través del mercado para lograr el uso óptimo de los recursos de propiedad común. La asignación de los derechos y los medios por los cuales se transfieren, constituye una función de las leyes sobre la propiedad y las regulaciones del mercado. Una vez que estos aspectos están presentes, conjuntamente con los términos acordados de la negociación, el mercado puede operar libremente, permitiendo a los compradores y vendedores ajustar sus necesidades según sus requerimientos individuales (Swingland, 2003), para la compraventa de permisos de emisiones que son distribuidos por un órgano regulador o generados en un proyecto de reducción de GEI (Bayon *et al,* 2007).

Existen varios mercados de carbono caracterizados por sus reglas, los tipos de activos comercializables y los tipos de actores implicados. Sin embargo, se reconocen dos grandes categorías Chenost *et al* (2010):

- *Los* ***mercados de cumplimiento****, regulados dentro del marco de acuerdos internacionales, de políticas nacionales o locales* (Chenost *et al*, op. cit.).

- *Los* ***mercados voluntarios*** *que* no son jurídicamente vinculantes, pero se han desarrollado como respuesta a aquellos que están interesados en convertirse en carbón neutral (Bent y Peña, 2007).

Los mercados de cumplimiento funcionan en base a acuerdos internacionales y políticas nacionales o locales que obligan a los países o actores económicos a reducir sus emisiones de GEI y a la vez atribuyen una cuota de derechos de emisiones susceptibles de transferir. Se fija un objetivo de emisión total que los entes deben lograr, bien sea reduciendo sus emisiones o adquiriendo permisos de emisiones a los actores que han logrado reducir sus emisiones sobre sus compromisos. Los mercados de cumplimiento incluyen los mecanismos flexibles de Kioto, el sistema de cuotas europeas (EU-ETS) y otros mercados regulados de menor tamaño (Chenost *et al*, 2010).

4.1.1. El Sector Forestal en el Mecanismo de Desarrollo Limpio

La consideración del uso de la tierra, el cambio de uso de la tierra y la silvicultura (LULUCF, por sus siglas en inglés) ha tenido una evolución muy compleja. Si bien, los artículos 3.3 y 3.4 del PK establecen la elegibilidad de diferentes actividades relacionadas con el sector LULUCF; el artículo 12 del mismo protocolo, no especifica ninguna actividad en referencia a la reducción de emisiones. Consecuentemente, este sector acaparó la atención de algunas reuniones de las Conferencias de las Partes (CoP). Así, en la CoP 4 de 1998, se fijó como fecha tope el año 2000 para el tratamiento de los tópicos relacionados con el uso de la tierra y la silvicultura. Sin embargo, las negociaciones de la CoP 6 del año 2000 fracasaron como resultado de las divergencias de opiniones respecto a la inclusión de las actividades forestales dentro del MDL (Aukland *et al*, 2002).

Finalmente, la CoP 6.5 de julio de 2001 incorporó la forestación y reforestación (F/R) al MDL como las únicas actividades del uso de la tierra, elegibles para el primer período de compromiso (Aukland *et al*, *op. cit.*). De este modo, en la decisión 16/CMP.1 se limita la elegibilidad de estos proyectos a la forestación y reforestación (F/R) y se define el concepto de bosque dentro del MDL (CMP, 2005a). Además, la CoP 6.5 también estableció que sólo el 1% de las metas anuales de reducción de emisiones de los países desarrollados, para los 5 años del primer período de compromiso, pueden ser cumplidas utilizando créditos de proyectos forestales (Aukland et al, *op.cit.*). Sin embargo, no se definieron más reglas para el sector forestal; pero se estableció una serie completa de reglas y modalidades para los proyectos de reducción de emisiones, lo cual posibilitó un desarrollo ágil de los sectores de la energía, captura de metano, entre otros, a diferencia del sector forestal (Neeff y Henders, 2007).

Las reglas y modalidades para el sector forestal finalmente se establecieron en el año 2003 (Neeff y Henders, *op. cit.*). Así, la decisión 19/CP.9 define algunas características del diseño de los proyectos MDL de F/R. En este sentido se señala la no permanencia (tCER[91] o lCER[92]), líneas de base, adicionalidad, las fugas y los impactos ambientales y socioeconómicos (CP, 2003). Sin embargo, la primera metodología para el sector forestal recién fue aprobada por la Junta Ejecutiva del MDL a finales de 2005 (Chenost *et al*, 2010). Consecuentemente, este sector ha tenido un desarrollo retardado, a tal punto que el registro del primer proyecto se dio en el año 2006 (Chenost et al, 2010). En la actualidad, los datos suministrados por la CMNUCC (2011a), evidencian que los proyectos forestales aún mantienen una **escasa participación**, considerando que existen 26 proyectos aprobados de un total de 3204 proyectos registrados dentro de los distintos ámbitos sectoriales.

4.1.2. El Sector Forestal en el esquema de comercio de derechos de emisión de la Unión Europea

La Unión Europea ha establecido su propio esquema de límites máximos y negociación. Considerando que el PK permite a las Partes lograr sus objetivos de reducción individual o colectivamente (Gutbrod *et al*, 2010), el esquema de comercio de derechos de emisión de la Unión Europea (EU ETS) constituye en sí, como una política de regional establecida para enfrentar al cambio climático (European Comission, 2010). El Parlamento

[91] tCER: Créditos temporales otorgados para remoción de emisiones certificadas para un proyecto MDL de forestación o reforestación que expiran al final del período de compromiso subsiguiente al período en el que fueron emitidos (CP, 2003).

[92] lCER: Créditos de largo plazo otorgados para reducción de emisiones certificadas por un proyecto MDL de forestación o reforestación (para ser reemplazados al expirar a finales del período de acreditación del proyecto o en caso de reversión de almacenamiento o la no presentación de un informe de certificación) (CP, 2003).

Europeo adoptó en el año 2003, la Directiva 2003/87/EC que dio origen al EU ETS. Un año más tarde, durante 2004 la UE adoptó la Directiva de Enlace 2004/101/EC para vincular el EU ETS a los mecanismos de IC y MDL del PK (Skjærseth y Wettestad, 2008). Sin embargo, el esquema representa un obstáculo serio para el desarrollo del MDL forestal, dada la negativa de aceptación de las CERs forestales. Este bloqueo se asocia a factores político, factores contables y al temor de que la afluencia de créditos forestales desestabilice este flamante mercado Chenost *et al*, (2010).

4.2. El MDL y el Sector Forestal en Argentina

El MDL es el único mecanismo destinado para la participación de países en desarrollo. No obstante, para que un país sea considerado como anfitrión de un proyecto MDL, es necesario el cumplimiento de determinados requerimientos generales de elegibilidad. Estos requerimientos establecen que el país sea Parte del PK, que la participación en un proyecto MDL sea voluntaria y que cuente con una Autoridad Nacional Designada (AND). En este sentido, como signatario de la Convención Marco Sobre el Cambio Climático, ratificada por la Ley 24.295, Argentina se alinea con estos requerimientos por cuanto corrobora su participación en el PK mediante la Ley 25.438 y con el Decreto 2213/02 designa a la Secretaría de Ambiente y Desarrollo Sustentable como la AND para la aprobación interna de los proyectos MDL (Magnasco, 2008).

El sector forestal en Argentina tiene un gran potencial de desarrollo. El total de plantaciones forestales se acerca al millón de hectáreas y se estima que existen 20 millones de hectáreas adicionales en las que se puede desarrollar la silvicultura (SAGPyA, 2009, citada por Novartis AG, 2010). Para incentivar el desarrollo de la silvicultura, se creó la Ley 25.080[93] que plantea algunos beneficios para estas actividades (Moncayo von Hase y García, 2008). Sin embargo, dentro del MDL, existen dos proyectos forestales registrados por la AND (SAyDS, 2011); de los cuales solamente uno ha conseguido el registro por parte de la Junta Ejecutiva del MDL (CMNUCC, 2011b).

4.3. Perspectivas de los Mercados de Carbono

El éxito global de los esfuerzos contra el cambio climático depende de un acuerdo internacional que reemplace al PK en 2012. Sin embargo, la negociación de un nuevo acuerdo global aún es incierta (Gutbrod *et al*, 2010). Un nuevo acuerdo puede tomar la forma de una enmienda al actual protocolo, puede surgir un nuevo protocolo, e inclusive se podría llegar a la instauración de un impuesto al carbono o la combinación de acuerdos más pequeños, focalizados en la reducción de emisiones (Gutbrod *et al*, op.cit.), para hacer frente a la externalidad mundial de las emisiones de CO_2 (Nordhaus, 2008).

5. Proyecto de reforestación de campos de pastura en santo domingo, argentina.

Si bien la industria farmacéutica no es un sector de alto consumo energético, Novartis considera que la eficiencia energética y la reducción de las emisiones de GEI son importantes para su éxito a largo plazo. En este sentido, la farmacéutica considera al PK como un instrumento político para obtener ganancias y no para evitar sanciones económicas. Es por ello que en el año 2005 Novartis hizo un compromiso voluntario para reducir sus emisiones de GEI, en 5% por debajo del nivel de 1990 hasta el año 2012 en línea con los objetivos establecidos por el PK, considerando que el fuerte crecimiento de la empresa había empujado el consumo de energía y de GEI. Más allá de ello, en el año 2010 Novartis se fijó nuevos

[93] LEY 25.080 DE INVERSIONES PARA BOSQUES CULTIVADOS, prorrogada mediante Ley 26.432. Disponible en: http://www.minagri.gob.ar/new/0-0/forestacion/regimen/ley2.htm

objetivos de reducción de emisiones totales de GEI. Así determinó una reducción del 15% para el año 2015 y del 20% para el año 2020 con respecto al nivel de 2008. Dados estos ambiciosos objetivos, la farmacéutica puso en marcha un programa integral de energía y clima con los objetivos de: (i) aprovechar al máximo las medidas de mejora interna de eficiencia y energías renovables, y (ii) aprovechar los proyectos de compensación de carbono[94]. Consecuentemente, la multinacional con sede en Suiza, decide emprender en un proyecto de reducción de emisiones en Argentina. Esta decisión se indica en el Reporte de la Reunión de la Junta Ejecutiva de Novartis Pharma AG que tuvo lugar el 16 de Junio de 2006. Esto determinaría la participación de Novartis Argentina S.A. como el participante local del proyecto MDL de reforestación (TÜV SÜD Industrie Service GmbH, 2010).

5.1. Historia del Desarrollo del Proyecto

5.1.1. Desarrollo del Documento de Diseño del Proyecto (DDP)

La primera versión de la DDP fue presentado a la entidad operacional designada en agosto de 2008. Este documento y otra información complementaria de los antecedentes relacionados con el diseño del proyecto y la base de referencia, se revisaron para verificar la veracidad de la información desplegada, inclusive corroborándola por medio de entrevistas con los interesados del proyecto. En lo posterior, luego de que un requerimiento de aclaración y acción correctiva fuera solventado por parte del proponente del proyecto, se presentó la versión final del DDP en noviembre de 2010 para su evaluación a cargo de TÜV SÜD (TÜV SÜD Industrie Service GmbH, 2010).

El DDP describe varios detalles sobre el diseño y la forma de ejecución del proyecto. En este sentido se menciona la ubicación del proyecto en el Departamento de Ituzaingó, Provincia de Corrientes con una extensión de 2.292 hectáreas para reforestar en un período de 3 años a partir del año 2007. La actividad de proyecto está clasificada en el ámbito de la forestación y reforestación, y emplea la metodología AR-AM0005 (versión 3) determinada para fines comerciales y/o industriales. Se estima que la actividad de proyecto logre una reducción de emisiones de 66.038 toneladas de CO_2e por año, con un período de acreditación de 20 años, renovable por dos períodos más (Novartis AG, 2010).

5.1.2. Aprobación del país de origen y de la Junta Ejecutiva del MDL

La AND de Argentina expide la Carta de Aprobación en febrero de 2010 autorizando a Novartis Argentina S.A. como participante de proyecto. Consecuentemente, se determina que Argentina es Parte del PK, la participación en el proyecto es voluntaria y que la actividad de proyecto MDL contribuye al desarrollo sostenible del país (TÜV SÜD Industrie Service GmbH, 2010). Luego de la validación del proyecto en noviembre de 2010 a cargo de la entidad operacional designada, TÜV SÜD Industrie Service GmbH recomienda el registro del proyecto a la Junta Ejecutiva del MDL (TÜV SÜD Industrie Service GmbH, 2010). Esta operación finalmente se concretó el proyecto el 11 de febrero de 2011 con un periodo de acreditación que va desde Mayo de 2007 hasta Mayo de 2027[95], constituyéndose así, en el primer proyecto de reforestación de la Argentina en ser registrado a nivel internacional[96].

[94] Información disponible en el portal: http://www.corporatecitizenship.novartis.com/environmental-care/minimizing-impacts/energy-climate.shtml
[95] Información disponible en: http://cdm.unfccc.int/Projects/DB/TUEV-SUED1290082467.8/view
[96] Información disponible en: http://cdm.unfccc.int/Projects/projsearch.html

5.2 Análisis Estructural Discreto

5.2.1 Ambiente Institucional

El ambiente institucional se encuentra definido por algunas leyes que rigen el desarrollo del proyecto. En referencia a la ejecución del proyecto, se precisa mencionar que las inversiones forestales disponen de algunos incentivos provistos por la Ley 25.080 y que estos beneficios de ninguna manera afectan el derecho de tenencia o los créditos de carbono (TÜV SÜD Industrie Service GmbH, 2010). Además, respecto a la ejecución de la evaluación de impacto ambiental el Decreto 133/99 de la misma ley, conjuntamente con la Ley 5.067[97] de la Provincia de Corrientes se consideraron para tal efecto (Novartis AG, 2010).

El reconocimiento del derecho de propiedad se reconoce en los artículos 14 y 17 de la Constitución Nacional de la República Argentina[98]. Con esta base se define como propietario de la tierra a la fiduciaria GMF Latinoamericana S.A. localizada en Salta, que actúa a nombre de Novartis Argentina S.A. conforme a los términos del Contrato de Derechos Operativos y de Forestación. La propiedad de la tierra se transmitirá a Novartis Argentina S.A cuando la Comisión de Nacional de Zonas de Seguridad apruebe su solicitud. Actualmente, se está llevando a cabo el proceso legal para la transferencia de la tierra (Novartis AG, 2010), conforme al artículo 4 del Decreto Ley 15.385/1944,[99] modificado por Ley 23.554. En lo que concierne a la propiedad de las lCERs, Novartis Argentina S.A. ha transferido los derechos exclusivos de los créditos generados por la actividad de proyecto MDL de forestación y reforestación a Novartis Pharma AG por medio del Contrato de Compra de Reducciones de Emisiones (ERPA) (Novartis AG, 2010).

5.2.2 Ambiente Organizacional

En el análisis del ambiente organizacional se establece la participación de organismos privados y oficiales del MDL. Respecto a los organismos privados se determina el rol de Novartis Argentina S.A. y Novartis Pharma AG como los participantes del proyecto, definiéndose así, la participación de Argentina como Parte anfitriona y de Suiza como Parte complementaria. No obstante, la ejecución del proyecto se configura a través de una relación de agencia, dado el lazo contractual entre GMF Latinoamericana S.A. y Novartis, con la finalidad de administrar y coordinar todas las actividades del proyecto, facilitar y supervisar la implementación de la actividad de proyecto MDL de F/R propuesta, organizar la formación técnica y consultas, así como también monitorear la captura de GEI de los sumideros y las fugas generadas por la actividad del proyecto. También se precisa mencionar la función desempeñada por ECO-CONSULTING S.R.L. en el desarrollo de la evaluación del impacto ambiental para el proceso de certificación del Consejo de Administración Forestal (FSC) y de los dueños de los viveros localizados en Misiones y Corrientes (Novartis AG, 2010).

En cuanto a los organismos oficiales del MDL se destaca el papel de la Autoridad Nacional Designada, la Entidad Operacional Designada y la Junta Ejecutiva del MDL. En este sentido Novartis Argentina S.A. obtiene la autorización de la Secretaría de Ambiente y Desarrollo, según lo confirma la carta de aprobación emitida el 8 de febrero 2010, como participante del proyecto, sucediendo lo propio con Novartis Pharma AG, que también recibe

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[97] LEY 5067 DE EVALUACIÓN DE IMPACTO AMBIENTAL. Disponible en: www.ambiente.gov.ar/archivos/web/DCA/File/corr_ley_5067.pdf

[98] Constitución Nacional de la República Argentina. Disponible en: http://www.senado.gov.ar/web/interes/constitucion/capitulo1.php

[99] DECRETO LEY 15.385/1944 de CREACIÓN DE ZONAS DE SEGURIDAD. Disponible en: http://www.mininterior.gov.ar/fronteras/sol_archivos/normativas/Decreto-Ley15385-44.pdf

la autorización respectiva por parte de la Oficina Federal del Ambiente de Suiza el 23 de agosto 2010. Mientras tanto la certificadora TÜV SÜD Industrie Service GmbH, constata que el proyecto satisface todos los requerimientos importantes de la CMNUCC para el MDL y recomienda el registro a la Junta Ejecutiva del MDL (TÜV SÜD Industrie Service GmbH, 2010).

A. Características de la Transacción

Frecuencia: Se determina que la frecuencia de la transacción es baja. Novartis Argentina a través del ERPA acordó la transferencia de los derechos de las lCERs generadas por el proyecto a Novartis Pharma AG (Novartis AG, 2010). Por lo tanto, el flujo de lCERs se producirá luego de cada verificación y certificación realizada por una EOD, y de la expedición ejecutada por la Junta Ejecutiva del MDL cada cinco años a lo largo del período de acreditación.

Incertidumbre: Existen varios eventos que pueden interferir en el desarrollo de este proyecto y consecuente transferencia de lCERs. Los eventos más importantes son: (i) la posibilidad de que el proyecto tenga un bajo desempeño y no se generen las lCERs pronosticadas, (ii) la no permanencia del carbono secuestrado por motivo de incendios u otros factores y (iii) la continuidad del PK o cualquier tratado similar que determine nuevas reglas de juego después del año 2012.

Especificidad de Activos: Existen altos activos específicos envueltos en la transacción de lCERs. A continuación se describen los mismos:

- *Especificidad de Activos Temporales: las lCERs expiran en el año 2027; pero el primer periodo de cumplimiento otorga validez institucional a los créditos hasta el año 2012.*

- *Especificidad de Activos Humanos: el personal propio de Novartis Argentina S.A y el equipo de GMF Latinoamericana S.A. representan una alta especificidad de activos humanos inmersos en la gestión del carbono generado por el proyecto.*

- *Especificidad de Activos Físicos: La biomasa almacenada en los árboles.*

B. Estructura de Gobernancia

La integración vertical es el mecanismo de gobernancia que facilita la ordenación interna de las transacciones cuando el grado de incertidumbre y/o el nivel de especificidad de activos son lo suficientemente altos (Ménard, 2000). Considerando que la incertidumbre institucional que envuelve a los mercados de carbono es alta y que el nivel de especificidad de activos también es elevado; la multinacional Novartis Pharma AG, como parte de su estrategia voluntaria para reducción de sus emisiones, ha desarrollado el proyecto de reforestación a través de su subsidiaria Novartis Argentina S.A. De este modo, Novartis Argentina S.A. acordó transferir las lCERs generadas por el proyecto a Novartis Pharma AG conforme a la regulación del ERPA (Novartis AG, 2010).

5.2.3 Ambiente Tecnológico

La generación de lCERs es el principal incentivo para el establecimiento de la plantación forestal (Novartis AG, 2010). En este sentido, Novartis decide establecer un

bosque de gran valor natural con clara preferencia en especies nativas (TÜV SÜD Industrie Service GmbH, 2010). A pesar de que la zona donde se desarrolla el proyecto es bastante lejana y la infraestructura es insuficiente, se logra la conformación de una plantación de 2.292 hectáreas reforestadas con 75% de especies nativas y 25% de especies exóticas. Para ello se adquirieron las plántulas en diferentes viveros localizados en las provincias de Misiones y Corrientes y se trasladaron a la zona de plantación en camiones con un ambiente controlado (Novartis AG, 2010). La actividad de plantación se llevó a cabo desde el año 2007 hasta el año 2009. A más de ello, cabe precisar que la plantación se rige por los principios y criterios del FSC, lo que proporciona mayor garantía de calidad a la gestión de la plantación y hace que el proyecto sea innovador en comparación con otras actividades de reforestación en el norte de Argentina (TÜV SÜD Industrie Service GmbH, 2010). El empleo de especies nativas se justifica al considerar que el proyecto no se basa en la maximización del retorno sobre la producción de madera. Si éste fuera el caso, la siembra de especies de rápido crecimiento se habría privilegiado. Consecuentemente, los propietarios del proyecto comprometieron el capital requerido para ejecutar el proyecto MDL de reforestación, asumiendo los riesgos del mercado de la madera producida con el propósito exclusivo de generar lCERs (Novartis AG, 2010).

5.3 Principales Restricciones en el Desarrollo del Proyecto

A nivel institucional, existen algunas leyes que inciden en el desarrollo del proyecto. En este sentido, la Ley 25.080 no es aplicable en lo que se refiere a los subsidios directos dependientes de la escala, al considerar que el proyecto sobrepasa el límite de 500 hectáreas reforestadas por año, aunque podría haber aplicado sólo para el área plantada durante el año 2009. Sin embargo, el proyecto aplicará exclusivamente a los beneficios fiscales. Por otro lado, es necesario destacar que la definición de la propiedad de la tierra, constituye un factor relevante en el desarrollo de la actividad propuesta. Teniendo en cuenta que de acuerdo al Decreto Ley 15.385/1944, modificado por Ley 23.554, es la Comisión de Nacional de Zonas de Seguridad el organismo que debe emitir la aprobación de la solicitud remitida por Novartis Argentina S.A. en relación a la radicación de la transferencia de dominio. En este sentido, la incertidumbre generada se mantendrá hasta el momento en que se decrete la titularidad de la tierra a favor del solicitante.

A nivel organizacional también existen factores que han limitado el desarrollo del proyecto. En este sentido, se debe precisar que existe una baja densidad poblacional en la zona donde se sitúa el proyecto (3,6 habitantes/km² en el Departamento de Ituzaingó) y que las empresas familiares de la zona son muy débiles para manejar la cadena de valor de las inversiones en madera a largo plazo (Novartis AG, 2010). Existen aproximadamente 12 familias que se dedican a la ganadería en la región y la posibilidad de encontrar personal con conocimientos técnicos con respecto al manejo de la plantación de especies nativas es escasa (Eco Consulting, 2007 citado por Novartis AG, 2010).

El ambiente tecnológico sin lugar a dudas representa el ámbito que plantea mayores desafíos para la ejecución del proyecto. Esto se da por cuanto la posibilidad de acceso a fuentes proveedoras de semillas de calidad de especies nativas en la región es muy baja (Eco Consulting, 2007 citado por Novartis AG, 2010). A más de ello, las especies nativas tienen un largo período de crecimiento en contraposición a plantaciones comerciales constituidas por pinos y eucaliptos principalmente (Novartis AG, 2010). Por lo tanto, se considera imprescindible la asignación de recursos por parte de Novartis Pharma AG para financiar el proyecto, ya que de no haber sido así, el proyecto propuesto no se hubiera desarrollado con el propósito exclusivo de generar CERs de larga duración, más aún al tener en cuenta que los

ingresos provenientes de la madera y las lCERs, sólo se obtienen después de varios años de iniciada la actividad del proyecto MDL de F/R propuesto (Novartis AG, 2010). Además, el mercado de madera nativa es inexistente (Dellacha et al, 2007 citado por Novartis AG, 2010), y como resultado de la no expedición de lCERs hasta el momento, no existen indicadores claros de precio de las lCERs y por lo tanto no es posible determinar los costos evitados en comparación a la obtención de una cantidad similar de lCERs de otro proyecto por parte de Novartis Pharma AG (Novartis AG, 2010).

6. Conclusiones

En un ámbito general existen algunas restricciones que subyacen en el desarrollo de los proyectos MDL forestales. Sin lugar a dudas, el ambiente institucional de estas actividades se caracteriza por la complejidad. Esto se ve expuesto en la definición tardía de las reglas de juego del sector forestal en el MDL, siendo esto el motivo principal de su inicio retrasado. Es preciso mencionar que el mercado regulado del MDL se desarrolla en un ambiente de alta incertidumbre institucional. Si bien el Protocolo de Kioto determina las reglas de juego para el primer período de compromiso que concluye a finales de 2012; existe mucha inseguridad sobre lo que pueda suceder luego de este término. Aunque la continuidad del actual protocolo con algunas enmiendas dentro de los mecanismos de flexibilidad parecería ser la opción más viable, también es posible que se constituyan otros acuerdos regionales e inclusive se llegue a la implementación de un impuesto al carbono. Si a esto le sumamos la renuencia del EU ETS para incorporar el comercio de derechos forestales, se obtiene como resultado un sector forestal que se encuentra en un estado primitivo de evolución.

A pesar de ello, la firma multinacional Novartis Pharma AG con sede en Suiza tomó la resolución de autoabastecerse de lCERs, a través de su filial localizada en Argentina en virtud de su programa voluntario de reducción de emisiones. De este modo, Novartis Argentina S.A transfirió el derecho de las CERs generadas por el proyecto a Novartis Pharma AG por medio del ERPA. Esta estrategia ayuda a reducir la incertidumbre, los riesgos implícitos por la contratación incompleta y los inherentes costos de transacción. A más de ello, la delegación de la ejecución del proyecto a GMF Latinoamericana S.A. por medio de un acuerdo contractual, constituye una opción conveniente dada la especialización de la empresa contratada y la evasión de mayores costos burocráticos que supone la integración vertical.

Aunque existen beneficios planteados por la Ley 25.080 de inversiones forestales, el proyecto desarrollado no aplica del todo a los mismos. Esto se debe a que los parámetros considerados por esta normativa, están muy por debajo de la realidad de este negocio. Por lo tanto es necesario un proceso de innovación que plantee mejores incentivos para el desarrollo del sector forestal, especialmente dentro del marco del MDL.

Además, se debe considerar que los derechos de propiedad son muy importantes para canalizar el crecimiento económico. Si bien la propiedad de los derechos de carbono ha sido transmitida a Novartis Pharma AG, no sucede lo mismo con la transferencia de la tierra. Este proceso ha sido prolongado y debe regirse a otros lineamientos ya que la locación del proyecto se encuentra próxima a una zona de frontera. Por ello, la incertidumbre generada se mantiene hasta el instante en que se apruebe la solicitud emitida por Novartis Argentina S.A.

La escasez de personal apto para el manejo de la cadena de valor constituye una limitación importante a nivel organizacional. Esto se debe a que la posibilidad de encontrar personal en la zona que posea conocimientos técnicos es muy baja. Si a esto le sumamos que

en el ambiente tecnológico existe un bajo nivel de infraestructura en lo que concierne al abastecimiento de plántulas de especies nativas, lo cual ha producido la agregación de costos al desarrollo del proyecto en vista del traslado de las plántulas; resulta clave el hecho de que se deben generar ventajas comparativas a partir de un proceso de innovación que involucre a los proveedores de semillas y sustratos, los dueños de los viveros, productores de madera, aserraderos y comercializadores, con la finalidad de mejorar el desempeño económico de esta clase de actividades.

7. Referencias

Arias X.C, Caballero G. 2003. Una reorientación teórica de la economía política: el análisis político de los costes de transacción. Revista Española de Ciencia Política. (8), Abril. p. 131-161.

Aukland, L; Moura Costa, P; Bass, S; Huq, S; Landell-Mills, N; Tipper, R; Carr R. 2002. Colocando los cimientos para El MDL: Preparando al sector del uso de la tierra. Una guía rápida al MDL. IIED, Londres.

Bayon, R; Hawn, A; Hamilton, K. 2007. Voluntary Carbon Markets. Earthscan. p. 5, 7.

Bent, L; Peña, E. 2007. El mercado de carbono. Revista Perspectiva. 15. Ed. P. 27 – 29. Disponible en: http://www.revistaperspectiva.com/archivos/revista/No%2015/bent.pdf

Bernier, A. 2009. La lucha contra el cambio climático, prisionera de las finanzas. *In* Bardie, B; Vidal, D. Dirs. El estado del mundo. Anuario económico geopolítico Mundial 2010. Akal. p. 163.

Brohé, A; Eyre, N; Howarth, N. 2009. CARBON MARKETS: An International Business Guide. Earthscan. p. 25.

CEPAL (Comisión Económica para América Latina y el Caribe). 2010. La economía del cambio climático en América Latina y el Caribe: Síntesis 2010. Santiago de Chile. Disponible en: http://www.eclac.org/publicaciones/xml/8/41908 /2010-913 Sintesis-Economia cambio climatico-COMPLETO WEB.pdf

Chenost, C; Gardette, Y-M; Demenois, J; Grondard, N; Perrier, M; Wemaëre, M. 2010. Los mercados de carbono forestal. UNEP, French Development Agency, World Bank, BioCarbon Fund, ONF International. Disponible en: http://www.unep.fr/energy/activities/forest_carbon/pdf/spanish%20version%205.pdf

CMNUCC (Convención Marco de las Naciones Unidas Sobre el Cambio Climático). 2011a. Registration. CMNUCC. Disponible en: http://cdm.unfccc.int/Statistics/Registration/RegisteredProjBYScopePieChart.html

_____. 2011b. Project Search. CMNUCC. Disponible en: http://cdm.unfccc.int/Projects/projsearch.html

CMP (Conferencia de las Partes en Calidad de Reunión de las Partes en el Protocolo de Kioto). 2005a. INFORME DE LA CONFERENCIA DE LAS PARTES EN CALIDAD DE REUNIÓN DE LAS PARTES EN EL PROTOCOLO DE KYOTO SOBRE SU PRIMER PERÍODO DE SESIONES, CELEBRADO EN MONTREAL DEL 28 DE NOVIEMBRE AL 10 DE DICIEMBRE DE 2005. Decisión 16/CMP.1. CMNUCC. Disponible en: http://unfccc.int/resource/docs/2005/cmp1/spa/08a03s.pdf#page=3

CP (Conferencia de las Partes). 2003. Modalities and procedures for afforestation and reforestation project activities under the clean development mechanism in the first commitment period of the Kyoto Protocol. Decision 19/CP.9. CMNUCC. Disponible en: http://unfccc.int/resource/docs/cop9/06a02.pdf

Eguren, L. 2004. El mercado de carbono en América Latina y el Caribe: balance y perspectivas. Publicación de las Naciones Unidas. p. 7. Disponible en: http://www.eclac.org/publicaciones/xml/2/14902/lcl2085e.pdf

Eguren, L; Fernández; F; Acquatella, J; Alvarez, D; Antonissen, M. 2006. ANALYSIS OF THE PRESENT SITUATION AND FUTURE PROSPECTS OF THE CLEAN DEVELOPMENT MECHANISM (CDM) IN THE FEALAC MEMBER COUNTRIES. Publicación de las Naciones Unidas.

European Commission. 2010. The European Union emissions trading scheme: a cost-effective tool for addressing climate change. European Commission. 200 Rue de la Loi, B-1049 Brussels, Belgium.

Gutbrod, M; Sitnikov, S; Pike-Biegunska, E. 2010. Trading in air: mitigating climate change through the carbon markets. Infotropic Media. p. 29.

Joscow, P.L. 1995. The New Institutional Economics: Alternative Approaches. Journal of Institutional and Theoretical Economics. (155). p. 248-259.

_____. 2004. New Institutional Economics: A Report Card. ISNIE Presidential Address. Budapest. June 2004. Disponible en: http://econ-www.mit.edu/files/1171

Kherallah, M; Kirsten, J. 2001. THE NEW INSTITUTIONAL ECONOMICS: APPLICATION FOR AGRICULTURAL POLICY RESEARCH IN DEVELOPING COUNTRIES. MSSD discussion paper No. 41. International Food Policy Research Institute (IFPRI). USA.

Klein, P. 1999. New Institutional Economics. *In* Bouckeart, B; De Geest, G. Eds. Encyclopedia of Law and Economics. Cheltenham, U.K. p. 456 – 489.

Magnasco, E. 2008. Instituciones: Oficina Argentina del Mecanismo para un Desarrollo Limpio. *In* Cámara Argentino Alemana. Ed. Protección ambiental en Argentina y Brasil. Potencial del mercado y guía para proyectos MDL. AHK. p. 146 – 148.

Matthews, R. C. 0. 1986. THE ECONOMICS OF INSTITUTIONS AND THE SOURCES OF ECONOMIC GROWTH. Economic Journal 96:903-918.

Ménard, C. 2000. Institutions, Contracts and Organizations: Perspectives from New Institutional Economics. Edward Elgar Publishing. p. 245.

Ménard, C; Shirley, M. M. 2005. Introduction. *In* Ménard, C; Shirley, M. M. Eds. Handbook of New Institutional Economics. Springer. p. 1 – 18.

Moncayo von Hase, M; García, L. 2008. Marco legal de las inversiones en MDL en la Argentina. *In* Protección ambiental en Argentina y Brasil. Potencial del mercado y guía para proyectos MDL. AHK. p. 166.

Nabli, M. K; Nugent, J. B. 1989. The New Institutional Economics and its Applicability to Development. World Development. V. 17 (9). p. 1333-1347.

Nuñez, M. 2010. Cambio Climático: Proyecciones para Argentina. *In* Cámara Argentino Alemana. Tecnologías Sustentables apropiadas para la Protección Climática. AHK. p. 40 – 44.

Neeff, T; Henders, S. 2007. Guía Sobre Los Mercados y la Comercialización de Proyectos MDL Forestales. CATIE. Turrialba, Costa Rica. p. 16.

Nordhaus W. 2008. A Question of Balance: Weighing the Options on Global Warming Policies. Yale University Press, US. p. 12.

North, D.C. 1990. Institutions, institutional change and economic performance. Cambridge: Cambridge University Press.

Ordóñez, H. A. 2000. Nueva Economía y Negocios Agroalimentarios. Programa de Agronegocios y Alimentos. Facultad de Agronomía. UBA. p. 72.

Novartis AG. 2010. CLEAN DEVELOPMENT MECHANISM PROJECT DESIGN DOCUMENT FORM FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES: Reforestation of grazing Lands in Santo Domingo, Argentina.

Disponible en: http://cdm.unfccc.int/UserManagement/FileStorage/HYD81BPRQLCOKMXZ370GJ4FENV62TU

Salinas, Z; Martínez, C; 2008. Introducción. *In* Salinas, Z; Hernández, P. Eds. Guia para el diseño de proyectos MDL forestales y de bioenergia. p. 3 – 9.

SAyDS (Secretaría de Medio Ambiente y Desarrollo Sustentable de la Nación). 2011. Proyectos MDL Presentados (PDDs). Buenos Aires, AR. Disponible en: http://www.ambiente.gov.ar/?idarticulo=6304.

Skjærseth, J.B; Wettestad, J. 2008. EU emissions trading: initiation, decision-making and implementation. Ashgate Publishing. p. 49.

Swingland, I.R. 2003. CAPTURING CARBON AND CONSERVING BIODIVERSITY: The Market Approach. Earthscan. p. 57.

TÜV SÜD Industrie Service GmbH. 2010. VALIDATION OF THE CDM-PROJECT: REFORESTATION OF GRAZING LANDS IN SANTO DOMINGO, ARGENTINA REPORT NO. 1215648. Munich, Ger Disponible en: http://cdm.unfccc.int/UserManagement/FileStorage/C0R9IALKJUXZP3TB4MGDE2VONS8HYW

Williamson, O. 2000. The New Institutional Economics: Taking Stock, Looking Ahead. Journal of Economics Literature. V. 38 (3). p. 595-613.

Woerdman, E. 2004. The institutional economics of market-based climate policy. Elsevier. Amsterdam, The Netherlands. 326 p.

ANIMAL WELFARE: THREAT OR OPPORTUNITY? LESSONS FROM POULTRY PRODUCTION IN ARGENTINA

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Abstract
Argentina has traditionally been an important player in the animal protein businesses, being a well-known beef supplier, currently gaining share in the chicken global market and with opportunities to become an important player in the egg business as well. Argentina is a country with low primary production costs. This is the situation for all three sectors: broilers and layers. This means that Argentina has a large potential to be an important player on the world market and be competitive on the world market with other important exporters. Meanwhile, animal welfare was identified as one of the priorities of the World Organization for Animal Health (OIE) with objectives and actions within the Strategic Plan for the 2001-2005 period and generally, policy-makers in developed countries claim that consumers have increasing preferences for the welfare of production animals (European Commission, 2006). At the same time, the dilemma with no apparent solution, between the lack of food for an increasing demand in quantity and quality, and the sustainability of the production processes has raised several questions on what sustainability really is. The paradigm of the "4 E's" proposes that sustainability must be analyzed in terms of Economics, Environment, Energy and Ethics. Animal welfare must take into account all these factors in order to be sustainable in the long run and actually provide a solution. The objective of this paper is to assess the state of animal welfare in the poultry agribusinesses and analyze their impacts on productive systems. At farm level, there is a large difference between and within the broiler and egg production sectors in Argentina. The husbandry conditions directly related to animal welfare are relatively good for broilers. For layers the conditions are below the average situation in EU countries in North-West Europe. Whether the Argentinean sector can use opportunities for increasing animal production and adapt it to global demands will partly depend on the policy of the government. The economic instability is a risk, resulting in limited credit availability, a quite high lending rate and uncertainty regarding if investments will pay for themselves. A risk can also be found in the export tax system, which rates can change rapidly, since export taxes are used as a political instrument. Finally, certification and verification is relevant when exporting to the EU. So there will be a need for an independent monitoring system to be able to guarantee the product specifications of exported products.

Key words: productivity,viability, global consumer.

ANIMAL WELFARE: THREAT OR OPPORTUNITY? LESSONS FROM POULTRY PRODUCTION IN ARGENTINA

1. Introduction

Animal welfare receives more legislative attention in the European Union (EU) than in most other regions of the world. Standards for poultry are generally taken to be higher in the EU than in producing countries exporting to the EU, particularly developing countries. The recent action plan for animal welfare introduced by the European Commission aims to further expand the body of regulatory standards (Van Horne & T.J. Achterbosch, 2008).

The EU position is partly induced by specific features of the production environment. In addition, policy-makers claim that EU consumers have increasing preferences for the welfare of production animals (European Commission, 2006). Consumer researchers have revealed a wide divergence in the ambitions and motivations of private labels in the EU regarding animal welfare (Ingenbleek et al., 2007).

At the same time, the dilemma with no apparent solution, between the lack of food for an increasing demand in quantity and quality, and the sustainability of the production processes has raised several questions on what sustainability really is. The paradigm of the "4 E's" proposes that sustainability must be analyzed in terms of Economics, Environment, Energy and Ethics. Animal welfare must take into account all these factors in order to be sustainable in the long run and actually provide a solution.

Producers in developing countries also achieve levels of animal welfare that exceed regulatory minimum levels to a different degree. Selected agribusiness systems in developing countries already comply, or potentially will comply with EU standards for farm animal welfare and should be allowed to export their products to the EU (Van Horne & T.J. Achterbosch, 2008).

Argentina has traditionally been an important player in the animal protein businesses, being a well-known beef supplier, currently gaining share in the chicken global market and with opportunities to become an important player in the egg business as well.

Argentina is currently positioned as the 9th producer of broiler meat, with 1,425,000 metric tons in 2009. It enjoys comparative advantages that determine an important potential for the activity. Since 2003, broiler production has more than quadrupled, and exports have exceeded imports, representing 16% of the total produced. At present, Argentina exports chicken and by-products to 81 countries. In terms of egg production, Argentina is currently positioned as the 25th world producer in terms of units (0.79% share of global production) and the 19th world producer in terms of volume (0.93% share of global production). It is important to state that both production and domestic consumption have almost doubled since 2001, and due to its comparative advantages, the country has the potential become a global provider of hen eggs and by-products. According to CAPIA (Argentine Association of Poultry Farmers) estimations the whole of the Poultry sector in Argentina (Broilers, Layers, Breeders) employs over 132,000 people both directly and indirectly.

In that sense, and given the evolution of the characteristics of demanding markets, the need arises to know the conditions in which poultry production is developed in order to evaluate its status in terms of animal welfare.

2. Objectives

The general objective of this paper is to assess the state of animal welfare in the poultry (egg and broilers) agribusinesses and analyze their impacts on productive systems. In

order to become acquainted with the state of animal welfare in poultry production in Argentina, the research centered around the following aspects: 1) description of the Poultry (broiler and egg) Agribusiness Systems (ABS), 2) aspects of the regulatory framework in force with respect to animal welfare, 3) survey of animal welfare indicators in productive systems.

2. Materials and methods

2.1. Survey methodology

Standardized surveys were performed on 116 companies that operate in Argentina, 40 in the broiler sector and 30 in the egg sector: the composition of the population surveyed consisted of roughly 1/3 large operations, 1/3 medium-sized operations and 1/3 small operations for each sector.

A standardized survey was made of businessmen and broiler producers that covered 11 main broiler producing and processing companies in Argentina and their coordinated producers, taking the population up to 40 surveys. These companies concentrate around 60% of the national broiler production. 40 broiler producing units were surveyed, which form part of the coordinated production of the companies or of their own production.

Out of the 30 companies assessed in egg production, 13 were from Buenos Aires, 6 from Entre Ríos, 4 from Córdoba, 2 from Santa Fe and Mendoza and 1 from Salta, San Juan and Río Negro.

2.2. Agribusiness System analysis

The Agribusiness Systems approach (ABS) has its origin in two different conceptualizations, developed at different places and times but showing similarities with respect to the structure of productive systems.

The first of these is based on the work of Davis and Goldberg (1957); these were the first references to the study of agribusiness and introduce the concept of "Agribusiness" as a new alternative to the approach of the old concept of agriculture.

Later, Goldberg (op. cit.) adds that "Agribusiness" is a broad concept in a vertical sense, "from the field to the table", incorporating within this new frame from Research and Development (R&D) to the final consumer and institutions. This author discusses coordination aspects in agribusiness, relating contractual relations, coordinating institutions and vertical coordination and integration. This determines the definition of a "Commodity System" as an aggregate of several transformations of a product along a vertical chain oriented towards the consumer.

On the other hand, the concept of "*filière*" originates in the French school of industrial organization that applies a sequence of activities that transform a commodity up to the final consumer (Morvan, 1985, in Zylbersztajn, 1996): "(…) the *filière* is the sequence of operations that allows the production of goods. Its articulation is influenced by the technological possibilities and is defined by the strategies of the agents who look for a maximization of their wealth. Relations between agents are those of interdependency or complementarity and are determined by hierarchy forces." This approach focuses on non-price coordination and especially on the industrial aspects of the product.

Zylbersztajn (1996) is sustained by the contributions of these two currents as far as descriptive capacity and the definition of vertical systems around a product and also presents coordination, the limitations of the price mechanism, the influence of the institutional environment, the distribution aspects and the competitive environment as relevant issues (Theory of Modern Industrial Organization).

In 1995, he proposed that the Agribusiness System (ABS) should be studied as a set of contractual relations between specialized businesses with the object of satisfying the consumer. In relation to this, according to Zylbersztajn and Neves (2000), ABSs contain the following fundamental elements for their descriptive analysis: agents, relations between them, sectors, support organizations and an institutional environment. Based on these, the authors define the business network theoretical model. In this sense, the process consists in analyzing a business and its group of suppliers and distributors, the relationships that exist among them and the relation to the environment. In essence, it is an interaction and relations approach (Neves, 2007).

3. Brief description of the broiler and egg Agribusiness Systems (ABS) in Argentina

The purpose of this chapter is to characterize the Argentine poultry Agribusiness Systems (ABS) by defining the links and actors that compose it, as well as to present quantitative information about it. In this sense, the poultry ABS must be subdivided into two subsystems: broiler production and egg production, because of their technological and organizational differences. Chapter 3.1 will refer to the Broiler ABS, while Chapter 3.2 will refer to the Layer ABS (egg production).

3.1 The Broiler Agribusiness System in Argentina

At present, Argentina is positioned as the 9th producer of broiler meat, with 1.43 million tons in 2009, which represent 2% of the total produced in the world. Worldwide, the United States, China, Brazil and the European Union account for about 67% of the production (Table 1).

Table 1: Global broiler meat production, ranking of the top ten producing countries

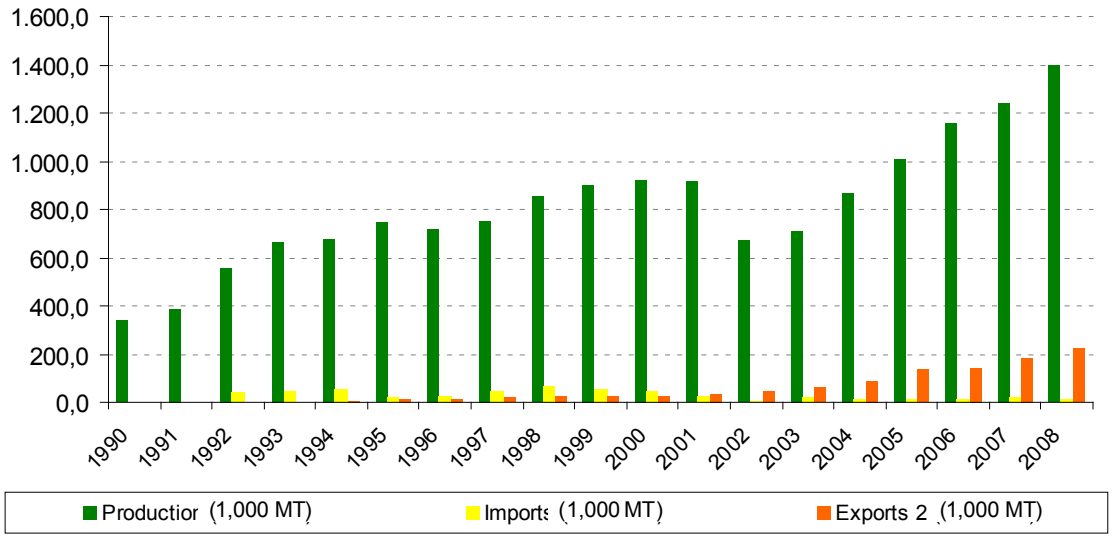
Ranking	Country	Production in 2009 (1,000 MT)	World Participation
1	US	15,919	22.3%
2	China	12,133	17.0%
3	Brazil	11,360	15.9%
4	EU-27	8,600	12.1%
5	Mexico	2,795	3.9%
6	India	2,350	3.3%
7	Russia	1,775	2.5%
8	Iran	1,430	2.0%
9	Argentina	1,425	2.0%
10	Japan	1,260	1.8%
	Rest	12,307	17.2%
	Total	**71,354**	**100.0%**

Source: the authors, based on FAS – USDA.

The activity in Argentina has been on the rise especially since the 1990s, when a process of reengineering of the business took place within the organizational environment and investments in process and product assets increased, allowing the sector to venture into the world poultry business. The following graph shows that broiler farming in Argentina has grown steadily, except during the 2002 setback as a result of the economic crisis in the

country at that moment. Production has more than quadrupled, and since 2002, exports have exceeded imports, representing 16% of the total produced.

Graph 1: Evolution of production, imports and exports of chicken 1990 -2008.



Source: the authors, based on data from MAGyP[100]- Small and Farm Animals Directorate - Poultry Area.

According to estimates made in 2008, (Table 2.3) the sector GDP was 2,004 million dollars, which represented about 0.61% of the GDP.

Table 2: Broiler GDP, 2008.

2008 GDP		
Internal Market Sales (thousands of U$S)	1,693	million
Exports (thousands of U$S FOB)	311	million
Total	**2,004**	**million**

Source: the authors, based on data from MAGyP and BCRA.

Both fatteners and industrialists are grouped in chambers (CAPIA and CEPA respectively), and have implemented joint strategies through a strategic plan for the promotion of the activity. In the present business design, the coordinating industries provide the fatteners the feed and the baby chicks, as well as technical advice.

In Argentina there are 3,926 broiler farms. The province of Entre Ríos concentrates 56.5% of the farms, followed by the province of Buenos Aires, which has 41.5% of them. There have been changes in the scale of the farms, which have shown a tendency to become larger. Qualified informants interviewed in this work agree that the size of the farms has been increasing in the last few years with the growth of the activity. An estimated 20 % of the farms have an installed capacity lower than 10,000 broilers per breeding cycle; 55 % of them are between 10,000 and 20,000 broilers per breeding cycle, and the remaining 25 %, over 20,000 broilers per breeding cycle.

As with production, slaughter is concentrated in the provinces of Entre Ríos and Santa Fe, where a group of six leading companies account for over 50% of the total slaughter of broilers. Approximately 17% of the broiler meat produced is processed in pieces, cold meats and giblets. Broiler meat production, estimated on the basis of slaughter in plants with or without SENASA authorization, also increased with respect to the previous year, totaling 1.4

[100] MAGyP: Argentine Ministry of Agriculture and Fishing.

million tons (1.24 million tons in 2007) (SAGPyA, currently MAGyP: Ministry of Agriculture, 2008).

The distribution of broiler products, both broilers and processes products, is done through distributors or wholesalers (55- 65%), hypermarkets and supermarkets (25-30%) and retailers, food services and institutional consumption (10-15%).

The total apparent consumption of broiler meat in Argentina, mainly broiler, has grown vigorously in the past 10 years, from 792,000 tons in 1997 to 1,254,000 tons in 2008. Current per capita consumption of broiler meat is 31.47 Kg./capita/year. CEPA estimates that by 2015 consumption will have reached 34 Kg./capita/year.

Exports of broiler products and byproducts have been on the rise since 2002. In 2008, they reached 223,000 MT for over 310 million U$S FOB, representing 16% of the total produced. Whole birds are the main product imported (40% of the exported volume; 44% of its value), followed by other edible products, which represent 21% of the volume and 16% of its value. Exports have destinations in 93 countries. The most important, Chile, represents 21% of the volume and 16% of the value of exports. It is followed by China, with 11% in volume and 9% in value. Venezuela has become the main market for exports of fresh broiler meat, receiving 22% of the volume. Of the five main destinations for poultry and by-products, Germany represents the highest FOB value per MT, U$S 3,020. It is worth mentioning that in 2008 Venezuela became the main market for exports of fresh broiler meat. Historically, this country was not considered an important buyer; however, in 2008, 22.2% of the volume of exports was destined to it.

Broiler imports in 2008 represented 0.9 % of the estimated national production, with 13,400 tons. The main import origin was Brazil, and the main products imported were non edible products (flours for animal feed, cartilage, other).Imports have been dropping (from a maximum of 66,000 MT in 1998), as a consequence of anti-dumping measures taken after an investigation conducted by the sector.

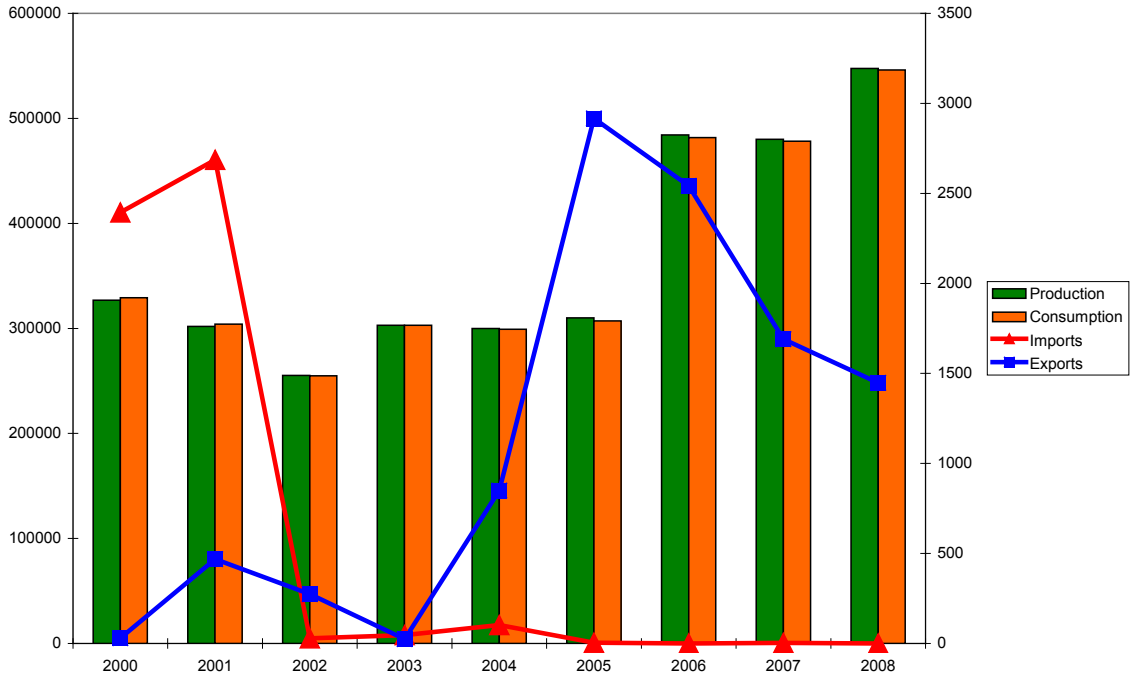
3.2 The Layer Agribusiness System in Argentina

Argentina is the 25th world producer in terms of units (0.79% share of global production) and the 19th world producer in terms of volume (0.93% share of global production). The largest egg producers in the world are China, the USA, India and Japan. In fact, the top 8 producers concentrate over 77% of total world production.

Commercial egg production in Argentina is a 40-year old business, and it had been relatively stable in production up until the mid 90's, when the sector grew at a higher rate in production, revenue, industrialization and exports.

It is estimated that currently, the number of layers in production in the country is about 33 million. During the year 2008, Argentina produced 8.77 billion eggs (about 548,000 MT) of hen eggs in shell; this represents a 67.6% increase during the 2000-2008 period, and over a 100% increase since 1994. The overall development of the Hen Egg ABS can be observed on the next graph. It is important to state that both production and domestic consumption have almost doubled since 2001 and that although some imports occurred at the beginning of the decade, currently they are practically inexistent, and on the other hand exports have grown over the same period of time.

Graph 2: Argentine egg in shell production, consumption, imports and exports (in MT, production and consumption are shown on the left axis, imports and exports are shown on the right axis).



Source: The authors.

Out of total argentine egg production of 2008, over 11% was consumed by the industry, representing roughly 280 million US Dollars and about 1% was exported, accounting for 24.3 million US dollars and representing just over 1.05 billion eggs combined. The remaining 7.72 billion eggs (representing roughly 644 million US dollars) were sold domestically through various formal and informal channels, including wholesalers, supermarkets, minimarts, direct sales to end users (consumers), local and regional small retailers, fairs and self-consumption. The overall sales of the sector added up to 948.3 million US Dollars during 2008, representing about 0.29% of overall Argentinean GDP. The following table shows this information.

Table 3: Hen Egg Agribusiness System, 2008. Sales.

SALES 2008		
Domestic market sales (US$)	644	millions
Industry Sales (US$)	280	millions
Exports (US$ FOB)	24.3	millions
Total	**948.3**	**millions**

Source: The authors, based on MAGyP y BCRA data.

Egg production in Argentina has traditionally been a very heterogeneous business, with very important variations in scale of production, technology and formality levels. To this day, about 35-40% of the production is still being done with low or very low levels of technology, small scale, obsolete stalls and very high restrictions to maintain production throughout the year. At this scale of production and level of technology there exists a great deal of informality, both fiscal and sanitary. On the other hand, almost 60% of current egg production is done under systems of medium to high scale that use higher levels of technology (in accordance to scale) and have an adequate sanitary status.

An increase in the levels of technology can be observed, with larger and more technological operations being launched and the modernization of some existing operations. The sector is tending towards more formality, with informal and backyard producers decreasing the participation in the business as a whole. Added to this, production is tending towards more vertical integration, such as large scale models, in which the farmer owns the inputs, the stalls, the layers and the egg produced, unlike what happens with broilers where most of the production is done through vertical coordination. Typically, large scale producers own the pullets as well, but grow them until ready for laying in a separate farm, due to health issues. Most egg producers market their eggs with no brand, in bulk, although the larger producers have brands of their own and sell both in bulk, as well as in smaller cases, typically by the dozen or half dozen. Layer operations are highly concentrated in geographical terms with the central region of the country being, by far, the most important producer. The top 5 producing provinces (Buenos Aires, Entre Ríos, Santa Fe, Córdoba and Mendoza) account for about 89% of the total number operations of operations across the country, and the first two provinces account for almost 64% of the country's operations.

The egg ABS is mainly oriented towards the domestic market, with less than 1% of total production being exported. A strong increase in domestic consumption both as a whole and per capita has been responsible for the larger part of the increase in production; Argentina is now consuming 217 eggs/year/person. Nevertheless, what is of relevance is the fact that Argentina has shifted from importing eggs and egg products at the beginning of the decade to exporting them presently.

Egg industrialization has been also growing, currently consuming over 11% of domestic consumption. It is the most dynamic in terms of foreign market and contributed to reversing the country's situation from being an importer of egg products to being an incipient exporter (Argentina is the 15th world exporter of industrialized eggs). In terms of industrial process, Argentina exports 2,300 MT of dried egg and over 250 MT of liquid egg and in terms of component, the country exported 1,578 MT of yolk products and 970 MT of albumen products during 2008. In terms of value, processed egg products added up to 14.6 million US dollars; while eggs in shell export value was 9.7 million US dollars, for an added value of 24.3 million US dollars. Argentina's main destinations for industrialized egg products are Angola (22%), Austria (22%), Russia (11%) and Belgium (8%).

The value of the whole ABS can now be estimated at about 950 million US Dollars and it is expected to keep on growing in value, volume and product diversity over the next few years.

4. Brief description of the state of Animal Welfare regulations in Argentina

Animal welfare was identified as one of the priorities of the World Organization for Animal Health (OIE) with objectives and actions within the Strategic Plan for the 2001-2005 period.

The definition of Animal Welfare that this Organization proposes is the same adopted in Argentina by the institutions directly involved in the topic; this definition states that animal welfare is the way in which individuals cope with the environment, and this includes their health, their perceptions, their mental state and other positive or negative effects that influence the physical and psychological mechanisms of an animal. Additionally, the National Service for Health and Quality of Agricultural Food Products (SENASA, 2004) includes in the definition "the set of measures taken to diminish the animal's tension, suffering, trauma and pain during its transfer, exhibition, quarantine, commercialization, exploitation, training and slaughter."

According to a study conducted in several Latin American countries, the adoption of animal welfare principles and regulations is directly related to the possibility of and interest in exporting (Rojas et al, 2005). This is the case in countries that export to demanding markets such as the European Union and obligatorily covers the aspects of slaughter and transportation, while in general the production aspects are voluntary.

Argentina has promulgated partial legislation, not directly related to Animal Welfare, but to connected topics. In Argentina in particular, there are public and private institutions oriented towards the topic that have published guidelines and reference manuals for the orientation and implementation of animal welfare in the country. In spite of this, animal welfare criteria are scarcely applied by producers, transporters, processing plants, and so on (Figueroa, 2008).

In all cases, the general criterion of animal welfare practices in Argentina (Figueroa, 2008) and worldwide is based on the five freedoms. The animal must be free from:

1. Hunger, thirst and malnutrition.
2. Fear and distress.
3. Discomfort (physical and thermal).
4. Pain, injury or disease.
5. Must be able to express normal behavior.

In particular in Argentina, most of the information found on animal welfare refers to bovines. Studies performed in the country have shown that the losses sustained because of ill-treatment, stress, poor handling, and bruising of the meat, among others, are reflected in a significant economic damage for the industry. For instance, in 2004 the University of Tandil (UNCPBA), together with the Institute for the Promotion of Argentine Beef (Instituto de Promoción de Carne Vacuna Argentina - IPCVA) conducted a study on slaughterhouses to calculate the losses due to poor handling and a lack of animal welfare policies (Figueroa, 2008). These losses were only quantified at the slaughterhouse; even today there are no studies that reveal losses incurred from weaning (primary production) to the moment of slaughter. According to INTA (2008), the advantages of animal welfare perceived in Argentina are centered fundamentally on aspects such as food safety and quality.

The most generic reference to the topic is Law N° 14.346 dated 1954, which refers to animal protection before acts of ill-treatment or cruelty. This is a penal law, which leads to the conclusion that, in Argentina, ill-treatment of animals is a penal crime. As a complement to this Law, other legislative advances were found in relation to the topics of health, euthanasia, transportation and organic production. The Following table summarizes the legislation covering animal welfare in Argentina.

Table 5: Synthesis of current animal welfare situation in poultry production in Argentina: legislation and documents.

Topic	Law 14.346	Procedure Manual on Animal Welfare	National Registry of Means of Transportation. Resolution 97 dated 1999	Manual of Good Transportation Practices	State of the Art of Animal welfare
Institution	**National**		**SENASA**		**INTA**
General treatment, handling, feeding, rest, etc					
Production					
Transportation					
Slaughter					
Characterization of problems					
Recommendations					

Source: the authors.

5. Results of the surveys conducted

5.1 Broilers

The current broiler business design –slaughter coordinated with finishing– has given rise to a high standardization of broiler production. Approximately 95% of the broiler farms are coordinated with the processing industries. Eleven of the main companies producing and processing broilers in Argentina were interviewed, and information was gathered on 40 productive units linked to those.

The productive units surveyed are located in the province of Entre Rios (75%), followed by those in Buenos Aires and Córdoba. An average of 2 to 3 sheds per farm was registered. The average surface of the sheds in the sample was 1,500m2. The average age of the sheds was 10 years, a datum that coincides with the recent innovation of the broiler industry in Argentina (mid-1990s). The most common bird density is 10 birds/m2.

In general, shed ventilation is natural (42%), and is combined with mechanical systems such as ventilation fans (25%). 22% of the units in the sample have automatic ventilation systems (fans and tunnel system), found in the newer, more technologically developed sheds. The ventilation capacity of the sheds is undefined for most of those surveyed; however, calculations made on the information provided make it possible to estimate a value of 17 m3/bird/hour in those sheds with tunnel ventilation systems. 65% of the productive units have automatic feeding systems; 87% have nipple drinking systems. 82% have fogging refrigeration systems. 97% have gas bell heating. 70% have compacted soil floors. Bedding is rice chaff in 82.5% of cases.

Average light during the period of breeding of the chicks is 17 hours, and average darkness is 8 hours. During the first two weeks of light, there is almost no darkness. The catching method is 100% manual. The production break of the sheds lasts an average of 14 days and the total cleaning of the shed (manure removal and bedding renewal) is done twice a year. The most widely used breed among those surveyed was AA (45%). The duration of the fattening cycle averages 48 days to obtain an average weight of 2.6 kilograms. The daily weight gain is 55 grams and the average feed conversion rate is 2.02 kilograms. The average mortality rate was 5.5% for the entire fattening period.

Transportation is done in crates (80 cm x 50 cm x 35 cm) at an average density of 8 birds per crate. The average duration of transportation is 1 hour, associated to the regional character of the activity. The production and processing stages are concentrated geographically. Mortality rate during transportation is less than 0.05%. As for slaughter quality criteria, they are established by the processing companies, which in general agree on avoiding ill-treatment of the animals in order not to affect the quality and presentation of the meat.

5.2 Layers

The business design in layer production is almost entirely vertical integration and this is the main difference with what happens with broiler production where contracts are much more common. The survey conducted included 30 operations, 10 of each scale (small, medium-sized and large).

Operations were mainly located in Buenos Aires (43.3%), Entre Ríos (20%) and Córdoba (13.3%). In average, the number of stalls was 7.4, with an average size of the stall at 4,750 square meters. Their average age was 11.4 years, with an average size of the flock at 377,470 layers per operation and 42,000 per stall. Ventilation is generally mechanic (over 75%), while feeding used some sort of automation in 86.7% of the operations and water supply was automatic in 90% of the operations. Regarding cooling, 27 out of the 30 surveyed operations had a cooling system, while just 4 out of the 30 companies assessed having a heating system. As for manure handling, 16.7% of the farms had a manure belt system, while the remaining 83.3% used the open pit format. With regards to the egg collection system, 26 out of the 30 surveyed operations used an automatic system.

In terms of rearing, it is important to establish that not all of the operations had their own rearing system. Regarding rearing location, just 3 of the operations that were assessed (10%) had the rearing house at the same location as the layer house. As for the rearing system, 83.3% of the pullets were reared in cages, while 16.7% were reared on litter floor. Transfer from the pullet to the layer house happens at the average age of 18.2 weeks, with the most efficient farms transferring them at 16 weeks.

In terms of management, the survey showed that 13 operations used little daylight, 9 operations used bright daylight and 8 operations used dark house systems. As regards light schedule, the average amount of dark hours per day added up to 7.8 hours. The empty period between flocks averages about 22 days. Regarding performance the average length of the laying period was about 532 days. During this process, the average amount of eggs laid is 352.5 of which an average 11.5% of the eggs are second grade eggs. Regarding feed indicators, the average feed intake in the surveyed operations was just over 160 grams per day and the average conversion rate observed was just below 2.8 kg of feed for each kg of eggs produced. In terms of mortality rate, the average percentage observed in the surveyed farms was just over 9% and the main causes of layer mortality were temperature related problems, prolapse and age.

Layer transport from the layer house to slaughter is done by truck in crates or boxes that carry in average 8 or 9 birds. The average transport period is just below 2 hours, in which the birds are transported to the slaughter house and transferred.

6. Conclusions

Argentina is a country with low primary production costs. This is the situation for all three sectors: broilers and layers. This means that Argentina has a large potential to be an important player on the world market and be competitive on the world market with other important exporters like Brazil or the USA. The low civil density, low environmental pressure and abundant space contribute as well.

Looking at the current situation at farm level it can be concluded that there is a large difference between the sectors. The husbandry conditions directly related to animal welfare are relatively good for broilers. For layers the conditions are below the average situation in EU countries in North-West Europe. For layers in particular the average space allowance per hen is below the EU level and far below the new level implemented in 2012.

In all sectors small improvements can be made to increase the animal welfare level. Many of these improvements also directly result in financial gains for farmers through better performance and improved quality. Some examples are lowering the mortality rate, better ventilation, better handling before transport, better conditions during transport.

For raising animal welfare to EU standards in the layer sector, an overall change in husbandry systems is necessary in Argentina. New housing systems (enriched cages or floor housing) have to be introduced for layers. Changing to this type of husbandry will increase the production costs. And even though these animal welfare measures could lead to additional costs in Argentina, these probably will be lower than the additional costs for farmers in the EU because of the comparative advantages in land prices and labor costs in Argentina. However, Argentinean farmers will need to see their additional costs compensated, for example through higher prices in the market. At this moment there is no market in Argentina for any 'welfare friendly' products, but there is one abroad - the EU. The only opportunity to get a market bonus for the added value products would be export to the EU. To take this opportunity the Argentine poultry sector should actively approach the market (partners) and look for the dialogue and possibilities to sell high value animal welfare products.

The paradigm of the “4 E’s” is of key importance to understand how these policies may affect these businesses in the long run. Animal welfare practices must lead to gains in the economical, ethical, energetic and environmental aspects of production for it to be truly sustainable. Animal welfare must take into account all these factors in order to be sustainable in the long run and actually provide a solution.

Whether these sectors in Argentina can use such opportunities will partly depend on the policy of the government. The economic instability is a risk, resulting in limited credit availability, a quite high lending rate and uncertainty regarding if investments will pay for themselves. A risk can also be found in the export tax system, which rates can change rapidly, since export taxes are used as a political instrument. Finally, certification and verification is relevant when exporting to the EU. So there will be a need for an independent monitoring system to be able to guarantee the product specifications of exported products.

7. References

Boletín Avícola – Anuario 2008. Dirección de Animales Menores y Granja. SAGPyA, currently MAGyP.
Comité Interamericano de Sanidad Aviar – CISA. “Bienestar Animal en la Producción de Ponedoras, reglas y estándares recomendados”

Davis, J.H. & Goldberg, R.A. 1957 A Concept of Agribusiness. Division of Research. Harvard University, Boston, 136p.
Estol Leopoldo, 2007. Bienestar Animal en Latinoamérica. Documento interno de la Asociación Latinoamericana de Bienestar Animal.
European Commission. 2006. "Commission working document on a Community Action Plan on the Protection and Welfare of Animals 2006–2010: strategic basis for the proposed actions". Brussels, European Commission, DG Consumer Protection and Health. European Union.
Figueroa M. E. 2008. "El estado del Arte del Bienestar Animal en la Argentina". Instituto Nacional de Tecnología Agropecuaria (INTA) - Documento Interno. www.inta.gov.ar
Ingenbleek, P., Binnekamp, M. & Goddijn, S. 2007. Setting standards for CSR: A comparative case study on criteria formulating organizations. Journal of Business Research, 60(5): 539–548.
Neves, M.F., 2007. "Planificación y gestión estratégica de los sistemas productivos visando competitividad: el método GESIS". En: "Agronegocios en Argentina y Brasil: una estrategia conjunta y una visión a futuro". Editorial Facultad de Agronomía, Colección Agronegocios.
Reglamento (CE) Nº 1/2005, del Consejo de 22 de diciembre de 2004.
Rojas H, Stuardo L y Benavides D., 2005. "Políticas y prácticas de bienestar animal en los países de América: estudio preliminar". Rev. sci. tech. Off. int. Epiz., 2005, 24 (2), 549-565
Secretaría de Agricultura, Ganadería, Pesca y Alimentos (SAGPyA), 2000. "Guía de aplicación de Buenas Prácticas de Manufactura: faena y procesamiento de pollos parrilleros". Documento versión digital: www.alimentosargentinos.gov.ar
Servicio Nacional de Sanidad y Calidad Agroalimentaria (SENASA), 2004. "Manual de Procedimientos en Bienestar Animal". Dirección Nacional de Sanidad Animal – Luchas Sanitarias. www.senasa.gov.ar
Servicio Nacional de Sanidad y Calidad Agroalimentaria (SENASA). "Manual de Buenas Prácticas de Transporte de Animales" Dirección Nacional de Sanidad Animal – Luchas Sanitarias. www.senasa.gov.ar
Van Horne P.L.M and T.J. Achterbosch. "Animal welfare in poultry production systems: impact of EU standards on world trade" - World's Poultry Science Journal, 2008 - Cambridge Univ Press
Zylbersztajn D., Farina B. 1996. "Governance structures and Agribusiness Coordination: A transaction cost economics based approach" research in domestic and International Agribusiness Management. Editor Ray Goldberg. JAI Press. Volume 12.
Zylbersztajn, D.; Neves, M. F. 2000. Economia e gestão dos negócios agroalimentares. São Paulo: Pioneira.

Websites consulted:

Cámara de Productores Avícolas. www.capia.com.ar
Centro de Empresas Procesadoras Avícolas www.aviculturaargentina.com.ar
Fundación Argentina para el Bienestar Animal: www.fabaonline.com
Oficina Nacional de Control Comercial Agropecuário. www.oncca.gov.ar
Organización Mundial de Sanidad Animal: www.oie.int
SENASA. www.senasa.gov.ar
USDA Foreign Agricultural Service. www.fas.usda.gov

CAPTURA DE VALOR EN EMPRESAS AGROPECUARIAS POR IMPLEMENTACIÓN DE AGRICULTURA CERTIFICADA: UN ESTUDIO DE 4 CASOS REALES

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Abstract
Todo proceso de protocolización y certificación apunta a la captura del valor creado por parte de las organizaciones adoptantes. Ello puede verse reflejado en mayores ingresos por precios diferenciales en el producto o servicio, en el acceso preferencial o prioritario a determinados mercados; o bien por una mejora en la performance de la empresa al adoptar el protocolo. El "Sistema de gestión de calidad ambiental y productiva en agricultura de conservación (SGC-AC)", conocido como Agricultura Certificada (AC), es un esquema que brinda herramientas para realizar una agricultura de manera más precisa y responsable, ambiental y productivamente. A través del protocolo de Buenas Prácticas Agrícolas y la medición de indicadores de calidad de gestión ambiental, permite describir y monitorear las acciones y conductas productivas; habilitando además certificar el proceso de producción agropecuaria. En este estudio se describen, cuatro casos reales de empresas agropecuarias que adoptaron y certificaron bajo SGC-AC, abordando cuales son los beneficios tangibles en el plano tecnológico, organización e institucional capturado por dichas empresas.

Key words: Agricultura certificada, Calidad, certificación, siembra directa, buenas prácticas agrícolas.

CAPTURA DE VALOR EN EMPRESAS AGROPECUARIAS POR IMPLEMENTACIÓN DE AGRICULTURA CERTIFICADA: UN ESTUDIO DE 4 CASOS REALES

I. Introducción

Actualmente, se reclama que cualquier actividad productiva contemple el paradigma de las tres "E", haciendo alusión a los vocablos en lengua inglesa "*Economy, Ethics, and Environment*" (economía, ética y ambiente). Es más, algunos autores proponen hablar del paradigma de las cuatro "E", agregando la palabra "*Energy*" (energía); en referencia a que las actividades humanas sean energéticamente sustentables. La agricultura y producción de alimentos no escapan a esta realidad. Al respecto, el desarrollo de una agricultura productiva, rentable y sustentable ambientalmente es uno de los grandes desafíos de la humanidad para el Siglo XXI (Solbrig, 2002).

A nivel nacional, Argentina cuenta con más de 25 millones de hectáreas sembradas bajo siembra directa (Aapresid, comunicación personal); sistema productivo que no utiliza labranzas, y que es considerado el máximo exponente de la agricultura de conservación. En consecuencia, mas del 70% de la actividad agropecuaria argentina está conceptualmente mucho más cerca del paradigma de las "4 E" que los sistemas con labranzas que caracterizan actualmente la agricultura mundial.

Por otro lado, la diferenciación de productos y procesos es una variante cada vez más utilizada por los mercados para materializar el compromiso de cumplir con las exigencias planteadas por los consumidores actuales. Es un mecanismo de captura y generación de un nuevo valor agregado para bienes e insumos agropecuarios (Malvicino, 1998). Son los consumidores, finalmente los que traccionan cualquier cadena comercial – incluida la de los alimentos – por lo que se torna prioritario que estén informados respecto a las virtudes de la agricultura de conservación – como se conoce mundialmente a la siembra directa - si es que se quiere generar una demanda de productos que provengan de procesos productivos sustentables.

La redacción y aplicación de normas, estándares, protocolos surgen como la opción más válida y reconocida para adecuar los productos y procesos a las demandas de clientes y consumidores a lo largo de la cadena agroalimentaria (UCA, 2003). Estos son instrumentos consensuados por las partes interesadas, y que sirven de orientación a los productores u organizaciones empresariales y que además son pasibles de auditorías que permiten realizar un dictamen técnico denominado certificación (Viglizzo, 2004). La certificación es el reconocimiento explícito de que un sistema, proceso, producto o servicio cumple con los requerimientos de una determinada norma, estándar o protocolo.

En Argentina, Aapresid (Asociación Argentina de Productores en Siembra Directa) ha liderado la implementación de un sistema de gestión de calidad para la agricultura de conservación bajo siembra directa. Desde 2008, existe el programa Agricultura Certificada (AC), derivado de la tesis de Maestría en Agronegocios que realizó y defendió en 2006 Santiago Lorenzatti, bajo la tutoría de Héctor Ordoñez en el marco del Programa de Agronegocios y Alimentos de la FA-UBA (Lorenzatti, 2006). El sistema de Agricultura Certificada ya fue adoptado por más de 40 empresas agropecuarias alcanzando más de 100.000 hectáreas, en más de 80 establecimientos. Cuatro de esas empresas ya han logrado la certificación, incluyendo 10 establecimientos, y más de 20.000 hectáreas certificadas.

2. AGRICULTURA CERTIFICADA, DESCRIPCIÓN

La gestión ambiental responsable es un tema ineludible en la agricultura actual. No sólo por las exigencias de mercado, que cada vez más demandan productos amigables con el ambiente; sino como una condición básica para la sustentabilidad económica del negocio agrícola de largo plazo. En consecuencia, procesos, procedimientos documentados, auditorías y certificaciones dejaron de ser sólo conceptos elegantes, para ser una realidad tangible, que poco a poco gana espacios en campo argentino. En el ámbito nacional, Aapresid lidera un innovador programa de gestión agronómica y ambiental, denominado **Agricultura Certificada (AC)**, que ya cuenta con varios campos certificados.

La AC consta de dos elementos constitutivos básicos: un manual de Buenas Prácticas Agrícolas (BPAs); y el uso, medición y registro de indicadores de gestión ambiental, con foco en el recurso suelo. Aapresid es el actor que mantiene vigente y actualizado el protocolo de BPAs y la medición de indicadores, tomando de la ciencia los avances que ocurran en este sentido y que sean implementables a campo. Sin embargo, Aapresid no certifica que tal o cual productor cumpla con los requisitos de AC; sino que esa tarea es desarrollada por una tercera parte (entidad certificadora), lo cual le da credibilidad y transparencia al sistema. El uso cotidiano de AC, promete a los productores adoptantes el poder tomar decisiones agronómicas con mayor sustento científico; conociendo de antemano sus posibles impactos sobre la calidad de los recursos naturales involucrados.

Según sus impulsores, la implementación de AC por parte del productor agropecuario, le permite acceder a mejores herramientas para una gestión agronómica profesional; a través del registro ordenado de información y el análisis de indicadores de calidad edáfica y de eficiencia. Es decir, que brinda una herramienta tendiente a aumentar la eficiencia de los sistemas productivos; habilitando a un camino de mejora continua, con reducción de costos y mejora de la rentabilidad. En simultáneo, el esquema plantea la oportunidad que el empresario tiene de mostrar al resto de la sociedad como son los procesos de producción de alimentos y su impacto sobre el ambiente, creando así la oportunidad de capturar el valor de la externalidad positiva que la AC ejerce sobre el mismo.

3. Problema y método de investigación

El trabajo apunta a describir cuáles son las causas que estimulan a las empresas a implementar y certificar bajo AC; como así también cuál es el valor agregado que capturan una vez implementado el proceso la certificación.

La hipótesis de trabajo afirma que "la implementación y certificación de Agricultura Certificada por parte de empresas agropecuarias argentinas, les permite: capturar valor a través de la mejora en la gestión de los procesos productivos, de la mejora de la imagen ante los competidores y la comunidad, y de estar en condiciones de flexibilidad suficientes para adaptarse al contexto para aprovechar oportunidades emergentes".
El método de investigación seleccionado para el presente trabajo es el "Estudio de Caso Múltiple", el cual es un método cualitativo y fenomenológico. Al respecto, Sterns et al. (1998) afirma que los casos de estudio, a menudo, están enmarcados en una comprensión del conocimiento tal que los fenómenos de interés no pueden separarse de su contexto; o sea, se logra el conocimiento mediante la reflexión sobre la acción humana y de cómo esta acción emerge de las reflexiones personales de los actores individuales.

El método de estudios de caso, en particular, se propone investigar un fenómeno contemporáneo dentro de su contexto real - donde los límites entre el fenómeno y el contexto no son claramente percibidos- por medio de múltiples fuentes de evidencia: entrevistas, archivos, documentos, y observación (Yin, 1989). La posibilidad de usar varias fuentes de evidencias es considerada por Lazzarini (1997) una de las particularidades y ventajas de la investigación basada en estudios de caso. Es más, sostiene que el método de estudio de casos resulta en un método de investigación hábil y sensible para analizar un fenómeno dentro de su contexto más amplio, en situaciones donde esta inserción trae reales beneficios a la investigación.

Según Yin (1989), el estudio de caso surge como método potencial de investigación cuando se desea entender un fenómeno social complejo. Tal complejidad presupone un mayor nivel de detalle de las relaciones dentro y entre los individuos y organizaciones, bien como los intercambios que se procesan con el medio ambiente en los cuales están insertos.

En el presente estudio la investigación se centró en el análisis de entrevistas no estructuradas, la revisión de archivos y documentos, y la observación directa de cuatro empresas agropecuarias que adoptaron Agricultura Certificada, y que lograron la certificación formal durante 2010 y 2011.

4. Resultados y discusión

En el presente apartado se enuncian los principales hallazgos encontrados durante el proceso de investigación en cada uno de los 4 casos estudiados.

IV.i: Presentación de casos

Caso 1: Establecimiento "La Madrugada", de Guillermo L. Cabrini
Es una empresa agrícola familiar con sede en Arias, en el sudeste cordobés que se convirtió en la primera empresa en certificar bajo el esquema liderado por Aapresid. El establecimiento La Madrugada cuenta con una superficie de 200 hectáreas, y el 7 de mayo de 2010 obtuvo su certificación. La empresa posee más de 20 años de experiencia en siembra directa, acompañada de prácticas como la rotación de cultivos y la fertilización estratégica. La secuencia agrícola elegida es trigo/soja- maíz, a veces alternando con cebada o sorgo.

Las razones que llevaron a Cabrini a ingresar en Agricultura Certificada son:

- Ser parte de un nuevo proceso de innovación, apoyados en la confianza que una organización de referencia nacional como Aapresid representa, y de cuyos conocimientos agronómicos y productivos la empresa viene nutriéndose desde hace 15 años.
- Lograr un beneficio incremental en la capacidad de gestión de la empresa agrícola, por adoptar un sistema de gestión de calidad. Para la visualización de esta oportunidad fue clave la existencia en la empresa de un recurso humano calificado con experiencia previa en la implementación de calidad.
- Oportunidad de diferenciación como productor sustentable.

Respecto a la captura tangible de valor, luego de un año de lograda la certificación Cabrini da evidencia tangible de:

- Haber mejorado la eficiencia de los procesos; lo cual se traduce en una mayor productividad por un uso eficiente de recursos.
- Mejorar el diagnóstico ambiental y agronómico de su campo al encontrar indicadores que le permiten cuantificar determinadas variables; logrando a su vez el diseño de estrategias productivas y ambientales superadoras.
- Haber elevado el nivel formal de capacitación de recursos humanos y proveedores, como así también su compromiso con la empresa; habiendo detectado nuevas capacidades en determinadas personas del equipo, y desarrollado nuevos proveedores.
- Mejorar la imagen de la empresa y su responsabilidad social empresaria al dar evidencia tangible y verificable de la gestión del ambiente, aspecto muy valorado por la empresa al tener varias fracciones del establecimiento próximas a una zona urbana.

Caso 2: Caldenes SA

Estancia Caldenes, es un campo mixto de 18.190 hectáreas situado en el noroeste de la provincia de Buenos Aires. Del total de hectáreas 14.500 hectáreas son agrícolas y 3690 son ganaderas; destinándose estas últimas a la cría extensiva, Feed Lot y Cabaña Hereford. Las hectáreas agrícolas presentan dos rotaciones, una intensiva (maíz-trigo/soja) en ambientes de mejor calidad y (maíz-soja-trigo/soja) en ambientes inferiores. La empresa tiene una Cabaña de prestigio de más de 50 años donde la mejora genética es el pilar del crecimiento. Preocupados por el impacto de la agriculturización del campo, el Directorio de Caldenes decisión ingresar en AC, siendo el segundo campo en hacerlo.

La empresa tiene una raíz ganadera muy fuerte, y la agriculturización experimentada en lo últimos años los llevo a preguntarse si el camino elegido era realmente sustentable. AC les brindó la oportunidad de encontrar una herramienta para medir indicadores que den respuesta científica a ese interrogante central planteado internamente por el Directorio.

Respecto a la captura de valor al implementar y certificar bajo normas AC, Caldenes SA mostró evidencia de:

- Mejorar el procesamiento de información y la obtención de nuevos indicadores de gestión empresarial.
- Poder cuantificar el impacto del cambio de la actividad productiva central sobre el recurso suelo, dando respuesta al principal interrogante del Directorio de Caldenes SA.
- Encontrar nuevos puntos de mejora en la gestión agronómica que dispararon planes de gestión tendientes a mejorar ese estado relativo.
- Mayor conocimiento interno de la empresa y sus procesos, con mejores sensible en la eficiencia de procesos.

Caso 3: Grupo Romagnoli

Es un grupo de empresas diversificadas que realizan agricultura, ganadería de ciclo completo, y multiplicación y procesamiento de semillas. Tiene sede en Monte Buey, Córdoba, siendo su fundador y actual presidente, Jorge Romagnoli, uno de los pioneros de la siembra directa en Argentina, y uno de los fundadores de Aapresid. En la actividad agropecuaria, focalizan su actividad en campos arrendados principalmente con núcleos productivos en el sudeste, y centro sur de Córdoba, y el sur de Santa Fe. Posee 6 establecimientos bajo Agricultura Certificada; dos de los cuales corresponden a campos arrendados, lo cual marca una diferencia positiva en la vinculación propietario / arrendantario. Son la tercera empresa en certificar, y la que cuenta con mayor número de establecimientos certificados.

Si bien la empresa venía trabajando orientada a un SGC, al no fijarse plazos de tiempo para concretar determinadas etapas, los tiempos se dilataban y los avances no eran significativos. Al decidir acompañar el proyecto de Aapresid y certificar bajo las normas de AC, se plantearon objetivos de trabajo y plazos de ejecución. Esto imprimió un mayor ritmo de avance y, en algunas etapas, cuotas extras de esfuerzo. Las expectativas iniciales apuntaron a:

- Poder trabajar bajo un sistema de gestión de calidad
- Poder medir el impacto del manejo agronómico sobre el recurso suelo,
- Lograr una diferenciación positiva en el mercado de arrendamiento, de manera de tener una posición relativa de negociación más favorable.

Los beneficios realmente capturados por Grupo Romagnoli son:

- Mejora en la imagen externa de la empresa en su entorno social y de negocios, manteniendo su perfil de innovación.
- Mayor competividad por mejora de la posición negociadora en el mercado de arrendamientos de campos; lo cual quedó evidenciado en la repactación del arrendamiento de un campo en Zavalla (Santa Fe); y la suma de un campo en Godoy (Santa Fe). Sin embargo, este aspecto sólo pudo hacerse tangible en un universo relativamente chico de dueños de campo.
- Nuevos negocios: ampliación de las opciones de multiplicación de semillas a partir de poder dar evidencia de una gestión agronómica y administrativa verificable, trazable y auditable.
- Mejor selección de prestadores de servicios y proveedores estratégicos.
- Mejora de procesos internos, su trazabilidad y la asignación de roles y responsabilidades, que repercutieron en mejora de la eficiencia y la productividad.
- Readecuación de diferentes aspectos de la empresa al encuadre legal vigente, muchas veces no tenido en cuenta por usos y costumbres diferentes al marco normativo.
- Mejores negocios en la compra de insumos, a partir de descuentos y bonificaciones realizadas por empresas asociadas a Agricultura Certificada (Aapresid).

Caso 4: Tecnocampo SA

Empresa de agronegocios integrados, con sede en Monte Cristo, Córdoba. La firma combina agricultura, acopio y venta de insumos, equipos de riego y herramientas de agricultura de precisión. Trabaja 15.000 hectáreas en el centro de Córdoba, de las cuáles el 90% son arrendadas. La gestión productiva tiene un esquema horizontal, liderado por un Gerente de Producción que se complementa con varios responsables técnicos zonales que tienen a su cargo la gestión agronómica de una superficie en torno a las 4.000 hectáreas. Esquema que se complementa con el apoyo de un área de logística que se encarga del aprovisionamiento de insumos y tareas agrícolas propias y contratadas. Contratan el 20% de la pulverización, el 80% de la cosecha y el 100% de las siembras. Son el noveno establecimiento certificado y la cuarta empresa en hacerlo.

Las expectativas iniciales de Tecnocampo consistían en incorporar una herramienta de gestión que les permitiera dar un salto cualitativo en el manejo y gestión de la información. Como segundo objetivo se plantearon dar evidencia tangible de una producción sustentable como muestra de responsabilidad social empresaria. Finalmente, se plantearon ingresar en AC como forma de estar preparados para un nuevo entorno de negocios dónde la diferenciación será clave.

Respecto al valor capturado, en Tecnocampo se puede detectar:

- Unificación de criterios y mejora en la calidad de la información agronómica y de gestión relevada y procesada.
- Mejora de la eficiencia de procesos por mejor gestión de prestadores de servicios considerados clave en el proceso agrícola.
- Aprendizaje interno para poder mostrar gestión de acuerdo a protocolos y estándares, lo cual posiciona a la empresa en un nivel superior a la hora de entablar nuevos negocios.

A continuación se presenta un resumen de los principales hitos alcanzados por las 4 empresas certificadas y que se convienten en muestra concreta de la captura de valor que el sistema de gestión de calidad AC ofrece a las empresas adoptantes.

Tabla 1. Resumen de los principales logros alcanzados por empresas certificadas bajo el esquema AC que evidencian captura de valor. .

Porque AC?	**Caso 1**	**Caso 2**	**Caso 3**	**Caso 4**
Medir impacto del manejo en el suelo		x	x	
AAPRESID como innovador tecnológico	x			
Mayor Capacidad de Gestión	x	x	x	x
Diferenciación de procesos y productos. Ventaja nuevos negocios.	x		x	x
Captura de Valor				
Nuevos Negocios			x	
Mayor Productividad por mejora en los procesos	x	x	x	x
Mejorar las condiciones ambientales del suelo a través de indicadores	x	x	x	x
Mejora en los RRHH	x		x	x
Mejora imagen por RSE	x		x	

IV.ii. Discusión

Desde una mirada centrada en la empresa agropecuaria la certificación de AC demostró tener beneficios directos para el empresario, tanto en la gestión técnico/agronómica de la empresa como en el negocio. Por un lado, la certificación involucra necesariamente el uso de registros y de información ordenada; que junto al relevamiento de los indicadores de calidad de suelo – todos ellos de basamento científico – se convierten en instrumentos que agregan valor a la gestión agronómica; la cual se torna más seria, precisa y profesional. Por otro lado, la descripción de procesos y la implementación de un sistema de gestión de calidad repercuten en la mejora de la eficiencia global de la empresa y por ende en la mejora de su productividad.

En el plano tecnológico la implementación de Buenas Prácticas Agrícolas (exigencia del AC) se traducen en una mejora consistente en las condiciones productivas de los campos, lo cual quedó de manifiesto en las 4 empresas estudiadas.

Desde una visión más amplia, la certificación mostró tener la potencialidad de exponer a las empresas que lo adopten a una auditoria social del proceso de producción de materias primas agropecuarias, abriendo una clara oportunidad de capturar el valor por una mejora de la imagen corporativa, por la oportunidad al acceso preferencial de mercado y por crear en la empresa una cultura de transparentar procesos y estar dispuesto a ser auditad y controlada.

Además, AC como todo sistema de gestión de calidad, exige que la empresa ordene toda la documentación correspondiente a las actividades que realiza. La obligatoriedad de tener claramente evidenciable toda la requisitoria legal, hace que la empresa minimice los riesgo de desajustes al marco regulatorio por olvidos o usos y costumbres alejados de la legalidad. También es necesario conocer toda la legislación nacional, provincial y municipal que aplica a la actividad que desarrolla la empresa. Esto supone un trabajo de estudio y comprensión de la legislación vigente por parte de la dirección de la empresa, con la consiguiente comunicación al resto del equipo sobre cambios y/o adaptaciones que deberán llevarse a cabo para estar en regla con la ley. Muchas de estas mejoras en la empresa brindan un marco de mayor seguridad ante accidentes, imprevistos o incluso ante acciones legales contra la empresa, sean por parte del estado, de los empleados, de los terceros intervinientes o de la comunidad cercana.

Por el lado de la documentación interna, permite transparentar y comunicar claramente el alcance de los procesos, sus ingresos, salidas y actores intervinientes, delimitando en simultáneo responsabilidades. Se logra así, identificar fallas, debilidades e inconsistencias de los procedimientos actuales, evidenciando oportunidades de mejoras en los procesos y en su comunicación interna. También, frente a eventuales salidas de personal o cambio de proveedores, el contar con documentos descriptivos de cómo la empresa pretende desarrollar dicha tarea o actividad, facilita el proceso de capacitación y puesta a punto.

Se estimula también la constante capacitación, en búsqueda de la excelencia y mejora continua. Esto favorece la motivación y promueve el aumento de compromiso de los empleados y prestadores de servicios externos a la estructura fija.

IV.iii. Relación entre los estudios de casos y la hipótesis de trabajo propuesta

La evidencia relevada mediante el estudio de 4 casos de empresas agropecuarias argentina adoptantes de Agricultura Certificada permite aceptar y corroborar la hipótesis de trabajo: "La implementación y certificación de Agricultura Certificada por parte de empresas agropecuarias, les permite: capturar mayor valor a través de la mejora en la gestión de los

procesos productivos, mejorar la imagen ante los competidores y la comunidad, y estar en condiciones de flexibilidad suficientes para adaptarse al contexto para aprovechar oportunidades emergentes".

Si bien hay evidencias concretas, claras y contundentes respecto a los dos primeros aspectos de la captura de valor; el referido a la flexibilidad suficiente para adaptarse al contexto y aprovechar oportunidades emergentes sólo pudo verificarse parcialmente. Queda como punto a profundizar en futuros estudios si realmente la adopción de AC permite capturar un diferencial económico tangible, o bien si habilita a la empresa adoptante a ser más flexible para adoptar otras exigencias que el negocio imponga.

Finalmente, existe evidencia que Aapresid ha desarrollado convenios exclusivos con algunas empresas de insumos socias de la entidad para su programa Agricultura Certificada, de manera de favorecer y mejorar el proceso compra por parte de productores certificados. Esta relación diferencial con proveedores permite en algunos casos una rebaja en el precio de adquisición del insumo o bien una bonificación en producto; en definitiva una mejora de las condiciones de compra.

Finalmente, estar certificado bajo AC, permitiría a la empresa estar en posición y condición de aprovechar aquellas oportunidades de negocio donde sea requerido contar con información sobre el proceso de producción, cumplimiento estricto de la ley y/o por contar con una mejor reputación a nivel comunidad.

6. Conclusiones

Los casos analizados contribuyen a dilucidar los aspectos planteados en la hipótesis; y simultáneamente plantean nuevos interrogantes que ponen en evidencia la necesidad de profundizar conceptual y empíricamente algunos aspectos relacionados a la implementación del sistema propuesto en el futuro, con una experiencia más prolongada de certificaciones.

El presente trabajo pone en evidencia la importancia de la calidad como factor aglutinante para la construcción de genuina competitividad. Todo proceso de protocolización y certificación de calidad apunta a la captura del valor creado por parte de las organizaciones adoptantes. Ello puede verse reflejado en mayores ingresos por precios diferenciales en el producto o servicio, en el acceso preferencial o prioritario a determinados mercados; o bien por una mejora en la *performance* de la empresa al adoptar el protocolo. El "Sistema de gestión de calidad ambiental y productiva en agricultura de conservación (SGC-AC)", conocido como Agricultura Certificada (AC), es un esquema que brinda herramientas para realizar una agricultura de manera más precisa y responsable, ambiental y productivamente. A través del protocolo de Buenas Prácticas Agrícolas y la medición de indicadores de calidad de gestión ambiental, permite describir y monitorear las acciones y conductas productivas; habilitando además certificar el proceso de producción agropecuaria.

Es para destacar también la importancia relevante que en materia de agronegocios tiene el impacto de la actividad sobre el ambiente; máxime si se trata de la producción de alimentos, o de otros productos primarios. Queda en claro que gestionar el impacto ambiental en las empresas vinculadas a los agronegocios dejó de ser una rareza para convertirse casi en la regla. Quien así no lo perciba no es que se privará de acceder a determinados negocios o mercados; sino que corre el riesgo de quedar fuera de muchos mercados. Agricultura Certificada mostró ser una herramienta útil para cumplir con estos objetivos.

6. Bibliografia

AAPRESID. El sendero de la calidad. Revista de la Asociación Argentina de Productores en Siembra Directa. 2005.

Lazzarini, S.G. Estudos de Caso para Fins de Pesquisa: Aplicabilidade e Limitações do Método. In: Farina et. al. (Coord). Estudos de Caso em Agribusiness. São Paulo: ed. Pioneira, p. 9-23. 1997.

Lorenzatti, S. Factibilidad de implementación de un certificado de agricultura sustentable como herramienta de diferenciación del proceso productivo de siembra directa. Programa de Agronegocios y Alimentos – FAUBA. 2006.

Malvicino Guillermo. Sistema de Certificación de Productos Agrícolas Diferenciados. En: Carpeta Seminario-Taller: Prevención del riesgo de contaminación agrícola. Bs.As. 1998.

Sterns, J.; Schweikhardt, J.; Peterson, H. El uso de casos de estudio como enfoque para realizar investigaciones en agronegocios. Journal IAMA, vol. 1, n 3. Jai Press. 1998.

Solbrig, O. T. El impacto ambiental de la agricultura pampeana: reflexiones en relación a la crisis. Rosario: Actas del X Congreso de AAPRESID. 2002.

UCA. Universidad Católica Argentina. Curso: Inocuidad en la Cadena Agroalimentaria. Un requisito para exportar. Módulo: BPA. Buenos Aires. Septiembre 2003.

Viglizzo, E. Desarrollo de una metodología compatible con la norma ISO 14000 para la eco-certificación de predios rurales. Programa Nacional de Gestión Ambiental. INTA. 2004

Yin, R.K. Case Study Research: Design and Methods. Newbury Park. SAGE Publications

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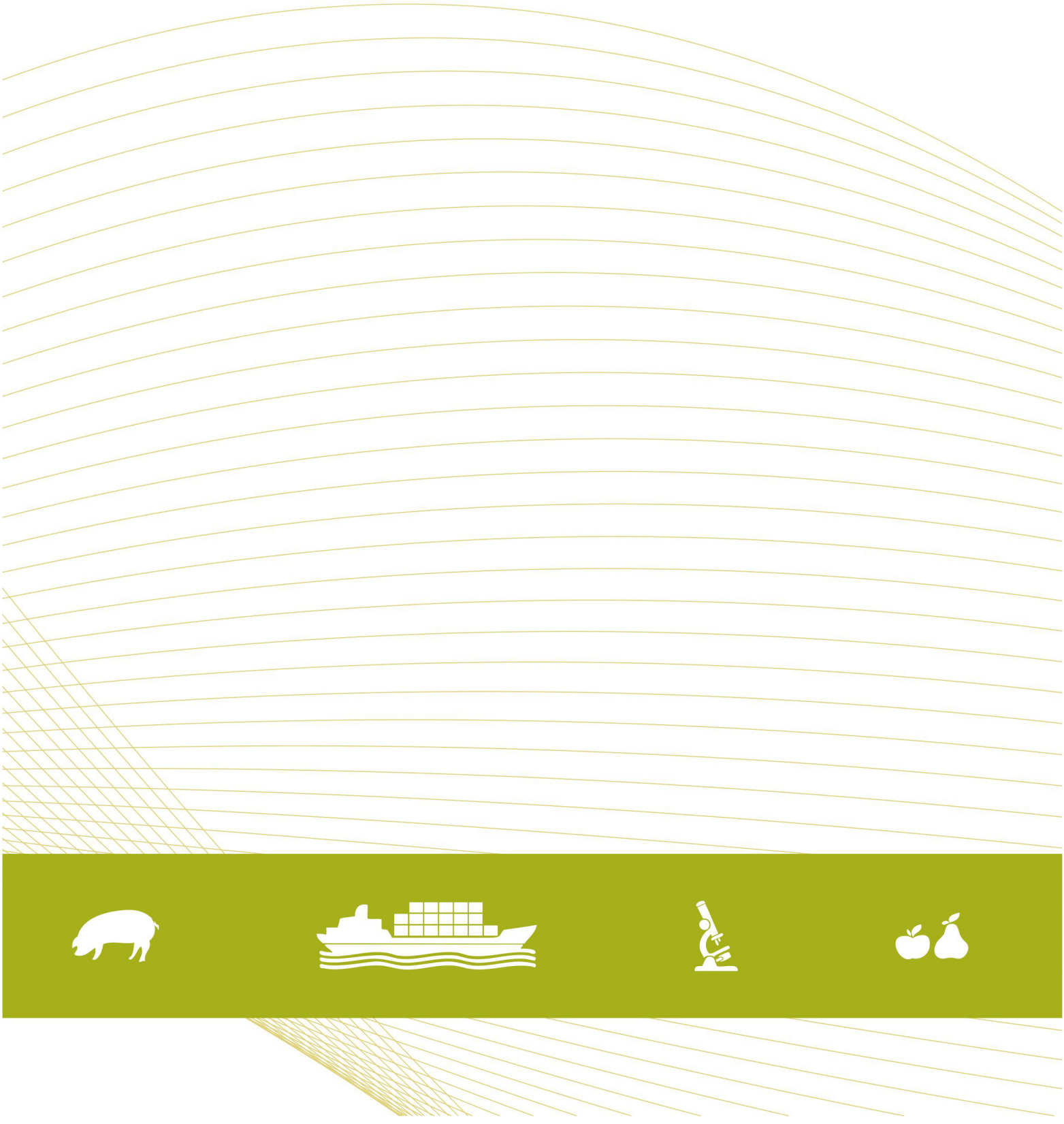

AN ANALYSIS OF PRICE RISK MANAGEMENT BY THE PRODUCERS OF ARABICA COFFEE IN BRAZIL

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Abstract
The futures markets have restricted use among Brazilian coffee growers, which, somehow, does not match the high ratios obtained in the optimal hedging ratios in minimum variance models. This low utilization is associated with the producer and his business characteristics, preference about the risk management model for his activity and behavioral issues. Thus, the present study aimed to determine the influential factors interfering in this decision making process among the Brazilian coffee growers. In a first step, the optimal hedge ratios were calculated, for the BM&FBOVESPA and ICE Futures. The ratios had values higher than 50%. In a second step, in the resulting 373 interviews, 12.9% of the sample are familiar with and use futures, and, on the average, the hedge ratio adopted was below 50%. In a third step, from a logit model, we concluded that price risk aversion degree, production size, level of derivatives knowhow, and the extent of understanding concerning these instruments capabilities to aid greater revenue stability were influential factors in the use of contracts.

Keywords: futures markets, arabica coffee, risk management.

AN ANALYSIS OF PRICE RISK MANAGEMENT BY THE PRODUCERS OF ARABICA COFFEE IN BRAZIL

1. Introduction

In agro-industrial activities, prices risk is a major factor. Thus, for business continuity, an important element is the use of instruments to ensure protection against prices reverse movement. A way to perform this type of risk management involves the use of derivative markets. By negotiating these contracts, agents may determine now the asset price for a future date, thus, reducing their exposure to unwanted oscillations, ensuring profitability of their activity. Such operations are known as hedge.

Futures contract is one of the more traditional derivatives, traded exclusively in commodity exchanges. This agreement establishes an asset's purchase and sale for a certain future date at a given price. In Brazil, the Securities, Commodities and Futures Exchange (BM&FBOVESPA) provides trading for a series of agricultural commodities futures contracts, namely arabica coffee, live cattle, soybean, corn, crystal sugar and ethanol. Between 2000 and 2010, the trading volume quadrupled, from 655,190 to 2,667,650, reaching 3,282,950 in 2008. The live cattle and arabica coffee futures are the most traded - in 2010, it accounted for approximately 43.3% and 24.0% of the overall business of the agricultural futures market, respectively.

However, although the trading volume had a significant growth in recent years, it appears that farmers still make little use this market; despite the high optimal hedge ratios and hedging effectiveness, obtained in several studies, using average and variance and expected utility models - Nogueira et al. (2002) and Fontes et al. (2003) for arabica coffee, Silveira and Ferreira Filho (2003) for live cattle, Aguiar and Martins (2004) for soybean, Orange et al. (2003) for the crystal sugar, among others.

The literature suggests several reasons for the low use of futures markets by the farmers. It is possible to separate these reasons into three groups, as follows.

The first group consists of the producer and his business' characteristics. Factors such as age, activity experience, risk aversion, production size, level of indebtedness, pricing monitoring level, derivatives level of knowledge, among others, interfere with the futures contract use (Goodwin and Schroeder, 1994; Isengildina and Hundson, 2001; Shapiro and Brorsen, 1988; Turvey and Baker, 1990).

The second group is based on the producer's preference about the risk management model for his activity. In this context, the use of alternative instruments, such as activity diversification, participation in government programs to protect against falling prices, use of agricultural insurance, establishment of fixed-term contracts with industries and/or traders, among others are introduced (Isengildina and Hundson, 2001; Velandia et al., 2009). The futures market characteristics are basis for their choice when compared to the other options. Some may be decisive for its use, such as trading on the derivative exchange, resulting in improved security in negotiations and the standardization issue that at any given time could bring the possibility of position reversal. However, other important aspects could account for their low usage, such as margin requirements, daily settlement of accounts (variation margin), trading costs and basis risk (Cruz Jr, 2009; Turvey and Baker, 1990).

The third group, in turn, refers to behavioral issues. Works similar to Pennings and Leuthold (2000), Sherrick et al. (2003), Egelkraut et al. (2006) and Cruz Jr (2009) show the importance of variables related to producer's behavior in explaining his approach to risk

management. Here are some significant points: a) risk perception; b) risk attitude; c) futures contracts performance perception, d) the level of influence from agents over the producer's decisions; e) the producer's understanding of the futures contract benefits to his business.

In the traditional models the above aspects are not considered in the producers' objective function. Consequently, the optimal hedge ratio generally overestimates the producers' futures market position[101] (Shapiro and Brorsen, 1988; Turvey and Baker, 1990).

In this context, this article has three objectives, as follows: i) to estimate, from the Myers and Thompson (1989) model, the hedge ratios and hedging effectiveness in Brazil's arabica coffee market considering the BM&FBOVESPA and ICE futures exchange, ii) through the surveys answers provided by the producers, analyze the proportions in which the futures are being used to manage the price risk, and iii) to investigate the main factors that influenced these derivatives uses, verifying if the producer and his business' characteristics, risk management preferences, and their risk perceptions have impacted their decision.

2. Methodology

2.1. Optimal hedge ratio and hedging effectiveness

Measures for the optimal hedge ratio and hedging effectiveness were obtained from the Myers and Thompson model (1989). These authors improved Ederington's (1979) work, by developing a generalized approach to estimating optimal hedge ratios, through a multiple regression equation of spot price (P_s) on futures price (P_f) and lagged values of spot and future prices:

$$Ps_t = \alpha + \beta_0 Pf_t + \sum_{i=1}^{q} \beta_i Ps_{t-i} + \sum_{j=1}^{q} \beta_j Pf_{t-j} + \varepsilon_t \qquad (1)$$

Where $\hat{\beta}_0$ is the optimal hedge ratio; q is equal to the lags number in the model; ε_t represents the i.i.d. random noise with zero mean. It should be noted that, by supposition, the cash and the future rates follow an autoregressive process (AR).

The hedging effectiveness, in turn, is derived from the variances calculations of hedged and unhedged portfolios, as described in equation (2).

$$E^* = \frac{Var(Ps_t) - Var(h * Pf_t)}{Var(Ps_t)} = 1 - \frac{Var(h * Pf_t)}{Var(Ps_t)} = 1 - \frac{Var(Ps - h^* Pf)}{Var(Ps)} \qquad (2)$$

Where $Var(Ps_t - h^* Pf_t)$ equals the income variance in a hedged portfolio considering the optimal hedge ratio (h^*) and $Var(Ps_t)$ equals the revenue variance in a unhedged portfolio. In the case of the series not being stationary in level, equation (1) need to be estimated in the first differences and the effectiveness calculation must use the prices in the first differences.

[101] Some authors by recognizing same overestimation decide to insert other explanatory variables in the model (e.g., transaction costs, margin requirement and alternative investments possibility) or use an utility function that alter their shape and behavior in relation to the producer's risk (Cruz Jr, 2009; Lence, 1996; Mattos, Garcia and Nelson, 2008). In the first case, a large number of simulations is necessary to test all the variables hypotheses presented by the model. In the second case, due to the greater number of variables inclusion in the model, along with more complex utility functions, the minimizing risk solutions also become more convoluted. Finally, some authors try to circumvent the static problem in the traditional model by using dynamic models. The use of time series models, in this case, allows for the dynamic coefficients estimation for the conditional optimal hedge ratio over time (Baillie and Myers, 1991).

Thus, in a step prior to the estimations, unit root tests (ADF tests[102]) were performed to test the stationarity of the series. Then, to obtain the price lags to be included as explanatory variables (to determine the autoregressive process orders, AR(*p*) series generator), the Akaike Information Criterion (AIC) and Schwarz Bayesian Criteria (SBC) were employed. It was used the model's order which obtained the AIC and SCB lowest values. Then the models were estimated by Ordinary Least Squares, getting the optimal hedge ratio. The hedging effectiveness was calculated from equation (2).

2.1.1. Research data

The data used to estimate the hedging effectiveness and optimal hedge ratio consisted of coffee cash prices, for the March 2004 to August 2010 period. We analyzed three regions in Minas Gerais State (Cerrado, Zona da Mata and Southern), two regions in Sao Paulo State (Mogiana and Garça) and Northwestern of Paraná State. *Safras & Mercado* provided the historical cash price quotations. The first delivery contract prices were obtained from BM&FBOVESPA and ICE Futures. To estimate the optimal hedge ratio, we considered weekly and monthly data.

2.2. Futures Markets Conditioning Factors Analysis

To analyze the factors which positively or negatively influence the futures contract use by the producers, 373 survey interviews were conducted with farmers between March and May 2010[103]. The surveys were divided into three parts. The first part aimed to characterize the producer according to age, educational level, cooperative membership, production size and existence of other activities. The second evaluated the grower's knowledge of the futures market and the extent of its usage. If the producer didn't use futures contract, the reasons for this fact were investigated. In the third part, we analyzed the producer's risk attitude, risk perception, market orientation, level of understanding about futures market and perceptions about the futures market performance in reducing the fluctuations in the producer's revenue.

With such information, in a first stage, a logit model was used to obtain the relationship between the use of futures (*UF*) and the variables considered in equation (3).

$$UF = f(AGE, SCH, COOP, PS, IA, PARM, LRP, MMD, RAD, FMU) \quad (3)$$

Where, *AGE* is the producer's age; *SCH* is the producer's schooling; *COOP* is a dummy variable equal to 1 if the producer is cooperative membership and equal to 0 if is nonmember; *PS* is the producer's production size (in thousand bags); *IA* is dummy variable equal to 1 if the producer has income from other activities and 0 if the income is generated exclusively by coffee activity; *PARM* is the preference degree for alternative risk management tool; *LRP* is a degree that indicates the lack of price risk perception; *MMD* is the market monitoring degree; *RAD* is the risk attitude degree; *FMU* is the futures markets unfamiliarity level.

The variables *PARM, LRP, MMD, RAD* and *FMU* were obtained from questions using a five points Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The *PARM* variable was evaluated by the agreement with the statement "I prefer to use another type of price protective mechanism instead of the futures market. *LRP* was measured by agreement with the notion that the coffee market is not risky. High indices indicate, by hypothesis, a

[102] Dickey Fuller Extended Test.

[103] The survey response rate determined the sample size. From an 800 Brazilian coffee growers contact database, by simple random sampling, 373 telephone surveys were conducted.

lack of price risk perception. The market monitoring degree (*MMD*) was analyzed from the agreement in relation to coffee prices daily monitoring. The risk attitude degree (*RAD*) was obtained from the agreement with the producer's preference for his intuition over the futures market to assess the best time to sell the coffee. A high score indicates, by definition, high-risk propensity (which equates to low risk aversion). The variable *FMU,* in turn, was analyzed from the statement "I have little knowledge of the futures market."

In a second step, a logit model was estimated using only the answers of the coffee farmers that had previous knowledge of the futures market. This fact enabled the inclusion of a variable related to the degree by which the grower considers that futures contract ensures greater revenue stability, obtained from a concordance Likert scale regarding the statement "The operations in the futures market contribute to my revenue stabilization."

It was hoped that a producer with higher education, production, level of market monitoring, and high level of agreement regarding the futures contribution in revenue stabilization as well cooperative participation[104] would present a higher probability of using futures markets. Moreover, the inverse relationship was expected for these variables: age[105], income from other activities[106], lacking futures market knowledge, preference for other instruments, lack of risk perception and risk propensity.

Since the response variable is a dichotomous variable representing the producer's use ($Y = 1$) or non-use of futures markets ($Y = 0$), a discrete response model is a good fit to the proposed study. According to Greene (2003), partly due to its mathematical convenience, the logit model is one of the most used in this type of analysis.

In the proposed analysis, the set of variables at the function described by equation (3) can explain the futures market use or non-use by the coffee producers. It is assumed that all explanatory variables can be grouped into a vector $\mathbf{x}$, and that the vector β contains parameters reflecting the changing impact of $\mathbf{x}$ on the probabilities to whether or non-use the futures market. According to equation (4), the proposed logit model combines the interest variables to a cumulative logistic distribution function $\Lambda(\mathbf{x'\beta})$to estimate such probabilities:

$$P(\mathrm{Y}=1\,|\,\mathbf{x}) = F(\mathbf{x'\beta}) = \frac{e^{\mathbf{x'\beta}}}{1+e^{\mathbf{x'\beta}}} = \Lambda(\mathbf{x'\beta}) \tag{4}$$

According to Griffiths, Hill and Judge (1993), the estimation of binary choice models is usually based on estimating the maximum likelihood method due to the discrete nature of the variable response to the parameters nonlinearity and functional relations between the probabilities P_i and the explanatory variables x_i. According to Greene (2003), the likelihood function can be written as follows:

$$P(Y_1 = y_1, \cdots, Y_n = y_n) = \prod_{y_i=0}\left[1 - F(\mathbf{x'\beta})\right] \prod_{y_i=1}\left[F(\mathbf{x'\beta})\right] = \prod_i \left[F(\mathbf{x'\beta})\right]^{y_i} \left[1 - F(\mathbf{x'\beta})\right]^{1-y_i} \tag{5}$$

$$\ln L = \sum_i \left[y_i \ln\left[F(\mathbf{x'\beta})\right] + (1 - y_i)\ln\left[1 - F(\mathbf{x'\beta})\right]\right] \tag{6}$$

[104] It is acknowledged that cooperatives encourage the use of futures markets for price risk management. The interviewed coffee cooperatives managers affirmed that they encourage the futures use as means to reduce their members vulnerability and indirectly the cooperative as well.

[105] It was considered the hypothesis that older producer tend to adopt more conservative risk management model.

[106] The investment in other activities is in itself a means to hedge. Thus, at first, there were no reasons for the use of derivatives.

The maximum likelihood estimator is obtained by maximizing (6) with respect to unknown parameters β_i's contained in the vector **β.**

3. Results Analysis

To apply the Myers and Thompson (1989) model, unit root tests were conducted, based on the ADF test. The series are stationary in level form. The Akaike Information Criterion (AIC) and Schwarz (SBC) indicated that the weekly series followed an AR(2) - except for the Mogiana region's cash prices, which followed an AR(1). In the monthly series was identified an AR(4), except for the BM&FBOVESPA futures prices and Garça's cash prices, for which an AR(3) was identified.

From such considerations, the equations (1) and (2) were estimated. In all estimated equations, the cash and futures level prices were used. The explanatory variables were: futures prices at time *t,* lagged futures and cash prices (the lags were indicated by the autoregressive processes orders).

Table 1 shows the hedging effectiveness and the optimal hedge ratio in the BM&FBOVESPA and ICE Futures markets, from the weekly series. Table 2 shows the monthly results. From weekly data (monthly), the optimal hedge ratios were between 49% and 66% (59% and 69%) in BM&FBOVESPA and between 42% and 57% (47% and 58%) in ICE Futures. There was also a greater hedging effectiveness conducted in the Brazilian market in relation to the U.S. exchange. Using weekly data (monthly), the BM&FBOVESPA efficacy range was between 80% and 88% (84% and 91%); meanwhile at the ICE Futures they were between 69% and 78% (70% to 81%). Regardless of the observations frequency, the hedge was generally less effective in both Northwestern Paraná and Garça regions.

Table 1. Effectiveness and optimal hedge ratios in the regions, using weekly data.

	BM&FBOVESPA		**ICE FUTURES**	
	Hedge Ratio (%)	**Effectiveness (%)**	**Hedge Ratio (%)**	**Effectiveness (%)**
Cerrado (MG)	65.78*	86.06	56.53*	73.34
Southern Minas Gerais	64.28*	87.72	55.82*	76.70
Zona da Mata (MG)	55.95*	81.70	48.85*	77.44
Northwestern PR	49.37*	80.58	42.91*	68.78
Garça (SP)	50.94*	80.70	44.41*	71.87
Mogiana (SP)	65.67*	87.58	56.67*	75.12

*Significative at 1%.

Table 2. Effectiveness and optimal hedge ratios in the regions, using monthly data.

	BM&FBOVESPA		ICE FUTURES	
	Hedge Ratio (%)	Effectiveness (%)	Hedge Ratio (%)	Effectiveness (%)
Cerrado (MG)	68.99*	88.21	56.94*	78.01
Southern Minas Gerais	68.94*	90.35	57.45*	77.32
Zona da Mata (MG)	68.00*	90.50	57.40*	80.56
Northwestern PR	59.52*	84.49	47.84*	70.74
Garça (SP)	59.80*	84.57	47.85*	73.32
Mogiana (SP)	68.89*	89.79	57.43*	75.45

*Significative at 1%.

The 373 farmers' survey answers were evaluated after the completion of the optimal hedge ratios and hedging effectiveness analysis. The farms were in the States of Minas Gerais (32.7% of the sample in Southern region; 13.4% in Cerrado and 11.0% in Zona da Mata), São Paulo (28.2%), Espírito Santo (4.8%), Paraná (4.3%), Bahia (3.2%), Ceará (1.3%), Goiás (0.5%) and Rio de Janeiro (0.5%). The vast majority, about a third, were 51 to 60 years old. Regarding schooling, 51.5% have college degrees, 29.0% are high school graduates and 19.6% have only elementary education. The majority, 91.2%, is cooperative member and 76.7% have other income besides coffee growing (especially other crops or retirement). Regarding the expected output for 2010, 53.4% of the farmers expected to produce up to a thousand bags, on the other hand, 12.3% indicated an excess of 5,000 bags. Coffee crops (59.2% of producers), in general, are not sold in advance (before harvest)[107].

The answers also demonstrated that 151 farmers in the surveyed areas (40.5% of the sample) had no knowledge of futures market. The factors for such disinterest were: high costs; risky markets, more suitable for large producers, not interest in price risk management (Table 3).

Table 3. Analysis of leading factors preventing lead farmers from seeking information about futures market.

Factor	Percentage of Producers Indicating the Factor as:		
	Unimportant	Important	Very important
I'm not interested in managing price risks	34.6%	10.8%	54.6%
Risky market perception	34.8%	11.9%	53.3%
I have small sales volumes, I believe it's only for large producers	38.9%	9.5%	51.6%
High costs perception	36.9%	11.5%	51.6%
I prefer other mechanisms to manage price risk	60.0%	20.0%	20.0%

Another 174 producers (46.6% of the sample) were familiar with the derivatives, but make no use them, pointing out that margin requirements, daily settlement of accounts (variation margin) and brokerage costs were among the principal barriers (Table 4).

[107] About 37.0% of the farmers have advance sales for part of their production and 0.8% pre sells the entire crop. This is a slightly smaller percentage than the one obtained by Goodwin and Schroeder (1994), from a 509 sample of Kansas (USA) grain and livestock producers, noted that 42.8% of farmers have established forward contracts in at least one growing season.

Table 4. Analysis of factors preventing farmers, with knowledge of the futures market, from making use of such mechanisms.

Factor	Percentage of producers indicating the factor as:		
	Unimportant	Important	Very important
Margin requirement	35.6%	14.8%	49.6%
Variation margin	36.8%	15.8%	47.4%
Brokerage costs	32.1%	20.1%	47.8%
Lacked sufficient information	48.1%	12.7%	39.2%
Preference for forward contracts	45.2%	26.8%	28.0%
Preference for government programs	50.6%	22.1%	27.3%
Have used it, but it was not a good deal	74.7%	9.7%	15.6%

Only 48 farmers (12.9% of the sample) stated knowledge and use of futures contracts for coffee price risks management, and 44 make use exclusively of the BM&FBOVESPA markets, four use the ICE Futures (New York) and another eight have transactions in both exchanges. The percentage of producers using futures contract was similar to that found by Goodwin and Schroeder (1994), which, from a sample of 509 Kansas farmers (soybean, corn, wheat and sorghum) and livestock (beef and pork), between 1990 and 1992, observed that only 10.4% used futures contract.

Table 5 shows profile of the average farmer who reported that uses futures market. The average age is 50 years old, a cooperative member, well educated (64.6% have college degree), diversified income (approximately 75% have outside income), production higher than 2,000 bags (68.8% producers), and pre sells part of the crop (79.2% of the sample). Moreover, it was observed through the Likert scale (five points) analysis that producers had: average risk propensity, degree of risk perception from medium to high, superior degree of market monitoring and elevated agreement level regarding the futures contribution in revenue stabilization.

Table 5: Average farmer who reported that uses futures markets.

Producers that use futures market:
- 48 producers

Age:
- Average and median of 50 years old; standard deviation of 11.95 years.

Education:
- 5 had elementary education, 12 high school graduates and 31 had college degree.

Outside Income:
- 36 farmers have outside income, and for 12 of them, coffee is the only source of income.

Production Size:
- 33 estimated for the 2010 harvest a production equal to or greater than 2,000 bags. 19 of those expect the production to be equal or higher than 5,000 bags.

Cooperative
- 43 of 48 producers are cooperative members.

Risk Propensity:
- Average index of 2.3 points (median of 2 points) in a Likert scale for concordance regarding the preference for intuition when deciding the best time to sell the crop.

Degree of Risk Perception
- Average index of 2.2 points (median of 1.5 points) in a Likert scale for concordance regarding the assertion that the coffee market offers low risk. This low rate can be understood as being medium to high, the risk perception degree.

Market Following Degree
- Average index of 4.1 points (median of 5 points) in a Likert scale for agreement regarding the assertion of daily prices following. That is, these producers were found to have a high market monitoring level.

Concordance Level Regarding Futures Revenue Stabilization
- Average index of 3.9 points (median of 5 points) in a Likert scale for agreement regarding the assertion of futures markets contribution to revenue stabilization.

For 62.5% of farmers that uses futures, the hedge ratio was below 50% (Table 6). This result was lower than the estimated hedge ratios presented in Table 1. This observation, combined with the high number of producers that doesn't use futures, confirmed the limitations of average and variance models for calculating the optimal hedge ratio.

Table 6. Hedged percentage production for producers that uses futures markets.

Percentage of Hedged Production	Producers' Number	%
Up to 20%	5	10.4%
21 to 30%	10	20.8%
31 to 40%	7	14.6%
41 to 50%	8	16.7%
51 to 60%	5	10.4%
61 to 70%	3	6.3%
71% to 80%	2	4.2%
81% to 100%	4	8.3%
Not answered	4	8.3%

In order to understand the constraints to the use or non-use of futures contracts, a logit model was used. The results are presented in Table 7. The maximum likelihood test (from the likelihood ratio statistic - LR) showed that the variables satisfactorily explain the use of futures by the grower. The risk attitude degree (*RAD*), "Production size"(*PS*) and "futures markets unfamiliarity level" (*FMU*) variables have proved to be significant statistically, which shows that these factors influence the likelihood of using futures market.

Table 7. Parameter estimates from the logit model.

Variable	Coefficient	Z value	p-value	
C	0.5395	0.4272	0.6692	
RAD	-0.3284	-2.7973	0.0052	*
FMU	-0.4533	-4.0483	0.0001	*
PS	0.0453	2.9835	0.0029	*
AGE	-0.0170	-1.1592	0.2464	
SCH	0.2854	0.7814	0.4345	
LRP	-0.1559	-1.3129	0.1892	
MMD	0.1367	1.0204	0.3075	
IA	-0.1778	-0.4308	0.6666	
COOP	0.1506	0.2481	0.8040	
PARM	0.0768	0.6763	0.4989	
Likelihood Log	-116.4321			
LR statistic (10 gl)	53.5116			
p-value (LR statistic)	0.0000			
McFadden R^2	0.1869			

*Significative at 1%.

AGE refers to the producer's age, *SHH* education, *PS* production size (thousand bags), *COOP* cooperative association, *IA* outside income, *PARM* preference for another instrument of risk management, *LRP* lack of risk perception, *MMD* degree of market monitoring, *RAD* degree of risk propensity and *FMU* derivatives unfamiliarity level.

It is observed that higher production relates to greater use of futures. The higher the production, the greater exposure to risk, therefore, increased necessity for price fluctuations management, which explains the result. Shapiro and Brorsen (1988), Makus *et al.* (1990), Goodwin and Schroeder (1994) and Isengildina and Hudon (2001) also concluded that this variable was crucial to explain the use of futures contract among farmers.

Moreover, the greater the grower's risk propensity (low risk aversion), the lower was the effect on the usage of derivatives. Turvey and Barker (1990) and Isengildina and Hudson (2001) noted the importance of this variable as a determinant for hedging. The latter authors came to this conclusion after querying 108 U.S. cotton growers. According to them the probability of using futures and options markets, was directly proportional to the producers risk aversion, farm size and use of agricultural insurance and inversely proportional to income from government programs. It was also found that the higher the unfamiliarity with the derivatives, the lower the use of futures.

By using only producers acquainted with the future markets (total of 222 farmers), it was possible to introduce the *STAB* explanatory variable in the model, which measures the degree to which the grower considers that futures safeguard greater revenue stability. A total of 166 farmers answered this question and 56 were unable to offer an assessment. Table 8 shows the results.

Table 8. Parameter estimates from the logit model, for the farmers familiar with the futures market.

Variable	**Coefficient**	**Z value**	**p-value**	
C	-0.1063	-0.6320	0.5274	
RAD	-0.4008	-2.7181	0.0066	*
FMU	-0.1683	-1.1976	0.2311	
PS	0.0451	2.5047	0.0123	*
AGE	-0.1547	-0.3702	0.7113	
SCH	-0.0005	-0.0301	0.9760	
LRP	-0.1413	-1.0078	0.3135	
PARM	-0.0541	-0.3696	0.7117	
MMD	0.0917	0.5619	0.5742	
IA	0.3094	0.6233	0.5331	
COOP	0.4385	0.5884	0.5563	
STAB	0.2630	1.7974	0.0723	*
Likelihood Log	-82.9945			
LR statistic (11 df)	26.0011			
p-value (LR statistic)	0.0065			
McFadden R-squared	0.1354			

*Significative at 1%.

AGE refers to the producer's age, *SHH* education, *PS* production size (thousand bags), *COOP* cooperative association, *IA* outside income, *PARM* preference for another instrument of risk management, *LRP* lack of risk perception, *MMD* degree of market monitoring, *RAD* degree of risk propensity and *FMU* derivatives unfamiliarity level and *ESTAB* degree to which the grower considers that futures safeguard greater revenue stability.

In this analysis, it was found that the higher the perceived revenue stability is afforded, the greater the use of such instruments. Pennings and Leuthold (2000) concur with these last two results. Risk perception and production size were the other two significant variables in this matter.

4. Conclusions

This study aimed to evaluate issues surrounding the price risk management by Brazilian coffee growers with the use of futures contract. In a first step, the optimal ratio and

hedge effectiveness were calculated by using an already established method, based on expected utility models. The results showed optimal hedge ratios above 50% and hedging effectiveness over 80%, when considering the Brazilian exchange market. In a second step, a survey conducted with 387 farmers, showed low use of these protection mechanisms, only 12.9% claimed knowledge and usage of futures to manage coffee price risks. These, in turn, protect, generally less than 50% of the crop. This percentage was considerably lower than the optimal hedge ratios estimated by the models mentioned above.

It fell then to analyze, through a logit model, which variables influence the choice to use futures contracts made by the Brazilian coffee growers. When analyzing the characteristics of producer and his business, it was observed that age and education variables that usually determine the futures use in the work outlined in the first section were not significant. Production size and familiarity level with futures contract were the determining factors, overlapping the other variables that characterized the producer. These results highlight the need for investment in human capital (grower's education programs), specifically concerning managing price risk. Better publicity from BM&FBOVESPA regarding their markets, as well as educational activities at both the cooperatives and individual producer's levels, are needed for the increased use of such instruments.

It was also noted that the decision on whether or not use futures was not influenced by preferences for other risk management instruments. However, factors associated with producer's behavior were influential. The risk aversion degree was statistically significant. In general, agents not using futures prefer to rely on their intuition for the assessment of the best time to sell the coffee. Moreover, the risk perception degree was not a decisive factor.

Finally, when considering only producers who claimed some knowledge about the futures, besides risk aversion degree and crop size, the revenue stability perception level was statistically significant.

Therefore, it is observed that traditional average-variance models overestimate the optimal hedge ratios, and then require the inclusion of other explanatory variables and/or use of other utility functions that best represent the producer's behavior in relation to price risk.

5. References

Baillie, R. T.; Myers, R. J. Bivariate GARCH estimation of the optimal commodity futures hedge. **Journal of Applied Econometrics**, v. 6, n. 2, p. 109–124, 1991.

Cruz Jr, J. C. Modelo de razão de hedge ótima e percepção subjetiva de risco nos mercados futuros. 100 p. Tese de doutorado em Economia Aplicada – Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, 2009.

Ederington, L.H. The hedging performance of the new futures markets. Journal of Finance, v.34, n.1, p.157-70, 1979.

Egelkraut, T.; Sherrick, B.; Garcia, P.; Pennings, J. Producers' yield and yield risk: perceptions vs. reality. Long Beach: **American Agricultural Economics Association**, 2006.

Fontes, R. E.; Castro Junior, L.G.; Azevedo, A.F. Efetividade e razão ótima de *hedge* na cafeicultura em diversas localidades de Minas Gerais e São Paulo. In: 41° Congresso Brasileiro de Economia e Sociologia Rural, Juiz de Fora, MG. Anais. Brasília: SOBER, 2003.

Goodwin, B. K.; Schroeder, T. C. Human capital, producer education programs, and the adoption of forward-pricing methods. **American Journal of Agricultural Economics**, v. 76, n. 4, p. 936-947, 1994.

Greene, W. H. **Econometric analysis**. 5th ed. Upper Saddle River, NJ: Prentice Hall, 2003.

Griffiths, R. C.; Hill, W. E.; Judge, G. G. **Learning and practicing econometrics**. New York, John Wiley & Sons Inc., 1993.

Isengildina, O.; Hudson, M. D. Factors affecting hedging decisions using evidence from the cotton industry. In: NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, St. Louis, Missouri, 2001.

Lence, S.H. Relaxing the assumptions of minimum-variance hedging. **Journal of Agricultural and Resource Economics**, v. 21, n, 1, p. 39-55, 1996.

Makus, L. D.; Lin, B. H.; Carlson, J.; Krebill-Prather, R. Factors influencing farm level use of futures and options in commodity marketing. **Agribusiness**, v. 6, n. 6, p. 621-631, 1990.

Martins, A. G.; Aguiar, D. R. D. Efetividade do *hedge* de soja em grão brasileira com contratos futuros de diferentes vencimentos na Chicago Board of Trade. **Revista de Economia e Agronegócio**, Viçosa - MG, v. 2, n. 4, p. 449-471, 2004.

Mattos, F.; Garcia, P.; Nelson, C.H. Relaxing standard hedging assumptions in the presence of donwside risk. **Quartely Review of Economics and Finance**, v. 48, n. 1, p. 78-93, 2008.

Myers, R.J.; Thompson, S.R. Generalized optimal *hedge* ratio estimation. **American Journal of Agricultural Economics**, v.71, n.4, p.858-867, nov.1989.

Nogueira, F. T. P.; Aguiar, D. R. D.; Lima, J. E. Efetividade do *hedge* no mercado brasileiro de café arábica. **Resenha BM&FBOVESPA**, São Paulo, n. 150, p. 78-88, 2002.

Oranje, M.; Rodrigues, R.V.; Siqueira, K.B.; Aguiar, D.R.D. A efetividade do *hedge* nos contratos de açúcar antes e após a mudança no item de liquidação. In: XLI Congresso Brasileiro de Economia e Sociologia Rural, 2003, Juiz de Fora - MG. Exportações, Segurança Alimentar e Instabilidade dos Mercados, 2003.

Pennings, J. M. E.; Leuthold, R. M. The role of farmer's behavioral attitudes and heterogeneity in futures contracts usage. **American Journal of Agricultural Economics**, v. 82, n. 4, p. 908-919, 2000.

Shapiro, B. I.; Brorsen, B. W. Factors affecting farmers' hedging decisions. North Central **Journal of Agricultural Economics**, v. 10, p. 145-153, 1988.

Sherrick, B. J.; Barry, P. J.; Schnitkey, G. D.; Ellinger, P. N.; Wansink, B. Farmers' preference for crop insurance attributes. **Review of Agricultural Economics**, v. 25, n. 2, p. 415-429, 2003.

Silveira, R. L. F.; Ferreira Filho, J. B. S. Análise das operações de cross-hedge do bezerro e do *hedge* de boi gordo no mercado futuro da BM&FBOVESPA. **Revista de Economia e Sociologia Rural**, Brasília, v. 41, n. 4, p. 881-899, 2003.

Turvey, C. G,; Baker, T. G. The farm level financial analysis of farmers' use of futures and options under alternative farm programs. **North Central Journal of Agricultural Economics**, v. 72, p. 946-57, 1990.

Velandia, M.; Rejesus, R. M; Knight, T. O.; Sherrick, B. J. Factors Affecting farmers' utilization of agricultural risk management tools: the case of crop insurance, forward contracting, and spreading sales. **Review of Agricultural Economics**, v. 41, n. 1, p. 107-123, 2003.

AN EMPIRICAL TAXONOMY OF FARM BUSINESSES: FARM ASSETS AND THE FINANCING OF AGRICULTURAL PRODUCTION

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AN EMPIRICAL TAXONOMY OF FARM BUSINESSES: FARM ASSETS AND THE FINANCING OF AGRICULTURAL PRODUCTION

1.Problem

Changes in the organization of agricultural production such as the rise of contract farming and vertical coordinated forms of production is one of the most important changes in the late twentieth-century US agriculture (James, Klein and Sykuta 2010). In this context, transaction cost economics have promises to contribute to the understanding of current problems in the agricultural production sector.[108]

Williamson discusses applications of transaction cost economics in the agricultural sector and concludes that scholars "[…] have barely scratched the surface of interesting and important contract/governance issues in the agricultural arena." (2004, p. 37) Moreover, Scott Masten, in his article on "Transaction-cost economics and the organization of agricultural transactions" (2000, p. 190) argues that "agriculture provides a rich and largely unexplored area for application and refinement of transaction-cost theory."

Modern agriculture encloses novel and important challenges that are not only a fertile arena for applications of transaction cost economics but also an opportunity for refinement of the theory. However, empirical applications in the agricultural production sector have suffered from measurement problems of relationship-specific assets—the most important and most distinctive dimension with respect to which transactions differ. Studies of organizational forms have tended to restrict analysis to a single industry or firm, and hence, unable to explore variations across agricultural sectors (i.e., dairy, cash crops, vegetables, etc.). This restriction is of particular importance because measures of the variations in organizational forms and in the attributes of transactions of agricultural commodities such as relationship-specific assets represent abundant opportunities for formal statistical tests (Masten 2000).

One salient feature of agricultural production is that it heavily relies on non-depreciable assets that in some cases are also highly redeployable, being farm land the most distinctive one. However, agricultural production relies also on other type of assets such as single purpose equipment and facilities that are, in certain cases, non-redeployable. This is not only a distinctive feature but also a source of variation across farm activities, which justify efforts to abandon the traditional approach of capital as an undifferentiated (composite) kind, and to explore the differential redeployability of the assets involved in the production process and explores its implications in terms of contracting and financial choices.

In summary, the main challenge for studies that analyze the role of differential redeployability on organizational forms is to find good measures of relationship-specific asset. This has been a major limitation of previous studies and it remains as an important obstacle for empirical research. This task could be facilitated if applied researches had access to a classification of farm assets (physical and human) based on their degree of asset specificity.

The primary goal of this study is to understand how farm activities differ in terms of the attributes of the assets involved in the production process and its implications for the financing of agricultural production. This objective is pursued as follows. First, I provide an assessment of the degree of assets specificity involved in the production of the major

[108] I follow NAICS terminology where sector refers to a higher level of classification and 'industry' refers to a more detailed level of classification such as beef cattle feedlots, corn farming, and dairy cattle and milk production, etc.

agricultural products. Second, I develop an empirical taxonomy of farm activities based on the degree of asset specificity. Third, I discuss implication for financial choices.

The main challenge to measure asset specificity in the particular context of agricultural production is that the production of each agricultural product involves several assets with different degrees of asset specificity. In addition, differences in the production technology within agricultural products need to be contemplated, in particular, when different technologies involve assets with different degrees of asset specificity (e.g., confined versus pasture-based dairy or beef production, caged versus cage-free poultry production).

The strategy adopted in this study is to estimate the degree of asset specificity of the assets involved in the production of each agricultural product. For this endeavor, credit officers that focus on the agricultural production sector are the primary source of information. I rely on their judgment for the assessment of collateral to measure the degree of relationship-specific assets in most agricultural production activities. Credit officers are a relevant source of information because when evaluating a farm project to approve loans to farmers they perform an assessment of the farm assets that serve as collateral. This assessment involves not only the appraisal of farm assets but also the assessment of other factors that affect the salvage value such the importance and risks associated with the relationship with the buyer. These factors provide a straight forward measure of asset specificity in which, as argued by Williamson, differential redeployability of assets is the core issue (1988, p. 588).

Data collection is based on a mail survey where credit officers rate questions related to the each dimension of relationship-specific assets involved in the production of each agricultural product (i.e., physical, temporal, site, and human asset specificity). The list of agricultural products is based on SIC and NAICS industry classification with additional variants in agricultural products that are produced under different production systems.

The contribution of this study is twofold. First, it provides an empirical taxonomy of farm production activities based on the degree of asset specificity. Second, it contributes to the understanding of the differences across farm activates in relation to farm financing characteristics. This study will benefit studies that attempt to understand variations across agricultural industries, and also applications of transaction cost theory to several contractual problems such as inter-firm contractual relationships and firm financing decisions, etc.

This article proceeds as follows. Section 2 presents the transaction cost framework in an agricultural production setting and a discussion on agricultural loan decisions and collateral assessment. Section 3 discussed the methods and data. Section 4 presents an empirical taxonomy of farm businesses and Section 5 discusses the financing implications of this taxonomy. Section 5 concludes.

2. Theoretical Framework

Transaction Cost Economics and Agriculture

Transaction cost theory approaches the boundaries of the firm as the result not only of the productive technology, but also on organizational considerations. More precisely, transaction cost theory studies the choices of firms among alternative governance mechanism—that is, alternative "means by which to infuse order, thereby to mitigate conflict and realize mutual gain." (Williamson 1985).

The central exercise of this contractual approach is to explain how partners choose, from the set of feasible contractual arrangements, the one that best mitigates the relevant contractual hazards at least costs (Klein 2005). This task is articulated by Williamson in the discriminating alignment hypothesis which postulates that "[…] transactions [be they for intermediate product, labor, finance, final products, etc.], which differ in their attributes, are

aligned with governance structures, which differ in their cost and competencies, in a discriminating (mainly, transaction-cost-economizing) way." (Williamson 1991, p. 277).

Of several dimensions with respect to which transactions differ, asset specificity is the most important and most distinctive one. The condition of asset specificity refers to "durable investments that are undertaken in support of particular transactions, the opportunity cost of which investments is much lower in best alternative uses or by alternative users should the original transaction be prematurely terminated." (Williamson 1985, p. 55)

The rationale here is that when transactions are supported by generic assets, it is easy to redeploy investments to alternative uses or users, and each party can go its own way with little cost to the other. On the contrary, when significant investments in durable, specialized assets are put at risk, and there is small numbers bargaining, bilateral dependency sets in (Williamson 1985, 1991). In these situations, assets cannot be redeployed from existing use except at a significant loss of productive value, which generates incentives for a bilateral coordination of investment decisions. In other words, transactors are likely to be reluctant to make such investments without some form of protection.

Similarly, the transaction cost approach to firm's financing decisions approaches debt and equity as alternative governance structures rather than as financial instruments, where debt is the market form and equity is the administrative form. In this setting, the condition of asset specificity is also the primary factor to explain the use of debt versus equity finance (Williamson 1988).

The problem faced by firms is to choose the financial mechanism that minimizes the costs of external funding. Debt is a low cost governance arrangement for projects involving highly redeployable assets, because if the project is successful, interests and principal will be paid on schedule and if the project fails, debt-holders can liquidate assets to recover their investments. If the assets involved in a project are highly specific (i.e., non-redeployable) and, hence, have lower value for other purposes in case the project is liquidated. In this case, the terms of debt financing will be adjusted adversely as the degree of redeployability of assets declines, because the loss in case of failure increases as asset are less redeployable. Equity capital, although not costless, involves control over the firm which mitigates opportunistic behavior by the owner-manager, which reduces the cost of capital for projects that involve limited redeployability (Williamson 1988).

Based on this approach, those farm activities that rely more on assets with low redeployability are expect to have higher equity requirements than is the case for more farming activities relying on multiple purpose facilities and equipment, and land. Empirical analysis of these predictions might have insightful contribution to understand the use of different financial mechanisms across farming industries. The literature on agricultural finance literature has been successful at addressing the effect that the non-depreciable attribute of land has on the financial characteristics of agriculture (Barry and Robison 2001). However, little is known about the effect that other attributes of the assets involved in agricultural production have on the use of alternative financing mechanisms.

Williamson (1991) describes six types of asset specificity. The first three—physical, human, and site specificity—have received more attention in the empirical literature. Physical asset specificity refers to equipment, machinery and facilities that are required to provide a product or service. Human asset specificity arises when specific knowledge, experience or human capital is required to support the transaction. Site specificity refers to situations where successive stations or assets are located closely to one another. The fourth is brand-name capital. The fifth is dedicated assets, which are substantial investment in general purpose assets made for a particular customer. Although not specific to that customer, because of the level of the investment their release to the market would depress the market value of the assets. The sixth is temporal asset specificity, which refers to assets that must be used in a

particular sequence and where timely responsiveness is important. "'Temporal specificity' may arise because a product's value is inherently time dependent, like newspapers; because of the serial nature of production, as in construction projects; or because the product is perishable, as is the case, of course, with agricultural commodities." (Masten 2000, p. 180)

Agricultural transactions display a broad range of contractual arrangements. Based on the empirical literature it is possible to discuss general characteristics or particularities of the agricultural production sector and, in particular, about which attributes of the transaction play a bigger role in agricultural production. Masten (2000) argues that perishability is the most conspicuous attribute of agricultural products from other products and, hence, temporal-asset specificity is expected to play a distinctive role. Timing is of the essence for producers of perishable fruits, vegetables, dairy products, seafood and the like, which make them vulnerable to opportunistic processors. A default by the processor during harvest time would mean loss of value for producers of perishable products. This loss would arise either from crop deterioration or from costly sale in the thin spot market. Similarly, because processors cannot store perishable products, a default by a producer would either interrupt the processing activity or require quick and costly replacement from a thin spot market (Knoeber 1983).

Timing factors create temporal specificities in other agricultural industries such as poultry and dairy milk. Because of the risk of contamination with pathogens, poultry has narrow range of time which it must be sent to processors (Martinez 1999). Similarly, as a result of the perishability attribute of raw milk, transactions in the dairy industry tend to be coordinated by long term contracts and producer cooperatives.

Another attribute that is expected to have more relevance in the agricultural production sector is site specificity. That is the case of agricultural products with high weight-to-value ratio and in particular when that high ratio is reduced significantly in the processing facility. In those cases one would expect processing facilities to be located in proximity to input sources (Masten 2000). The importance of site specificity is, to some extent, influenced by the perishability of products.

However, vertical contracts are not limited to transactions of perishable products or situation where site specificity plays an important role. Vertical contracts cover a wide range of US agricultural transactions. (MacDonald and Korb 2008) For example, Hogs and Tobacco are two farm activities where vertical contracts coordinate more than 70% of the production in the US in 2005. Hog production do not face the severe schedule restriction described above for poultry because hogs can be transported further without losing value due to stress, weight loss, or death during transport. However, hog production relies heavily in single-use facilities and in many cases a heavily concentrated processing industry. Under these conditions, although site and temporal specificity are less important in hog production, physical asset specificity plays, in certain situation, an important role.

Physical and human asset specify play a relevant explanatory role in certain agricultural projects and, in particular, to understand variation across agricultural transactions. Furthermore, as discussed above transaction cost theory inform the alignment of several types of transactions beyond the applications of intermediate or final products such as labor and finance. Although the empirical literature using Transaction Cost Economics to study make or buy problems is growing, applications to understand firm's financial decisions are seldom.

3. Agricultural Loan Decisions and Collateral Assessment

The literature on agricultural lending is not conclusive as to which factors are most important in the agricultural loan decision-making process (Featherstone, et al. 2007). Agricultural lenders use five main factors when evaluating an agricultural loan application—capacity,

capital, collateral, character, and conditions.[109] Credit officers evaluate each of these factors independently based on borrower's financial statements, references, other documentation, and from previous experience with the borrower. These factors are then aggregated by various weighting schemes to assess the borrower's financial position and the loan decision (Gustafson 1989).

Collateral is an important factor in the loan decision-making process, being lending risks inversely related to the amount and quality of collateral provided. The collateral assessment involves not only the appraisal of the farm assets but also an assessment of other factors to determine the percentage of appraised collateral that they would approve in the loan (i.e., loan-to-value ratio). For this task, lenders use a combination of quantitative and qualitative information on borrower's behavior. That is, even when credit evaluation models are used, considerable lender judgment is still required (see, for example, Featherstone, et al. 2007; Gustafson, Pederson and Gloy 2005).

Although the literature is vague at pointing out how lenders evaluate different types of assets and on which ones they put greater emphasis, it can be inferred that the nature of the assets and the type of business are important to determine the percentage of appraised collateral that they are willing to lend. Gustafson et al. (1991) find that lenders base the maximum amount of credit they would approve on a percentage of appraised collateral securing the loan. Rates varied from 50% to 80%, with lower rates applied to machinery.

In addition, there are important differences between farming sectors in issues such as credit scoring and other measures of credit worthiness for agricultural loans. For example, Turvey (1991) compares alternative credit scoring models and although this study does not focus on the effects of farm type on credit scoring, it includes dummies to control for farm type such as cash crops, dairy, beef, hogs, poultry. These dummies are statistically significant, suggesting that there are specific factors that explain differences on credit decisions among farm commodity sectors.

Credit officers also take into account factors that affect the value of the assets in the case of failure. In particular, characteristics such as single use versus multiple-purpose facilities and machinery, and the number of potential buyers for the assets offered as collateral. These assertions were corroborated in the interviews to credit officers in commercial banks and Farm Credit System.

For this study, it is important to highlight that the factors considered by loan officers for collateral assessment take into account differences among farm sectors and, in particular, differences in the type of assets involved in the production process. There is an intimate relationship between the factors involved in the collateral assessment and the concept of asset specify, which make loan officers a relevant source of information to estimate the degree of relationship-specific assets involved in the production of each agricultural product.

Although there is a general framework given by the five credit factors described above, there is important variation among credit organizations with regard to their credit assessment model. The difference among credit organizations emerge from the weight or importance that each of these factors have in the loan decision. That is, guidelines used by

[109] "Capacity" refers to the repayment capacity of the borrower based on cash flows from operations or other sources of income. "Capital" refers to the ability of the operation to survive unanticipated risks and it is evaluated based on firm's financial position with special emphasis on risk ratios, including measures of liquidity and solvency. "Collateral" represents the level of assets securing a loan and serves a final source of loan repayment if the borrower defaults. "Character" refers to borrower's personal characteristics such as honesty, integrity, and reliability. It is a subjective estimate of the likelihood a borrower will try to honor their obligations. Finally, "Conditions" refer to the intended purpose of the loan, and also reflect general economic trends that affect a borrower's ability to repay (Duchessi, Shawky and Seagle 1988; Featherstone, et al. 2007; Gustafson 1989).

credit officers to evaluate a farm project, although existing, are not shared by credit organizations and tend to vary from one organization to another.

Some credit organizations grant credit more on the basis of collateral values. In that case, they must ensure an accurate assessment of the assets used as collateral (real estate, machinery, facilities, etc.). Alternatively, other credit organizations grant credit on the basis of repayment capacity and must ensure an accurate assessment of the borrower's future farm plans and expectation of profitability and cash flow (Gustafson, Beyer and Saxowsky 1991; Gustafson, et al. 2005).

4.Methods

Sources of information

As mentioned in the introduction, the primary goal of this study is to understand how farm activities differ in terms of the attributes of the assets involved in the production process. This objective involves the assessment of the degree of asset specificity of the assets involved in the production of each agricultural product. That is, for each major agricultural product I estimate the degree of asset specificity of all the assets involved in the production of that product.

Credit officers that focus on the agricultural production sector are the 'key informants' for the assessment of the degree of relationship-specific assets involved in the production of each agricultural product. I use credit officer's knowledge and judgment in two ways. First, I sent them a survey questionnaire asking them to rate questions on each attribute of asset specificity for each farm activity. Second, I interviewed credit officers to understand the lending process and criteria to rate investment projects. I focused, in particular, on the criteria used to classify farm assets in agricultural investment projects and how differences in farm assets affect lending decisions. To capture different aspects of the lending process, I interviewed credit officers from Farm Credit System associations, commercial banks, and private organizations that provide short term loans to farmers.

The argument to support this source of information is twofold. First, because the factors considered in the assessment of the collateral that is routinely performed by credit officers to approve loans to farmers are, in a great extent, related to the concept of asset specificity. Credit officers need to estimate the amount that the bank may recover in the event of failure and this task involves not only the appraisal of the farm assets but also the assessment of other factors that affect the salvage value of the assets. In particular, credit officers evaluate whether the assets are redeployable or are specialized for single use and consider other factors such as a comparison of the size of the operation relative to competitors. These factors explain not only the value of collateral assets but also the likelihood that the operation could be absorbed by its competitors in case of failure.

Second, loan officers have significant experience at evaluating farm assets in different commodity sectors. As discussed in Section 2.2, the guidelines for collateral assessment used by agricultural credit organizations take into account differences among farm sector such as differences in the type of assets involved in the production process. That is, loan officers are a qualified source to perform comparisons across farm sectors.

One of the challenges to measure asset specificity is that the production of each agricultural product involves several assets with different degrees of asset specificity. For example, the production of some agricultural products involves mainly land and multi-purpose machinery that can be used for the production of several agricultural products (e.g., soybean productions). In that case, the degree of physical asset specificity would be low if compared with other agricultural products whose production involves small acreage of land and relies mainly on single use facilities and equipment, and few potential buyers (e.g., hog

production). However, most farm activities involve a more complex situation using a combination of assets with different degrees of asset specificity such as land (highly redeployable) and single use facilities and equipment.

The strategy adopted is to assess the overall degree of the each attribute of asset specificity for each farm activity, as opposed to assessing each farm asset individually and aggregate the degree of asset specificity for each farm activity. For that purpose, credit officers offer the advantage that they not only analyze the individual assets involved in a farm project, but also they perform an assessment of the investment project as whole.

5. Key variables and survey questions

This strategy of data collection is based on previous surveys by Masten, Meehan, and Snyder (1991), Poppo and Zenger (1998), and Anderson and Schmittlein (1984). Masten et al. measure asset specificities of a set of components used in naval shipbuilder based on the judgment of a team of company officials including the managers of the production planning and purchase specification departments. Respondents rated, for example, the degree to which skills, knowledge or experience of workers are specific to a particular application; the degree to which facilities and equipment used in the production process are specific to a particular component. Poppo and Zenger study make-or-buy decisions in information services and rely on top computer executives as key informants to measure the degree of relationship-specific assets and other variables for nine information services through a mailed survey. Similarly, Anderson and Schmittlein test a model of integration of the sales force and rely on the judgment of sales managers to measure asset specificity of several electronic components.

The survey designed for this study required each loan officer to rate the level of asset specify of the assets involved in the production of each agricultural product. Based on the literature review, I identify key dimensions in the assessment of collateral that are related to the concept of asset specificity. Each respondent is asked to name up to ten farm activities with which they were familiar with. The respondents rated each farm activity across 7 questions that cover 4 dimensions of assets specificity—physical, temporal, site, and human. Questionnaire items are measured using a 7-point scale in which '1' represented 'low degree' and '7' represented 'high degree. Table 1 reports the variables and survey questions.

The following demographic questions were also included in the questionnaire. In what year were you born? What is the highest degree you have attended? How many years of experience do you have in the agricultural lending industry? Farm background: Are you involved in farm production? Or, were you raised in a farm?

Asset specificity variables and survey questions.

Variable	Survey question	Scale
Salvage value	To what degree would assets in this farm activity lose value in the event of bankruptcy (consider all assets as a bundle)?[/1]	1 to 7
Switch costs	How costly would it be for the producer to switch where they sell their product (consider all costs, including time and resources to find new buyers)?[/2]	1 to 7
Activity specific	To what degree are facilities and equipment used in the production process specific to this product (specialized/single use facility and equipment)?	1 to 7
Bargaining problems	How important are bargaining problems caused by small numbers of potential buyers (concentration in buyer´s market)?	1 to 7
Temporal specificity	How important is timely delivery of this product to processors/distributors (consider the time period within which the product must be sent to buyers)?	1 to 7
Site specificity	How important is it to be close to buyer's facilities for this product (consider the distance between farmers and buyers)?	1 to 7
Human-asset specificity	To what degree are skills, knowledge, or experience of the farmer/ manager, specific to this production activity and to particular buyers?[/1]	1 to 7

[/1] Adapted from Masten et al. (1991)

[/2] Adapted from Poppo and Zenger (1988)

6.List of agricultural activities

An additional challenge is related to the coexistence of different productive technologies within agricultural activities. For example, some dairy farms use confinement system whereas others use pasture-based technology (the same applies for beef production). Also, a poultry farm can use either caged or caged-free production system. These different technologies involve different asset and, hence, it can be expected that the degree of asset specificity will vary depending on the productive technologies. For that reason, for some farm activities I include variants depending on the technology of production.

The survey contains a list of 40 agricultural production activities. This list was obtained by using SIC (4-digits) and NAICS (6-digits) industry classification and additional variants for those agricultural products produced with different productive technology. That is the case of, (i) beef Cattle Feedlots and beef Cattle, Pasture-Based; (ii) Dairy Cattle and Milk Production –confinement and Dairy Cattle and Milk Production – Pasture-Based; (ii) Broiler, Fryer, and Roaster Chickens – Caged AND Broiler, Fryer, and Roaster Chickens - Cage-Free.

7.Data and Sample

Sample

The survey was mailed to a sample of commercial banks and credit organization of the Farm Credit System on April 2011. [110] The Farm Credit System has 93 credit organizations that are direct-lending associations affiliated with one of the five Farm Credit banks (AgFirst Farm Credit Bank; AgriBank, FCB; Farm Credit Bank of Texas; CoBank, ACB; and U.S. AgBank, FCB). According to the Federal Deposit Insurance Corporation there are 1566 commercial banks in the United States with agricultural loans totaling at least 25% of total loans. Commercial banks and the Farm Credit System accounted for over three quarters of the US farm sector's loan volume (45 and 36 percent, respectively) in 2007 (Harris, et al. 2009).

The selected sample contains 300 credit officers and is the result of the following two steps. First, I selected two bank branches for each of the 93 Farm Credit System (FCS) Associations from National Directory of the Farm Credit System 2008-2009, an annual publication of FCCServices, Inc. (183 pages). This method relies on the important penetration that FCS associations have in the United State that not only covers all states but also allows me to give priority to the areas where lending services are more important. Once I selected the credit branch, I obtained credit officer contact information from the National Directory of FCS or from their website. I referred to the branch manager when contact names were not available. As reported in Table 2, I sent the survey to 184 credit officers of the Farm Credit System, covering 38 different states.

The second step was to select a sample of credit officers from agricultural commercial banks. I rely on the geographical distribution of the sample of banks within the FCS to design a sample of commercial banks. For that purpose, I matched the geographical location of the FCS sample at the county level with the directory of commercial banks. Contact information on commercial banks was obtained from the directory of agricultural banks of the Federal Deposit Insurance Corporation (FDIC) (http://www2.fdic.gov/idasp/main.asp). Because some counties do not have an agricultural commercial bank listed in this directory, not every bank in FCS sample was matched with one commercial bank. I sent the survey to 116 credit officers of commercial banks, covering 30 different states.

[110] This method is aligned with previous studies on agricultural lending assessment that surveyed credit officers such as Featherston Wilson, Kastens, and J. Jones (2007)

It is important to mention that banks within the Farm Credit System focus mainly on the agricultural sector, whereas this is not necessarily the case for the commercial banks that although classified as agricultural banks, the portfolio of loans in the agricultural production sector can be as low as 25%. This argument justifies the procedure of selecting the sample of credit officers on the geographical distribution of the associations within the Farm Credit System and then use the geographical location of this sample to select the sample of commercial banks, and not the other way around.

Survey responses

Table 2 reports the sample of credit officers to whom the survey questionnaire was mailed and the response results. The survey was mailed to 300 credit officers in 38 different states in the US. Out of 288 deliverable surveys (12 envelopes returned because of wrong address), I got 50 responses back from credit officers and a response rate of 17.4%. A copy of the survey questionnaire is provided upon request.

The survey was mailed out and collected during April 14th and June 14th, 2011. The 300 surveys were mailed on April 14, a first reminder was sent by e-mail on May 3rd to 191 credit officers in the sample that I was able to obtain e-mail contacts using the directories and extensive searching in their organizations' web sites. A second reminder was sent on May 16th to 184 contacts in the sample.

Credit officers survey - sample and response results

	Credit Officers (N)	Coverage of US States (N)
Farm Credit System	184	38
Commercial Banks	116	30
Total Sample (mailed out)	300	38
Undeliverable (return to sender)	12	
Total deliverable sample	288	38
Surveys responded	50	more than 22 /a
Response rate	17.4%	

/a Based on the 30 respondents that provided contact information. These respondents cover 22 States.

Out of the 50 returned questionnaires, 48 were usable and contained a total of 319 case observations. In this setting, a case refers to one individual respondent's assessment of a farm activity (see Table 3). These observations cover 40 farm activities and, as expected, the number of responses per farm activity varies. Whereas some farm activities (e.g., corn, beef cattle-pasture-base, hog) were selected and rated by most credit officers, other farm activities with less economic importance or concentrated geographically received fewer responses (e.g., sugarcane, sugar beet, fur-bearing animal and rabbit). To mitigate this problem for some relevant farm activities that by May 14 I had gotten few responses, I asked to a contact person at FCS for contacts of credit officers that had lending experience in the following farm activities: Finfish fishing; Floriculture Production; Orange Groves. Through this procedure I got 8 contacts from FCS and sent them the survey questionnaire. The total sample of FCS reported in the Table 2 includes these contacts.

Summary of survey data

Valid Responses (N)	Case observations[a] (N)	Farm activities (N)	Responses per farm activity (average)[/b]	No. of farm activity rated per respondent (average)
48	319	40	8	7

/a A case observation refers to one individual respondent's assessment of a farm activity /b Min=1, Max=30

In relation to the quality of the responses, it is important to recall that the data collected in this survey is not related to characteristics of the respondents or their organizations. As explained above, respondents were asked to rate seven questions on the ten agricultural products that they were most familiar with. In addition, respondents had the opportunity to respond anonymously, in which case I would be unable to identify them or their organization. In this setting, there are no clear elements that could make respondents provide inaccurate information. This statement was confirmed by three interviewed credit officers that considered that, based on the requested information, there was no reason why a credit officer would not respond (other than their time). In addition, the survey was short (4 pages including cover letter) and it could be completed in less than 25 minutes.

Variables

Table 4 reports the descriptive statistics and correlations of the variables from the survey responses. Questions 1 through 4 are related to physical assets specificity and I use factor analysis to construct a variable of physical asset specify. In that respect, to mitigate measurement issues I use the information contained in these four questions to derive a multidimensional measure to be use in the empirical analysis.

Descriptive statistics and correlations - survey responses.

	Quest-ion	**Variable**	Mean	s.d.	1	2	3	4	5	6	7
1	Q1	Salvage value	4.02	1.85							
2	Q3	Switch costs	3.49	1.89	.41**						
3	Q2,Q4	Mean (Q2,Q4)	4.39	1.58	.56**	.65**					
4	Q2	Activity specific	4.64	1.86	.52**	.62**	.84**				
5	Q4	Bargaining problems	4.14	1.86	.43**	.48**	.84**	.43**			
6	Q5	Temporal specificity	4.41	1.98	.30**	.55**	.59**	.54**	.47**		
7	Q6	Site specificity	4.18	1.58	.14*	.41**	.42**	.34**	.36**	.58**	
8	Q7	Human asset specificity	4.98	1.57	.28**	.41**	.47**	.47**	.32**	.43**	.45**

N=319 * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

First, I combine questions 2 (activity specific) and 4 (small numbers bargaining problems) because the combination of these two questions provides a measure of physical assets specificity. That is, a high level of asset specificity occurs when a farm activity involves facilities and equipment that are specific to a certain product and when there are small numbers of potential buyers. Note that the correlation between activity specific (Q2) and bargaining problems (Q4) is below 0.5, which supports the importance of combining these two variables to capture relationship-specific assets as opposed to use only one of them as a proxy for physical asset specificity. The variables given by questions 1 (salvage value) and 3 (switching costs) are a straightforward measures of physical asset specificity.

The correlations among the three physical asset specificity variables are between 0.4 and 0.65. Although these values denote important correlation among these variables, a higher correlation should be expected given that the three constructs are design to capture the same variable—physical-asset specify. This confirms the measurement problem that empirical research has faced and, more importantly, supports the strategy of multiple measures as opposed to a single variable used in this study to mitigate measurement errors.

I conduct factor analysis for the three physical-asset specificity measures to determine whether these three measures should be combined. One factor is revealed with Cronbach's

alpha (reliability) of 0.78, which indicates very high degree of internal consistency. Therefore, a measure of physical-asset specificity is computed from the mean of the following three variables: question1, question 3, and the mean value between question 2 and question 4. The remaining analysis employs this combined index exclusively.

8.Taxonomy and cluster analysis techniques

There are two basic approaches to classification—typology and taxonomy. A typology is generally multidimensional and conceptual, meaning that it is a conceptual classification where the cells of the topology represent concepts rather than empirical cases. Taxonomies differ from typologies in that they classify items on the basis of empirical observable and measureable characteristics. Moreover, taxonomies are, in general, hierarchical (as in family, genus, species) (Bailey 1994 p. 6). However, this is far from a universal distinction in social sciences research. For convenience, the term "taxonomy" is used in this study as defined above.

The important step for a successful classification is the ability to identify the key variables on which the classification is to be based. For this task, there is no specific formula for identifying key characteristics and three approaches coexist—inductive, deductive, and cognitive (Ketchen and Shook 1996). In this study I base the identification of the key variables on the Transaction Cost approach and use empirical data and quantitative analysis to construct the taxonomy.

Cluster analysis has been a popular method in research areas where the emphasis is to identify groups of similar individuals or organizations such as strategic management. This technique takes a sample of elements (e.g., individuals, organizations, industries) and groups them such that the spastically variance among elements grouped together is minimized while between-group variance is maximized. More importantly, cluster analysis permits the inclusion of multiple variables as sources of configuration definition.

Some concerns or unresolved issues had been identified in cluster analysis. Ketchen and Shook (1996) summarize the main concerns for the research in strategic management. A major issue is that cluster analysis can impose groupings where none exist. A second issue is that the selection of clustering algorithms is critical to the effective use of cluster analysis. Different groups emerge from different choices of the rules or procedures followed to sort observations. A third unresolved issue in cluster analysis is the choice of a stopping rule, and hence, a criterion to determine the number of clusters.

In summary, there are several concerns to be addressed when using cluster analysis. Nevertheless, there are multiple procedures in cluster analysis that help to mitigate some of these concerns and provide greater validity and robustness in the analysis. Rather to select the best algorithm or method, cluster researchers promote the use of multiple procedures to a single research problem.

On the selection of clustering algorithm, not only there is no consensus among cluster experts but also each method is questionable because each one has limitations (Ketchen and Shook 1996). There are two basic types of algorithms to develop cluster solutions—hierarchical and nonhierarchical. The hierarchical method involves successive clustering and re-clustering of individuals elements by adding them (agglomerative) or deleting them from (divisive). In nonhierarchical methods (also known as K-means) a data set is divided into a prespecified number of groups. Therefore, as opposed to hierarchical methods, the number of clusters must be known *a priori*. Nonhierarchical have the following advantages over hierarchical. First, the cluster solution is less influenced by outliers because this method allows observations to switch cluster membership. Second, the final cluster solution optimizes

within-cluster homogeneity and between-cluster heterogeneity because this method allows multiple rounds through the data.

Ketchen and Shook (2006 p. 446) review the literature on cluster analysis and state that the solution advocated by experts is the to use a two-stage procedure where "a hierarchical algorithm is used to define the number of clusters and cluster centroids; these results then serve as the starting points for subsequent nonhierarchical clustering." The idea here is that to obtain the improvement of the nonhierarchical requires to know *a priori* the number of clusters. In that respect, the best results may be obtained by using hierarchical and nonhierarchical methods in tandem.

I follow this two-stage cluster procedure in this study to analyze the survey data for each farm activity and to place farm activities into groups on the basis of their degree of similarity/dissimilarity in the several attributes of the assets involved in the production process. In order to examine differences in the attributes of the assets involved among farm activities, individual responses were aggregated. That is, I compute the mean response for each farm activity on each of the asset specificity variables. As a result, the cluster analysis procedure is performed on the mean values.[111]

Two important decisions need to be made. First, which agglomerative algorithm will be used in the hierarchical method. Of the several hierarchical algorithms for computing distance between two clusters (each with its own strengths and limitations), I use two algorithms that are widely applied—complete linkage (furthest neighbor) and average linkage (between-groups linkage or UPGMA) based on Euclidean distance. In complete linkage the distance between groups is defined as the distance between the most remote pair of individual and it requires that potential members of a cluster to bear similarity to all members of the cluster. In average linkage the distance between groups is given by the average of all inter-individual distances made up of pairs of individuals, one from each group. This method uses information about all pairs of distances and not just the one of the most remote pairs as the complete linkage (Landau and Everitt 2004).

For robustness, first I compare the cluster solutions from these two hierarchical methods. Then I compare the clusters solutions from the hierarchical and the nonhierarchical (K-means) methods. For this comparison, I rely on Goodman-Kruskal lambda test as a measure of the degree of association or similarity between both cluster solutions. This statistic (lambda) has a range between 0 and 1, where 0 indicates perfect non-relationship and 1 indicates perfect relationship.

The second decision is the criteria to identify the number of clusters in the solution. A common employed technique to define the number of clusters is through visual inspection of dendrogram. Specifically, researchers examine the incremental changes in the distance between two merging clusters, where a sudden increase in the size of the difference in adjacent steps indicates that dissimilar clusters have been merged and, hence, the appropriate number of clusters is given by the step prior to that clustering step (Landau and Everitt 2004).

9.A Taxonomy of Farm Businesses

Cluster results

I use cluster analysis to examine the survey data for each farm activity and to place farm activities into groups on the basis of their degree of similarity/dissimilarity in the four

[111] A similar treatment of the data set is found in Ng, Westgren, and Sonka (2009). They use cluster analysis to place 11 firms into strategic groups on the basis of their degree of similarity, or dissimilarity, in 16 competitive attribute ratings. They survey members of the swine genetic value chain and each respondent was asked to name up to eight swine genetic firms with which they were familiar with and to rate, for each firm, 16 competitive attributes. Cluster analysis procedure was performed on the mean response for each firm's attribute.

attributes of the assets involved in the production process. I run this analysis for 31 farm activities that were rated for at least three credit officers.

The two hierarchical procedures—complete linkage and average linkage (between-groups) provide almost identical cluster solutions. I identify six groups of farm activities based on the examination of the incremental changes in the distance between two merging clusters (agglomeration schedule). Table 5 reports the Goodman and Kruskal (G-K) lambda test results which indicates that the cluster solutions of these two procedures have perfect relationship (Lambda statistic=1.0).

Based on the cluster cutoff determined though the hierarchical procedure, I used the nonhierarchical K-means procedure prespecifying six cluster solution. The comparison between complete linkage and K-means procedures is also reported in Table 5 and indicates strong relationship (Lambda statistic=0.8). This result indicates that the cluster solutions are robust and are not sensitive to changes in the cluster method.

G-K Lambda test statistics (symmetric)

Comparison	Lambda	Significance
Complete linkage and K-means (6 cluster cutoff)	0.769	0.000
Complete and Average linkage (6 cluster cutoff)	1.000	0.000

Based on the discussion on cluster analysis in the Methods section, I followed a two stage procedure to obtain the best cluster solution. One of the premises discussed is that K-means offers improvement but requires to know *a priory* the number of clusters. For that reason, I use the cluster solution obtained with the K-means procedure for the empirical analysis.

Table 6 reports the membership of each farm activity to the six clusters identified and the mean scores of the cluster members on the four asset specify variables.

10.Discussion

The six identified clusters represent distinct composition of the assets involved in the production process. Each of the six groups identified in this study is here discussed. Table 6 summarizes the characteristic of the six types of farming activities based on the four dimensions of asset specify. In this table, I also report, for each group of farm activities, statistics of the percentage of production under contract (marketing or production) and the percentage of the total value of production explained by nonfamily farms. Nonfamily farms can be related to farm businesses that use external equity capital given the definition of the ERS-USDA—any farm for which the majority of the farm business is not owned by individuals related by blood, marriage, or adoption.

#1 – High asset specificity

Farm business in Cluster #1 can be best described as relying in highly nonredeployable assets and involving high temporal, site and human asset specificities. The combination of high degree of asset specificity in all four dimensions makes this group a distinct and extreme one.

Figure 1 shows that the member of this group has distinctive characteristics when compared to other farm activities based on physical asset specificity and the combination of site and temporal asset specify. Contractual hazard and specialized coordination forms are require to coordinate the production in this industry. In that respect, the broiler industry has receive important attention and has been extensively studied within the transaction cost literature (e.g., Martinez 1999; Martinez 2002; Ménard 1996).

Boundaries among groups are, in general, difficult to establish from the cluster output because each cluster might have "outliers". That is not the case in this cluster result and Figure 1 shows that it is possible to distinguish distinct groups and that the presence of outliers is not a problem for the interpretation of this cluster output.

#6 – High temporal and site asset specificity

Farm businesses in this group are heavily exposed to perishability problems and site specificities. As discussed above, it is expected that these two dimensions of asset specificity are expressed simultaneously in empirical examples because perishable products might lead to incentives for sellers and buyers to locate their facilities close to each other. These characteristics bring together farm activities that *a priori* might be seen as very different from each other such as dairy, shellfish fishing, berry, food crops grown under cover. In that respect, farm activities in this group share important similarities in type of organizational problems originated by their high temporal and site specificities condition.

Description of the taxonomy of farm activities

Group	Distinguishing characteristics	Farm activities	Asset specificity[a]				Percentage of production under contract[b]	Percentage of value of production by nonfamily farms[c]
			Physical	Temporal	Site	Human		
1	High asset specificity (all dimensions)	Broiler, Fryer, and Roaster Chickens (Cage-Free)	High	High	High	High	94%	9%
6	High temporal and site asset specificity	Dairy Cattle and Milk Production (Confinement and Pasture-Based); Food Crops Grown Under Cover; Berry; Shellfish Fishing	Medium^{+}	High	High	Medium^{+}	59%	19%
5	Medium-high asset specificity	Chicken Egg; Hog and Pig; Floriculture; Broiler, Fryer, and Roaster Chickens (Caged); Nursery and Tree ; Potato ; Tobacco; Finfish Fishing; Deciduous Tree Fruit; Tree Nut	Medium^{+}	Medium^{+}	Medium^{-}	Medium^{+}	81%	18%
3	Medium-low asset specificity	Beef Cattle Feedlots; Sheep/Goat; Horse and Other Equine; Peanut; Cotton; Rice; Orange Groves	Medium^{-}	Medium^{-}	Medium^{-}	Medium^{-}	44%	25%
2	In-between	Timber Tract Operations; Turkeys and Turkey Eggs	Medium^{-}	Low	Medium^{-}	Low		
4	Low asset specificity (in all dimensions)	Corn; Soybean; Wheat; Barley; Hay; Beef Cattle (Pasture-Based)	Low	Low	Low	Low	18%	10%
		Mean (all farm activities)	4.3	4.8	4.4	5.2	41%	15%

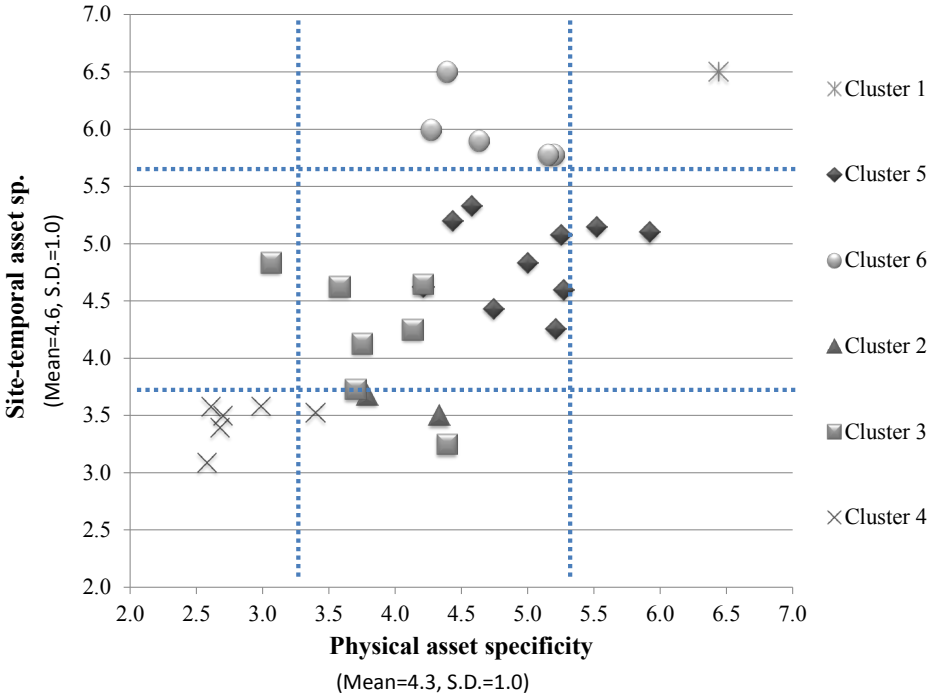
[a] Based on primary data collected in this research. Description based on the mean value of each cluster. High=one standard deviation above the mean or higher; Low=one standard deviation below the mean or lower; Medium=in between Low and High, where + and - indicate above and below the mean, respectively.

[b] Based on ARMS Data 2005 reported in MacDonald and Korb (2008). This is an approximation based on the

available information because the contracting data is not available for some farm activities.

[/c] Over total farms in each farm activity. Based on ARMS data 2009. This is an approximation based on the available information in the tailored reports because these reports do not cover all farm commodities. http://www.ers.usda.gov/Data/ARMS/app/default.aspx?survey_abb=FINANCE

Figure 1: Plot of farm activities' mean values on physical-asset specificity and site-temporal asset specificity by cluster group



5 – Medium-high asset specificity

Farm businesses grouped in Cluster #5 can best be described as exposed to several assets specificity problems. As shown in Table 6, business in this cluster have "medium^{+}" degree of physical, temporal, and human asset specificity, meaning that have above average values on these variables. A distinctive and important characteristic of this group is that these farm activities do not rely on farm land as the dominant asset. Further analysis on this observation is presented in next section.

Contracts play an important role in the coordination of the production in these farm activities. For example, contracts coordinate above 70% of the production of hog, poultry, and tobacco.

3 – Medium-low asset specificity

Farm activities grouped in Cluster #3 have the defining characteristic of involving "medium-low" levels of all dimensions of asset specify. That is, the mean value of the four variables of asset specificity in this group ranges between the mean value and one standard deviation below the mean.

The comparison between Cluster #3 and Cluster #5 is clearly represented in Figure 1 where farm activities of both groups are in the middle range of site and temporal specificities but Cluster #5 involves higher degree of physical-asset specify. Although in both groups, farm activities involve facilities and equipment that are, to some degree, specific to the product involved, the farm activities in Cluster #3 tend to use more land, which is, in general, highly redeployable.

4 – Low asset specificity

Cluster #4 farm activities can be best described as relying in highly redeployable assets and involving low temporal, site and human asset specificities. This group represents the opposite features than Cluster #1. That is, the combination of low degree of asset specificity in all four dimensions makes this group a distinctive and extreme one that denotes the lower tail in a continuum of farm activities sorted by the degree of asset specificity.

Farm activities in this group conform a more homogeneous group where the production process relies heavily in land and multiple purpose assets. All the cash crops are in this group together with pasture-based beef cattle production.

2 – In-between

Farm activities in Cluster #2 have similar characteristics to Cluster #4 but it involves a less redeployable facilities and equipment and some degree of site specificity. In that respect, this group is best described as an in-between group (between Cluster #4 and Cluster #3) with only two farm activities belonging to this group.

Summary of the taxonomy

Overall, this taxonomy shows that farm activities constitute a clear continuum on the degree of asset specificity. More importantly, given the theoretical construct and predictions of Transaction Cost Economics, this taxonomy allows to group farm activities with similar organizational problems given the characteristics of the assets involved in the production process. Further comparative analysis within and between these groups can originate useful insights.

This taxonomy contributes to the understanding of the differences among farm activities and, in particular, it calls for further interpretation and connection with how agricultural production is organized. Cross-industries studies have largely relied on industry classification systems such as SIC and NAICS to group industries within major economic sectors. The classification developed here is a better way to group industries within the agricultural sector, which facilitates the comparative analysis of industries in this sector.

11.Farm Financing

As discussed in the Methods Section, the main variables used to identify clusters of farming activities were based on Transaction Cost Economics. In that respect, it is possible to analyze the implications that this classification has on the financial characteristics of agriculture. Given the importance that characteristic of the assets used as collateral have on loan decisions (according the transaction cost approach to financing), this section relies on insights from semi-structured interviews on collateral assessment and lending process to credit officers from different credit organizations in the U.S.—commercial banks and Farm Credit System.

The analysis of farm financing pursued here is not designed to be conclusive and lacks the rigor of an empirical test for generalization. The interviews were design to understand the lending process and for the interpretation of the cluster groups. That is, the analysis presented here should be interpreted as insights and hypotheses for future empirical tests rather than a conclusive analysis of the farm financing characteristics.

12.Credit evaluation of farm investment projects

Collateral is a key determinant of the level of debt capital the bank will approve. To evaluate the assets offered as collateral, several factors are taken into account. One important aspect is whether assets are ‘single-use/specialized’ or can be used for the production of multiple products.

Multiple-purpose assets such as land are more secured assets because its value does not change in case of default and, hence, it represents low risk collateral from the lender point

of view. Risks associated with collateral increase for depreciable assets such as machinery and equipment. Risks are particularly high for single-purpose assets.

Most interviewed credit officers provided examples like this: when comparing two similar investment projects—confinement dairy versus corn—the loss in case of failure would be higher for confinement dairy. The explanation here is that whereas the assets involved in confinement dairy will lose value in case of failure, the assets involved in the production of corn will most likely keep their value.

In that scenario, the potential buyers for the single-purpose facilities and equipment used in confinement dairy would be restricted to other confinement dairy farmers. Moreover, if the failure is attributed to industry factors (as opposed to management problems) the number of potential buyers will be significantly reduced to other existing or potential dairy farmers or speculators that can invest in dairy assets and wait for the recovery of the industry. In any case, it is expected that the assets will lose value.

The problem with single-purpose specialized assets is not only that the number of potential buyers is restricted to other producers in the same industry, but also that the design of specialized assets such as a poultry or hog facility might differ from one farmer to another and, hence, the value of the assets for a different farmer might be lower. The farmer that is interested in buying the assets might have to make adaptations, which will be an argument to beat down the price of those assets. These types of issues are unusual for real estate assets.

In addition, credit officers have to reassess collateral in times of distress in a particular industry. In that case, the value of multiple-purpose assets tends to be more stable than single-purpose facilities, which enhance the importance of this attribute of the assets for lending purposes.

The problem associated with assets with low degree of redeployability is intensified for debt financing because of the following situation. Due to banking regulation, banks in the U.S. are not allowed to hold assets beyond a certain period of time. That is, banks have to liquidate assets and, as the date gets closer, the value of the assets might go down. As the number of potential buyers is lower for single-purpose assets with low degree of redeployability, this problems is particularly serious for these types of assets. Potential buyers know about this and use this information to beat down the price of the assets.

A second factor that credit officers look at when evaluating the collateral is the ‘risk associated to the commercialization’ of the farm product. In certain farm industries counterparty risk is an important element to be analyzed by the credit officer. That is the case of highly concentrated industries and where marketing contracts and production contracts tend to coordinate the transactions between farmers and processors such as hog and poultry production. In industries where contracting and the relationship with the buyer is important, lenders evaluate not only the farm project and the analysis of the producer operation, but also the viability of the processor and the contract between the farmer and the processor. Some credit officers refer to this factor as the sixth credit factor taken into account in the credit evaluation process—in addition to collateral, capacity, credit, character, and conditions.

This means that credit officers pursue additional analysis on investment projects in industries that are highly concentrated or farm projects that have long term contractual relationship with the processor. Poultry represents a clear example of this situation, where a producer that is willing to enter the industry can rent or buy a poultry operation but in order to run a business he or she needs a contract with the integrator. The value of the assets might be affected by this condition where lower salvage value is associated with farm activities in which the business project is bounded by the relationship with the integrator. The reverse example is given by cash crops where the relationship with the buyer is not that important for the viability of the farm project.

A third aspect considered by credit officers when assessing the collateral is 'size of the operation relative to competitors'. Loan officers compare the size of the operation with what is normal for a certain region or according to industry standards. This factor is related to the likelihood that the operation could be absorbed by its competitors in case of failure.

If an operation has either bigger or smaller size relative to the competitors, the assets will have lower value in case of failure. An example of this situation is given by new dairy operations that involve higher scale relative to the existing dairy farms in a given region. If that type of project fails, those operations would not be absorbed by other dairy farmers.

As a result of these factors, the advance rate for a single-purpose asset tends to be lower than for multiple-purpose ones. Whereas loans are usually 65-70% of appraised value of the collateral in the case of land, these percentage is reduced as less redeployable assets are involved. Hence, farming activities that rely on low redeployable assets will face higher credit constraints to finance their projects.

The alternative mechanism for external funding—equity—although not costless, it mitigates part of these problems because investors have control over owner-manager decisions, which provides better assurance properties. In addition, in case of failure outside owners (external equity investor) that participates in other businesses in the same industry or in related industries might be able to repossess and redeploy the assets more efficiently than the bank. Unlike the banks, outside owners can wait to sell the assets.

Banks have policies to abide that make debt a more rigid financing mechanism. In that respect, equity investors are more forgiving than banks, which makes this mechanism a better fit for certain farm projects that, for example, have to afford period of bad returns.

As mentioned in Section 2.2, when assessing an investment project banks take into account other factors for their lending decision. Although there is certain interaction and complementarity among credit factors (e.g., management and collateral), collateral itself serves to distinguish groups of farming activities that involve higher risks from the bank point of view. When comparing two farm projects that are similar in everything but the characteristics of the assets involved in the production process—i.e., ceteris paribus—the one involving less redeployable assets will face higher credit constraints.

Having made this connection for the particular setting of agricultural loan decisions in the U.S., the groups of farming activities identified in this study have important implications to understand the financing characteristics of farming agriculture. The groups of farm activities reported in Table 6 represent a continuum in the probability of a farm project being financed by debt. Farm activities in Cluster #4 (corn, soybean, wheat, barley, hay, beef cattle pasture-based) involve highly redeployable assets, being land the most important one.

Farmland has desirable properties from the lender point of view, which reduces the risks of lending to these farm activities. Land can be used for the production of several agricultural products and because of its non-depreciable attribute; land does not lose value over time. However, this non-depreciable attribute deserves further analysis that is important to understand what financial mechanism is better for purchasing farmland.

13.Idiosyncratic properties of farmland

Barry and Robison (1986; 2001) argue that the debt-carrying capacity of non-depreciable assets, farmland in particular, is lower than that of depreciable assets, under traditional loan repayment arrangement. Considering that farm real estate accounted for 87% of the value of total farm assets in 2009 (USDA), it is logical to expect lower aggregate debt-to-asset ratios for farm sector. For example, this farm sector ratio was, in 2007, 10% for the

U.S. (USDA), 14.6% for the UK and 26.1% for the European Union (FADN).[112] These farm sector debt-to-asset ratios are low relative to other economic sector. For example, this ratio for the corporations in the U.S. food processing and restaurant sectors was, in 2004, 21% and 29%, respectively (Compustat). Similarly, Petersen and Rajan (1994) report average debt-to-asset ratios for over 3,400 small non-farm U.S. companies of 27% for corporations and 24% for sole proprietorships and partnerships.

The explanation for this phenomenon is that owning farmland can be a profitable investment, but it will have persistently inadequate cash flows (Oltmans 1995). This makes the purchase of farmland unable to pay for itself on a cash flow basis using debt capital. That is, land is an appreciable asset and returns capital gains as well as current income to owners.

The financial implication related to these pricing and returning characteristics of farmland in which much of its economic return occurs as capital gains or losses (Barry and Robison 2001) is the following. If debt financing is used to purchase land, down payment amounts reduce liquid reserves. Land is more ideally suited to equity financing because it usually carries lower demand on current cash flow than debt financing (Oltmans 1995, p. 62).

Renting land is a way to expand and control additional land. About 66% of medium and large-scales farms in the U.S. own part of the land they operate and rent the rest (Hoppe, et al. 2007). Approximately 50% of farm land in U.S. and Canada is leased by farm operators and the demand for leased land is growing (Painter 2006). Purchasing land for leasing purposes has been a mechanism used for external investors (non-farmers) that allows them to diversify their investment portfolio.

Two important remarks here. First, the prediction within the transaction cost lens that debt would be suitable for farm businesses that rely heavily on redeployable assets such as land does not contradicts the analysis on farmland discussed here. Lenders will be willing to support the purchase of land given that those investments are secured by collateral. However, it might be very difficult for a young farmer to start purchasing land with debt, but it might be feasible on later stages for gradual expansion relying on equity on existing landholdings to support the purchase of additional land. Second, the generalization made in the literature when referring to the farm sector as one in which farm land is the dominant asset, although it can be true at the aggregate level, it ignores important heterogeneity within farm industries and, hence, it can be misleading for some farm activities.

14.Cluster groups and farm financing

Farm activities in cluster #4 were discussed above. Although these operations involve low degree of asset specificity, farmland is the most important asset. Farm financing analysis in those industries need to contemplate not only the redeployability attribute of farmland but also the financial implications derived from the non-depreciable and capital gains characteristics discussed above.

The farm activities grouped in the clusters with medium-high and high degree of asset specificity (Clusters #1, #2, #5 in Table 6) are clear examples of farm activities in which land is not the dominant asset involved in the production process. In that respect grouping farm activities based on the attributes of the farm assets allows to explore differences within the farm sector and, in particular, understand better the implications for the use of equity versus debt. Farm activities differ on the attributes of the assets used as collateral and, hence, on the specific risks attached to certain farm industries from the lender point of view.

Farm activities in Clusters #2 and #3 involve low and medium-low asset specificity and are expected to have better access to debt capital. Credit officers will evaluate other credit

[112] Farm Accountancy Data Network - FADN

factors such as capacity and management abilities to grant credit to a specific farmer, but low risk will be attached to the collateral factor.

Farm activities in cluster #5 rely, in a greater extent, on single-purpose assets. That is the case of poultry, hog, floriculture, fruit and tree nut production. Advance rates will be adjusted adversely for these farm activities if compared to cash crops groups in cluster #4 and, hence, higher credit constrains are expected for these farm activities.

Farm activities in cluster #6 involve high temporal and site asset specificity that, from the lender point of view, increases counterparty risk. Lenders will evaluate not only aspects related to the farm operation and the investment project, but also the relationship with the processor/buyer and its viability. Asset in the farm activities in this group—confinement dairy, berry, shellfish fishing, and food crops under cover—lose value in case of failure not only because single-purpose condition but also because the relationship with the processor becomes a relevant factor for the farm project. As discussed above, potential buyers in these industries will need not only the facilities and machinery for these farm activities, but also some type of specialized vertical coordination agreement with the processor. As a result, the number of potential buyers will be reduced, which will probably reduce the salvage value of those assets.

The same applies to the farm activity in cluster #1—poultry cage-free. The properties associated with equity might be a better fit for these farm activities when the cost of credit increases or the credit constraints become severe.

15.Conclusions

Farming sector has been traditionally approached as a sector with special or idiosyncratic characteristics. The most distinctive one is the exposure to unpredictable shock and random outcomes due to Mother Nature. Another important distinction in the literature is the high capital intensity and low asset liquidity. This characteristic is related to the dominance of farm real estate in the asset structure, where farm real estate comprises about 80% of total assets from year to year in U.S. farm sector.

The taxonomy developed in this study contemplates and goes beyond the differential attributes of farm land compared to other assets such as buildings, machinery, equipment, etc. This taxonomy contemplates the differences among farm activities as far as the attributes of the assets involved in the production process is concern. In that respect, this study contributes to abandon the traditional approach of capital as an undifferentiated kind by exploring the differential redeployability of the assets involved in agricultural production settings. As articulated in the Transaction Cost theory, these attributes are the drivers of organizational choices such as the make or buy decisions and the use of alternative financing options.

Two limitations should be mentioned. First, the unit of analysis in this study is the transaction between farm activities and processors or financial organizations. However, these transactions are measured at a farm-activity (industry) level. That is, difference within farm activities are not captured in the empirical analysis pursued here. However, as explained in the introduction, one of the gaps that motivate this study is the lack of studies exploring the difference between farm activities.

Second, generalization of this taxonomy to other countries needs to be cautious. Farm activities in different countries might have different measures of each of the dimensions of asset specificity. Not only because the technology of production might be different and the assets involved in each farm activity might change, but also because small numbers bargaining problems might be very different as well. The latter is, in a great extent, affected by the degree of concentration of the processing industry and or distribution industry.

16.References

Anderson, E., and D. C. Schmittlein 1984. Integration of the Sales Force: An Empirical Examination, *The RAND Journal of Economics* 15, 385-395.

Bailey, K. D. 1994. *Typologies and Taxonomies: An Introduction to Classification Techniques*. thousand Oaks, CA: Sage.

Barry, P., and L. J. Robison 1986. Economic versus Accounting Rates of Return for Farm Land, *Land Economics* 62, 388-401.

Barry, P. J., and L. J. Robison 2001. Agricultural finance: Credit, credit constraints, and consequences. In L. G. Bruce, and C. R. Gordon eds., *Handbook of agricultural economics*, 513-571. Elsevier.

Berger, A., and G. Udell 1995. Relationship lending and lines of credit in small firm finance, *Journal of Business* 68, 351-381.

Duchessi, P., H. Shawky, and J. Seagle 1988. A knowledge-engineered system for commercial loan decisions, *Financial Management*, 57-65.

Featherstone, A., C. Wilson, T. Kastens, and J. Jones 2007. Factors affecting the agricultural loan decision-making process, *Agricultural Finance Review* 67, 13-33.

Gustafson, C. 1989. Credit evaluation: monitoring the financial health of agriculture, *American Journal of Agricultural Economics* 71, 1145-1151.

Gustafson, C., R. Beyer, and D. Saxowsky 1991. Credit evaluation: investigating the decision processes of agricultural loan officers, *Agricultural finance review (USA)*.

Gustafson, C., G. Pederson, and B. Gloy 2005. Credit risk assessment, *Agricultural Finance Review* 65, 201-217.

Harris, J. M., J. Johnson, J. Dillard, R. Williams, and R. Dubman 2009. *The debt finance landscape for US farming and farm businesses* (United States Dept. of Agriculture, Economic Research Service, Washington, DC).

Hoppe, R. A., P. Korb, E. J. O'Donoghue, and D. E. Banker 2007. *Structure and Finances of US Farms* (United States Dept. of Agriculture, Economic Research Service., Washington, DC).

James, H. S., Jr., P. G. Klein, and M. E. Sykuta 2010. The Adoption, Diffusion, and Evolution of Organizational Form: Insights from the Agrifood Sector, *Managerial and Decision Economics* Forthcoming.

Ketchen, D., and C. Shook 1996. The Application of Cluster Analysis in Strategic Management Research: An Analysis and Critique, *Strategic Management Journal* 17, 441-458.

Klein, P. G. 2005. The Make-or-Buy Decisions: Lessons from Empirical Studies. In C. Ménard, and M. Shirley eds., *Handbook of New Institutional Economics*, 435-464. New York, NY: Springer.

Knoeber, C. R. 1983. An alternative mechanism to assure contractual reliability, *The Journal of Legal Studies* 12, 333-343.

Landau, S., and B. Everitt 2004. *A handbook of statistical analyses using SPSS*. CRC Press.

MacDonald, J. M., and P. Korb 2008. *Agricultural contracting update, 2005* (Economic Research Service, US Department of Agriculture, Washington, DC).

Martinez, S. 1999. Vertical coordination in the pork and broiler industries: implications for pork and chicken products.

Martinez, S. W. 2002. *A Comparison of Vertical Coordination in the U.S. Poultry, Egg, and Pork Industries* (United States Department of Agriculture, Economic Research Service).

Masten, S., J. Meehan Jr, and E. Snyder 1991. The costs of organization, *Journal of Law, Economics, and Organization* 7, 1.

Masten, S. E. 2000. Transaction-cost economics and the organization of agricultural transactions. In M. Baye ed., *Advances in Applied Microeconomics: Industrial Organization*, 173-195. New York: Elsevier Science.

Ménard, C. 1996. On Clusters, Hybrids, and Other Strange Forms: The Case of the French Poultry Industry, *Journal of Institutional and Theoretical Economics* 152, 154-183.

Ng, D., R. Westgren, and S. Sonka 2009. Competitive blind spots in an institutional field, *Strategic Management Journal* 30, 349-369.

Oltmans, A. W. 1995. Why farmland cannot, will not and should not pay for itself, *The Journal of American Society of Farm Managers and Rural Appraisers* 59, 57.

Painter, M. 2006. The Financial Benefits of a Canadian Farmland Mutual Fund, *Journal of the American Society of Farm Managers and Rural Appraisers* 69, 40–48.

Petersen, M. A., and R. G. Rajan 1994. The benefits of lending relationships: Evidence from small business data, *The Journal of Finance* 49, 3-37.

Poppo, L., and T. Zenger 1998. Testing alternative theories of the firm: transaction cost, knowledge-based, and measurement explanations for make-or-buy decisions in information services, *Strategic Management Journal* 19, 853-877.

Short, J. C., D. J. Ketchen, N. Bennett, and M. du Toit 2006. An examination of firm, industry, and time effects on performance using random coefficients modeling, *Organizational Research Methods* 9, 259.

Turvey, C. 1991. Credit scoring for agricultural loans: a review with applications, *Agricultural finance review (USA)*.

Williamson, O. 2004. Transaction cost economics and agriculture: an excursion. In W. V. Guido van Huylenbroeck, Ludwig Lauwers ed., *Role of institutions in rural policies and agricultural markets*, 19. Emerald Group Pub Ltd.

Williamson, O. E. 1985. *The economic institutions of capitalism : firms, markets, relational contracting*. New York; London: Free Press ; Collier Macmillan.

Williamson, O. E. 1988. Corporate Finance and Corporate Governance, *The Journal of Finance* 43, 567-591.

Williamson, O. E. 1991. Comparative Economic Organization: The Analysis of Discrete Structural Alternatives, *Administrative science quarterly* 36, 269-296.

Marketing




PUBLIC PERCEPTIONS OF THE AGRI-FOOD INDUSTRY - A COMPARATIVE ANALYSIS OF THE SOCIAL WEB AND THE QUALITY PRESS IN GERMANY

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Abstract
The agri-food industry has developed in an exceptional way in recent decades. In western societies, food has never been as safe and secure as today. However, over the years these achievements have become part of the expected standard, and society's demands have continued to grow. Criticism of the industry is increasingly becoming the central point of public discourse and presents the industry with new challenges regarding marketing and public relations.
The aim of this paper is to conduct a structured analysis of the themes dominating the public interest and of the tonality of the comments. Therefore, a quantitative semantic analysis was applied to the social web and six newspapers that are regarded as key media in Germany. 50,931 web posts and 5,903 articles were collected covering 21 issues identified as relevant for the agri-food industry. The results show that the issues of interest in the social web differ from those in the press. Whereas in the social web renewable resources and the structure of agriculture are the top themes, in the press issues such as GMOs, the environment and crop protection, and agricultural policy are in the focus. Furthermore, the tonality also differs between the media. The content in the social web is more critical than in the press articles. But in general the modern productivity-driven industry is judged negatively, and trends towards more natural food production are seen as a positive development.

Key words: agri-food industry, media analyses, social web, framing, society

PUBLIC PERCEPTIONS OF THE AGRI-FOOD INDUSTRY - A COMPARATIVE ANALYSIS OF THE SOCIAL WEB AND THE QUALITY PRESS IN GERMANY

1. Introduction

The agri-food industry has developed in an exceptional way in recent decades. In western societies food has never been as safe and secure as today (e.g. DBV, 2009; CDC, 2009). However, over the years these achievements have become part of the expected standard, and society's demands have continued to grow. Criticism of the food industry is increasingly becoming the central point of public discourse and confronts the industry with new challenges regarding marketing and public relations (Boehm et al., 2009).

This paper conducts a structured analysis of the themes dominating the public interest and of the frames they are based on. A quantitative semantic analysis is applied to the social web and six newspapers that are regarded as elite media in Germany (Kepplinger, 1994). 50,931 web posts and 5,903 articles were collected covering 21 issues identified as relevant for the agri-food industry. The aim of the semantic analysis is to assess each of the broad challenges of the agri-food industry in order to analyse the public's perceptions of these issues.

The collected data is structured on the basis of a framing matrix, which allows the classification into the frames 'naturalness' and 'productivity', and an assessment of the tonality with which these frames are presented. Finally, the climate of opinion of the social web and the quality press towards the agri-food industry is compared. The article concludes with a discussion of the results and some implications for further research and for the industry.

This is, to our knowledge, the first study using a comparison of new dynamic and interactive communication techniques, such as social media, and classical sender-orientated communication in the fields of agribusiness.

2. Research framework and methodology

The development of the agri-food industry over the past few decades, with an increase in productivity in all stages of the food chain, came along with a fundamental structural change.

Whereas one hundred years ago about 38 % of the overall labour force in Germany was employed in agriculture, today the production of food is mechanised to the extent that the current proportion is about 2 %. Accordingly, a loss of about 35 % of farm holdings has been recorded since 1990 (DBV, 2009). The remaining farms have increased in average size and the agricultural character of the country declines constantly, as is the case in most other western societies. This implies an increasing alienation of society from food production. With the lack of contact, the transfer of information has also been lost. Personal knowledge and perceptions of farm-related issues are now almost exclusively provided by agricultural or food related reporting through the media (Spiekermann, 2008).

Against this background the relevance of the media for the image of the agri-food industry becomes apparent. Due to a low general level of knowledge, particularly in major cities, the image of the agri-food industry is affected by the media and often strongly romanticised (Koecher, 2009). The former well informed impression has now been substituted by a fragmented indirect perspective. The perception of the industry is therefore

selective, which can be analysed accordingly with the concept of framing as a superordinate theoretical construct, since framing describes the selective perception of issues.

Out of this constellation, diverse conflicts with society arise, like the vast usage of environmental resources, modern animal husbandry or the provision of adequate diets. In recent years, these conflicts have reached a level of intensity that Lang and Heasman (2004) classify as 'food war'. They divide the different conflicts into two opposing paradigms of 'productivity', which is followed by the majority of the food industry, and 'ecology' which is preferred by the majority of the food interested parts of society.

Up to now, studies on food-related communication mostly focused on specific conflicts or themes (e.g. Marks and Kalaitzandonakes, 2001; Ten Eyck, 2005; Neff et al., 2008). Except for the study of Mahlau in 1999, which focussed on agricultural topics, this explorative study is the first comprehensive analysis of public communication on food and its production. Therefore an evaluation of the social impact of the described paradigms is made and transferred into framing-theory which is already well-accepted in communication science. In order to expose potential biases, printed media data is compared with social media data from 2007 to 2009.

2.1. Framing theory

The concept of framing has its origins in media research and is defined as the effect of the selective description of issues by giving the recipient an orientation or interpretative pattern in unclear circumstances (Entman, 1993). Since it is impossible in the media coverage to consider every facet of an issue, a reduction of the complexity is necessary. These patterns, which serve as a simplification of structures, are termed 'frames' in the more recent media research (Druckman, 2004; Entman, 1993). Frames emphasise certain aspects of a subject and thus provide a model for the selective perception of complex topic areas. Correspondingly, they allow individuals as well as organisations to quickly come to terms with complex problems and large amounts of information (Snow et al., 1986).

One classic example of framing is the 'David against Goliath'-Frame, which reduces complex conflict situations to the superiority or inferiority of the conflict parties (Dahinden, 2006). Hereby it is suggested that the stronger party is abusing its authority and thus encouraging a positive attitude towards the weaker side. Other aspects that could be of importance in conflicts (legitimacy, ethical or moral lapses, economic or financial consequences) are then communicated only to a minor extent (Dahinden, 2006). Frames emphasise certain interpretations and exclude others, because in the media coverage one single frame, or at least few patterns, regularly prevails.

Since the term 'framing' was defined the first time by Bateson in 1972, this theory became common in media science and expanded rapidly (Matthes and Kohring, 2008). Framing has also been used several times concerning agricultural themes in classical media (e.g. Marks et al., 2007; Feindt et al., 2009). Even though the theory of framing is based on a classical sender-orientated understanding of media, it can likewise be applied to the analysis of social media in which the producer of content has the possibility of reducing the complexity of an issue as well.

The theory of framing can be transferred to the agri-food industry and provides the opportunity of evaluating this sector in a superordinate context. The following concept will serve as theoretical construct for the presented analysis of the perception of the agri-food industry.

2.2. The frames 'naturalness' and 'productivity'

As described in the introduction, the (German) agri-food industry is often confronted with severe criticism and a growing lack of knowledge about food production on the part of the consumers. The improvements in efficiency and productivity that were achieved in the last century are not sufficient to satisfy the consumer and are regarded more as a loss of tradition and naturalness than as a gain in quality due to improved food safety and hygiene. Organic products, GMO (Genetically Modified Organisms)-free food and free-range animal husbandry are only a few of the new alternative developments in the food chain underlining this tendency (Busse, 2006).

These briefly presented developments in nutrition and food production show a long-term conflict between an industry that enhances its performance in a market-oriented way, and a counter-movement within society that is no longer prepared to accept the external effects on consumer health and the environment. These trends indicate a split into two opposing paradigms (Lang and Heasman, 2004) upon which communication about agricultural and food related issues could be based[113]. In classical media as well as in social media, journalists and producers frame 'alternative' methods of production with different attributes than 'conventional' methods. In the following, these opposing frames are dubbed 'naturalness' and 'productivity'.

This paper aims to categorise the obtained press articles and social media posts on 21 predefined topics of investigation into the frames 'naturalness' and 'productivity' on the basis of the structure of their content. Thereby, the displayed tonality is also considered so that finally a classification within the following matrix (Fig. 1) can be made.

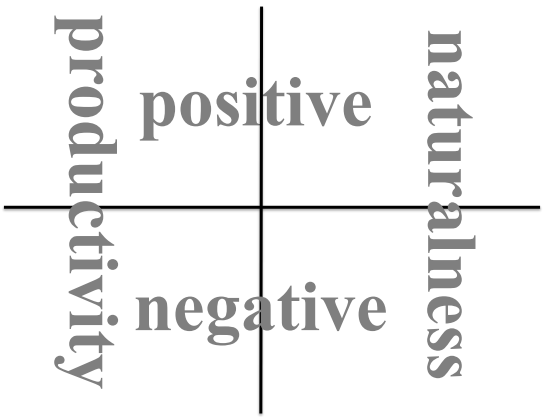


Fig. 1 Framing Matrix

Based on the literature study and expert discussions, the following hypotheses are reviewed according to the structure of the framing matrix.

H1: Since the European BSE crisis the communication about food-related issues has been continually increasing.

H2: The paradigms discussed in the literature (Lang and Heasman, 2004) are empirically usable and deliver viable results.

H3: The dominance of the productivistic paradigm in the German food industry (DBV, 2009) results in the predominance of communication about productivity.

[113] Also the "Third Foresight Expert Group " of the Standing Committee on Agricultural Research (SCAR) of the European Committee is talking in their final report (Freibauer et al., 2011) about two opposing paradigms that will affect the agri-food industry in the future. They call these two different world-views as 'Productivity Narrative' and as 'Sufficiency Narrative'.

H4: Professional newspaper journalism is constrained by journalistic good practise in presenting a balanced view. Thus, social media posts are more negative than newspaper articles (Soloski, 1989).

These four hypotheses form the basis for the explorative study and shall illustrate a first quantitative overview of the communication about food-related issues, comparing the quality press and the social web.

3. Research design

Explorative prestudy

In order to approach the diversity of agricultural and food related topics, a qualitative prestudy with group discussions was conducted to identify relevant subjects. These broad subject areas were then analysed manually with the search engines 'http://blogsearch .google.com/', 'http://technorati.com' and 'http://www.blogpulse.com'. With the explorative prestudy, 21 issues could be identified covering the whole agri-food industry. The following issues (Tab. 1) were characterised by up to 72 keywords[114] per issue and therefore broad and newsworthy enough for the analysis:

Agricultural Lobbyism	Country Life and Agriculture	Genetic Engineering for Agriculture
Agricultural Policy	Crop Protection	Industrial Agriculture
Agricultural Structure	Farm Animal Welfare	Milk Strike
Agriculture and Climate Protection	Food Additives	New Breeding Methods
Agriculture and Environmental Protection	Food Prices	Renewable Resources
Agri-Food Company Names	Food Related Scandals	Traditional Breeding
Alternative Animal Husbandry	Food Safety	World Food Affairs

Tab. 1 Topics of investigation

On the basis of these issues, the framing concept of 'naturalness' and 'productivity' will be analysed in the following in order to categorise the web posts and articles in a superordinate structure.

Social web analysis

Concerning the social web analysis, posts containing at least one keyword were extracted from the internet. In cooperation with a private market research company for social media, the whole German-speaking social media community on the internet was scanned and the relevant posts were automatically saved and categorised. The analysis concentrates on two applications of social media: web discussion forums and weblogs. Discussion forums are characterised by the participation of several users sharing opinions or knowledge, whereas a

[114] Limited (e.g. mass production if meat) and unlimited keywords (e.g. 'Meat-Mafia') were used.

blog (short for weblog) is a website managed by a single person (blogger), who journals his thoughts and ideas about a particular subject. As the name 'weblog' – a composite of the words 'web' (world wide web) and 'logbook' – describes, many blogs are personal diaries detailing someone's experiences in life. As opposed to discussion forums, the blogger controls the content of the postings; visitors may comment on the content but usually only read the latest news of the blogger (Zhou and Hovy, 2006).

This data set then was purged of irrelevant posts by hand and finally 50,931 posts remained: 47,427 posts in discussion forums and 3,504 posts in weblogs. The time period of investigation for the blogs was limited from January 2009 to August 2009, while the time period for the discussion forums was from July 2007 to August 2009. The difference between the two lies in the variation of the accessibility of the web sources, because blogs are usually not managed as professionally as forums and exist for shorter periods of time. Thus, all time series analyses are only based on the forum posts.

The next step was the integration of the data in the semantic software tool 'SPSS PASW Text analytics for surveys 3' which is able to detect single words and their synonyms as well as semantic terms (e. g. adjective + noun). For this only a random selection of 10,000 posts was used because of a limitation of IT resources. In a qualitative semantic evaluation, the surrounding texts of the terms were reviewed to group and assign them to one of the four blocks in the framing matrix. In order to control or correct the subjective bias, investigator triangulation was used (Flick, 1992).

Quality press analysis

Relating to the analysis of the quality press, the design was similar. In contrast to the social web, the internet archives of six nationwide newspapers and magazines were searched. The chosen daily newspapers (Die Welt, Frankfurter Rundschau, tageszeitung, Sueddeutsche Zeitung), the weekly (Die Zeit) and the magazine (Der Spiegel) are often called 'prestige media' (Kepplinger, 1994), 'quality press' (Gerhards et al., 1998) or 'elite media' (Kleinschmit and Feindt, 2004) in Germany. Together they build a conglomerate towards which the majority of journalists orient themselves (Kepplinger, 1994) and therefore these newspapers have a tremendous influence on the media landscape and on political agendas (Gerhards et al., 1998; Wanta and Hu, 1994). 5,903 articles dealing with at least one of the predefined issues were identified during the time period of investigation from July 2007 to December 2009. Subdivided into the different newspapers, 37.4 % of the articles were published in the Sueddeustche Zeitung, 20.6 % in the tageszeitung, 20.4 % in Die Welt, 17.0 % in the Frankfurter Rundschau, 2.6 % in Die Zeit and 2.0 % in Der Spiegel.

Due to limited IT resources, a random selection of 3,000 articles was used for the semantic analysis.

4. Results

4.1. Formal criteria of the communication

The relevance of social media continues to grow, as increasing numbers of users exchange their views in discussion forums and weblogs (Kaplan and Haenlein, 2010; Agichtein et al., 2008). In the case of issues related to food and agriculture the posts per week rose consistently from 300 posts in forums in the middle of 2007 to around 700 posts in the middle of 2009, whereas the course of growth was quite heterogeneous. In holiday times during summer and around Christmas the intensity was quite low (<200), while when issues were discussed in the classical media, the intensity rose to over 1,000 posts per week. High

food prices and hunger in developing countries in the spring of 2008 and the ban of the GM-maize MON810 by the German agricultural minister (in the spring of 2009) were the most discussed events in the social media.

The results in the quality press are quite similar. An increase from about 40 articles in the middle of 2007 to about 50 articles per week in the middle of 2009 was observed (Fig. 2).

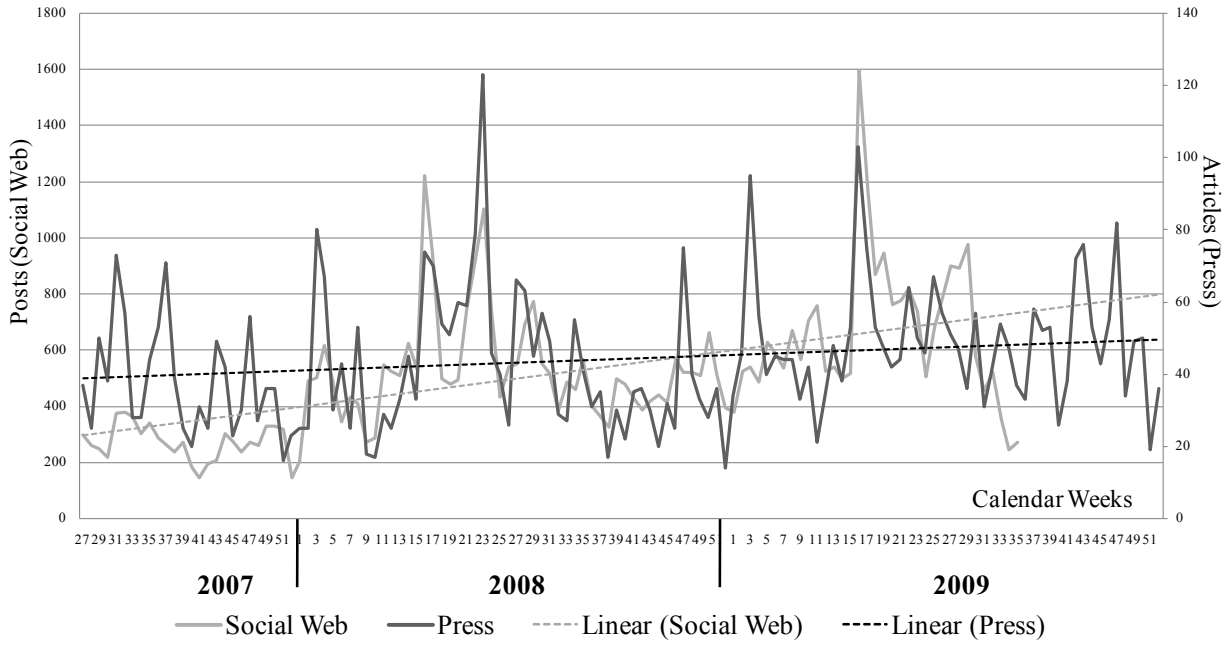


Fig. 2 Course of communication about food and agricultural issues

Even though the course of communication in these two communication channels differs, the mentioned 'top-themes', i.e. the hunger riots and the ban of MON810 led to an intensive discussion in both media.

The most mentioned themes in the analysed two years are different as well in the social web and in the press. In the social web Renewable Resources (10,026 hits), the Agricultural Structure (9,261) in Germany, Genetic Engineering for Agriculture (9,126), Industrial Agriculture (7,772) and Farm Animal Welfare (4,239) were the top 5 issues, producing almost two-thirds of all hits[115]. Especially the three issues, GMOs, Industrial Agriculture and Farm Animal Welfare, are of special interest, because they have been discussed by the German public for years; and the differences between the proponents and opponents seem irreconcilable.

In the press, the top 5 themes were Genetic Engineering for Agriculture (642), Agriculture and Environmental Protection (474), Agricultural Policy (455), Agriculture and Climate Protection (431) and World Food Affairs (397). However, except for the discussion about GMO, there were only few single themes that stood out by themselves. The other issues were accompanied by a broader report about agriculture.

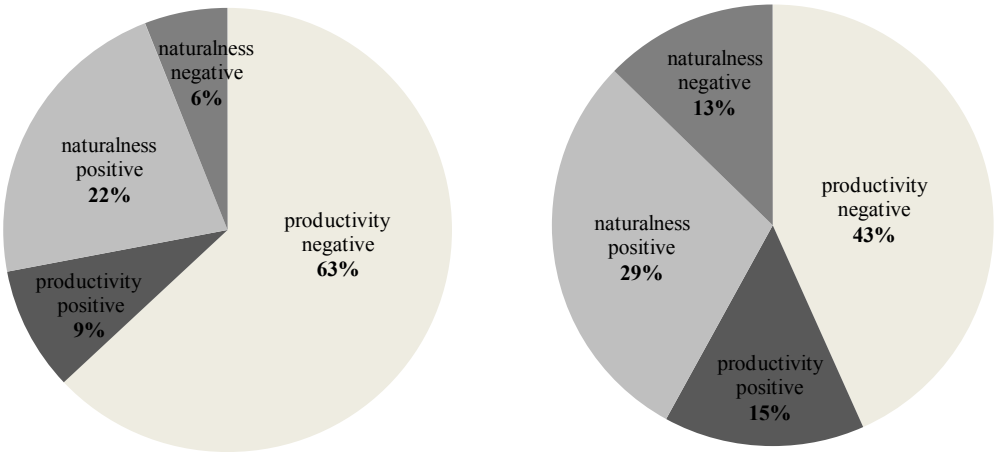
4.2. Results of the framing analyses

In the semantic analysis it was possible to allocate 35.8 % of all web posts and 48.5 % of the press articles to at least one frame type and 6.1 % and 13.6 % respectively to more than

[115] A differentiation between posts and hits has been made, because especially blogs sometimes target two issues in one post. That is why in the data set there are 23 % more hits (62,803) than posts (50,931).

one. This left 64.3 % of all posts and 51.5 % of all press articles unallocated, as they were lacking specific terms that indicate a special pattern of interpretation.

Most of the posts framed agricultural and food-related issues with a negative attitude concerning the frame 'productivity' of all four specifications (Fig. 3). These posts are characterised by negative connotations of GMOs, animal husbandry, and unhealthy food and living habits induced by the agri-food industry. A positive framing of the benefits of the agri-food industry is much less frequent and characterised predominantly by economic terms. Concerning the frame 'naturalness' the situation is exactly the opposite. Here the positive aspects are mostly stated with components that reflect an organic and animal welfare orientation. Negative perceptions of 'naturalness' are only represented with the smallest fraction in both media and are based mainly on economic issues and terms concerning hunger.



Social Web Press

Fig. 3 Allocation of the different frame types

The framing of the agri-food sector has a likewise dynamic development. In Figures 4 and 5 the four frames are displayed in their progression over the two years of the sample period. The different frames are quite stable over time and only show minor changes. But, particularly in the social web in the spring of 2008, the rejection of productivity declines. Here, the otherwise stable framing of the industry breaks up, while at the same time food

prices rose and hunger riots spread all over the world (e.g. Haiti and Mexico). However, after this short interruption, the former patterns emerged again.

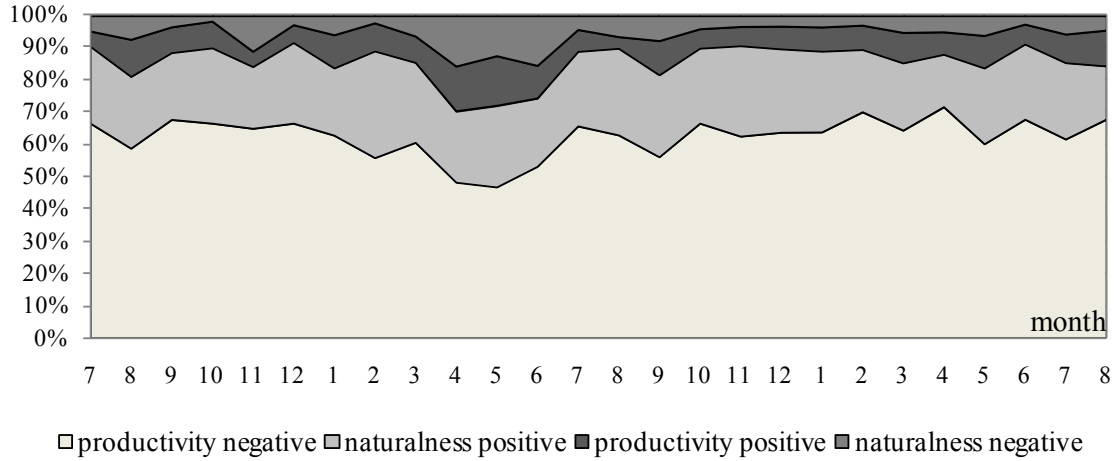


Fig. 4 Progression of the frames in the social web from 2007 to 2009

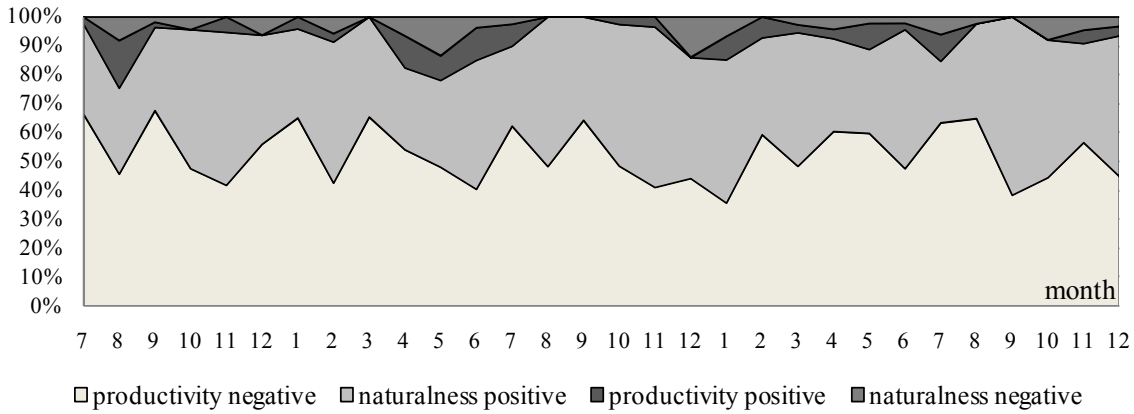


Fig. 5 Progression of the frames in the press from 2007 to 2009

5. Discussion

In the 21st century the supply of food has developed so far that in Western Europe for instance only a very small portion of the labour force is employed in this field. This came along with an increasing divide between the consumption and the production of food in recent decades. Accordingly, for the majority of the population the access to agricultural and food related processes occurs only indirectly through the media coverage (Spiekermann, 2008). With the first food related scandals in the 1970s (Kapfelsberger and Pollmer, 1983), critical discussion concerning the food chain started to appear in the public sphere. The industry has, however, pursued an intensification of food production in order to remain competitive in the global market. This kind of production bears consequences like an increasing use of chemicals (pesticides, fertilisers, artificial food additives) or an industrialisation of process chains, especially in livestock husbandry. Thus, these issues were presented and discussed in the media and brought to the consumers.

As shown here, communication about food and agricultural issues has increased in recent years. This is not only in the social web, which is still growing in general, but also in

the quality press, which implies an increased interest in these themes since the frequency of total newspapers articles remains constant. This is in concordance with H1.

The difficulty of this development lies in the fact that the media often acts according to the motto "Good news is no news" (Emsley, 2001) and thus is more critical of the industry. This development requires the sector to show more social responsibility in order to maintain a stable reputation (Heyder and Theuvsen, 2009).

The level of framed articles (35.8 % in the social web; 48.5 % in the press) also shows that the chosen framing concept is appropriate and able to indicate the major line of conflict in the 'food wars' (H2).

In the press as well as in the social web, negative posts and articles concerning the modern agri-food industry dominate. Particularly striking is the negative framing of 'productivity' in both medias (about 60 % in the social web and about 40 % in the quality press), which complies with H3.

Hence, the industry, which has been focussing on a 'productive' approach to food manufacturing (Lang and Heasmen, 2004) is greeted by a negative climate of opinion in the media. The image of a separation of society, which in parts prefers 'natural' food production, from the industry, which hangs on to its traditional concept of a rise in output and an increased efficiency, is therefore more negative in the social web than in the press (H4).

Possible reasons are that in contrast to the social web, where people in general express their personal opinions, the journalistic coverage is subject to the code of good practice (Soloski, 1989). In the ideal case both sides will be considered and weighed against each other. However, no institution controls the veracity of posts etc. in the social web. Also the motivation to write a post is regarded as higher when people have negative opinions or have had negative experiences (Harrison-Walker, 2001; Huang et al., 2007). Furthermore, the social web is the core element of the communication strategy of NGOs (Non-Governmental-Organisations), who regularly confront the agri-food industry with their campaigns (e. g. Grace and Free Range Studions, 2010; Molleindustria, 2006). The industry is currently not only insecure and cautious about how to react to these campaigns appropriately, but generally restrictive towards the media or the public since always (Albersmeier and Spiller, 2009).

6. Conclusions and limitations

As shown in the presented article, the agri-food industry is a permanent and growing subject of interest in the media. The orientation towards an efficient food production is criticised in the majority of articles and posts and at the same time a more natural production is being supported. So, the media document a change in society, which no longer only expects the agri-food industry to deliver enough and secure food, but rather a much wider and more sustainable product range.

One limitation of this study is that the quality of the results is dependent on the quality of constructs behind the frames. Software-based analysis always tends to be imprecise and inflexible (Cohen and Hersh, 2005).

For further research a better tested and more precise data set could provide monitoring tools for the industry and governments to understand people's opinions on the diverse issues. Also, the use of diverse theories like priming and agenda-setting could be appropriate for evaluation of these issues. Research in this direction could pluralise the points of view and help to identify new crises and scandals at an early stage and localise the sources easily. Likewise, a longer period of investigation might be useful in order to evaluate more precise trends of the communication.

To sum up, the agri-food industry has the choice to open up for the demands of today's society and to intensify the dialogue with the media in order to exert influence. In

contrast, the industry could continue to isolate itself from society and accept that people object to its production processes and that this objection is going to influence consumer choice and political decisions in the future (Boehm et al., 2009) – an outcome unhelpful for any society.

7. References

Agichtein, E., Castillo, C., Donato, D., Gionis, A. and Mishne, G. (2008). Finding high-quality content in social media. In Association for Computing Machinery (ACM) (ed), *WSDM '08 Proceedings of the international conference on web search and web data mining*. New York: ACM, 183-194.

Albersmeier, F. and Spiller, A. (2009). Das Ansehen der Fleischwirtschaft: Zur Bedeutung einer stufenuebergreifenden Perspektive. In Boehm, J., Albersmeier, F. and Spiller, A. (eds), *Die Ernaehrungswirtschaft im Scheinwerferlicht der Oeffentlichkeit.* Lohmar: Eul Verlag, 213-250.

Bateson, G. (1972). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution and epistemology*. Chicago: Chicago University Press.

Boehm, J., Schulze, H., Kleinschmit, D., Spiller, A. and Nowak, B. (2009). The impact of media coverage on proposed strategies for preventing future food scandales. In Fritz, M., Rickert, U. and Schiefer, G. (eds), *System Dynamics and Innovation in Food Networks.* Proceedings of the 3rd International European Forum on System Dynamics and Innovation in Food Networks in Innsbruck-Igls (Austria). Bonn: University of Bonn – ILB-Press, 383-397.

Busse, T. (2006). *Die Einkaufsrevolution. Konsumenten entdecken ihre Macht*. Munich: Blessing.

Centers for Disease Control and Prevention (CDC) (2009). *Incidence of Foodborne Illness.* In http://www.cdc.gov/Features/dsFoodborneIllness/ (viewed 11.02.2011).

Cohen, A. M. and Hersh, W. R. (2005). A survey of current work in biomedical text mining. *Briefings in Bioinformatics* 6 (1): 57-71.

Dahinden, U. (2006). *Framing: Eine integrative Theorie der Massenkommunikation*. Konstanz: UVK.

Deutscher Bauernverband (DBV) (2009). *Situationsbericht 2010. Trends und Fakten zur Landwirtschaft*. Berlin.

Druckman, J. (2004). Political preference information: Competition, deliberation, and the (ir)relevance of framing effects. *American Political Science Review* 98 (4): 671-686.

Emsley, J. (2001). Good news is no news. *Nature* 413 (6852): 113.

Entman, R. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication* 43 (4): 51-58.

Feindt, P. H., Kleinschmit, D. and Stirn, S. (2009). Der publizistische Konflikt um die „gruene Gentechnik“: Sprecher und Frames in deutschen Qualitaetszeitungen. In Boehm, J., Albersmeier, F. and Spiller, A. (eds), *Die Ernaehrungswirtschaft im Scheinwerferlicht der Oeffentlichkeit.* Lohmar: Eul Verlag, 153-181.

Flick, U. (1992). Triangulation revisited: Strategy of Validation or alternative? *Journal for the Theory of Social Behaviour* 22 (2): 175-197.

Freibauer, A., Mathijs, E, Brunori, G., Damianova, Z., Faroult, E., Girona i Gomis, J., O´Brien, L. and Treyer, S. (2011). *Sustainable food consumption and production in a resource-constrained world*. The 3rd SCAR (European Commission – Standing Committee on Agricultural Research) Foresight Exercise.

Gerhards, J., Neidhardt, F. and Rucht, D. (1998). *Zwischen Palaver und Diskurs. Strukturen oeffentlicher Meinungsbildung am Beispiel der deutschen Diskussion zur Abtreibung*. Opladen: Westdeutscher Verlag.

Grace and Free Range Studios (2010). *The Meatrix*. In http://www.themeatrix.com/ (viewed 15.12.2010).

Harrison-Walker, L. J. (2001). The Measurement of Word-of-Mouth Communication and an Investigation of Service Quality and Customer Commitment as Potential Antecedents. *Journal of Service Research* 4 (1): 60-75.

Heyder, M. and Theuvsen, L. (2009). Corporate Social Responsibility in the Agribusiness: A Research Framework. In Berg, E. (ed), *Risiken in der Agrar- und Ernaehrungswirtschaft und ihre Bewaeltigung*. Muenster-Hiltrup: Landwirtschaftsverlag, 265-277.

Huang, L., Chou, Y. and Lang, I. (2007). Effects of Perceived Risk, Message Types, and Reading Motives on the Acceptance and Transmission of Electronic Word-of-Mouth Communication. *Contemporary Management Research* 3 (4): 299-312.

Kapfelsperger, E. and Pollmer, U. (1983). *Iss und stirb. Chemie in unserer Nahrung*. Muenchen: Dt. Taschenbuch-Verlag.

Kaplan, A. M. and Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons* 53 (1): 59-68.

Kepplinger, H. M. (1994). Publizistische Konflikte. Begriffe, Ansaetze, Ergebnisse. *Sonderheft der Koelner Zeitschrift fuer Soziologie und Sozialpsychologie* 1994 (34): 214-233.

Kleinschmit, D. and Feindt, P. H. (2004). Verursacher, Opfer und Helfer - BSE und Agrarpolitik in deutschen Zeitungen. *Forschungsjournal Neue soziale Bewegung* 3: 93-98.

Koecher, R. (2009). Landwirtschaft und Gesellschaft. Einstellungen, Erwartungen, Erfahrung und Fernbild – Ergebnisse einer aktuellen Befragung. In DLG e. V. (ed), *Landwirtschaft 2020. Herausforderungen, Strategien, Verantwortung*. Frankfurt a. M.: DLG-Verlags GmbH, 227-248.

Lang, T. and Heasman, M. (2004). *Food wars. The global battle for mouths, minds and markets*. London: Earthscan Publications.

Mahlau, G. (1999). *Das Image der Landwirtschaft: ein Vergleich zwischen Medienberichterstattung, Bevoelkerungsmeinung und Realitaet*. Witterschlick/Bonn: Wehle.

Marks L. A. and Kalaitzandonakes, N. (2001). Mass Media Communications about Agrobiotechnology. *AgBioForum* 4 (3&4): 199-208.

Marks L. A., Kalaitzandonakes, N., Wilkins, L. and Zakharova, L. (2007). Mass media framing of biotechnology news. *Public Understanding of Science* 16 (2): 183-203.

Matthes, J. and Kohring, M. (2008). The Content Analysis of Media Frames: Toward Improving Reliability and Validity. *Journal of Communication* 58 (2): 258-279.

Molleindustria (2006). *McDonald's Video Game*. In http://www.mcvideogame.com (viewed 15.12.2010).

Neff, R. A., Chan, I. L. and Smith, K. C. (2008). Yesterday's dinner, tomorrow's weather, today's news? US newspaper coverage of food system contributions to climate change. *Public Health Nutrition* 12 (7): 1006-1014.

Snow, D. A., Rochford, B. E., Worden, S. K. and Benford, R. D. (1986). Frame Alignment Processes, Micromobilization, and Movement Participation. *American Sociological Review* 51 (4): 464-481.

Soloski, J. (1989). News reporting and professionalism: some constraints on the reporting of the news. *Media Culture Society* 11 (2): 207-228.

Spiekermann, U. (2008). Ausdifferenzierung des Selbstverstaendlichen - Essen und Ernaehrung in Deutschland seit der Hochindustrialisierung. In Antoni-Komar, I., Pfriem, R., Raabe, T. and Spiller, A. (eds), *Ernaehrung, Kultur, Lebensqualitaet. Wege regionaler Nachhaltigkeit.* Marburg: Metropolis-Verlag, 19-40.

Standage, T. (2009). *An edible history of humanity*. New York: Walker.

Ten Eyck, T. A. (2005). The media and public opinion on genetics and biotechnology: mirrors, windows, or walls? *Public Understanding of Science* 14 (3): 305-316.

Wanta, W. and Hu, Y. (1994). Time-Lag Differences in the Agenda-Setting Process: An Examination of Five News Media. *International Journal of Public Opinion Research* 6 (3): 225-240.

Zhou, L. and Hovy, E. (2006). On the summarization of dynamically introduced information: Online discussions and blogs. In *Proceedings of American Association for Artificial Intelligence-2006 Spring Symposium on Computational Approaches to Analyzing Weblogs.* Stanford, CA, 237-242.

AGRONEGOCIOS DE HORTALIZAS FRESCAS PRECORTADAS EN LA CIUDAD DE BUENOS AIRES: ESTRATEGIAS, TÁCTICAS Y ESTRUCTURAS DE GOBERNANCIA ADOPTADAS POR LAS EMPRESAS PROVEEDORAS

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Abstract
Los negocios de hortalizas frescas precortadas en la ciudad de Buenos Aires muestran una presencia reciente y surgen como resultado de los cambios en los hábitos de consumo, derivados de la preocupación del consumidor por la sanidad, calidad e inocuidad de los alimentos, así como los asociados a la salud, de la misma manera que ocurre en los mercados globales. A pesar de estar presentes un dinámico grupo de empresas en la Argentina dedicadas a la actividad, no se ha estudiado de manera puntual la índole de los emprendimientos, ni mucho menos los aspectos relevantes que hacen a la actividad como negocio agroalimentario. El presente trabajo tiene como propósito la identificación y relevamiento de las principales empresas productoras de hortalizas frescas precortadas presentes en la ciudad de Buenos Aires, poniendo especial atención a las estrategias competitivas, las tácticas y las estructuras de gobernancia utilizadas por las mismas. Para tal fin se hizo uso de la metodología de estudio de casos múltiple aplicada a tres de los casos más representativos en el mercado, lo cual permitió tanto la observación directa del contexto y de la problemática abordada, como el establecimiento de patrones comunes y puntos de divergencia en torno a las variables analizadas. Los resultados del estudio de casos apuntan, entre otros, hacia la adopción de estrategias de diferenciación y enfoque, donde el liderazgo en calidad y el posicionamiento de la marca juegan un papel importante. Las tácticas utilizadas convergen hacia la diferenciación del portfolio de productos, así como de los canales comerciales, logrando conseguir precios visiblemente superiores a los de los productos frescos a granel. Al estudiar las estructuras de gobernancia en los tres casos se puede notar la confluencia hacia la adopción de los tres mecanismos existentes (integración vertical, coordinación vertical, y mercado).

Key words: agronegocios, hortalizas frescas precortadas, estrategias, tácticas, estructuras de gobernancia

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1. Introducción

Una de las más importantes tendencias en el mercado mundial de alimentos es la conveniencia de consumo. Esta se evidencia en productos "listos para consumir" o "listos para preparar", que implican ahorro en tiempo de preparación y disminuyen el uso de utensilios. En forma concurrente, la facilidad de acceso a la información, la mayor educación en términos de salud y nutrición y las campañas mundiales de consumo de frutas y hortalizas han facilitado un cambio de estilo de vida y demanda.

En concordancia, en las últimas décadas la actividad hortícola argentina ha empezado a cubrir las demandas cada vez más crecientes de hortalizas y verduras diferenciadas y especializadas. De hecho, Ferrato (2002) pone en relevancia la presencia de empresas innovadoras, con modernas técnicas de enfriado, sobre todo en los alrededores de la Ciudad de Buenos Aires, y cercanías al Mercado Central de Buenos Aires, donde la presencia de plantas de procesado mínimo de hortalizas es notable. De esta manera se evidencia el interés por la aplicación de estrategias de descommoditización o especialización de productos agrícolas, vía agregado de valor o diferenciación, en la búsqueda de la captura de mayor rentabilidad.

Los productos vegetales precortados en Argentina se configuran como una especialidad dentro de los productos hortícolas frescos presentándose al consumidor de forma seleccionada, cortada, lavada y empacada, y en muchos casos listas para consumir una vez abierto el empaque. Podemos distinguir dos categorías de consumidores de productos hortícolas mínimamente procesados, el doméstico y el institucional. Para el consumidor final doméstico este tipo de productos son una respuesta a las tendencias mencionadas anteriormente hacia alimentos más prácticos y saludables. El consumidor argentino ha ido evolucionando en cuanto a los hábitos de consumo y va tomando gradualmente conciencia de la importancia de las hortalizas en la dieta, aunque hoy en día no forme parte importante de la misma. En el caso de los consumidores institucionales (restaurantes, hoteles, etc.), el uso de hortalizas precortadas reduce la necesidad de mano de obra, se minimizan las pérdidas debidas a deterioro y constituye una clase de productos de características más uniformes que las que se pueden conseguir en el mercado de hortalizas a granel.

No obstante estos planteos, es necesario mencionar la existencia de limitaciones en cuanto al acceso a información concerniente a este rubro, de hecho Sgroppo y Montiel (2005) argumentan que en la Argentina es muy poco lo que se realiza en materia de investigación sobre vegetales frescos cortados, a diferencia de otros lugares del mundo donde constituyen un mercado en continua expansión.

En este escenario, y teniendo en cuenta los emprendimientos en el sector que han tratado de satisfacer los requerimientos del mercado, constituyendo un punto de referencia y ganando reconocimiento a nivel local y nacional, se plantea la necesidad de estudiar de manera puntual las estrategias, las tácticas y las estructuras de gobernancia asociadas a la dinámica de desarrollo de las empresas del sector hortalizas frescas precortadas con asiento en la ciudad de Buenos Aires, lo que ha de permitir la generación de información respecto a la forma en que

se adaptan a las perturbaciones del medio ambiente de negocios y logran subsistir, competir y crecer en un contexto competitivo signado por la informalidad.

2. Metodología

La metodología de trabajo utilizada es la de estudio de casos múltiple, abarcando un tipo de investigación descriptivo, donde la recopilación de información de fuente secundarias (Internet, textos, revistas especializadas y papers), que sobre el tema se pudieron consultar, y de fuentes primarias consultadas (entrevistas a directivos de las empresas productoras de hortalizas frescas precortadas), facilitaron la explicación del funcionamiento de los fenómenos de interés en términos de relaciones de influencia recíproca entre los factores o elementos de mayor importancia para el cabal cumplimiento de los objetivos propuestos.

Se planteó de esta manera el estudio en base a los tres casos de empresas del sector que mayor relevancia presentaban al año 2009 en la comercialización de hortalizas frescas precortadas: Finca Pilar, Good Leaf y Sueño Verde, las cuales contaban con cerca del 75% del mercado de estos productos en la ciudad de Buenos Aires, y se constituían en las empresas con mayores ventajas competitivas en torno al agregado de valor y diferenciación de productos.

Para tal fin la realización de entrevistas a los directivos de las tres empresas seleccionadas permitieron la recopilación de información inherente a los casos de estudio y cuyo foco se dirigió hacia aspectos organizativos, de mercado, competitivos, inversiones en activos específicos, perturbaciones y relaciones con otros actores de la cadena. De esta forma y dando cumplimiento al proceso de recopilación de información a través del trabajo de campo, se utilizaron formularios de entrevista semi-estructurados y abiertos en los cuales se presentaron un conjunto de preguntas generales sobre el tema de la investigación procurando la registración de las respuestas en forma literal, para luego proceder a la redacción de documentos escritos en base a las respuestas obtenidas, presentando de manera sintética las ideas más relevantes planteadas.

En cuanto a la recopilación de información secundaria se procedió a la revisión de las distintas fuentes bibliográficas que sobre el tema se pudieron encontrar, siendo las páginas Web de organismos como la SAGPyA y el SENASA de gran ayuda. La revisión de artículos y trabajos publicados con antelación, aunque pocos, se consolidaron como una buena herramienta para la complementación de la información recabada de primera mano.

Además de lo anterior y teniendo en cuenta la importancia del supermercadismo como canal comercial en la distribución de este tipo de productos se procedió a la realización de entrevistas semi estructuradas a encargados de compras de vegetales cortados y gerentes del área de frutas y verduras de las cadenas de mayor representatividad, (Disco y Carrefour), procurando la compilación de información concerniente a la percepción de las cadenas respecto a la situación de las empresas seleccionadas.

En concordancia con el propósito del trabajo, el marco teórico utilizado gira en torno a cuatro ejes principales: los preceptos ligados las estrategias competitivas, la teoría del "Marketing Mix", la competitividad y estructuras de gobernancia.
En el siguiente cuadro se detallan los temas relevados y los principales autores consultados:

Cuadro 1. Síntesis del marco teórico y principales autores relevados

Teoría	Autor
Estrategias competitivas	Porter (1980)
Marketing Mix	McCarthy (1960) Kotler y Armstrong (2004),
Competitividad (Moderna organización industrial)	Farina et al. (1999) (Kennedy et al, 1998) Oster (1994)
Estructuras de gobernancia	Williamson (1985, 1996)

En base a los lineamientos consultados se procedió a realizar el abordaje de los casos de estudio como se resume en el siguiente apartado.

3. Análisis de casos múltiple

En este capítulo se presentan las tres empresas seleccionadas para el análisis de casos múltiple, a saber Finca Pilar, Sueño Verde y Good Leaf. Siguiendo la metodología planteada para el abordaje de los casos en el capítulo primero, se ha de plantear la descripción de cada uno de ellos, las estrategias y tácticas, y las estructuras de gobernancia.

3.1. El caso Finca Pilar

Finca Pilar tuvo sus inicios en 1992, cuando dos agrónomos (Alejandro Belaga y Diego Radicella) vieron la oportunidad de abastecer chefs y cocina gourmet de importantes cadenas hoteleras y restaurantes de la ciudad de Buenos Aires. Para tal fin empezaron a realizar viajes al exterior, evaluando tendencias de producción y consumo de hortalizas.

Empezó produciendo y envasando productos Bay Leaf (*pequeñas)*: zanahorias y tomates (tomate cherry), con los cuales se encargaron del abastecimiento de restaurantes, hoteles y empresas de catering aéreo hasta el año 1995. El objetivo fue llegar al segmento de clientes ABC1 a través de la gastronomía. Luego en 1996 decidieron apostar al supermercadismo siguiendo el mismo objetivo y la misma estrategia comercial pero apostando fuertemente al segmento de las ensaladas gourmet. De esta forma la línea de productos empieza a ganar las góndolas de las cadenas de supermercados (Disco, Jumbo, Carrefour, Coto, Libertad, Wall Mart).

Los productos fueron ideados sobre la base de tres premisas: ser poseedores de alta calidad, ser de variedades especiales y estar listos para consumir. Luego se enfocaron en el desarrollo de productos como *haricort vert extrafine* o chauchas extrafinas, "mâche" o hierba del canónigo, lechugas baby (como lollo rossa, roble rojo y roble verde), zanahorias baby, nabitos rojos y blancos, rúcula, tomates cherry, mini choclos, radicchio, entre otros, siempre respetando la estrategia competitiva.

Ante la rápida expansión del mercado, Finca Pilar decidió ampliar la planta de procesamiento y adquirir nueva tecnología, recurriendo a endeudamiento con bancos para financiar el proyecto de ampliación. Antes de la devaluación (2001), Finca Pilar contaba con 160 empleados y estaba integrada verticalmente contando con producción propia (invernaderos). En la crisis económica del 2001-02 las ventas se redujeron en un 60%, lo que implicó severas consecuencias en empleo y tamaño de la planta.

Sin embargo, desde el principio la incorporación de tecnología se configuró como algo indispensable [nota del autor: esto está alineado con su estrategia]. La misma política de incorporación de tecnología se hizo extensiva a la planta de empaque y administración. En la primera, se diseñó un sistema de flujos de procesos productivos similares a los empaques ingleses y holandeses. Se incorporaron máquinas de pre-enfriado, envasadoras, etiquetadoras y sistemas de frío distribuidos en una "cámara de mercadería sucia" para cosecha y otra de mercadería limpia para envasado. Finca Pilar cuenta con vehículos de carga propios, garantizando la máxima calidad de los productos hasta las distintas bocas de expendio.

Para mantener todo el año una oferta variada con calidad, la empresa cuenta con productores satélites en otras regiones del país que proveen algunos productos en determinadas épocas, salvando así el problema de la estacionalidad. Estos acuerdos de producción se complementan con asesorías técnicas y de capacitación. La empresa también muestra interés en la exportación de radiccio y albahaca, y como consecuencia proyectan implementar Buenas Prácticas Agrícolas (BPA) en la producción propia y en la de los proveedores.

3.1.1. Estrategia

La estrategia de Finca Pilar se basa en la diferenciación y alta segmentación. La diversificación constante del portafolio de productos de acuerdo a las preferencias del consumidor es para la empresa un factor clave en la creación de ventajas competitivas. Los productos son ideados sobre la base de tres premisas: alta calidad, variedades especiales y listas para el consumo. La estrategia de marca le confiere a la Finca Pilar un mayor poder de negociación frente a los supermercados.

3.1.2. Tácticas (Marketing Mix)

Productos:
Vegetales frescos precortados y/o envasados: dentro de los cuales se encuentran las ensaladas listas para consumir, mezclas de lechugas especiales, lechugas bay leaf, tomates cherries entre otros.
Vegetales frescos empacados: en esta categoría se incluyen los vegetales que se comercializan en el canal gourmet y que se someten a procesos de selección, acondicionamiento, lavado y empacado en presentaciones "institucionales" (mayores a las comúnmente presentadas en el canal de retail).
Línea industrial de vegetales lavados: aquellos a los que solo se les realizan labores de selección, lavado y se comercializan a granel de acuerdo a los requerimientos del cliente que en última instancia es quien realiza el proceso de corte y elaboración.

Plaza (Canales de Distribución):
Supermercados – Retail: Representan cerca del 70% de las ventas de Finca el Pilar. Los supermercados a los que distribuyen son Wall Mart, Carrefour, Disco, Jumbo, Libertad y otras cadenas chicas. En general las cadenas no exigen estándares de calidad demasiado altos. El personal entrevistado de Finca Pilar afirma tener buena relación con los supermercados haciendo énfasis en la buena comunicación y el cumplimiento de acuerdos. Sin embargo, es evidente que en esta relación transaccional es mayor el poder de mercado del supermercadismo a la hora de poner condiciones de tipo comercial.
Restobar, catering – vegetales frescos: Actualmente las ventas en esta línea han aumentado 3 veces, por esta razón las ventas en este canal representan 25% aproximadamente. Personal de

la empresa se encarga de tomar los pedidos vía telefónica, los cuales son despachados según requerimientos del cliente.
Línea Industrial – vegetales lavados: Este canal está dirigido a fabricas de pastas, restaurantes de comidas rápidas (*fast foods*) o deshidratadores. Es un canal con un bajo porcentaje de participación, y la venta se realiza también a través del sistema de toma de pedidos vía telefónica.
Canal gourmet – ensaladas listas para consumir: Son ensaladas que mezclan carnes y están dirigidas a estaciones de servicio (Repsol YPF), cadenas de café y otros, como Freddo. Se tienen acuerdos comerciales en el caso de Repsol y se han captado clientes importantes en la restauración y catering a los cuales se les atiende bajo el mismo sistema de ventas que a los otros canales comerciales.

Precio: El relevamiento de información por observación directa en las bocas de expendio de los supermercados permite notar que los productos Finca Pilar son en términos generales los que mayor diferencia de precio respecto al producto a granel presentan, en contraste con las otras dos empresas relevadas, así por ejemplo las lechugas empacadas tienen una diferencia cuatro veces mayor al producto fresco a granel, la radicheta Finca Pilar tiene un valor en góndola de $98,9/Kg, el cual arroja una diferencia 14 veces mayor al del producto a granel.

Sin duda las distintas estrategias implementadas por la empresa desde las labores en campo, pasando por el empaque y las labores logísticas y comerciales dentro de las cuales se resalta el posicionamiento de marca ligada a productos con valor agregado son claves a la hora de explicar el plus en el precio para los productos de la empresa en mención.

Tabla 1. Precio al consumidor por producto hortícola (procesado y fresco) en supermercados. Finca Pilar

Producto	$/Unid	$/Kg	$ kg Fresco	Diferencia
Radicheta x 100g	9,89	98,9	7	14,1
Lechuga mantecosa x300g	8,99	29,9	6,85	4.38

Fuente: elaboración propia con base a observación directa en supermercados Disco, Jumbo y Carrefour, 2009

Promoción: La empresa cuenta con página Web y recurre al canal supermercadismo para la promoción de los productos en las góndolas. En 2008, como estrategia de comunicación de los beneficios del consumo de frutas y vegetales frescos, se inició una alianza con Disney para incorporar a algunos productos las imágenes de sus personajes y, de esa manera, llegar a los más chicos para que empiecen a concientizarse de las ventajas de consumir productos saludables, sin embargo esta estrategia no arrojó buenos resultados, dado que el producto insignia de la campaña, la *manzana,* presentó en el periodo estudiado variaciones de precio que incidieron en la perdida de al menos el 25% del negocio para Finca (Malaspina, 2009).

La inclusión de los productos Finca Pilar en programas de cocina en canales de televisión es una estrategia de publicidad recientemente incorporada por la empresa en el 2009, con la cual se busca informar respecto a la calidad y frescura de los productos y motivar la compra en el público televidente.

3.1.3. Estructuras de gobernancia

El estudio de la estructura de negocios de Finca el Pilar permite observar que la empresa cuenta con una parcial coordinación vertical, ya que en las fases primarias realiza una compra coordinada de materia prima a productores satélites (70% de la materia prima) a los cuales,

según las fuentes consultadas, se les presta asesoría técnica para las labores de pre-cosecha y cosecha, sobre la base de contratos informales y compromisos creíbles. El tener tercerizada la producción en tan amplio porcentaje implica dificultades para controlar la calidad de los productos. También se debe decir que ante situaciones de crisis esto se puede convertir en una ventaja dada la posibilidad del salir del negocio con mayor facilidad.

Por su parte, el 25% de la producción de materias primas está integrada verticalmente ya que la empresa es propietaria de los activos y de los factores de producción. Además la empresa recurre al mercado para realizar compra de productos que no produce o que produce en menor escala como es el caso de zanahoria y zapallo (5% de la materia prima).

Finca Pilar se integra verticalmente en las labores de procesamiento de la materia prima donde la inversión en activos físicos y el desarrollo de activos específicos intangibles (know how e imagen de calidad en el mercado), entran a jugar un papel de gran importancia, así por ejemplo, productos orgánicos y desarrollo de nuevos productos.

En cuanto a la fase comercial, la firma no llega directamente al consumidor final (en este sentido estaríamos hablando de una venta coordinada donde se transfiere la propiedad de manera parcial al ente comercializador, quien posee la estructura para ejecutar la venta).

3.2. El Caso Sueño Verde

Sueño Verde surge de la iniciativa de Agustín Benito y Pablo Maseda, estudiantes en ese entonces de la Facultad de Agronomía de la UBA, quienes en 1992 deciden iniciar el emprendimiento para poner en práctica conocimientos teóricos relacionados con el agro, sin tener que realizar una gran inversión.

Sueño Verde surge a raíz de abastecer a los chef de las grandes cadenas hoteleras y de restaurantes de la ciudad Buenos Aires. En la actualidad, los productos Sueño Verde son elegidos porque han logrado desarrollar los procesos productivos y logísticos adecuados para llegar a las manos de sus principales clientes con la variedad y la calidad requeridas. Para tal fin, la supervisión de la producción por parte de ingenieros agrónomos juega un papel relevante, desde la siembra hasta el momento de cosecha, para luego ser seleccionada y acondicionada en la planta de empaque sin interrumpir la cadena de frío, manteniendo las características de calidad propias del producto fresco.

El conocimiento y difusión de los vegetales "Sueño Verde" en el mercado se debe entre otras cosas a una estrategia enfocada al canal HORECA tipo "gourmet", que permitió llegar a los chefs del canal de cable *El Gourmet,* quienes requerían productos distintos para diferenciar los distintos platos. También están presentes en los menús que se preparan en los hoteles cinco estrellas y los restaurantes más reconocidos de la Argentina. La idea, luego, fue acercar los ingredientes gourmet al consumidor interesado en realizar preparaciones sofisticadas en su hogar.

Según Benito (Entrevista personal, 2009): *"se creó la necesidad al consumidor de querer hacer en su casa lo que probó en algún restaurante gourmet o vio en pantalla"*. Fue así como se aprovechó el hecho de que cadenas de supermercados como Jumbo, Disco y Wall-Mart empezaran a mostrar interés por tener en sus góndolas los productos Sueño Verde para empezar a ganar un espacio importante en las bocas de expendio de los estratos ABC1 (locales ubicados en Palermo, Recoleta, Belgrano y la zona norte del Conurbano, como Pilar,

Martínez y San Isidro), donde estos productos, con precios más altos que los del resto de las verduras y hierbas, tienen más demanda.

En Sueño Verde trabajan con 70 cultivos que componen un catálogo gourmet[116]. Se cosechan 30 tipos distintos de verduras de hoja, desde lechuga a rúcula, cada una con variantes. Ofrecen además una línea de hierbas aromáticas frescas. También tienen todas las variantes de papas andinas y frutos exóticos, que van desde tomates mexicanos a berenjenas chinas. Y las flores comestibles: borraja, caléndula, girasol y taco de reina. Las bandejas en las que se exhibe la mercadería en góndola llevan una descripción del producto.

Benito cuenta que les tomó aproximadamente cinco años descubrir o encontrar los productos, importar las semillas e iniciar las plantaciones. Como la gastronomía demanda los productos a lo largo del año, casi sin estacionalidad, debieron armar un esquema de cultivo de manera tal que pudieran cosechar todo el año. Por tal motivo, cuenta con productores satélites distribuidos en Mar del Plata, en la zona al norte del Gran Buenos Aires, Corrientes y Salta. Sueño Verde tiene 20 hectáreas de producción propia en las cuales se encarga de todo el proceso: cultivo, cosecha, empacado, comercialización y distribución.

En el año 2007 la firma obtuvo el V Premio La Nación-Banco Galicia a la Excelencia Agropecuaria en la categoría mejor horticultor, en reconocimiento a su innovación como empresa y en productos.

3.2.1. Estrategias

Sueño Verde plantea la diferenciación como estrategia vital para el desarrollo empresarial, enfocándose a productos novedosos y de una alta calidad. Ligadas a la diferenciación se encuentran la investigación y desarrollo para la adaptación de siembra de nuevas variedades en actividades de producción primaria para el desarrollo posterior de nuevos productos. El desarrollo del canal HORECA (restaurantes y hoteles), se configura en una estrategia de segmentación determinante para el éxito en la comercialización de los productos, de modo que se logra el posicionamiento de la marca en el segmento productos tipo gourmet.

La estrategia comercial en los supermercados incluye además la inclusión de recetas o formas de preparación de los distintos productos a manera de involucrar al cliente al proceso de *feed back* que permita conocer sus expectativas y sugerencias respecto a los productos comercializados.

3.2.2. Tácticas (Marketing Mix)

Productos

Vegetales frescos: Esta modalidad de productos se presenta empacada en bolsas plásticas acorde con los requerimientos del cliente, representando cerca del 60% de las ventas. Están destinados a atender la demanda del canal HORECA y se clasifican en: hojas, aromáticas, flores comestibles, frutos, papas andinas, minis, "micro greens", brotes y "etnias".

Vegetales frescos precortados: Representa el 40% restante del volumen de ventas de la compañía y en esta línea se encuentran los productos empacados en bandejas de PET, bolsas plásticas selladas o bandejas de polipropileno expandido recubierto con film de PVC. La variedad de productos va desde productos seleccionados, lavados y empacados hasta aquellos a los que además se les realiza un proceso de corte y mezcla. Estos productos son

[116] Ver: http://www.s-verde.com.ar/

denominados como "*productos sibaritas*" dentro de los cuales se mencionan: albahaca italiana, albahaca mix, albahaca morada, berenjena china, berro de tierra, cherry dos colores, cebolla de verdeo, ciboulette, duo de ruculas, espinaca baby, guarnición andina, mix de pimientos hot, mix de lechugas, puerro baby, radiccio rosso, entre otros.

Plaza (Canales de comercialización):
HORECA (Hoteles, Restaurantes y Catering): canaliza el 60% de las ventas de Sueño Verde, poniendo especial atención al abastecimiento de los chef de las grandes cadenas de restaurantes y hoteleras de la ciudad de Buenos Aires. La empresa pretende mantener el nivel de ventas a este canal en función de las inversiones realizadas para satisfacer la demanda del mismo, tanto en las fases productivas como en las fases de distribución.
Supermercadismo: tiene el restante porcentaje de ventas (40%), siendo Jumbo y Disco (ambas cadenas inmersas en CENCOSUD) los principales clientes en la ciudad de Buenos Aires, abasteciendo además otras ciudades como Mar del Plata.

Precios: La diferenciación de producto, ligado al agregado de valor que implican las labores productivas y logísticas ligadas a la actividad, además de la marca constituyen para Sueño Verde las mayores fuentes de ventajas competitivas que se traducen en el posicionamiento en góndola con precios altos en comparación al fresco. Apuntando a cubrir la demanda del estrato de consumidores al que se dirige la atención. Para las mezclas de lechugas comercializadas por la firma se observa una diferencia 4 veces mayor a la del producto fresco, de manera similar la relación es tres veces mayor para el tomate cherry y 9 veces mayor para la rúcula. Se releva además que un producto como el Radiccio empacado por Sueño Verde, alcanza un precio en góndola de $39/Kg.

Tabla 2. Precio al consumidor por producto hortícola (procesado y fresco) en supermercados. Sueño Verde

Producto	$/Unid	$/Kg	$ kg Granel	Variación
Rúcula x100g	6,29	62,9	7	9
Cherry x300g	10,4	31,3	10	3,13
Lechugas x300g	8,07	23,6	6,85	3.93

Fuente: Elaboración propia con base a observación directa en supermercados Jumbo, Disco y Carrefour, 2009

Promoción: La empresa utiliza como canal publicitario la Web y a través de la página www.s-verde.com.ar comunica a sus clientes (actuales y potenciales) acerca de las ventajas del consumo de los productos ofertados (el portafolio de productos). Informa acerca de la historia de la empresa así como facilita el contacto con el servicio de atención al cliente.

Otro canal utilizado es el televisivo (programa de cocina "*El Gourmet"*), a través del cual se hace explicito el uso de los productos por parte de los chef especializados, esto les permite generar curiosidad en el televidente. Otra estrategia de comunicación bastante práctica es la inclusión en las bandejas de producto de recetas y consejos para la preparación de los vegetales en el hogar. A través de las etiquetas y la explotación de la marca se busca la asociación de la empresa con calidad y seguridad de consumo.

3.2.3. Estructuras de Gobernancia

Sueño Verde eligió como estructura de gobernancia principal a la empresa integrada verticalmente para disminuir los costos de transacción y hacer eficiente el sistema. La integración hacia delante, permite generar un "*know how*" del negocio en las labores de distribución, comercialización y consumo, así como la generación de redes relacionales con

los clientes que a la postre deriva en la disminución de costos transaccionales y de la incertidumbre ligada a las condiciones del mercado. De esta manera la empresa maneja la mayoría de los productos especialmente aquellos en los que se precisa de un mayor control de calidad con mira a atender los requerimientos de clientes en particular.

Por otro lado, la empresa también presenta, aunque en menor porcentaje, un esquema de coordinación vertical vía contratos informales con productores satélites a través de los cuales se realiza el aprovisionamiento de aquellos productos cuya producción requiere del desarrollo de habilidades especiales con las que la empresa no cuenta o aquellos para los cuales la relación costo beneficio es negativa si la empresa invierte en la producción propia de los mismos.

La integración hacia delante (venta directa, B2B), permite generar "know how" del negocio en las labores de distribución, comercialización y consumo, así como la generación de redes relacionales con los clientes que a la postre deriva en la disminución de la incertidumbre ligada a las condiciones del mercado.

Por otro lado, la venta de productos al canal HORECA presenta una mayor afinidad al tipo de estructura del mercado *spot*, si se tiene en cuenta que los arreglos con los clientes no implican compromisos de venta diarios o programados. Se hace necesario muchas horas para entablar contacto telefónico y consecuentemente estar al tanto de los requerimientos del cliente o conocer si necesita o no productos. Pese a esto, y conociendo los estándares de calidad y la puntualidad en el servicio exigidos por el canal HORECA, así como también el plus en el precio que están dispuestos a pagar, Sueño Verde integra las operaciones hacia atrás produciendo las variedades requeridas, con las mejores calidades, añadiendo valor agregado y desarrollando un sistema logístico que permita la entrega *Just in Time* de los productos.

3.3. El Caso Good Leaf

Empresa creada por el Ingeniero Agrónomo Guillermo Gottfriedt en el año 1996. Good Leaf se dedica a la producción, empaque y comercialización de hortalizas de hoja (espinaca, rúcula, acelga, lechuga hoja de roble roja, hoja de roble verde, mantecosa y ensaladas listas para consumir).

Las instalaciones, planta y cultivos se encuentran en la localidad de Solís, provincia de Buenos Aires, donde la empresa tiene un campo arrendado, al igual que las instalaciones de empacado. La empresa comercializa sus productos bajo la marca comercial "*Buy & Eat*", siendo el único caso en el que se puede ver una diferenciación entre el nombre de la firma y la marca insignia de los productos para su comercialización. Los productos "Buy & Eat" tienen en el supermercadismo su canal principal desde los inicios.

Cabe resaltar la influencia de la presentación y el empaque como instrumentos generadores de valor agregado, sumados a la calidad de los productos. Good Leaf se especializó en sacar al mercado una línea de productos más acotada pero aprovechando al máximo la misma. Sus esfuerzos se centran en obtener una mayor escala productiva con miras de abastecer en tiempo y forma un mercado que según la empresa, se encuentra insatisfecho.

En la actualidad y siguiendo un proyecto de expansión, la empresa ha establecido alianzas con productores de la zona. De esta forma la empresa y los productores asociados han iniciado una fase de crecimiento productivo, buscando reducir los costos fijos al disminuir los recursos

dedicados al arriendo de campo y al mismo tiempo asegurar la calidad y volúmenes requeridos de materia prima para las fases posteriores.

Teniendo en cuenta lo planteado, la constante supervisión de las labores precosecha y cosecha a campo se convierte en un punto determinante para el éxito de las fases subsiguientes, a tal punto que las inversiones en sistemas de riego por goteo, los invernáculos y el control de plagas y enfermedades concentran la atención y requieren mano de obra experimentada y altamente especializada. Aunque no se tienen planes de iniciar con procesos de exportación, se están desarrollando acciones para la realización de alianzas con productores de lechugas hidropónicas. El mercado de productos orgánicos no es visto por el momento como atractivo para los intereses de la firma.

Con una producción cercana a las 50.000 unidades (bolsas y bandejas) por mes, los procesos de empaque son "artesanales", poco tecnificadas y con baja incorporación de maquinaria, la infraestructura de frío es buena y se cuenta además con transporte refrigerado propio para las labores de distribución y aseguramiento de la cadena de frío.

3.3.1. Estrategias

Estrategia de posicionamiento de marca a través de la especialización en un portafolio de productos reducido, mayor control de la producción y de la calidad del producto final. A diferencia de los otros dos casos, Good Leaf, no enfoca la estrategia de diferenciación en la variabilidad del portafolio e inclusión de nuevas variedades, sino que centra su interés en el agregado de valor que demanda el proceso productivo y el empacado, además de tratar de suplir en la mayor proporción posible la demanda del mercado. Esto es el aumento de la escala productiva que permita suplir la demanda insatisfecha de productos hortícolas frescos cortados, como es el caso especifico de la espinaca.

Creación de alianzas con empresas dedicadas a la comercialización de otro tipo de alimentos en este caso Champiñones con la empresa Abrantes S.A., lo que le confiere un aumento en los volúmenes de ventas aprovechando el posicionamiento de la marca "Buy and Eat". Esto a la postre le permite ganar más presencia en el mercado y mayor poder de negociación.

3.3.2. Tácticas (Marketing Mix)

Productos:
Hortalizas frescos: esta modalidad de productos que se presentan empacados en bolsas plásticas acorde con los requerimientos del cliente y los requisitos de calidad. Están mayormente enfocados a la venta en el canal HORECA y representan un porcentaje un poco menor al 20% de las ventas.
Hortalizas frescas precortados: representan el 80% restante del volumen de ventas de la compañía. Los productos (espinaca, rúcula, acelga, lechuga hoja de roble roja, hoja de roble verde, mantecosa, ensaladas listas para consumir, tomate cherry), son empacados en bolsas plásticas o bandejas en porciones individuales que van desde los 150 a los 500g. Dentro de esta categoría de productos encontramos los productos Gourmet (jengibre, hongos secos, ají de chalote) y las hierbas aromáticas.

Plaza (canales de comercialización):
Canal HORECA: En este canal se atiende a restaurantes y servicios de restauración que exigen calidad de producto y puntualidad en las entregas.

Supermercadismo: Es el canal que moviliza la mayor proporción de las ventas de la empresa y se constituye como un bastión importante para la permanencia de la empresa en el mercado de tal modo que el cumplimiento de los compromisos adquiridos con los clientes que pertenecen a este segmento constituye el eje sobre el cual la empresa articula sus estrategias productivas y la planificación a futuro.

Precio: La estrategia de la empresa Good Leaf en este sentido apunta a la competitividad en el precio vía a agregado de valor en términos de calidad, calidad en este sentido referida a la durabilidad del producto en góndola más allá de la diferenciación en sistemas de empaque o en variedades. De esta forma el precio diferencial se logra gracias al reconocimiento de la empresa en cuanto a volúmenes de comercialización.

La marca aquí es determinante, de tal forma que productos como la Espinaca triplican el valor del producto a granel, las Lechugas lo cuadriplican y en el caso de la acelga lo duplica.

Tabla 3. Precio al consumidor por producto hortícola procesado por Good Leaf y en fresco, en supermercados

Producto	$/Unid	$/Kg	$ kg Granel	Variación
Espinaca x300g	7,69	25,63	7,69	3,33
Acelga x500g	6,99	13,98	6,05	2,31
Lechuga mantecosa x300g	8,07	26,9	6,85	3.93

Fuente: Elaboración propia con base a observación directa en Supermercados Carrefour, 2009

Promoción: Good Leaf cuenta con la página Web www.buyandeat.com.ar. La estrategia de comunicación se enfoca en el trabajo en las góndolas de los supermercados, haciendo degustaciones y trabajando directamente con el cliente, lo que implica la provisión de información y las ventajas del uso de los productos en el hogar.

En este sentido lograr comunicar o transmitir la idea de producto saludable y de calidad, se constituye en una fuente de gran valor a la hora de captar nuevos clientes e implementar mejoras con base en las expectativas y experiencias del cliente cautivo a través de un proceso de retroalimentación de gran importancia para los objetivos de la empresa.

3.3.3. Estructuras de gobernancia

La empresa presenta una combinación de estructuras de gobernancia que muestra un esquema orientado hacia la integración vertical, a través del cual produce el 70% de la materia prima en campos arrendados. Tiene inversiones en activos específicos referidos a invernaderos, sistemas de riego, maquinaria, equipos y flota de transporte propia. Esta estructura permite tener un mayor control de las calidades requeridas por el cliente así como el aseguramiento de los volúmenes de venta acorde con la demanda del mercado.

La otra estructura de gobernancia es la coordinación vertical hacia atrás que se puede evidenciar en las labores de compra coordinada de materia prima para el procesamiento en un porcentaje cercano al 30%. Se basa en un conjunto de proveedores con los cuales se tienen contratos no formales, construidos en base a relaciones de confianza y compromisos creíbles, donde el valor de la palabra es de vital importancia. El porcentaje de incumplimiento de los contratos es considerado por la empresa como bajo por Godfrietd

Otra evidencia del grado de integración vertical de Good Leaf está representada por las labores de poscosecha en planta donde se puede observar la inversión en activos específicos en aras de agregar valor a los productos y conservar la calidad de los mismos.

Good Leaf no está integrada verticalmente en las labores de comercialización (no tiene inversiones en activos específicos que le permitan llegar de manera directa al consumidor final), pero si coordina las mismas a través de acuerdos de compra con el supermercadismo que es su principal canal comercial. La venta de los productos a través del canal HORECA exhibe características de mercado *spot* por cuanto se hace necesaria la búsqueda del cliente o mantener el contacto periódicamente para estar al tanto de las necesidades o en su defecto se está a la espera de que los clientes hagan llegar sus requerimientos.

El operar con un esquema combinado de estructuras de gobernancia de acuerdo a las distintas fases de la cadena permite a la empresa adaptarse a los requerimientos del mercado minimizando los riesgos propios de la actividad y que podrían traducirse en costos de transacción positivos. Al estar integrada verticalmente asegura los volúmenes productivos y la calidad de la materia prima. La compra coordinada de materia prima le confiere la posibilidad de suplir inconvenientes o pedidos extraordinarios y al mismo tiempo de abastecerse de aquellos productos en los cuales no se especializa o cuya producción propia es inviable en términos económicos.

4. Conclusiones

A partir del análisis de los casos se concluye que las empresas despliegan estrategias y tácticas que les permitan un mejor posicionamiento en el mercado. Por ejemplo, Finca Pilar y Sueño Verde desarrollan estrategias de diferenciación y alta segmentación a partir de la preocupación por introducir en el mercado productos de alta calidad, variedades especiales y listas para consumir, donde el trabajo en investigación y desarrollo de nuevos productos juega un papel primordial. Sueño Verde se consolida como la empresa que más trabaja en diferenciación a través de la adaptabilidad de semillas y el desarrollo e introducción de nuevas especies y variedades.

La empresa Good Leaf, que también apunta a llegar al segmento ABC1 y obtener un mayor valor agregado a través de las labores de empaque, exhibe mayor afinidad con una estrategia de costos, dada la especialización en pocas variedades incluidas en el portafolio de productos. Pareciera estar más enfocada a ganar escala productiva y mayor poder de negociación.

La comercialización se realiza principalmente al supermercadismo y al canal HORECA y en menor medida al de exportación, generándose estructuras de gobernancia del tipo mercado spot (no existen compromisos de compra). El precio diferencial es un indicador del posicionamiento de las distintas empresas en los canales comerciales introducidos y a la vez marca la pauta respecto al tipo de consumidor al que van dirigidos sus productos. La publicidad ha ido ganando un espacio importante para los tres casos toda vez que la misma les permite dar a conocer los productos que ofrecen, los beneficios del consumo de los mismos y ganar un mayor reconocimiento de las marcas asociadas. La incorporación de página Web es un imperativo y la misma se aprovecha como mecanismo de *"feed back",* canalizando las inquietudes y reclamos de los clientes.

En los tres casos se evidencia la adopción de estructuras híbridas de gobernancia, pudiéndose observar la implementación de distintos mecanismos en función de las fases de la cadena de

valor involucradas. De esta manera en las fases productivas se combina integración vertical, coordinación y mercado *spot* en distintas proporciones. Al integrar parte de la producción logran asegurar la calidad y los volúmenes de aquellas materias primas que mayor significancia a nivel de ventas, la coordinación les permite romper con la estacionalidad y ganar escala sin hacer inversiones en activos físicos, y el mercado *spot* sirve para la provisión de aquellos productos requeridos en bajos volúmenes o en los que las firmas no se especializan. En la fase de transformación las tres firmas se integran de manera vertical haciendo inversiones en activos de alta especificidad y en lo comercial coordinan la venta a través de contratos informales. En este caso se destaca el hecho de que ninguna de las firmas tenga estructuras de venta propias, con lo cual factores como calidad, diferenciación, escala productiva, marca y cumplimiento se consoliden en mecanismos claves a la hora de entablar las negociaciones.

En definitiva, se puede decir que los tres casos abordados despliegan sus estrategias y tácticas, y adaptan las estructuras de gobernancia en las fases productiva, agroindustrial y comercial, logrando una mayor flexibilidad y por ende sobrevivir, crecer o ser competitivas en un medio ambiente de negocios, qué como el de las hortalizas frescas esta signado por la informalidad y sujeto a perturbaciones externas mayormente relacionadas con la variabilidad de los precios de los productos agrícolas.

5. Bibliografía

FARINA, *et al*. (1999). Competitividade e coordenação de sistemas agroindustriais: um ensaio conceitual. Departamento de Economia da Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo. En: Revista Gestao & Producao, Vol.6, n.3. pp. 147-161

FERRATO, J. (2002). Cambios en la comercialización de hortalizas en el mundo y en nuestro país (1ª y 2ª Parte). Revista Agromensajes. 12-2002. Facultad de Ciencias Agrarias. UNR.

JUSTO A. M., PARRA P. (2004). Inteligencia de Mercado de Productos Diferenciados: Comercialización de Hortalizas en Fresco. Documento de Trabajo Nº 30, INTA. 70 pp.

OSTER, S.M. (1994): Modern competitive analysis. Oxford University Press, 2º Edition. New York.

KENNEDY, R., GHEMAWAT, P. AND KHANNA, T. (1998). "Competitive Policy Shocks and Strategic Management", in Michael Hitt, Joan E. Ricart and Robert Nixon, eds., Managing Strategically in an Interconnected World, John Wiley, New York, N.Y.

KOTLER, P. A; ARMSTRONG, G. 2004. "*Principles of Marketing*", Tenth Edition, New Jersey: Pearson Education Inc.

MCCARTHY, E.J. (1960). "*Basic Marketing - A Managerial Approach*", Illinois: Irwin

ORDOÑEZ, H. (2000). Nueva Economía y Negocios Agroalimentarios, Programa de Agronegocios y Alimentos, UBA. 72 pp.

PORTER, M. E. (1980) Competitive Strategy: Techniques for Analyzing Industries and Competitors, pp. 34-317

SGROPPO S., MONTIEL G.M. (2005). Estado Actual del Mercado de Frutos y Vegetales Cortados en Argentina, Universidad Nacional del Nordeste (UNNE), p 61-69

SOLENO, R. (2010). Hortalizas frescas precortadas en la ciudad de Buenos Aires. Estructuras de gobernancia, estrategias y tácticas asociadas. Tesis de Máster en Agronegocios y Alimentos. Universidad Buenos Aires, 108 pp.

WILLIAMSON O. (1985) The Economic Institutions of Capitalism: Firms, Markets, Relational Contrats. The Free Press. New York.

WILLIAMSON, O. (1996). The Mechanisms of Governance. New York: Oxford University Press.

CAN PORK CONSUMPTION INCREASE IN BRAZIL? CHALLENGES AND OPPORTUNITIES FOR THE BRAZILIAN PORK PRODUCTION CHAIN

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Abstract
In spite of being the world's most consumed meat, pork consumption ranks only third place in Brazil, much less than the country's poultry and beef consumption. Although pork consumption has been increasing in the last years, 67.9% of the Brazilian pork consumption is based on processed pork products. The chain has been through a lot of technological improvements, but producers and industry were not yet able to inform, innovate and captivate the new millennium consumers. Brazil is a country of continental dimensions and the recent changes in the economical status of the population have created a favourable environment for the development of new pork products. Yet, very little is known about these consumers in terms of their eating habits, preferences and satisfaction with the current market offers. In this paper, we propose to investigate these issues using data collected from a survey with 482 consumers as part of the Q-PorkChains project in Brazil. Results indicate that consumers prefer fresh (not frozen) products and the supermarket is the preferred distribution channel. Pork products are consumed mostly at home, with the family, on any week day. Consumers are generally satisfied with the products available in the market, although healthy aspects, convenience and price could improve. In spite of being traditional, the interviewed pork consumers in Brazil are signalling opportunities for the pork chain in terms of innovation and new product development.

Key-words: Brazil, pork chain, product innovation, consumer behaviour

CAN PORK CONSUMPTION INCREASE IN BRAZIL? CHALLENGES AND OPPORTUNITIES FOR THE BRAZILIAN PORK PRODUCTION CHAIN

1. Introduction

Agri-food chains and networks play an increasingly important role in providing access to markets for producers in developing countries (Ruben, Slingerland and Nijhoff, 2006). The agri-food system is generally composed by its agents, their relationships, the sectors, the supporting organizations and the institutional environment (Zylberstajn and Neves, 2000, Batalha, 2001). A supply chain is therefore defined as a set of three or more agents directly involved in input and outputs flows of products, services, financial resources and information from the origin to the end consumer (Mentzer et al., 2001).

In agri-food markets, it is important to analyse the value perceived on products by customers. This is especially true to those still considered as commodities, such as pork meat. Chain orientation towards end-consumer is therefore fundamental for the organisation of all agents. A supply chain will only be competitive if it is connected with the demand and consumers' needs (Vieira, Aguiar and de Barcellos, 2010).

Our aim in this study is therefore to investigate Brazilian pork consumers purchasing and eating habits, and their quality perception and satisfaction level of the pork products available at the market. To succeed in this dynamic food industry environment, we propose that pork chain managers need to understand the consumer community and their purchasing and eating behaviour. Challenges and opportunities for the chain are also discussed, in the light of bringing the consumer back to meat.

The structure of this paper is as follows: Section 2 provides the major theoretical and empirical considerations for this study, and addresses the supply chain management, the pork production chain and Brazilian pork consumers in particular. Section 3 elaborates on the methodological approach, including the research strategy employed, sampling methods and questionnaire content. Section 4 presents the results of the survey performed in the eight Brazil. Section 5 discuss on the results, and presents the main conclusions of this study and finally section 6 points out the main implications of the study for public policy purposes, industry, stakeholder and further research.

2. Theoretical background and study domain

Supply Chain Management in the Pork Production Sector

Supply chain management (SCM) is a cross-function that includes the bidirectional flow of products (materials and services) and information, and the associated managerial and operational activities from producer to consumer (Cooper, Lambert and Pagh,1997). It is the systemic and strategic coordination of tasks among different companies that are part of a supply chain, aiming to improve each company's performance as well as the overall supply chain (Mentzer et al., 2001). The ultimate goal of SCM is to deliver superior consumer value at less cost to the supply chain as a whole while satisfying variable requirements of other stakeholders in the supply chain (e.g. government and NGO's) (Van der Vorst, 2000, Van der Vorst, Beulens and von Beek, 2005).

The concept of supply chain management (SCM) has changed the competitive paradigm, when scholars consider that competition happens amongst supply chains, thus providing flexibility. Flexibility and chain competition are key concepts on agro-food systems, which have been recently becoming more concentrated and responding to changing demand. Nevertheless, the applicability of SCM is difficult in some sectors due to opportunistic

relationships present amongst agents. A key issue in supply chain management is coordination (Vieira et al., 2010).
The progressive reversal of food supply chains from being supply to demand (consumer) driven has made an enormous difference to their structure and *modus operandi* (Boselie, Henson and Weatherspoon, 2003). However, SCM does not come without its difficulties. The clear identification of demand and demand trends and the ability to communicate this (information transfer) backwards through the chain, which would result in determining both product and processes standards, still encounter important constraints (Vieira et al., 2010).
In the case of the pork chain in Brazil, there are no official statistics, but estimates point out that 88% of the technified pig farms are vertically integrated through contracts or farm promotion programs from agri-food industries and cooperatives. Vertical integration predominates in South Brazil, but it is growing in Southeast and Center-West Brazil, lately developed as pig production regions (Miele, 2007). In that sense, agri-food industries are the chain leaders and main responsible for the supply chain management, including product innovation and lately, consumer satisfaction.
Innovation in the food industry is an important source of differentiation and a value-adding opportunity for managers. Hence, innovation constitutes a competitive advantage in the globalised agri-food scenario (De Barcellos et al., 2009). Costa and Jongen (2006) state that product innovation may help to maintain firm's growth (thereby protecting the interests of investors, employees and food chain actors), reduce the market risk, enhance the company's stock market value and increase competitiveness. Conversely, the authors state that the European food and beverage industry is quite conservative in the type of innovations it introduces to the market, displaying much lower research and development (R&D) investments than industries in other sectors. Some possible explanation, according to studies by Cooper (1994) and Costa and Jongen (2006), is that many food product introductions fail. Around 40% to 50% of new product introductions are out of retailers' shelves within a year, according to Ernst & Young Global Client Consulting (1999). As a consequence of such negative product introduction results, the food sector strategy is characterized by a parsimonious development of innovations. Much of the innovation is based on brand extensions of the same product line which is a less risky strategy (Grime et al., 2002).
In Brazil, agri-food chain competitiveness is still oriented by production cost advantages and abundant natural resources. Nevertheless, product innovation is rising as a new competitiveness element in this scenario in order to guarantee better market access (De Barcellos et al., 2008). According to Omta and Folstar (2005) consumers expect continuous improvements in the agro-food-products offered.
In that sense, it becomes paramount to identify how and why consumers behave in consumption experiences, allowing the understanding of their preferences and driving chain marketing activities (Grunert, 2006).

The pork production chain in Brazil

In spite of being the world's most consumed meat (15.05 kg/inhab/year), pork meat consumption ranks only third place in Brazil. Reported annual pork consumption in 2010 was only 14.3 kg/inhab/year (Desouzart, 2011), very low if compared to the country's poultry and beef (36 and 37 kg/inhab/year respectively) consumption. Notwithstanding, since Brazil is a country of continental dimensions and has an estimated (growing) population of 190.73 million inhabitants (IBGE, 2010) it can be seen as an important market for pork meat products. In 2010, 3,286.8 thousand tons were internally consumed (Desouzart, 2011).
In fact, pork consumption in Brazil has increased in the last years. From 1990 to 2006 the average annual growth was 4.9% (USDA-2007, in Saab, Armando and Neves, 2007). Interestingly, about 67.9% of the Brazilian pork consumption is based on meat products like

sausages and other processed products (Miele, 2011). The main reasons why fresh cuts are not preferred can be explained by cultural and historical aspects related to the image consumers have from the first pork production systems that existed in Brazil. Pork production is still perceived by most of the consumers as an activity where an extremely fat animal, living in a "dirty and smelly pen", is fed with leftovers (Miele, 2007). Until half of the 20th century the use of animal fat in human nutrition was common in Brazil. By that time, pork fat was as important as the loin or fresh ham. Pigs had only 40 to 45% of lean meat in the carcass and 5-6 centimetres of external fat. With the development of vegetal fats, such as margarines, pork fat was no longer used. New pig breeds were then selected to produce a lean meat type animal. The outcome was a revolutionary change in the Brazilian pork production chain, leading to the modern pig type found nowadays: an animal with 58 to 62% lean meat in the carcass, and only 1.2 to 0.8 centimetres of external fat (Roppa, 2006). High quality, industrial pig production (as opposed to subsistence pig production, mostly destined to the own farm's consumption) increased 1.5% in 2010 and accounts for 90% of the overall Brazilian pig production system. Subsistence production in fact has been decreasing, and accounted for only 10% of the pork production system in 2010, while it corresponded to 29% in 2002.
In spite of all the technological improvements and animal genetic developments that the chain has been through (especially in regard to quality assurance and production of lean pork meat), producers and industry are not yet able to inform, innovate and captivate consumers. At the retail level, some studies indicate a lack of variety and the high price of the products (Altmann, 1997; Weydmann, 2004; Miele, 2006; Miele and Waquil, 2007; Saab, 2011).

Pork consumers in Brazil

Like the European, Brazilian consumers are also a heterogeneous group. Being a country of continental dimensions (850 millions of hectares), and formed by people descending from a large variety of cultures, one can expect significant variability in food consumption behaviours. Regional differences are strongly marked in the Brazilian food context. People from the northeast part of the country have very different eating habits than people from the southern states. In the 19th century, the south region had the first strong colonization wave of immigrants from Europe and many of the eating habits from that region were established based on those influences. Also, pork consumption is higher in the South and Southeast if compared to the North, Northeast and Central West regions (Schlindwein and Kassouf, 2006). Recent data shows that pork consumption is higher in the state of Minas Gerais (ABCS, 2011), reaching 21 kg/inhab/year. Pork consumption in the rural areas of Brazil is also said to be higher than in urban areas, according to the same study by Schlindwein and Kassouf (2006). According to Brazilian statistical data, around 85% of the national households are situated in urban areas and only 15% in rural areas (IBGE, 2005). Previous studies indicate that family income has a highly positive and significant effect on the probability of pork consumption in Brazil, i.e., raises in the family income increase the probability of pork consumption at household level. Interesting to notice is that as income increases, there is a substitution of processed products for fresh meat (Miele, 2011). Finally, a negative effect of gender in regard to pork consumption was found. In this case, when the household responsible person is a male, there is a higher probability of pork consumption if compared to households where the responsible person is a female. Brazilians also have a good availability of pork meat, since domestic consumption represents around 83% of the overall production. The excess 17% are exported, mainly to Russia and Asian countries (ABIPECS, 2011).

3. Methodology

Research approach and sampling

In order to represent at some extent the important cultural differences stated above, the Q-PorkChains survey was applied in four different states (Rio Grande do Sul, Paraná, Mato Grosso and Goiás), representing two different regions of the country, namely south and central west. Both regions also represent different pig production systems, since the former is characterized as a very traditional and familiar type pork production region, with most of its population descending from European immigrants, mainly from Germany, Italy and The Netherlands. On the other hand, the central west region represents a new pork production area. Highly industrial, larger and more professionalized rural properties were responsible for the growth of 176% in pork production from 1998 to 2004 (Miele and Girotto, 2006). The region is still growing since it is located in the heart of the Brazilian grain production area, what make a significant difference in production costs (Miele, 2007, Silveira and Talamini, 2007). This region is quite different, less populated but rapidly expanding, since new cities are created as industry follows agriculture, pork and poultry production expansion. People migrate from other states to the central west region and there is a wider variety of cultures and habits.

Hence, quantitative descriptive data were collected through a consumer survey in eight Brazilian selected cities from the four selected states being two states of traditional pork production system (Rio Grande do Sul and Paraná) and two states from new production areas (Mato Grosso and Goiás). The criteria established to select the cities was that for each of the states (1) one big city, the capital, would be selected, and also (2) a small city with medium to high pork production levels. For that reason, the cities presented next were selected:

- Curitiba and Ponta Grossa were selected from the state of Paraná;
- Porto Alegre and Santa Rosa, from the state of Rio Grande do Sul;
- Cuiabá and Campo Verde, from the state of Mato Grosso;
- Goiânia and Rio Verde, from the state of Goiás.

Sample characteristics

Participants were randomly selected by TNS-Interscience researchers in line with predetermined quotas pertaining to age and region. The target population was intentionally divided in 3 different groups (from 18 to 30 years old, 31-50 and more than 51 years), with specific quotas equally divided between the eight cities.

A total number of 482 consumers answered to the interview. Female respondents represented 50.2 % of the total sample. The sample was equally distributed in all the eight cities (12.5% in each). According to the quota design, 50% of the respondents live in urban areas, while 50% in small cities with high density of pork production. Seventy five percent of the respondents are not living alone (50% married, 25% not married but living together) while the rest include single (10%), widowed (6%) or divorced (9%) respondents. Most of the respondents had upper secondary school (44.5%), followed by lower secondary school (29.1%), 14.9% with elementary education and only 11.6% with high school, University and beyond.

Questionnaire content

Consumers were asked to answer a personal interview based on a structured questionnaire, following the Q-PorkChains study conducted in Europe (Verbeke et al., 2010). The questionnaire consisted of seven sections: 1) Socio-demographic and anthropometric (self reported height and weight) characteristics of the respondents; 2) Food related lifestyle questions; 3) Schwartz Pictorial Value Questionnaire; 4) Attitudes towards environment and nature, industrial food production and technological progress; 5) Ethnocentrism; 6) Conjoint

study measuring citizen attitude towards pig production systems and 7) A questionnaire on the frequency of intake of pork-based food products including questions on the frequency of pork consumption (11 products/categories of products), the occasions or 'when' (working day, any day, weekend, special occasions), the company or 'with whom' (alone, with family, with friends, with others) and the place of actual consumption or 'where' (at home, outside of home). So, in order to shorten the time of the interview, 11 pork products were aggregated and further classified into 5 different categories, according to their processing level: fresh, minimum processed, further processed, dishes and processed pork products (Sichieri et al., 2008).

In Brazil, fieldwork was carried out from March 20th to 31st 2008. All interviews were made by TNS-Interscience researchers at the place of purchase of pork meat, basically supermarkets and local butchers. Respondents were randomly intercepted, and the time for answering the interviews ranged from 45 to 60 minutes.

The questionnaire was applied by personal (face-to-face) interviews, because the application of self-administered electronic questionnaires could seriously restrict the sample, given the characteristics of the population. In Brazil, there are 73.9 million people with access to the internet (Ibope/Nielsen, 2010), less than 50% of the population.

4. Result

Pork Consumption in Brazil

Table 2 shows the frequency of consumption of the listed pork products in Brazil. Official statistic data indicates that pork consumption is low in Brazil (14.3 kg/inhab/year) and mainly based on processed pork products (67.9%). In our survey, results confirm that trend: meat products, such as salami, ham and mortadela are the only ones that are consumed daily (19% of the respondents eat those products *everyday*), which is still relatively a low proportion if compared to some European countries.

It is noticeable that there is a large proportion of respondents who reported very low frequency of consumption, particularly of paté (52% never and 28% seldom); other fresh items like entrails, fat, tail or ear are also very little consumed (with 29% of respondents reporting never). Seventy-two percent of respondents never or seldom eat further processed meat. Dishes are also seldom consumed, which might indicate a lack of available products in the market. Most fresh products are seldom consumed by this sample of Brazilians: fresh ham (68%), sausages, minced, brochette (50%), loins and chops (54%) and pork ribs (54%).

Table 1. Consumption frequency of pork meat and derived pork products (%)	Never	Seldom	Less than once per week	At least once per week	Daily
Fresh first cuts					
Pork ribs	5.6	**53.6**	27.6	12.2	1.0
Loins and chops	5.8	**54.1**	25.6	12.7	1.9
Fresh ham	4.4	**68.2**	18	7.7	1.7
Others (entrails. fat. tail. ear)	29.0	**47.3**	14.3	8.9	0.4
Fresh minimally processed					
Sausages. minced pork meat. brochette. dry meat	15.5	**49.8**	23.8	9.6	1.0
Fresh further processed					
Stuffed meat. escalope. roasted meat. sate	24.3	**48.1**	19.7	6.8	1.0
Dishes					
Lasagne. pizza. spaghetti. feijoada	7.1	**39.4**	36.3	16.6	0.6

Processed Meat products					
Salami, ham, mortadela	4.8	19.5	24.0	**33.0**	18.7
Bacon	15.8	**36.8**	25.8	18.6	3.1
Sausages	6.6	**28.0**	27.8	33.0	4.6
Paté	**51.5**	28.2	9.6	8.7	2.1

n=482, results expressed in percentages. Higher consumption frequency per product in bold.

Furthermore, a series of regressions were run in order to identify the main socio-demographic determinants of pork meat consumption. The higher the education Brazilian respondents are, the more frequent is their intake of processed meat. Similarly, women consume more frequently processed pork products (salami, ham, mortadela) than men. When comparisons were performed by occupational categories, the study found that in general non-manual workers eat less processed meat than employees and unskilled workers. Divorced and not married but living together respondents eat more frequently processed meat than married respondents.

Way and place of purchase

Table 3 shows the way and the place of purchase of pork based products. From the total sample, 89.1% of respondents purchase their pork products fresh. A 10.53% average proportion reported purchasing frozen pork products, but the distribution is not equal, as 20,1% buy frozen dishes and 15,1% buy further processed products (minced pork meat, escalope) frozen, and a very small amount of respondents (3.6%) buy frozen meat products (ham, salami, mortadela).

The great majority of respondents (72.7%) buy the listed pork products in the supermarkets. Only 23% of the respondents purchase them at the butcher shop, but this has a big variation, as only 3.8% buy patés at the butchers and 5.2% of the consumers buy meat products like ham at the butchers. As expected, the fresh products are the ones that the majority of respondents reported buying at the butchers with the biggest proportion. This confirms the tendency in European countries, where fresh products are also the ones that are more bought at butcher shops.

This result attests a fact that can be easily seen in Brazil, where butchers are losing their sales to the supermarkets. Consumers want to buy all the food at the same place, for convenience (Dallari, 2007), and so the concept of "one stop shop" is broadly spread throughout the country. The butcher shops are much fewer in number than some time ago, and supermarkets are stealing their space (Milan, 2008, Honda, 2008). In fact, they were not able to adapt to this tendency of convenience as were the bakeries, for example, that started to sell a lot of other products together with bread in order to keep the consumers going there every day.

Further processed products and dishes are the only ones that have a considerable amount of respondents that buy their products somewhere else (18.9% for dishes and 14.1% for further processed), maybe at rotisseries or patisseries, or even at restaurants, as they have also a considerable amount of purchasing ready to eat (34.9% for dishes and 16.1% for further processed products).

Table 2. Way and place of purchase of pork meat and derived pork products	How you buy ?			Where you buy ?		
	Fresh	Frozen	Both	At the butcher	At the Supermarket	Somewhere else
Fresh first cuts						
Pork ribs	**88.7**	10.3	1.0	41.2	**57.6**	1.3
Loins and chops	**89.5**	10.5	0	45.7	**52.6**	1.6
Fresh ham	**84.0**	13.9	2.2	32.5	**65.4**	2.2
Others (entrails, fat, tail, ear)	**88.3**	11.1	0.6	37.8	**58.3**	3.9
Fresh minimally processed						
Sausages, minced pork meat, brochette, dry meat	**88.8**	10.8	0.4	19.6	**78.8**	1.7
Fresh further processed						
Stuffed meat, escalope, roasted meat, sate	**84.9**	15.1	0	20.3	**65.6**	14.1
Dishes						
Lasagne, pizza, spaghetti, feijoada)	**79.9**	20.1	0	5.2	**75.9**	18.9
Processed Meat products						
Salami, ham, mortadela	**96.4**	3.6	0	8.1	**89.8**	2.1
Bacon	**93.8**	6.2	0	20.0	**79.3**	0.7
Sausages	**92.7**	7.3	0	19.0	**80.3**	0.8
Paté	**93.1**	6.9	0	3.8	**96.2**	0

n=482, results expressed in percentages. Higher frequency per product marked in bold.

Occasions: When they eat

Table 3 shows that, like Europeans, Brazilians eat pork meat at any occasion, what confirms the idea that if available in a broader and more convenient variety of cuts, the extremely low consumption rate of pork meat can indeed increase. In fact, a recent study (Dallari, 2007) indicates that Brazilian consumers prefer the taste of pork as compared to other meats (basically chicken and beef). Dishes are the only type of pork meat where the percentage of consumption during *weekends* is higher than *any day* (48.3% versus 40.4%). The second highest percentage of consumption *during weekends* is for further processed meat (stuffed, escalope, roasted meat and saté), with 32.3%, also the ones that have the second highest percentage (12.0%) of consumption *only on special occasions*, fresh ham has the highest percentage of consumption in this occasion (17.3%), what can be associated to the fact that it is mostly offered at the point of sale in one big single piece and mostly consumed at Christmas and New Years' celebrations.

Notwithstanding, if comparing both rows *on a week day* and *during weekends*, only meat products (ham, salami, mortadela) have a higher percentage of consumption *on a week day*, and the fact that they are usually consumed on sandwiches as snacks or at breakfast must contribute to that. All the other items are more consumed *during weekends*, indicating that those are types of meat that probably would require more time to be prepared (as people usually have more time to spend cooking on weekends). It can also be an indicative that these products are available in big pieces, and so they could only be consumed by an entire family (as a meal with a united family is something that happens mostly on weekends).

Table 3. When Brazilian consumers eat pork meat and derived pork products

When you consume	On a week day	Any day	During weekends	Only on special occasions
Fresh first cuts				
Pork ribs	17.0	**57.2**	20.9	4.8
Loins and chops	11.5	**67.1**	15.1	6.3
Fresh ham	9.1	**50.2**	23.4	17.3
Others (entrails, fat, tail, ear)	10.0	**75.6**	13.9	0.6
Fresh minimally processed				
Sausages, minced pork meat, brochette, dry meat	10.0	**65.4**	21.3	3.3
Fresh further processed				
Stuffed meat, escalope, roasted meat, saté	8.9	**46.9**	32.3	12.0
Dishes				
Lasagne, pizza, spaghetti, feijoada	8.1	**40.4**	48.3	3.2
Processed Meat products				
Salami, ham, mortadela	6.4	**87.9**	4.7	0.9
Bacon	7.2	**80.0**	11.0	1.7
Sausages	6.5	**85.2**	7.3	1.0
Paté	11.5	**77.1**	11.5	0

n=482, results expressed in percentages. Higher frequency per product marked in bold.

Company: With whom they eat

In Brazil, pork products are consumed with the family. Further processed products such as stuffed meat, escalope, roasted meat and saté (18.8%), and especially dishes (lasagne, pizza, spaghetti or feijoada), with a percentage of 31.1%, are the only items that have expressive amounts of consumption with friends. Fresh minimally processed products (sausages, minced pork meat, brochette, dry meat) also have a percentage of consumption with friends above 10% (11.3%). Meat products (ham, salami, mortadela) are the most consumed alone, followed by patés (16%), sausages (12.5%) and bacon (11.7%), as indicated in Table 4.

Table 4. With whom Brazilian consumers eat pork meat and derived pork products

With whom you consume	Alone	With family	With friends	In other company
Fresh first cuts				
Pork ribs	6.4	**89.4**	4.2	0
Loins and chops	5.9	**87.2**	6.9	0
Fresh ham	5.6	**84.8**	9.1	0.4
Others (entrails, fat, tail, ear)	6.7	**85.0**	7.8	0.6
Fresh minimally processed				
Sausages, minced pork meat, brochette, dry meat	5.8	**82.9**	11.3	0
Fresh further processed				
Stuffed meat, escalope, roasted meat, saté	7.8	**73.4**	18.8	0
Dishes				
Lasagne, pizza, spaghetti, feijoada	4.1	**64.2**	31.1	0.6
Processed Meat products				
Salami, ham, mortadela	18.0	**78.7**	3.3	0
Bacon	11.7	**85.2**	2.8	0.3
Sausages	12.5	**84.9**	2.6	0
Paté	16.0	**82.4**	1.5	0

n=482, results expressed in percentages. Higher frequency per product marked in bold.

Places: Where they eat

Pork products in Brazil are most consumed *at home*. Products like paté (98.5%) or bacon (95.9%) are almost only consumed in this place. Only four products have noticeable percentages of consumption *at a restaurant*: further processed meat (stuffed meat, escalope, roasted meat and saté), with 21.4%; dishes (18.9%); minimally processed products (sausages, minced pork meat, brochette, dry meat) with 12.9%; and others (entrails, fat, tail, ear), with 12.2%. No item has a percentage of consumption above 10% either *on the go* or *somewhere else*, but dishes have equal percentages in both places (9.6%). Table 5 presents the results.

This confirms the notion that pork is poorly diffused in restaurants and other places of food service, like snack bars. It is very usual to find at restaurants a wide variety of meat products prepared with beef and chicken, but very few with a pork meat choice. So, promotional actions like culinary courses or contests with restaurant chefs are very important. But also diffusing the use of pork at snack bars, or pizza restaurants is urgent. Not only to increase consumption, but to create the habit of consumers to eat and ask for pork products when out of home.

Table 5. Where Brazilian consumers eat pork meat and derived pork products (%)

Where you eat	At home	At a restaurant	On the go	Somewhere else
Fresh first cuts				
Pork ribs	**91.3**	7.1	0.6	1.0
Loins and chops	**91.4**	6.3	0	2.3
Fresh ham	**87.4**	7.8	0.4	4.3
Others (entrails, fat, tail, ear)	**85.6**	12.2	0.6	1.7
Fresh minimally processed				
Sausages, minced pork meat, brochette, dry meat	**82.9**	12.9	2.9	1.3
Fresh further processed				
Stuffed meat, escalope, roasted meat, saté	**68.2**	21.4	7.3	3.1
Dishes				
Lasagne, pizza, spaghetti, feijoada	**61.9**	18.9	9.6	9.6
Processed Meat products				
Salami, ham, mortadela	**94.5**	4.7	0	0.7
Bacon	**95.9**	3.4	0	0.7
Sausages	**93.8**	5.2	0.3	0.8
Paté	**98.5**	1.5	0	0

n=482, results expressed in percentages. Higher frequency per product marked in bold.

Evaluation of pork products

Table 6 shows the quality perception of pork meat and products by the Brazilian consumers' sample. Brazilians overall are satisfied with all pork meat and products. All products have scores of 5.8 and above. Brazilian consumers are also very satisfied with pork products taste, since mean scores are quite high (at least 5.9). Yet, standard deviation on both items is between 1.0 and 1.2, indicating moderate variability in the degree of agreement among respondents. Health concerns are reflected on the lower scores for all the items, especially others (fat, entrails, 4.5, SD 2.3) and bacon (4.9, SD 2.1), and a maximum score for paté (5.7, SD 1.4).

Regarding convenience aspects, the mean of the questioned items ranged from 5.5 (further processed meat; SD 1.6, and others; SD 1.5) to 6.3 (paté; SD 1.0), with smaller scores for pork ribs (5.6; SD 1.4), loins and chops, and fresh ham (5.7; 1.4 S.D), and the highest scores for meat products and sausages (both 6.1; SD 1.2). As expected, price is the worse evaluated item, with means ranging from 3.9 to fresh ham (SD 2.1) to 5.2 with paté (SD 1.7).

Table 6. Quality perception and satisfaction levels by pork product in terms of Taste, Health, Convenience and Price

Quality perception and satisfaction level by product	Overall Mean	SD	Taste Mean	SD	Health Mean	SD	Convenience Mean	SD	Price Mean	SD
Fresh first cuts										
Pork ribs	6.0	1.1	6.2	1.0	5.1	2.0	5.6	1.4	4.1	1.9
Loins and chops	5.9	1.1	6.2	1.1	5.1	1.9	5.7	1.4	4.1	2.0
Fresh ham	6.0	1.1	6.2	1.1	5.1	2.0	5.7	1.6	3.9	2.1
Others (entrails, fat, tail, ear)	5.8	1.2	6.1	1.1	4.5	2.3	5.5	1.5	4.2	2.2
Fresh minimally processed										
Sausages, minced pork meat, brochette, dry meat	5.9	1.1	5.9	1.2	5.3	1.8	5.8	1.3	4.3	1.8
Fresh further processed										
Stuffed meat, escalope, roasted meat, sate	6.0	1.2	6.1	1.1	5.3	1.7	5.5	1.6	4.0	1.9
Dishes										
Lasagne, pizza, spaghetti, feijoada	6.0	1.1	6.4	1.0	5.4	1.7	5.9	1.4	4.4	2.0
Processed Meat products										
Salami, ham, mortadela	6.0	1.1	6.1	1.1	5.2	1.9	6.1	1.2	4.4	2.0
Bacon	5.9	1.2	6.0	1.2	4.9	2.1	6.0	1.2	4.2	2.2
Sausages	6.0	1.2	6.1	1.1	5.1	2.0	6.1	1.2	4.6	2.0
Paté	6.1	1.0	6.1	1.1	5.7	1.4	6.3	1.0	5.2	1.7

Mean values based on a 7-point scale

We also verified the existence of statistic difference on consumer satisfaction as a function of the place of purchase - butcher or supermarket. To this end, the satisfaction indicators (overall, taste, health, convenience, and price) were grouped into a single measurement calculated by its average. The t test presented significant differences on almost all products, showing always higher evaluation to the supermarket. Table 7 shows the test results mean difference.

Table 7. Mean differences of overall satisfaction levels per distribution channel

Overall satisfaction level by product	At the butcher			In the supermarket			Difference		
	N	Mean	SD	N	Mean	SD	t	df	*sig.*
Fresh first cuts									
Pork ribs	128	**5.06**	1.29	179	**5.62**	0.80	-4.35	196.39	*0.000*
Loins and chops	115	**5.07**	1.24	132	**5.55**	0.82	-3.53	192.75	*0.001*
Fresh ham	65	**5.21**	1.14	128	**5.50**	0.95	-1.86	191.00	*0.064*
Others (entrails, fat, tail, ear)	60	**4.73**	1.34	88	**5.52**	0.85	-4.03	91.32	*0.000*
Fresh minimally processed									
Sausages, minced pork meat, brochette, dry meat	38	**4.72**	1.19	147	**5.59**	0.90	-4.18	48.44	*0.000*
Fresh further processed									
Stuffed meat, escalope, roasted meat, saté	28	**4.60**	1.24	105	**5.52**	0.94	-3.66	35.81	*0.001*
Processed Meat products									

Bacon	42	**4.56**	1.07	161	**5.49**	1.00	-5.29	201.00	*0.000*
Sausages	49	**4.45**	1.06	208	**5.63**	0.90	-7.21	65.22	*0.000*

Note: Salami, ham, mortadela, dishes and paté were not tested because the small number of observations for "at the butcher". Mean values based on a 7-point scale. All differences are statistically significant.

5. Discussion and Conclusions

One of the main problems of the low consumption of pork meat and pork products is their low adaptation to the attributes consumers want, like a larger variety of cuts, smaller cuts size and more convenience, as there are very few ready-to-cook products in the Brazilian market (De Barcellos et al., 2008). Consumer are also very concerned about health issues and body shape, and consequently they are increasingly looking for products with less amounts of fat and low calories but with higher levels of quality and food safety (Dallari, 2007, Milan, 2008). The image of the pig as a fatty animal, raised under precarious hygiene conditions and inadequately fed is beginning to change. Small and unspecialized producers who had the activity as a secondary one are being confronted with the surge and strengthen of industrial and professional pig production. This has led to a big change, as industries started to demand a constant offer, with very well defined production patterns (Miele, 2007). Producers are therefore challenged to adapt, in order to satisfy industry and consequently consumers' needs.
The strong governance of the big industries created the possibility of a lot of changes. It began at the animal genetics level, generating at the end of the production chain a product which had the same attributes consumers would like to have and for which they would be willing to pay. And it was possible to reduce the fattening period (from the animal birth to slaughter), the fat content of meat and also to create better sanitary conditions at production, transport, storage and commercialization levels (Miele, 2007). In Brazil the slaughter/industrial sector is very much concentrated, and the three biggest industries are responsible for 44.13 % of total pig slaughter in the country. But this concentration, with strong and very well known brands, changed the traditional characteristic of local commercialization into nationally commercialized products. Such brands have a positive image in terms of consumers' trust and food safety, both in fresh and in processed meats, although not much innovation is seen.
Like Q-PorkChains survey results' in Europe, the less processed the meat is, the more likely it is to be prepared and consumed at home. This can be caused by the poor availability of ready-to-eat pork products, pork dishes at restaurants and other out-of-home places to eat in Brazil.
Brazilians buy mostly fresh or chilled pork meat and products. Supermarkets have more than 50% of the total of the place of purchase of food in general, reaching almost 90% for meat products like ham or salami, and almost 100% for paté. Fresh products have a larger proportion of acquisitions with the local butchers. More processed products (dishes and meat products) are also mostly acquired in supermarkets. The meat retailing environment is largely dominated by supermarkets in Brazil and consumers are also more satisfied with this distribution channel. Butchers seem to be losing space and opportunities to capture value through the offering of differentiated and convenient products.
Although consumed mostly on any occasion, fresh first cuts and dishes are more consumed on weekends as compared to week days. In general, in these occasions, consumers are willing to spend more time and money with food products, which might represent an interesting opportunity for the Brazilian pork chain to develop new products. The only products that have been reported to be consumed more on week days than on weekends are meat products like ham, salami or mortadela, traditionally consumed during breakfast or as snack in the evening, normally accompanied by bread.

In terms of gender, female consumers reported more frequent processed meat consumption than male consumers. The consumption frequency increases with the educational achievement. Although marginally significant, the higher the education is, the more frequent the intake of processed meat. The overall picture is of a socio-economic gradient in the frequency of pork meat consumption. Mostly the wealthier segments (highly educated, non-manual workers) eat processed pork products, and female consumers, suggesting that purchasing power and convenience may influence the choice of specific products.

Brazilian consumers are generally satisfied with the listed products in the Q-PorkChains survey. The study of the Brazilian sample found lower levels of satisfaction with pork prices, as well as with healthy characteristics of pork, particularly items like fat, entrails, and also bacon. In spite of being traditional in their eating habits, the interviewed pork consumers in Brazil are signalling opportunities for the pork chain in terms of innovation. The development of innovative pork products with more accessible prices could leave to a significant increase in consumption. Brazil is one of the emerging countries that experienced economic growth during the last decade and was not significantly affected by world economic crisis of September 2008. The country enters the new decade with very positive expectations, and some economists point to this being the "Brazil's decade". Purchasing power of the population is increasing, as 36 million people will move up to social classes A, B and C until 2020. Meat products are amongst the ones to grow, as demand for high value protein products increases with the income. In addition, global market demands increasingly pressure the chain in terms of quality, safety and innovation. Challenges and opportunities are therefore equally foreseen for the pork chain in Brazil and elsewhere.

6. Implications of the study

***For public policy purposes*:** Although a very important item in the human food intake for its high nutritional value, pork meat is still very poorly consumed in Brazil, especially as it has a high and still increasing production of good quality and well accepted product. Initiatives like introducing it as an item on the scholars menu or reducing the very high tax rates on the whole production chain to lower the prices to the final consumer could be easy and quickly implemented to increase demand and also the nutritional status of the Brazilian population.

***For industry*:** Brazilian consumers are overall satisfied with the pork products listed on the questionnaire. In terms of product positioning and the development of new products, the pork chain should take into account the concerns about the perceived aspects of production, cultural habits of consumption and the overall availability of the products at the supermarkets and butcheries (higher adaptation to the demands of the consumer, like more variety of cuts, smaller portions of cuts, more convenience). Also, include more options at restaurants and snack bars. Attention should be given for research to reduce the salt and fat level of processed products; and also more information about industrial animal production (traceability, transparency, information).

***For all stakeholders*:** Correct information about the entire pork chain should be provided, from the inputs to pig production, through industrialization of the products, benefits of pork meat consumption and even to the eventual risks associated to its consumption. Pricing and convenience strategies of fresh pork meat and meat products could improve the overall consumer satisfaction.

***For research*:** Further studies should involve a wider sample that could explore different localities of the country, like the biggest cities of São Paulo and Rio de Janeiro, where a different kind of consumer can probably be found. Also, other characteristics of the meat consumer in those important consumption centers, such as attitudes or beliefs should be studied, so it would possible to identify the specific socio-demographic characteristics

associated to pork meat consumption. Include other factors, like cultural and consumption habits, and also the effect of income and its changes on consumption. Finally, how Brazilian food industries are *de facto* incorporating technology, consumers' demands and regulatory drivers into their internal processes is yet an issue to be studied. How these aspects can be expanded to the chain is another question to be asked.

7. References

Associação Brasileira da Indústria Produtora e Exportadora de Carne Suína, (ABIPECS), 2011). Annual Report ABIPECS 2010. Available at <http://www.abipecs.org.br/english/relatorios/ABIPECS_relatorio_2010_en.pdf> Accessed 06/02/2011.

Altmann, R., (1997. A agricultura familiar e os contratos: reflexões sobre os contratos de integração, a concentração da produção e a seleção de produtores. Florianópolis: Ed. Palotti, 112 pp.

Batalha, M.O., 2001. Gestão Agroindustrial, 2th Edition. São Paulo: Atlas.

Boselie, D., Henson, S. and D. Weatherspoon, 2003. Supermarket Procurement Practices in Developing Countries: redefining the roles of the public and private sectors. American Journal of Agricultural Economics, 85: 1155-1161.

Cooper, M.C., Lambert, M.D and J.D. Pagh, 1997. Supply Chain Management More than a new name for logistics. International Journal of Logistics Management, 8(1): 1-13

Cooper, R.G., 1994. New products: factors that drive success. International Marketing Review,11(1): 60-76.

Costa, A.I.A., and W.M.F. Jongen, 2006. New insights into consumer-led food product development. Trends in Food Science & Technology, 17(8): 457-465.

Dallari, M., 2007. Demandas do consumidor final e como o varejo vê o mercado. International Meat Congress. São Paulo, May 2007.

De Barcellos, M.D., Ferreira, G.C. Vieira, L.M., and L.K. Aguiar, 2008. Food innovation: Perspectives for the poultry chain in Brazil. In: 8th International Conference on Management in AgriFood Chains and Networks, 2008, Wageningen. 8th International Conference on Management in AgriFood Chains and Networks. Wageningen: Wageningen Academic Publishers, 2008.

De Barcellos, M.D., Aguiar, L.K, Ferreira, G.C, and L.M. Vieira, 2009. Willingness to Try Innovative Food Products: a Comparison between British and Brazilian Consumers. Brazilian Administration Review, 6,(1): 50-61.

Desouzart, O., 2011. O consumo per capita de carne suína no mundo. Porkworld,10 (61): 50-54.

Ernst & Young Global Client Consulting, 1999. Efficient product introductions: the development of value-creating relationships (Report n. 0264H / 1999), Brussels, Belgium, Author.

Honda, S., 2008. A carne suína em supermercados – cenário atual e perspectivas. Proceedings...AVESUI 2008, Florianópolis, May 2008.

Grime, I., Diamantopoulus, A., and G. Smith, 2002. Consumer evaluation of extensions and their effect on core brand. European Journal of Marketing, 36(11/12): 1415-1438.

Grunert, K.G., 2006. Future trends and consumer lifestyles with regard to meat consumption. Meat Science, 74: 149-160.

Instituto Brasileiro de Geografia e Estatística (IBGE), 2010. Banco de dados agregados. Available at: <http://www.sidra.ibge.gov.br/bda/>, Accessed 06/02/2011.

Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith C.D, and Z.G. Zacharia, 2001. Defining Supply Chain Management. Journal of Business Logistics, 22 (2): 1-25.

Miele, M., 2006. Contratos, especialização, escala de produção e potencial poluidor na suinocultura de Santa Catarina. Porto Alegre, 278p. Thesis, PPG in Agribusiness, UFRGS, 2006.
Miele, M., and A.F. Girotto, 2006. Tendências e incertezas para a construção de cenários na suinocultura. In: Congresso Brasileiro de Economia e Sociologia Rural, 46., Fortaleza, 2006. Proceedings... Fortaleza: SOBER, 2006.
Miele, M., and P.D. Waquil, 2007. Cadeia produtiva da carne suína. Revista de Política Agrícola, 16(1): 75.
Miele, M., and P.D Waquil, 2008. Transação entre suinocultor e agroindústria em Santa Catarina. Concórdia: Embrapa Suínos e Aves, 2006. 8 p. (Embrapa Suínos e Aves. Comunicado Técnico, 428.
Miele, M., 2011. Consumo de carne suína no Brasil: indicadores, evolução e diferenças regionais. Suinocultura industrial, 33(239): 14-23.
Milan, M.,2008. Relações institucionais – Carne de porco ou carne suína ? AVESUI 2008, Florianópolis, May, 2008.
Omta, S.W.F., and P. Folstar, 2005. Integration of innovation in the corporate strategy of agrifood companies, in Jongen, W.M.H., and Mulenberg, M.T.G., Editors, "Innovation in Agri-Food Systems, Wageningen Academic Publishers, Wageningen, pp 223-46.
Roppa, L., 2006. Coma Carne Suína no Verão. Saúde e Vida on Line. Available at <http://www.migplus.com.br/principal.php?id_menu=salaveterinario&id_sala=12> Accessed 06/10/2008.
Ruben, R., Slingerland, M., and H. Nijhoff, 2006. Agro-food chains and networks for development: issues, approaches and strategies. In: Ruben, R., Slingerland, M., Nijhoff, H. (2006) International Agro-food Chains and Networks as Instruments for Development. Dordrecht: Kluwer-Springer Verlag, pp. 1-25.
Saab, M.S.M., 2011. Comportamento do consumidor de alimentos no Brasil: um estudo sobre a carne suína. (PhD Thesis). Faculty of Economics and Business Administration. University of São Paulo.
Saab, M.S.M., Armando, E., and M.F. Neves, 2007. Pork value chain in Canada and Brazil: a small comparison. In: Proceedings of the VI International PENSA Conference, Ribeirão Preto, October 2007.
Schlindwein, M.M., and A.L. Kassouf, 2006. Análise da influência de alguns fatores socioeconômicos e demográficos no consumo domiciliar de carnes no Brasil. Revista de Economia e Sociologia Rural, 44 (3): 549-572.
Silveira, P.R.S., and D.J.D.Talamini, 2007. A cadeia produtiva de suínos no Brasil. Revista CFMV, Brasília/DF, Year XIII (42), 11-20.
Van der Vorst, J.G.A.G., 2000. Effective Food Supply Chains, Generating, modelling and evaluating supply chain scenarios, Wageningen University, Wagenningen, The Netherland, 305p.
Van der Vorst, J.G.A.J., Beulens, A.J.M. and P. van Beek, 2005. Innovations in Logistics and ICT in Food Supply Chain Networks. In: W.M.F. Jongen and M.T.G. Meulenberg (eds.) Innovation in agri-food systems, Product quality and consumer acceptance, Chapter 8, Wageningen Academic Publishers, Wageningen.
Verbeke, W., Pérez-Cueto, F. J. A., De Barcellos, M. D., Krystallis, A., and K.G. Grunert, 2010. European citizen and consumer attitudes and preferences regarding beef and pork. Meat Science, 84(2): 284-2 92.
Vieira, L.M., Aguiar, L.K. and M.D. de Barcellos, 2010. Understanding the Coordination Mechanisms in a Fair Trade Fruit Supply Chain. Journal of Operations and Supply Chain Management, 3(2): 13-25.

Weydmann, C.L., 2004. O padrão concorrencial na agroindústria suína e as estratégias ambientais. In: Guivant, J., Miranda, C. (Org.) Desafios para o desenvolvimento sustentável da suinocultura. Chapecó, [s.n.], 2004, v.1, p.173-199
Zylbersztajn, D., and M.F. Neves (Orgs), 2000. Economia e gestão dos negócios agroalimentares. São Paulo. Pioneira.

ENTERPRISE: CABAÑA ARGENTINA. CASE: CABAÑA ARGENTINA, QUALITY AND TASTE FROM ITS ORIGIN.

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Abstract
The hog market (commercial category of pigs) was slightly informal as to the payment chain and was constantly undergoing the menace of imports of frozen meat mainly coming from Brazil and Chile, which attempted against the integration of argentine pork (the imported cuts provoked a break in the supply balance of national cuts).
Historically in Argentina, the main destination of pork meat was the making of sausages and preparation of pressed meat (cold food). The consumption of fresh meat has always been very low in relationship to what happens in other countries it being the most consumed meat at worldwide levels as compared to beef, poultry and sheep meat.
Out of this one can conclude that on one hand the local market, as well as the traditional and hypermarket channels, is supplied by an offer that cannot certify its origin neither the quality of its raw ingredients to be found in the final food product. This creates the opportunity for the same breeder to self supply his own cold storage plant thus breaking the scheme of the traditional market. On the other hand, for a cold storage plant to be efficient, it must always guarantee that each hog slaughtered becomes an integral part of its marketing product as otherwise the business becomes highly risky for its survivance.

Key words: pork meat – cold food – sausages – hog market – consumption – supply chain management – marketing – markets – supermarkets – traditional markets – cold storage plant – hog slaughtered – quality – origin- traceability –pork industry - Cabaña Argentina

ENTERPRISE: CABAÑA ARGENTINA
CASE: CABAÑA ARGENTINA, QUALITY AND TASTE FROM ITS ORIGIN.

1. Diagnosis

At the beginning, the Pacuca hog breeding place was a secondary activity within the agricultural establishment La Biznaga, located in Roque Pérez in the province of Buenos Aires, exercising the typical traditional intensive production system (in open sheds). At that time there prevailed different sanitary and reproductive problems which made the business unit the subject of inefficient production and suffering from the typical hog cycles of supply and demand, turning it unstable throughout time.

The hog market (commercial category of pigs) was slightly informal as to the payment chain and was constantly undergoing the menace of imports of frozen meat mainly coming from Brazil and Chile, which attempted against the integration of argentine pork (the imported cuts provoked a break in the supply balance of national cuts).

Historically in Argentina, the main destination of pork meat was the making of sausages and preparation of pressed meat (cold food). The consumption of fresh meat has always been very low in relationship to what happens in other countries it being the most consumed meat at worldwide levels as compared to beef, poultry and sheep meat.

1992 – The owner of the establishment decided to investigate the possibility of setting up in Argentina a hog breeding enterprise fulfilling the international standards of its time, envisaging a promising future both for the activity to be developed locally and abroad. During the course of this year professional researchers were engaged to work in the new project.

1993 – A survey of Argentine consumer behavior and preferences at the national level in respect to fresh meat, sausages and pressed meat was conducted and the results showed that contrary to what happens in the rest of the world, fresh meat had serious negative preconceived ideas, based mainly on the poor quality of the meat offer. The principal obstacle for its consumption was the excess of fat, its use being limited to special occasions or as a special tidbit but minimal in the traditional argentine “asado” (barbecue) given that at the same time it has always been recognized for its excellent taste with respect to beef and poultry meat.

In these circumstances, a SWOT (Strengths, Weakness, Opportunities and Threats) study was carried out resulting in the following diagnosis:

STRENGTHS

- Argentina is one of the principal producers of maize and soybean, the main cost involved in hog production.
- The climate is moderate and the quality of water in the Humid Pampa make it the ideal place to produce pigs in an efficient manner and at competitive costs regarding the rest of the world.
- The geographical location of the establishment with respect to the principal consumer centers and national and exports means of communication is optimum.

WEAKNESSES

- Negative cultural perception towards the consumption of fresh meat.
- Poor internal commercial development results in insufficient supply, lack of commercial formality and heterogeneous production standards according to the area and production scale.
- Little or worthless investment in cold-storage plants destined for exports.

O PPORTUNITIES

- The world trends for the production and consumption of pork meat are of continuous growth in time mainly due to the high efficiency that pigs show in converting beans into animal protein of high nutritional value for the human being and its elevated prolific rate as compared to beef and poultry.
- Food commodities' stepping up of international prices make added value of national grains production more competitive.
- Serious sanitary problems in Europe and Asia which increase the incidence of ETAS (food transmission diseases) result in a major food supply demand for exports coming from "healthy" countries.
- The possibility to incorporate technology, reconvert the traditional business and, in a short period of time, reach international standards turns this into an asset to achieve leadership in the sector.

THREATS

- As the national production of hogs does not satisfy the demand of the cold meat and sausages industries, it is usual to receive supplies from abroad, thus weakening the primary national sector.

CONCLUSIONS

In order to generate income from the pork business the chain value must follow integration from the nursery until it reaches the final food product ready for consumption.

An analysis of the markets comprising final food products arising from pork meat for massive consumption was carried out:

Fresh cuts: its principal demand is for the making of cold meat and sausages. Its direct sale is addressed to neighbourhood butcheries with no guarantee afforded to the consumer as to its origin. The demand is very irregular throughout the year, giving rise to an extreme concentration towards the end of the year festivities. In the supermarket chains there is only one differentiated brand in vacuum sealed cuts. The rest of the demand is supplied in conditions similar to that of the traditional channels, bearing no certainties as to quality and origin.

Cold meat: the main demand arises from delicatessen shops and self-services of the Traditional Channel. The principal cities of the country concentrate 80% of consumption. There are several cold-storage plants, mainly in the national capital cities and they supply almost exclusively the local market. Very few of these industries have their own nurseries and in a scale which is insufficient to fully supply their own needs for raw ingredients therefore they are compelled to purchase from other producers, slaughtering and cutting up cold-storage plants and/or the import of frozen cuts. It is a relatively mature and stable market with seasonal peaks of greater consumption in spring and summer periods.

Fresh sausages (sausages and blood pudding): as the raw ingredients of these foods are by-products of slaughtering and cutting up, in a greater measure than cold food, the manufacturing industries are supplied by a great number and diversity of cold storage plants making it impossible to track down the origin of its components. On the other hand, the argentine consumers are also biased by preconceived ideas as to fresh meat, in the sense that pure pork sausages are more fatty and risky than the mix of beef meat or the pure beef meat. The traditional channel is characterized by the handicraft making with cuts of no commercial value generated in each one of the neighbourhood butcheries and the hipermarket channel is supplied by the above mentioned industries, again offering no guarantee as to the origin and quality of its raw ingredients.

Out of this one can conclude that on one hand the local market, as well as the traditional and hypermarket channels, is supplied by an offer that cannot certify its origin neither the quality of its raw ingredients to be found in the final food product. This creates the opportunity for the same breeder to self supply his own cold storage plant thus breaking the scheme of the traditional market. On the other hand, for a cold storage plant to be efficient, it must always guarantee that each hog slaughtered becomes an integral part of its marketing product as otherwise the business becomes highly risky for its survivance.

2. Forecast

The strategic alternatives, identified and studied in that decisive year were:

A) Continue with the traditional system of primary production, becoming stagnant in time through the repetitive hog cycles facing the menace that another national or foreign actor might take the latent initiative for leadership of the national market.
B) Reconvert the business unit through a strong technological investment to guarantee an excellent status of the primary product to self supply its own cold storage plant, developing an agro-food business vertically integrated, accumulating all the added value until reaching the final product thus achieving the differentiation of a leader product for the local market and competitive for exports.

Choosing the investments alternative the possible stages for the beginning of its vertical integration and continuity in time were to enter in the fresh cuts market with a differentiated product through its greater offer in volume and with guarantee as to the origin and quality, versus the existing competitors, mainly operating in the hypermarket channel which is the only one where brand identification exists in the area of fresh butchery products.

Because of the deeply rooted habits of the Argentine consumer, it was predicted that its development would be slow in time and with low yield rates.

In the Cold Meat category this would depend mostly in the possibility of investing in relatively expensive technology, mainly machinery to elaborate salt cooked products (salazones cocidas), the greatest demand by the argentine consumer of pork products. This technology would have to be imported almost in its entirety from Europe and the feasibility to purchase was only limited by the business's group investment policy - reinvest profits coming from its own business.

The sausage and blood pudding categories represented the only possibility of unlimited growth in time due to the low investment required for its manufacturing and the high added value which could be potentially achieved being the self suppliers of 99% of their ingredients thus generating a promising leadership within the local market. The favorite channel to begin its marketing, as well as that analyzed for fresh cuts, were the national chain of hypermarkets with the already established tradition to offer products of differentiated brands.

The latter being the only lines of business which would allow the group to ensure the integration of slaughtered hogs, add value to its byproducts arising from the principal cuts used both in the manufacturing of cold meat as well as fresh cuts for consumption, meant entering into a new market option:

A) Produce the typical mixed sausage, in response to the local demand but modifying the business of being the only producers of whole pork food products.
B) Aim at the pure pork sausage and blood pudding products, imposing them in the market with our own differentiation: being able to guarantee the quality and origin of each of our final products.

3. Objectives

To achieve the vertical integration of the pork business, taking into account:

- ✓ The full marketing of pork, both principal cuts as well as the entire secondary cuts and byproducts and the cutting up of slaughtered animals.
- ✓ Add the greatest value in order to grow in utilities, exploiting the line of fresh sausages as well as the lines which offered more growth potential and with the best commercial margin.
- ✓ Enter the Hypermarket Channel aiming at reaching Leadership in the cuts and fresh sausages areas.
- ✓ Secondly, enter the Traditional Channel in those areas which would allow us to develop commercially on account of brand differentiation.
- ✓ Overthrow preconceived ideas of the argentine consumer by initiating and sustaining throughout time a change in the paradigma of food habits of the argentine population.

4. Actions

1994-2002 - To enter into the chain of hypermarkets was not an easy task. In order to facilitate conviction on the part of buyers in the butchery areas, brands were developed for each market chain, which would be applied to vacuum sealed fresh cuts and to sausages and blood pudding products.

“Corral Pampeano” for Jumbo.
“Lago Escondido” for Carrefour.

With these “commercial traps” we were allowed to supply them with a significant volume of fresh cuts named “complements” which were fractioned in their butcheries and then put up for sale under their own brand in each chain.

To achieve quick acceptance on the part of client’s taste sampling campaigns were carried out in each one of the chains.

In view of the preconceived ideas rooted in consumers a thorough research work was developed as to the nutritional qualities of our meat products as regards those of beef meat. An agreement was reached with the Foundation of the University of Buenos Aires whereby the first qualitative analysis on pork meat in Argentina was carried out showing without any doubt its potential as a healthy food product versus beef and poultry meat.

2003 – The manufacturing and marketing of the line of cooked cold meat (fiambres cocidos) under the brand Cabaña Argentina was initiated in the Traditional Channel, with none or scarce promotion actions as the commercial margins would not allow reinvestment in publicity campaigns and the cluster of different brands made communication towards our clients even more costly.

2004 – Having achieved relative experience in the category of cuts and fresh sausages and a promising commercial development in the cold meat line the strategic decision to unify all our lines under the umbrella brand: Cabaña Argentina was taken.

First, Hypermarkets had to be convinced of the benefits derived from resigning the exclusive brands that had been developed to begin competition among the chain of markets under the umbrella brand. The principal argument was that of all communication actions the business would now be able to highly enhance, in a more efficient manner, the potential to differentiate the product: to guarantee the quality and origin of each product.

At the same time they were provided with hired repositioners who secured the continuous flow of merchandise in the exhibitor counters and who also worked in the butcher's area allowing them to decrease operative costs. Likewise logistic services were increased in each of the outlets improving reposition of merchandise and securing that they would not suffer a break in stock if an increase in demand took place.

2005 – Having achieved a consensus as to the unification of all the products under the umbrella brand Cabaña Argentina, a speedy communication plan was initiated aiming mainly at developing demand for cuts and fresh sausages in the hypermarket chains and of cold meat in the traditional channel bearing the institutional message: Quality and Taste since its origin.

An agreement was reached with the Argentine Gastronomy Institute and the First Course on Pork Gastronomy was developed. This was to take place in July and September of each year. Four recipes a day were cooked which were sampled during the course of the same class and learning wine blending was offered by the National Wine Institute. These courses were addressed to housewives and cooks working in gastronomy enterprises.

Special courses of pork gastronomy were developed for the personnel of the grill area of Rincones Jumbo, which incorporated our pork cuts into their menu in an exclusive manner.

To further drive our line of sausages and blood pudding products, labels were developed based on the Feng Shui techniques applied to appetite impulses, including information to the consumer on the origin of cuts employed and most appropriate cooking methods, establishing the different lines of sausages, the quality "fresh pork" and "fresh grill pork". In this way, innovative recipes were developed for Premium sausages and blood pudding products to be consumed other than in the grill, thus allowing them to be cooked in gourmet dishes or in more day to day and simple recipes.

Graphic pieces were created, reinforcing the institutional differential messages which were used in commercial pamphlets, the edition of a recipe book carried out together with the IAG, the design of the institutional web page with recipes and advice to the consumer as to pork meat and the origin of each one of our products.

The beginning of participation in different husbandry and national agrofood prizes took place having obtained 2 first positions and 3 second positions.

Sampling campaigns of sausages began in different sales points of the hypermarket channel and cold meat in the traditional channel.

2006 – A Press Agency was hired to leave behind communication at the Sales Point and to begin launching in the graphic media, T.V. and radio channels of massive broadcast with short news items and newspaper columns. Information released dealt on investments in the nursery and cold meat plants, the call for cooking courses and the launching of new varieties of cold meat as well as mention of prizes obtained in each contest in which we participated.

The Disco and Vea hypermarket chains were incorporated as clients thus becoming the exclusive suppliers at the national level of all fresh pork cuts, other than the supply of cuts and fresh sausages with our brand Cabaña Argentina.

2007 – In February of that year a plot of land was purchased in General Las Heras, in the province of Buenos Aires, where the new Cold Storage Plant will be built allowing an increase in slaughtering, cutting up and manufacturing of more and new products with greater added value for both the local and international markets.

In April, the Argentine Cardiological Foundation approved 4 of our fresh pork cuts as being fit to be incorporated into a healthy heart diet: the saddle of pork or small loin of pork, the boned carré, the haunch bone and the loin round. This award has only been granted to the Canadian Association of Hog Producers and a pork industry in Spain.

In July the nursery was able to obtain for its Food Plant the international quality certification ISO 9004:2000 being the first establishment in its kind to achieve this goal.
In August the first shipment of byproducts took place with Hong Kong as its destination.

In our sampling campaigns at points of sale the pets of Cabaña Argentina: the “Sr. Chorizo” (Mr. Sausage) and “Sra. Morcilla” (Mrs. Blood Pudding) continued innovating and promoting its communicational approach to the final consumer.

As from May and until December we are present in different fairs and congresses related to the agrofood industry and gourmet products.

With all these new institutional developments the press campaign has been intensified through appearances in graphic news media, T.V. and radio broadcasting of massive propaganda.

2008 – All our campaigns have been focused in the sales promotion of fresh sausages, incorporating the consumption of nontraditional fresh cuts which further the commercial pork integration and a new variety of cooked pork: ham with lower salt and total fat content.

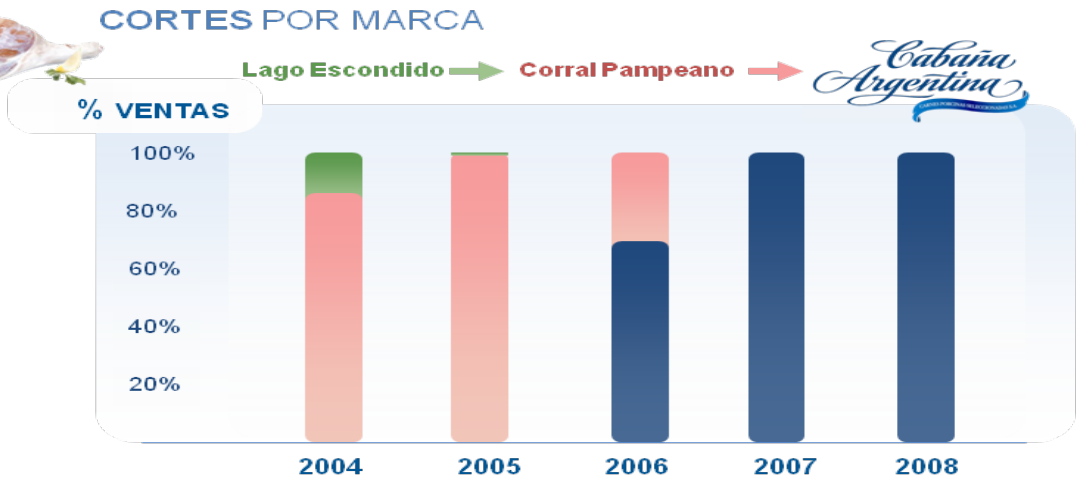
5. Results

Leader - category of Fresh cuts for consumption.
Leader - category of Sausages and Blood Puddings.

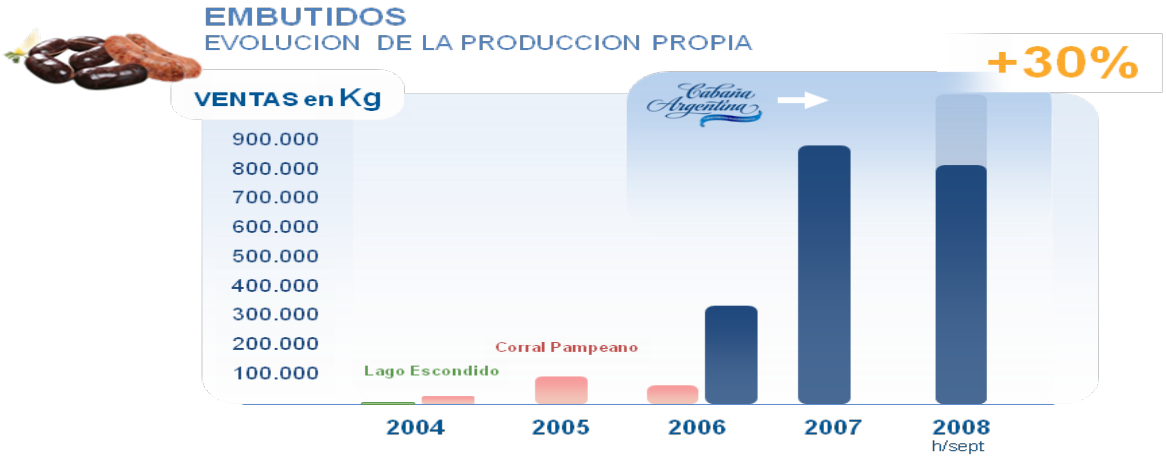
Capitanes de categoría

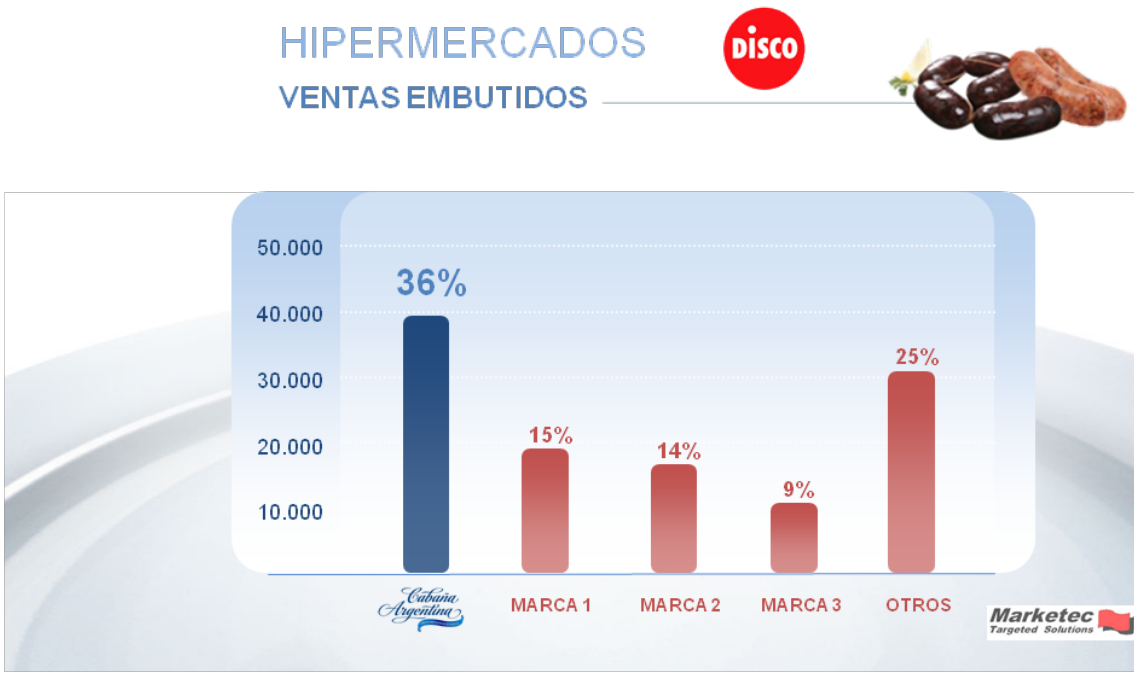
disco JUMBO plazaVea

Máxima capacidad
de venta y producción actual



Achieve maximum ranking of our cooked cold meat both in the interior of the province of Buenos Aires as well as in the principal site of national consumption: City of Buenos Aires 8CABA) and Greater Buenos Aires (GBA).

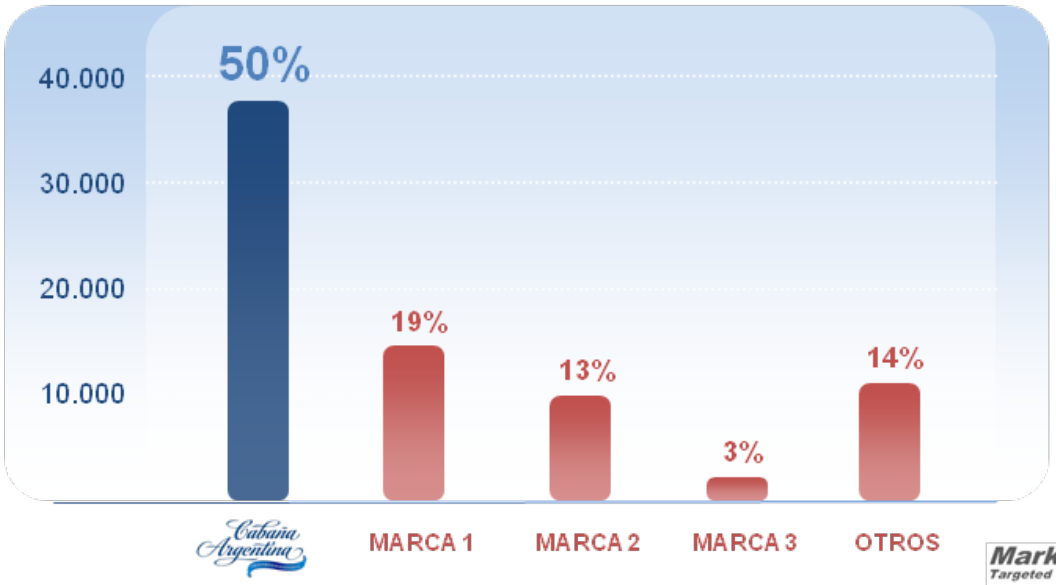

EMBUTIDOS
EVOLUCION DE LA PRODUCCION PROPIA
+30%
VENTAS en Kg
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
Lago Escondido
Corral Pampeano
2004
2005
2006
2007
2008
h/sept


HIPERMERCADOS
DISCO
VENTAS EMBUTIDOS
50.000
40.000
30.000
20.000
10.000
36%
15%
14%
9%
25%
MARCA 1
MARCA 2
MARCA 3
OTROS
Marketec
Targeted Solutions

HIPERMERCADOS

JUMBO

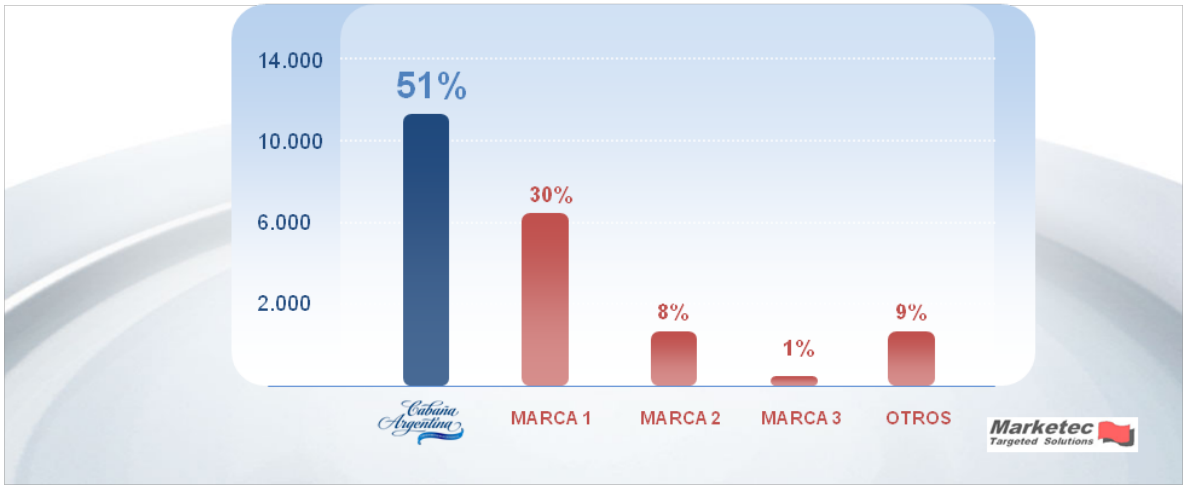
VENTAS EMBUTIDOS

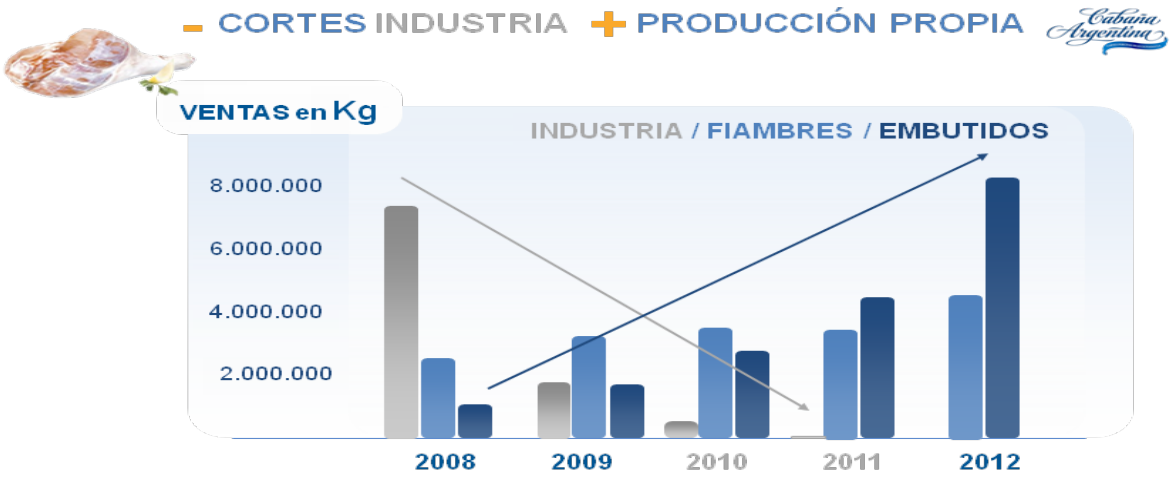


HIPERMERCADOS

plazaVea

VENTAS EMBUTIDOS





6. References:

Cabaña Argentina – 1992/2008.

FOOD CONSUMER BEHAVIOR: A STUDY ABOUT PORK

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Abstract
A study was realized with the main objective of investigating if there is any relation between lifestyle, attitudes and values of pork and pork products' consumers and the consumption of these products in Brazil. In this sense, with the theoretical basis of the Theory of Consumer Behavior, the final consumer of pork was accessed through a structured survey which included questions about attitudes and values related to pork and pork products and to pork production. This survey used data from a European integrated project called *Q-PorkChains*, which intends to improve the quality of pork and pork products to meet consumer demands. Because it was a questionnaire that involved a big diversity of different issues, this paper does not include analysis of all parts of the questionnaire. Further studies should cover the non analysed areas, and also make comparisons between the results found in Brazil and in China and the 5 European countries where the same survey was applied. Many statistic analyses were performed, but not all of the constructs that made part of the survey could be validated in the Brazilian sample. The hypothesis of the research was that the attitudes of Brazilian pork consumers towards the environment and nature, industrial food production, technological progress and ethnocentrism were influenced by the concepts of attitudes and PVQ (Pictorial Values Questionnaire), and that both attitudes and PVQ would influence the way the consumer sees swine production, what altogether would generate the behavior of the Brazilian pork consumer. This hypothesis could not be confirmed in the investigated sample, once little relation was found between the constructs of the research and the effective consumption of pork and pork products. Notwithstanding, besides the importance of replicating in Brazil a European study, this paper has as main contributions the verification of a series of information that work as indicators of tendencies of purchase and consumption of pork and pork products, and the use of scales still little used in the agribusiness sector in Brazil, as PVQ.

Key words: consumer behavior, pork, Brazil, attitudes, PVQ.

FOOD CONSUMER BEHAVIOR: A STUDY ABOUT PORK

1. Introduction

Within the Brazilian agribusiness, the pork chain is one of the fastest growing sectors. From 1999 to 2009, production presented growth of 136%. In addition to the expansion in the number of animals, the productivity of industrial pig production improved 21% between 2002 and 2009, what turned Brazil into the fourth largest world producer and exporter (CEPEA/ESALQ/USP, 2009).

The Brazilian swine chain – with 30 million heads, production of three million tons of meat, generation of 630 thousand direct and indirect jobs, investments in the field and in industry of R$ 9 billion, revenue of R$ 84 billion, R$ 30.4 billion domestically, R$ 2.6 billion in the foreign market, US$ 51.6 billion in distribution and in retail – is a very important economic activity, mainly in the South and Southeast regions of the country (CAMARGO NETO, 2010).

Nevertheless, the final consumer, which is the one who moves the whole economy and who decides about the growth of each of the agroindustrial chain, has been little studied. So, there is always space to learn more about this important economic agent. Studying the consumer behavior, according to Barcellos et al (2005), assumed a strategic role in business studies, once research results indicate that the more satisfied are the consumers, more time and resources they will tend to spend with those that better fulfills their demands.

In the first place, a company must choose targets that can be achieved. In addition, a better knowledge of the final consumer enables companies to formulate feasible strategies that are in accordance with their human, financial and time resources, which makes them important competitive differentiators for organizations (BARCELLOS, 2007). There is also the possibility to decide between segmenting the market or not, once the company can decide to try to hit the market as a whole or just divide it into different segments with common characteristics among themselves (KOTLER, 2000) and focus on one or more of these segments, saving efforts that otherwise could be wasted by acting without a defined focus (AAKER, 2001, p. 43).

Sheth *et al* (1988, p. 117), to refer to the development of comprehensive theories of consumer behavior, claim that "the buyer's behavior is very complex and highly dynamic to be completely explained by one-dimensional models and cross-cutting".

It is believed that the attitudes of consumers towards the products and production systems exert significant influence on their purchase behavior. In addition, the values consumers have and that are formed by their knowledge and experiences throughout their lives will largely determine what are the products that they will consume more or less and with greater or lesser frequency.

Grunert *et al* (2004) comment that consumers base their purchasing decisions on a small number of pre-set criteria, which have little predictive value on quality truly gained during the consumption of the product. With this, there is a tendency to delegate the evaluation of the product's quality to a foreign agent, that would be better prepared to evaluate the product.

According to Kotler & Armstrong (1998, p. 96), "the company that really understands how consumers respond to different characteristics, prices and advertising appeals have a great advantage over competitors."

Richers (1984) claims that consumer behavior is characterized by mental and emotional activities involved in the selection, purchase and use of products and services for the satisfaction of needs and desires.

In Brazil, the consumption of pork is well below the consumption of their main substitutes which are the other types of meat. While per capita consumption of pork is situated in the

range of 13 kg/hab/year, chicken meat reached 37 kg/hab/year, and the beef is 36 kg/hab/year (ANUALPEC, 2009). The reasons for this difference are various, from cultural problems, making the Brazilian consumers still believe that the pig is created inappropriately and therefore transmit a series of illnesses to consumers; health care and good form, since they believed that chicken meat is healthier for being more slender, and also less caloric; economic issues, since chicken meat is cheaper than other meats; issues of adaptation to new consumer demands for food products that are easier and more practical to prepare, and also the greater variety. Anyway, several are the possible reasons for the low consumption of pork in Brazil, which stresses the importance and the need to study more thoroughly the consumer to discover these reasons and perform actions that modify this situation.
Thus, based on the assumption that the consumer is the main actor in an agro-industrial system, and that being able to offer him the product that he wants with the attributes he wants is the only way a SAG can survive (SAAB, 1999; SOUKI, 2003), this paper intends to undertake a study on the behavior of the final consumer of pork in Brazil under the optics of agro industrial systems.

2. An overview of consumer behavior

Since the goal of marketing is to identify and meet the social and human needs of consumers, it is essential to know his buying behavior (KOTLER; KELLER, 2006, p. 4).
The research of the consumer as a systematic area of science of behavior in the way we know it today began in the late 1950's and early 1960 (ENGEL *et al*, 1995, p. 14).
Hoppe (2010, p. 23-25) makes a major literature review about the definition of consumer behavior, including, among others, Solomon (2002, p. 24), which defines it as "the study of the processes involved when individuals or groups select, buy, use or dispose of products, services, ideas or experiences to satisfy needs and wants", and Sheth *et al* (2001, p. 9), who claim that consumer behavior would refer to "physical and mental activities carried out by clients of consumer and industrial goods that result in decisions and actions, how to purchase and use products and services, as well as how to pay for them. "
Hoppe (2010, p. 24) defines it as "it is necessary to take the concepts of other disciplines than marketing to know about consumer behavior", i.e. it is an interdisciplinary theme (SOLOMON, 2002). Engel *et al* (1995, p. 4) define consumer behavior as "those activities directly involved in production, consumption and use of goods and services, including the decision-making processes that precede and follow these actions". This idea is supported by Barcellos (2007), who consider consumer behavior as an ongoing process that includes aspects related to before, during and after purchase.
There are several theories that attempt to explain the consumer buying behavior. Between them, this paper will utilize the Theory of Planned Behavior – TPB, one of cognitive theories.

2.1. Values and attitudes

Values form the foundation of much of human behavior and perception. An examination of values provide a general framework of an individual more abstract notions and is a way to unite central beliefs and attitudes. As it serves as standards of action, it tends to be limited, universal between different cultures, stable over time and can serve as a good predictor of the behavior of an individual for long periods of time. Thus, values are commonly taken as the point of intersection between the individual and the society, because they help to know and understand the interpersonal world and guide the individual's adaptation to surrounding conditions.
According to Brunsthe *et al* (2004), human values have been defined as abstract concepts or beliefs that represent the desired goals (ROCKEACH, 1968; SCHWARTZ; BILSKY, 1987). Thus, they constitute the most abstract level of cognition, not specific with respect to

situations or objects, but influencing the perception and evaluation thereof. It is assumed, so that values are the criterion used by people as guides for evaluating the stimulus, that is, situations, people and objects.

In general it is assumed that the values are universal in the sense that people pursue the same values in the world, but the relative importance of each one varies (ROCKEACH, 1973; SCHWARTZ; BILSKY, 1987). According to that general understanding, major assertions can be cited to describe systems of values: values are concepts or beliefs about desirable goals that transcend specific situations, guide the selection or evaluation of behaviors or events, and are ordered by importance (SCHWARTZ 1992).

The study of attitudes is extremely relevant to better understand the aspects relating to consumer behavior. In order to understand many of the aspects related to consumer buying behavior, it becomes very important to make an analysis of their attitudes (KARSAKLIAN, 2000).

According to Shiffman and Kanuk (2000, p. 165), "considering the context of consumer behavior, an assessment of prevailing attitudes has an important strategic merit."

So, once an individual has a positive attitude towards a given object, he displays a tendency to accept – in the case of products, consume – more favorably that same object. This idea can be expanded so that, once you know the attitudes of an individual, you can try to infer about his behavior in relation to the objects of this attitude (DONEGÁ, 2004, p. 15).

Greenwald (1989) points out the importance of identifying and measuring attitudes, considering them as a selective force for the perception and memory of individuals, serving several psychic functions; this way, attitudes can be one of the factors that help to "predict" the behavior of individuals in the light of its objects.

When the individual has a specific attitude towards something, based on some knowledge or belief about that object, he transforms this knowledge or belief in positive or negative feelings toward it and, finally, performs a tendency to some action (SHETH *et al*, 2001).

For Donegá (2004, p. 15), when an individual decides, for example, what brand to purchase, his choice will be based, among other factors, on assessments (favorable or unfavorable) he has in relation to the object (in this case, the brand or store, or even both). So, understanding and measuring attitudes are ways to identify why individuals make certain choices or select certain objects.

The responsible and sustainable environmental performance is another factor that influences consumer attitudes, and the products and brands that are able to guarantee that, throughout the production chain there have not been negative impacts on the environment, will be well evaluated (SOUKI, 2003). And the consumer is increasingly informed and aware about those impacts.

According to Kotler (2000), a company can drive much more effectively its marketing efforts to a market segment which is favorable for its products and services.

Verbeke (2005) states that not only the socio-demographic characteristics, most commonly used in research to justify the purchase behavior differences between individuals, but also the knowledge, attitudes and beliefs may explain much of the variations in the process of buying food.

For Myers (2000, p. 72), "attitudes will predict behavior [...] when they are specifically relevant to the behavior observed ". In the case of pork, it is presumed that the attitude that the consumer has in relation to the product and, before it, to the animal where it comes from, has influence on their behavior.

Thus, the improvements that have been made throughout the production chain must continue to obtain a product increasingly healthy, without antibiotic residues, drugs and anabolic steroids and with less fat and cholesterol, nutritionally rich and with high protein value (MOURA *et al*, 2009, p. 40).

According to Mowen and Minor (2003), attitude would be "the amount of affection or feeling for or against a stimulus". This concept stems from that one employed by Fishbein and Ajzen (1975). Solomon (2002, p. 165) defines it as "a general assessment and enduring people (including themselves), objects, ads and issues", stating that "an attitude is lasting because it tends to persist over time, and is general because it applies to more than a momentary event." Linking attitudes, intentions and behavior, other theories have been developed with the intention to better define and predict consumer buying behavior, and have been widely used, as the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). Both will be studied more in the next section.

2.2. The Theory of Reasoned Action and the Theory of Planned Behavior

According to Hoppe (2010, p. 25), the model proposed by Rosenberg and Hovland (1960) was the first one to consider attitudes "as affective, cognitive and behavioral responses to an object".

This model was the inspiration for the development of the Theory of Reasoned Action (TRA). Developed by professors from the Department of Psychology at the University of Massachusetts in 1967, this theory has been revised and expanded in the years 1970s. In the years 1980s, it has been used to study human behavior, suggesting that the behavior is determined by the intention to do so, and that this intention is a function of his attitude to behavior and subjective norms.

Ajzen and Fishbein (1980) argue that the individual beliefs that consumers have about themselves and about the world in which they live in are determinants of subjective norms and attitudes of individuals, and it is necessary to comprehend them to understand the behavior.

The more the behavior becomes dependent on external factors, that is, factors that are outside the person's control (such as the lack of a product which he wanted to acquire, or an unforeseen breakdown of the vehicle carrying the product and its consequent delay), less the behavior is under voluntary control. "The presence of those uncontrollable factors may thus interfere in the ability of the person to do what he or she wanted to do" (ENGEL *et al*, 1995, p. 389).

To Shiffman and Kanuk (2000, p. 174), the model "represents a complete integration of the components of the attitude in the form of a structure designed to generate much better explanations about better predictions of behavior".

Sheth *et al* (2001, p. 387) complement: "the advantage of the model [...] is that it considers normative social pressures and also the internal beliefs about the consequences of behavior."

The Theory of Planned Behavior (TPB) is an extension of the TRA. Created with the intention to decrease the first limitation, it includes in the study the perceived behavioral control variable. According to this theory, it is a variable that influences both the intention as purchasing behavior and it is expected that the relative importance of attitude, subjective standard and perceived behavioral control in predicting intention varies according to the different behaviors and situations (AJZEN; FISHBEIN, 1980).

The TPB was developed to try to complete some failures of adequacy found by the authors during searches using the TRA. The only difference between the two theories is the inclusion of behavioral control, perceived as an additional determinant of intentions and behaviors. In the development of the TRA, it is assumed that people will have control over the behavior of their interest (and they imagine that they are capable to perform the behavior if they desire). Under these conditions, the perceived behavioral control becomes irrelevant and TPB becomes TRA (AJZEN, 2001).

Psychologists perceived the attitude as an individual mental process that determines the actual and potential responses of a person, and so took the attitude as a forecast for the behavior. The

TRA sees more behavioral intentions than attitudes as the best predictors of behavior. The TPB puts the control that a person has or imagines having about his behavior as something that influences and asserts that the behavioral intention is influenced by the attitude, subjective norm and perceived behavioral control.

The perceived behavioral control refers to the individual's perceptions about his abilities to perform a given behavior. Ajzen (2001) adds the current behavioral control, which refers to how an individual possesses the skills, resources, and other prerequisites necessary to perform a given behavior. Therefore, if the individual perceives (or believes) that he does not have a set of skills or resources to play a certain behavior, his intentions will weaken. In the same way that in TRA, favorable attitudes toward behavior not necessarily will provide it.

Thus, according to this model, the behavior depends not only on a favorable intention, but also of a sufficient level of control over the behavior. This level is called volitive control (Donegá, 2004, p. 38).

So, here are some influencers of behavior:

· attitude – it is the degree with which the person has a favorable or unfavorable assessment about the behavior in question;

· subjective norm – it is the influence of perceived social pressure on the individual to perform or not certain behavior;

· perceived behavioral control – it is the individual's belief about how easy or difficult it is to perform or not certain behavior.

According to Ajzen (2001, p. 43), several studies concerned with the prediction of consumer behavior have compared the predictive power of the TPB with other models, however failed to achieve much better results, or had worse results than this theory. Barcellos (2007, p. 34) states that the use of the TPB as a theoretical basis for studies in several areas has been increasing, probably because of its simple and objective logic. The TPB has been used inclusive in studies outside the area of marketing (CORNELIUS et al, 2009).

3. Methodology

The presentation of the search method requires a detailed description of all activities and procedures adopted during the conduct of the study (BARCELLOS, 2007).

This study was conducted in two phases: the first was drawn up using the exploratory research with qualitative method approach; the second, using characteristics of descriptive research approach in quantitative method.

In the literature review books, articles, journals, theses and dissertations, sites on the Internet and other bases were consulted in order to contribute to the proposed study and broaden the sources of knowledge about consumer behavior, attitudes and TPB, specifically.

According to Malhotra (2001), the advantages of using jointly the two methods - qualitative and quantitative – reside in the fact that the quantitative could check the representativeness and validity of the points raised in the qualitative research; explain the results obtained by quantitative research and ultimately enrich the vision of the researcher.

Using exploratory research the literature review was made, which primarily sought to make a brief explanation on the topic of consumer behavior, with its main approaches, and to search for articles about the consumer behavior of meats in Brazil, in addition to studies about food consumption and TPB (Theory of Planned Behavior), part of the theory of consumer behavior chosen to serve as the theoretical basis of the study. In this phase the qualitative method of search was used.

Then the phase of applied work began, with the finalization and implementation of the questionnaire, which was preceded by a pre-test. Since it is a questionnaire that involves a series of subjects quite distinct from each other, different analyses were made for each of

them, as descriptive statistics, factor analysis, correlation analysis, joint analysis, each one explained during the presentation of results.

3.1. System of values of the respondents

The system of values of citizens was measured using comparative, not intervalar, Likert scale type. Almost all scales were balanced with an odd number of categories of responses, with the middle point representing a neutral category.

The values were measured using the Portrait Values Questionnaire - PVQ - Schwartz (2003), in a version of 21 items from the original version of 40 items, containing two to three items by value. The issues are different for men and women. The scale measures ten basic human values: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity and safety.

- Power: The motivational goal of power values is the attainment of social status and prestige, and the control or dominance over people and resources.
- Achievement: The primary goal of this type is personal success through demonstrated competence. Competence is evaluated in terms of what is valued by the system or organization in which the individual is located.
- Hedonism: The motivational goal of this type of value is pleasure or sensuous gratification for oneself. This value type is derived from physical needs and the pleasure associated with satisfying them.
- Stimulation: The motivational goal of stimulation values is excitement, novelty, and challenge in life. This value type is derived from the need for variety and stimulation in order to maintain an optimal level of activation. Thrill seeking can be the result of strong stimulation needs.
- Self-Direction: The motivational goal of this value type is independent thought and action (for example, choosing, creating, exploring). Self-direction comes from the need for control and mastery along with the need for autonomy and independence.
- Universalism: The motivational goal of universalism is the understanding, appreciation, tolerance, and protection of the welfare for all people and for nature.
- Benevolence: The motivational goal of benevolent values is to preserve and enhance the welfare of people with whom one is in frequent personal contact. This is a concern for the welfare of others that is more narrowly defined than Universalism.
- Tradition: The motivational goal of tradition values is respect, commitment, and acceptance of the customs and ideas that one's culture or religion imposes on the individual. A traditional mode of behaviour becomes a symbol of the group's solidarity and an expression of its unique worth and, hopefully, its survival.
- Conformity: The motivational goal of this type is restraint of action, inclinations, and impulses likely to upset or harm others and violate social expectations or norms. It is derived from the requirement that individuals inhibit inclinations that might be socially disruptive in order for personal interaction and group functioning to run smoothly.
- Security: The motivational goal of this type is safety, harmony, and stability of society or relationships, and of self.

· All items were answered on a scale of six items, ranging from 1 ("exactly as I") to 6 ("has nothing to do with me").

3.2. Attitudes toward the environment and nature, the industrial production of food and technological progress

Attitudes in relation to each particular item were drawn from the literature. Relevant constructs include attitudes towards intensive and extensive pig production systems;

perceived importance of local production systems, rural employment, economic welfare and rural coexistence; attitudes with respect to animal welfare; environmental awareness; attitudes towards innovations and technologies; political attitudes, concerns over future generations; and, finally, citizens' values system.
The attitude towards the environment (protection of the environment and nature) was measured using a reduced version of 5 items of scale New Environmental Paradigm (NEP), according to Dunlap (2000); for example, "*humans are abusing much of the environment*".
The attitude to industrial production of food was measured by 5 items based on Beckmann et al (2001), as, for example, "*most foods are so processed that they lose their nutritional value*."
The attitude towards technological progress was measured by 5 items according to Hamstra (1991).
Unlike the section referring to values, items about attitudes were answered on a scale of 7 points ranging from 1 ("fully agree") to 7 ("strongly disagree"), having been included a neutral category (4 – "don't agree nor disagree").

3.3. Ethnocentrism

According to Marconi and Presotto (2005), "ethnocentrism (...) means the overvaluation of the own culture in detriment of others. All individuals are carriers of this sentiment and the trend in cultural evaluation is judging the cultures in the manner of its own "(MARCONI and PRESOTTO, 2005, p. 32).
In order to investigate about the ethnocentrism of the respondents, part of the Consumer Ethnocentric Scale (CETSCALE), by Shimp and Sharma (1987), was used, including five items with respect to the local economy and three with respect to local employment. For example: "*Brazilian consumers who buy products made in other countries are responsible for leaving fellow Brazilians without jobs*".
Shimp and Sharma (1987, p. 280) built a scale to measure the term "consumer ethnocentrism", which, according to the authors, was adapted from the original concept of ethnocentrism studied for more than 80 years, with the purpose to serve the study of marketing and consumer behavior. Thus, the CETSCALE instrument was developed to measure ethnocentric trends in consumers to acquire domestic or foreign products. Attitudes with respect to food and the environment have been measured with a scale of three items obtained in a larger study of Lindeman and Väänänen (2000), as, for example, "it is important that every food I like is usually prepared so that it does not harm the environment." Lindeman and Väänänen (2000) drew two studies to review the scale Food Choice Questionnaire (FCQ), created by Steptoe et al. in 1995. On this scale, the authors evaluate nine distinct grounds in the choice of food: health, humor, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern.

3.4. Sample

In an attempt to minimize the significant cultural differences existing in the country, the survey was implemented in four different States (Rio Grande do Sul, Paraná, Mato Grosso and Goiás), representing two different regions of the country, the South and the Midwest. In addition, as an important part of the research was to verify the consumer's vision in relation to pig production, it was important that the selected cities were in regions with a significant production of these animals. Besides, the proximity to the production increases the possibility for consumers to know some kind of production. It is assumed that the consumer of major urban centers such as Rio de Janeiro and São Paulo, the largest cities of Brazil, would be less conscious about the relationship between rural production and consumption of food. Thus, we tried to select the achievement of the interviews cities that were in areas that were at the same time important consumer centers (such as the capitals of the states) and important centers of

pig production. Both regions represent different pig production systems, since the first one is characterized by a type of production fairly traditional and familiar, with most of its population descending from European immigrants, mainly from Germany, Italy and the Netherlands. On the other hand, the Center-West region represents a new production area. Highly industrial, with larger properties, more professionalized and using more technologies, this region was responsible for an increase of 176% in the production of pigs from 1998 to 2004 (MIELE; GIROTTO, 2006). The region is still growing, as is located in the center of the Brazilian area of grain production. This makes quite a difference in terms of production costs (MIELE, 2007; SILVEIRA; TALAMINI, 2007; MIELE; GIROTTO, 2008). This region is quite different, less populous, but with rapid growth, since new cities are being created as the industry follows the expansion of agricultural production and livestock (cattle, pigs and chicken). People have migrated to other States in the Midwest region, resulting in a wide variety of cultures and habits.

Thus, quantitative descriptive data were collected through a market research conducted by professional contractors of the company TNS-Interscience in eight Brazilian cities selected in four states elected, two of them representing the traditional system of pig production (Rio Grande do Sul and Paraná) and two other new producing areas (Mato Grosso and Goiás). The criterion established for selecting the cities was that for each of the Member States would have (1) a big city, the State capital, and also (2) a small town with production level medium to high. For this reason: Curitiba and Ponta Grossa have been selected in the State of Paraná; Porto Alegre and Santa Rosa, Rio Grande do Sul State; Cuiabá and green field, in the State of Mato Grosso; Goiânia and Rio Verde, Goiás.

Participants were randomly selected by TNS-Interscience researchers in line with predetermined quotas pertaining to age and region. Differently from the European survey, the questionnaire application was made through personal interviews, because of the characteristics of the Brazilian consumer, which would be seriously restricted if made by electronic procedures. The target population was intentionally divided in 3 different groups (from 18 to 30 years old, 31-50 and more than 51 years), with specific quotas according to age and locality of residence (equally divided between the 8 cities). A total number of 482 respondents answered to the interview. Female respondents represented 50.2% of the total sample, and men, 49.8%. According to the predetermined quota, 50% of the respondents live in urban areas, and 50% in small cities with high density of pork production. Fifty percent of the respondents are married, 25% not married but living together, 10% single households, 9% divorced and 6% widowed. Table 1 presents the age, gender and city distribution of the samples in Brazil.

Table 1. Age, gender and city distribution of the samples in Brazil

	Rio Grande do Sul		Paraná		Mato Grosso		Goiás	
Profile	Porto Alegre	Santa Rosa	Curitiba	Ponta Grossa	Cuiabá	Campo Verde	Goiânia	Rio Verde
Male	30	31	30	30	30	29	30	30
Female	30	31	30	30	30	31	30	30
Total	***60***	***62***	***60***	***60***	***60***	***60***	***60***	***60***
18-30	18	19	20	20	19	20	21	20
31-50	23	24	21	21	23	20	21	20
51-65	19	19	19	19	18	20	18	20
Total	***60***	***62***	***60***	***60***	***60***	***60***	***60***	***60***
TOTAL 482								

3.5. Questionnaire content

Participants were asked to answer a personal interview based on a structured questionnaire. The Brazilian questionnaire consisted of seven sections: 1) Socio-demographic and anthropometric (self reported height and weight) characteristics of the respondent; 2) Food-related lifestyle questions; 3) Schwartz Pictorial Value Questionnaire; 4) Attitudes towards environment and nature, industrial food production and technological progress; 5) Ethnocentrism; 6) Conjoint study measuring citizen attitude towards pig production systems; 7) A questionnaire on the frequency of intake of pork-based food products including questions on the frequency of pork consumption (11 products/categories of products), the occasions or 'when' (working day, any day, weekend, special occasions), the company or 'with whom' (alone, with family, with friends, with others) and the place of actual consumption or 'where' (at home, outside of home).

The questionnaire was applied by personal (face to face) interviews, because the application of self administered electronic questionnaires could seriously restrict the sample, given the characteristics of the population. So, in order to shorten the time of the interview, the pork products were aggregated in 11 categories of products that the consumer views as one single product (SICHIERI et al, 2008).

Fieldwork was carried out from March 20th to 31st 2008. All interviews were made by TNS-Interscience researchers at the place of purchase of pork meat, basically supermarkets and local butchers. Respondents were randomly intercepted, and the time for answering the interviews ranged from 45 to 60 minutes.

4. Data analysis

Reliability was assessed using Cronbach's alpha statistic. Factor Analysis with Varimax rotation was used to analyse values and attitudes together, which had a KMO (Keiser-Meyer-Olkin) score of 0.761. The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. Pearson's Correlation Analysis was also applied to measure the strength of the association between variables. Analysis of Variance (ANOVA) and Regression analysis were performed to investigate the association between frequency of pork consumption (fresh, processed as dependant variables) and correcting for the effect of potential confounders like attitudes, values and sociodemographics (introduced as independent variables). In all cases a P-Value less than 0.05 was considered statistically significant.

5. Results

Table 2 presents the results obtained from the Brazilian sample:

Table 3. Mean and Standard Deviation of the PVQ

PVQ Dimensions	Mean	Standard Deviation	Cronbach Alpha
Self-direction	4.76	0.95	0.43
Benevolence	4.75	0.94	0.502
Hedonism	4.53	1.06	0.469
Universalism	4.40	1.00	0.615
Achievement	4.32	1.12	0.661
Tradition	4.29	1.07	0.427
Security	3.93	1.05	0.01
Conformity	3.68	1.23	0.595
Stimulation	3.58	1.25	0.43
Power	3.27	1.21	0.379

Results indicate that for the interviewees, the most important values are somehow mixed, either representing openness to change (self-direction), self-transcendence (benevolence) and pleasure (hedonism).

5.1. Attitudinal Scales

All the attitudinal scales used were drawn from literature. Attitude towards environment and nature was measured using a reduced five-item version of the New Environmental Paradigm (NEP) scale (Dunlap, 2000). Attitude towards industrial food production was measured with five items developed by Beckmann et al. (2001). Attitudes towards food and environment were measured with three items from Lindeman and Väänänen (2000). Finally, part of the Consumer Ethnocentric Scale (CETSCALE, Shimp and Sharma, 1987) was used, including five items on local economy and three items on local employment. The scales described above have been tested in many countries and found to exhibit stability and cross-cultural validity. All attitudinal items were measured on 7-point Likert-type agreement scales with end points 1 = "strongly disagree" to 7 = "strongly agree".

Table 3 Attitudinal scales' description, mean scores and reliabilities

Attitudes	Mean
Attitude towards environment and nature Cronbach alpha:	0.573
1. Humans are severely abusing the environment	6.63
2. The balance of nature is strong enough to cope with the impacts of modern industrial nations (R)*	4.84
3. The so-called "ecological crisis" facing humankind has been greatly exaggerated (R)	4.60
4. The earth is like a spaceship with very limited room and resources	5.78
5. If things continue on their present course, we will soon experience a major ecological catastrophe	-
Mean	5.46
Attitude towards industrial food production Cronbach alpha:	0.742
1. Most food manufacturers are more interested in money than in the nutritional quality of their products	2.63
2. Modern food production removes vitamins and minerals form food products	2.71
3. The food industry is very concerned about the nutritional value of their products (R)	-
4. Most foods are so processed that they have lost their nutritional value	2.51
5. The majority of food products can be eaten without risk (R)	3.88
Mean	2.93
Attitude towards food and environment Cronbach alpha:	0.810
1. It is important that the food I eat on a typical day has been prepared in an environmentally friendly way	6.55
2. It is important that the food I eat on a typical day has been produced in a way which has not shaken the balance of nature	6.57
3. It is important that the food I eat on a typical day is packaged in an environmentally friendly way	6.73
Mean	6.61
Attitude towards local employment Cronbach alpha:	0.538
1. Buying (country)-made products keeps (country) working	6.34
2. (Country) consumers who purchase products made in other countries are responsible for putting their fellow (country) out of work	5.88
3. Buying (country) produced products supports the local community's livelihood	5.71
Mean	5.97
Attitude towards local economy Cronbach alpha:	0.828
1. (Country) products first, last and foremost	5.50
2. A real (country) should always buy (country)-made products	5.37

3. We should purchase products manufactured in (country) instead of letting other countries get rich of us	5.75
4. It's always best to purchase (country) products	5.74
5. It may cost me in the long-run but I prefer to support (country) products	5.61
Mean	5.59

*(R): item was reverse-scaled

As it is possible to depict from the above results, 'Attitudes towards food and environment' are quite strong for the interviewed consumers. 'Attitude towards local employment' is also positive, as well as 'Attitude towards local economy". Scale reliability of the 'Attitude towards environment and nature' was only moderate, perhaps indicating a lack of comprehension of the scale. In spite of that, consumers were also positive about environment and nature. Interviewed consumers are in favour of industrial food production, since they disagreed with most of the statements.

5.2. Values and Attitudes

Values and attitudes were then analysed together, by means of an exploratory factor analysis to test their structure. Eight factors were obtained, although results show that not all the variables/dimensions within the original scales could be confirmed in the survey applied in Brazil. Variables that presented fitting problems were therefore excluded from the subsequent analysis.

In the scale/factor 'Ethnocentrism', for example, the variable represented by question 1 ('Buy products made in Brazil. Keep the country working') had to be removed due to its very low reliability score.

All the items of the scale/factor 'Attitudes towards food production affecting the environment' were kept. The loadings were quite satisfactory, indicating that the items were highly correlated with the factor.

When analysing and interpreting the PVQ, the original dimensions 'Conformity', 'Power' and 'Security' have been aggregated in only one factor. Based on the resulting characteristics, this new factor was named 'Moral and Hierarchical Values', representing more a traditional behaviour.

The original PVQ values 'Stimulation', 'Achievement' and 'Hedonism' were also aggregated into a new factor, named 'Adventure and Freedom values', representing a more adventurous and exciting way of life.

In the scale/factor 'Attitudes towards the environment and nature', originally composed by 5 items, only three were kept in the analysis, and the items 'The earth is like a spaceship with very limited room and resources' and 'If things continue on their present course, we will soon experience a major ecological catastrophe' were excluded of the analysis.

The values 'Universalism' and 'Benevolence' from the PVQ were aggregated in only one factor, but only one dimension of each one has been kept: 'He thinks it is important that every person in the world should be treated equally. He believes everyone should have equal opportunities in life', from the value 'Universalism', and 'It's very important to him to help the people around him. He wants to care for their well-being', from the value 'Benevolence'. So, they both are considered less important values for the sample.

In the scale/factor 'Attitudes towards technological progress', from the 5 original items, only two were kept: 'In Brazil and in the rest of Europe we are probably better off than ever, thanks to the tremendous progress in technology', and 'Throughout the ages, technological know-how has been the most important weapon in the struggle for life'.

Reliability of the factors was considered satisfactory to moderate, with Cronbach's Alpha ranging from 0.624 to 0.843.

5.3. Regression analysis between attitudes and values and the consumption of fresh and processed products

There was then a regression analysis to see if there is relationship between some groups of variables identified in the study. The assumptions of regression have been verified and the waste considered normal.

Regression analysis studies the relationship between a dependent variable named and one or more other independent calls. In this study used the same agglomerations of attitudes and values obtained in the previous section, as independent variables (predictors), and the level of schooling to control variable.

Processed products

Using the frequency of consumption of products processed as dependent variable, obtained a R2 0.078, and R adjusted 0.060, with estimated standard error 1.15172. This indicates that 7.8% of the variance of the frequency of consumption of products processed by the sample searched can be explained by the variance of the independent variables of the model (values and attitudes). Or simply that the template explains 7.8% of the variation of the frequency of consumption of pork products category processed.

This positive correlation indicates that the sample who have positive attitude towards the industrial production of food have also a positive frequency of consumption of processed products. It makes enough sense, since the products are processed very industrialized and therefore must be more consumed by people who support this type of production.

Also the moral values and hierarchical (' Line ', ' Power ' and ' security '), with standardized beta -0.180 (negative correlation) and zero level of significance. Again, note that people with more traditional values tend to avoid most processed products, as it imagines that it is not known for sure "what is included" in the product, what were the ingredients used, how it was prepared, and traditional people usually prefer to prepare the products they consume at home since the beginning, which is not possible for products processed.

Fresh products

By placing as the dependent variable is the frequency of consumption of fresh produce, we obtained a R2 of 0.044, adjusted as 0.026, with estimated error 1.20747 standard, which means that 4.4% of the frequency of consumption of processed products can be explained by the values and attitudes utilized in the analysis.

Here also realizes that consumption negatively varies in relation to attitude to industrial production, which confirms the result found above, i.e. who values the industrial production of food tends to avoid fresh products. Also who has values that include ' hedonism ' has more characteristics "adventurer", likes to have free time to his adventures and therefore avoids the products giving work to prepare, which is the case of fresh products.

6. Theoretical and scientific implications

By the results obtained, it is noticed that several of the scales used could not be validated in the Brazilian sample, or did not have all its dimensions confirmed, as the PVQ. This implies the need to seek other scales, or even create them, to enable a better understanding about the Brazilian consumers of pork.

It is also important replicate this survey to other products in order to test the scales and check if they have not been validated with the pork product specifically, or if this is a question of adjustment of scales.

Moreover, even to the validated dimensions, the statistical results showed values that are considered low, which demonstrates that, by the methodology and the scales used, those were weak predictors of the product's consumption. Thus, it would be interesting to conduct new studies that include other factors in the search, such as the cultural habits or the effect of income and changes in income of pork consumers in Brazil.

Further studies should be made also involving a larger sample, exploring different places in the country, as the major cities and large consumer centers as Rio de Janeiro and São Paulo, which will probably be another type of consumer. Also the characteristics of this consumer should be studied in order to identify the socio-demographic characteristics associated with the consumption of pork.

7. Managerial implications of the research: messages to the pork AGS

In general, the image of the pig as a fat and dirty animal, created in precarious conditions and inappropriately fed is starting to change. Small producers who had non-specialized pork production as a secondary activity, are being confronted with the emergence and strengthening of professional and industrial swine production, which began to demand a constant supply, with very well defined production patterns (MIELE, 2007). Some of the major problems of the low consumption of pork in Brazil include the low adaptation to attributes that consumers want, as a larger variety of cuts, which demonstrates the need to train retailers in order to offer these cuts, and not only the three types of large cuts commonly found in retail, which are the sirloin, the shank and the rib, all sold whole and not in pieces, in steaks or ground, which would facilitate the preparation, adding value to the product, in the consumer' view.

They also want greater convenience. However, there are very few products ready for cooking in the Brazilian market (BARCELLOS et al, 2008). Here comes one more opportunity for companies wishing to introduce new products in its portfolio to meet the increasingly demanding consumer.

The expected trend, that the less processed product is, the more it tends to be prepared or finalised at home, is also confirmed by Brazilian consumers. And the more processed, more products tend to be finalized only at home or bought ready to be consumed.

Correct information should be disclosed about the enormous changes that have occurred in recent years in all phases of pig production in Brazil, from creation to industrialization of products, and also about the benefits of the consumption of pork and the possible risks associated with different kinds of meat and derived products. Pricing strategies should be adopted and improving the convenience of fresh meat and processed products in order to improve the satisfaction of the respondents in relation to pork products.

Conclusions

The proposal of this paper was to relate the attitudes and values of consumers of pork and the consumption of the product, separating products in fresh and processed, dividing the analysis of the sample between the genders (male and female) and by age.

Some interesting results were found and are summarized below, separated by item:

- **Food Related Lifestyle**
  - The factors "**relation price/quality**", "**security**" and "**price criteria**" are the most important – consumers are conscious towards price and traditional in the way they choose what to eat.
  - "**Freshness**" and "**importance of product information**", "**social relationships**", "**taste**" and "**health**" also represent important factors.
  - In terms of confiability of the scale, the items "**organic products**", "**specialty shops**" and "**social event**" had satisfactory levels.
- **Values and attitudes** – analysed together
  - Regression analysis – attitudes and values X consumption of products divided in fresh and processed, and also by gender and age.
  - General results:

- Positive attittude towards **industrial food production** – consumption of p**rocessed products**;
- Values "**stimulation**", "**achievement**" and "**hedonism**"- **avoid fresh products**;
- Values "**conformity**", "**power**" and "**security**" – **avoid processed products**;
- **Higher scholar degree – higher consumption of processed products** .
- Test on differences between BMI and cities didn't show significant results.
- Consumption in the South region is higher than in other regions.

Limitations and Contributions

The paper achieved the goals it had set itself, even if the results found were not exactly the ones that were expected. The impossibility of validation of some of the constructs used does not invalidate the results obtained in general. The reduced size of the sample turns it impossible to generalize the results, but it can work as an indicator of consumption tendencies. It has also an important contribution being the replication of an international survey, and also for being an empirical research with the final consumer, what is not very common.

References

AAKER, David A. ***Strategic market management***. 6th ed. Berkeley (CA): John Wiley & Sons, 2001.

AJZEN, Icek. *Nature and operation of attitudes*. **Annual Review of Psychology**, v. 52, p. 27-58, 2001.

_____; FISHBEIN, Martin. ***Understanding attitudes and predicting social behavior.*** Englewood Cliffs, New Jersey: Prentice-Hall, 1980.

ANUÁRIO DA PECUÁRIA BRASILEIRA – ANUALPEC. São Paulo: Instituto FNP, 2009.

BARCELLOS, Márcia Dutra de et al. New consumer approach: understanding emotions and involvement in beef consumption. *In*: INTERNATIONAL AGRIBUSINESS MANAGEMENT ASSOCIATION CONFERENCE – IAMA. **Proceedings...** Chicago, 2005.

_____ *et al. Food innovation: Perspectives for the poultry chain in Brazil*. *In*: INTERNATIONAL CONFERENCE ON MANAGEMENT IN AGRIFOOD CHAINS AND NETWORKS, 8., 2008, Wageningen. **Proceedings…** Wageningen: Wageningen Academic Publishers, 2008.

BECKMANN, Suzanne C. *et al.* ***Danish consumers and organic foods.*** Copenhagen: Copenhagen Business School, 2001.

BROWN, Kelly McCormack. **Theory of Reasoned Action/Theory of Planned Behaviour**. University of South Florida. 1999. Disponível em: <http://hsc.usf.edu/~kmbrown/TRA_TPB.htm>. Acesso em: abr. 2010.

BRUNSO, Karen *et al. Testing relationships between values and food-related lifestyle: results from two European countries*. **Appetite**. v. 43, p. 195–205, 2004.

CEPEA/ESALQ/USP. **Pib_Cepea_1994_2009**. Disponível em: <http://www.cepea.esalq.usp.br/pib/>. Acesso em: 15 out 2010.

DONEGÁ, Ricardo Angelotti. **Atitudes em relação a sites de leilão online: um estudo exploratório com internautas brasileiros.** São Paulo, 2004. Dissertação (Mestrado em Administração) – Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo.

DUNLAP, Riley E. *et al. Measuring endorsement of the new ecological paradigm: a revised NEP scale*. **Journal of Social Issues**. n. 3, v. 56, p. 425–442, 2000.

ENGEL, James F. *et al*. ***Consumer behavior.*** 8th. ed. Forth Worth: The Dryden, 1995. 995 p.

FISHBEIN, Martin; AJZEN, Icek. ***Belief, attitude, intention and behavior****: an introduction to theory and research*. Boston: Addison-Wesley, 1975.
GREENWALD, A. G. *Why are attitudes important? In:* PRATKANIS, A. R.: BRECKLER, S. J.: GREENWALD, A. G. (Eds.). **Attitude structure and function.** Hillsdale, NJ: Erlbaum, 1989. p. 1-10.
GRUNERT, KLAUS *et al*. *Consumer perception of meat and quality implications for product development in the meat sector – a review*. **Meat Science**. v. 66, p. 259-272, 2004.
HAIR JR., Joseph F. *et al*. ***Multivariate data analysis.*** 6th ed. Upper Saddle River, NJ: Prentice-Hall, 2006. 897p.
HAMSTRA, Anneke M. ***Biotechnology in foodstuffs:*** *towards a model of consumer acceptance*. Den Haag: Swoka, 1991.
KARSAKLIAN, Elaine. **Comportamento do consumidor.** São Paulo: Atlas, 2000.
LINDEMAN, M.; VÄÄNÄNEN, M. *Measurement of ethical food choices motives*. **Appetite**. v. 4, p. 55-59, 2000.
MALHOTRA, Naresh K. **Pesquisa de marketing:** uma orientação aplicada. Porto Alegre: Bookman, 2001.
MARCONI, Marina de Andrade; PRESOTTO, Zélia Maria Neves. **Antropologia:** uma introdução. São Paulo: Atlas, 2005.
MIELE, Marcelo. Cadeia produtiva da carne suína no Brasil. *In:* INTERNATIONAL PENSA CONFERENCE, 6., 2007, Ribeirão Preto. **Proceedings**... Ribeirão Preto, Oct. 2007.
MOWEN, John; MINOR, Michael S. **Comportamento do consumidor.** São Paulo: Prentice Hall, 2003.
MYERS, David. **Psicologia social**. Rio de Janeiro: LTC, 2000.
RICHERS, Raimar. O enigmático mas indispensável consumidor: teoria e prática. **Revista de Administração.** São Paulo, v. 19, n. 3, p. 46-56, jul./ago./set. 1984.
ROCKEACH, Milton. ***Beliefs, attitudes, and values.*** San Francisco: Jossey-Bass, 1968.
_____. ***The nature of human values***. New York: Free Press, 1973.
ROSENBERG, M. J.; HOVLAND, C. I. Cognitive, affective, and behavioral components of attitudes. *In:* _____ (Eds.). **Attitude organization and change**: an analysis of consistency among attitude components. New Haven, CT: Yale University Press, 1960. p. 1-14.
SCHIFFMAN, Leon G.; KANUK, Leslie Lazar. **Comportamento do consumidor**. 6. ed. Rio de Janeiro: LTC, 2000.
SCHOLDERER, Joachim *et al*. *The relative importance of habitual and deliberative factors in food consumer behaviour*. **Appetite**. v. 47, n. 2, p. 276, Sept. 2006.
SCHWARTZ, Shalom H. *Universals in the content and structure of values: Theory and empirical tests in 20 countries*. *In:* ZANNA, M. (Ed.). **Advances in experimental social psychology**. New York: Academic Press, v. 25, p. 1-65, 1992.
_____ *et al*. ***Marketing theory:*** *evolution and evaluation*. New York: Wiley, 1988. 231 p.
SHIMP, Terence A.; SHARMA, Subhash. *Consumer ethnocentrism: construction and validation of the CETSCALE*. **Journal of Market Research.** v. 24, p. 280-289, Aug1987
SILVEIRA, Paulo Roberto Souza da; TALAMINI, Dirceu João Duarte. A cadeia produtiva de suínos no Brasil. **Revista CFMV-Conselho Federal de Medicina Veterinária**, Brasília/DF, Ano 13, v. 42, p. 11-20, 2007.
SOLOMON, Michael. **O comportamento do consumidor:** comprando, possuindo e sendo. 5. ed. Porto Alegre: Bookman, 2002. 446 p.
SOUKI, Gustavo Quiroga. Estratégias de marketing para os agentes da cadeia da carne bovina. Lavras, 2003. Tese (Doutorado em Administração) – Universidade Federal de Lavras.
STEPTOE, A. *et al. Development of the motives underlying the selection of food: the food choice questionnaire*. **Appetite**. v. 25, p. 267-284, 1995.

VERBEKE, Wim. *Consumer acceptance of functional foods: socio-demographic, cognitive and attitudinal determinants*. **Food Quality and Preference**. v. 16, p. 45-57, 2005.

BRAND AND QUALITY LABELS: WHICH INTERACTION?

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Abstract
provide products, brands and territories with added value. The increase in quality signs nevertheless leads to market congestion resulting from both the juxtaposition of these signs and the overlap created on the same product. It is not uncommon to see a product carrying a commercial brand, a quality sign and a geographical origin. Combining a brand and a quality sign is a relatively common practice, but we are beginning to notice a significant increase in the number of products carrying two or even three quality signs (brand and origin, organic and fair trade, organic and origin, fair trade and origin). Recent work has shown that, in some cases, this practice of combining signs is not synonymous with an improved product valuation.
In this paper, based on the contributions of cognitive psychology and experimental economics, we endeavour to demonstrate the role of cognitive coherence between the different labels in consumer choices. This research is based on two food products carrying: i) an organic label and a fair trade label, and ii) a brand and a geographical origin. Results show that the additional impact of the second label is very limited and less beneficial than the sum of added values of each label, and that it may lead to a negative value in the case of perceived incongruity between the two elements.

Key words: food, quality labels, categorisation, cognitive psychology, interaction effect

BRAND AND QUALITY LABELS: WHICH INTERACTION?

1.Introduction

Numerous works have illustrated the benefits of including quality signs on products. They provide products, brands and territories with added value. Certain quality signs are used as policy instruments for the development and occupation of rural areas (AOC/AOP, PGI), while others are primarily intended to inform the consumer and reduce information asymmetries (AB, Label Rouge). Some quality signs (or, more generally speaking, labels) are genuine market instruments which provide an efficient response to the increasingly urgent consumer need for information.

When purchasing food products, consumers look for information when they are choosing the products in the shop (Bettman and Park, 1980), searching for heuristics which minimise their cognitive efforts. Labels are thus very useful information summaries for the consumer, in particular in evaluating credence attributes. Agricultural and agri-food firms and distributors have therefore increased the number of labels in order to differentiate their products from those of their competitors, thereby contributing to making the market for products carrying quality signs extremely complex and difficult for the consumer to understand.

The increase of quality signs leads to market congestion resulting from both the juxtaposition of these signs and the overlap created on the same product. It is not uncommon to see a product carrying a commercial brand, a quality sign and a geographical origin. Combining a brand and a quality sign is a relatively common practice but we are beginning to notice a significant increase in the number of products carrying two or even three quality signs (brand and label, organic and fair trade, organic and origin, fair trade and origin, etc.). The works of Hassan and Monier-Dilhan (2005) demonstrate that, in certain cases, this practice of combining signs is not synonymous with an improved product valuation due to the perceived interactions between the labels present. In the field of marketing, the interaction phenomena between different product attributes have been the subject of numerous works based on the theories of cognitive psychology. The theory of information integration considers that in the quality assessment process, the consumer evaluates a product by allocating a different weight to different attributes (country of origin and brand) (Jo et al, 2003). These different assessments are then combined, either in a weighting model or in an additive model, to form an overall evaluation of the product.

Another theory, put forward by Haübl and Elrod (1999) explains the success or failure of combinations of labels using congruence theory or cognitive coherence. Research in the field of cognitive psychology suggests that, in the consumer's mind, each label matches a category pattern with different representations and associations. We might therefore examine the coherence of the mental pattern relating to the different quality signs on a particular product. Similarly the question is also raised of the prominence of one label compared to the others.

In this paper, based on the contributions of cognitive psychology and experimental economics, we endeavour to analyse the effects of interaction between labels and to demonstrate the role of cognitive coherence between the different labels in consumer choices. This research is based on two field studies in the agri-food sector, the first concerning products carrying a brand and geographical origin and the second concerning products carrying the "fair trade" and "organic agriculture" labels.

We will begin by presenting the theoretical bases and research hypotheses before explaining the methodology of the study and finally discussing the results with regard to the theoretical contributions and managerial implications.

2. Theoretical developments

2.1 The theory of cognitive coherence

In the approach by hierarchical cognitive categories, the categorisation process (allocation of an element to a category) involves comparing the new item to be classified and the characteristics of the different pre-existing memorised categories. This means identifying similarities between a pre-existing memorised category and the new item to be evaluated. Each category is thus defined by a set of attributes which are individually necessary, collectively sufficient and common to all the other members of the category (Medin and Smith, 1984; Komatsu, 1992).
The proximity between the category and the item to be evaluated is reflected by the search for similarity and coherence. Similarity may be perceptual, based on the physical attributes and distinctive characteristics of the category (Tversky, 1977; Johnson, 1984; Ratneshwar et *al.*, 2001); contextual, linked to the formation over time of a category according to a goal (nutritional, travel, etc.); or based on the situation of use (Barsalou, 1991; Johnson, 1984). Conceptual coherence (Murphy and Medin, 1985) involves finding a meaning between the new item and the mental representation of the category in the individual's mind.

2.2 Category label and evaluation process

The category label indicates the characteristics or attributes strongly associated with a cognitive category. It activates mental patterns facilitating the quick and easy interpretation of the information available on the product, thereby generating an inferred affective response associated with the category and capable of influencing product evaluation. The literature on information processing shows that there are two stages in the process of forming an attitude: the first involves categorising the item or person by automatically and spontaneously activating the pattern associated with the category. The individual will attempt to link the stimulus to a cognitive category (Fiske and Pavelchak, 1986). The second stage involves refining the first by using all the information available on the item to obtain a more refined or more personalised categorisation. This stage is longer than the first and requires more cognitive resources. These resources are influenced by the need and capacity to process the information (if it is available).
A successful categorisation process requires the activation of the category pattern while the global product evaluation will be based on the affect associated with the category. In the event of failure, i.e. that no category is considered to be pertinent, the evaluation will adopt a more analytical process relating to the different attributes of the item, which will result either in the creation of a new category or in the rejection of the item.

The main category labels identified in the marketing literature are the brand (Tauber, 1988; Aaker and Keller, 1990; Boush and Loken, 1991), the price (Monroe, 1990; Broniarczyk and Alba, 1994; Ladwein, 1995) and the origin (Peterson and Jolibert, 1995; Verlegh and Steenkamp, 1999). Other recent works have shown the role of quality signs (or quality labels) in the consumer evaluation process (Larceneux, 2003; Hassan and Monier-Dilhan, 2005; Aurier and Fort, 2007; Tagbata and Sirieix, 2008). Thus, a product indicating a brand, an origin, a price and a quality sign may be associated with different cognitive categories which will impact the selection process. Superimposing different category patterns

associated with a particular product raises the question of the prominence of one or other of these and highlights the congruence effects between the labels.

2.3 The case of "organic" and "fair trade" labels

By definition and in line with their very principles, "organic" and "fair trade" labels can be perceived as indicating environmental, social and economic benefits while protecting public health, welfare and the environment throughout the production and commercialisation process. Even if both labels comply with the values of sustainable development[117] , several works examining different criteria, in particular the rationales and values associated with their consumption, demonstrate that they are clearly different from one another.

Numerous studies show that the main reason for purchasing organic products is not always the environment but rather a whole range of heterogeneous considerations including health, taste, food safety, family health and even respect for traditions (Sirieix et al., 2006; Hughner et al., 2007; Aertens et al., 2009).

Codron et al. (2006) show that by studying the rationale of consumers buying products with an environmental dimension (organic products) or social ethic (fait trade products) and the values associated with these rationales, several differences are revealed. The authors note a certain homogeneity of values associated with the social ethics dimension while the values associated with organic or environmental products are more heterogeneous. This diversity of rationales and values associated with the consumption of organic products is also confirmed by Hughner et al. (2007) and Aertens et al. (2009) who, by summarising research work, demonstrate that health (linked to safety), a desire for good taste (hedonism), discovery (stimulation), the protection of nature and the welfare of both people and animals (universalism), support for local production and the local economy (benevolence), the influence of standards (conformity) and the desire to dominate others (power) are the main rationales at work before the consumption of organic products.

Contrary to organic products, the field of social ethics (fair trade) would appear to almost exclusively a matter of universalist values, emphasising the perceived proximity between the producer and the consumer, environmental protection and decent work conditions (Pirotte 2007)

Other studies have examined the importance of environmental or social attributes indicated by "organic" labels (Canavari et *al.*, 2003; Krystallis and Chryssohoidis, 2005) or "fair trade" labels (De Pelsmacker et al., 2005; Loureiro and Lotade, 2005), but the question of the combined influence of these two labels in the valuation a good is a recent one which deserves to be explored.

In this article, we present a study of the combined effect of both labels carried on a single product on the consumer's evaluation of the products and then propose hypothesis H1.

H1: the combined effect of the organic and fair trade labels is weaker than the sum of the effects of each individual label.

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[117] *Fair trade, supported by consumers, guarantees producers in developing countries that their goods will be bought at a "fair" price, protected from market fluctuations.*
Organic agriculture, considered to be economical, independent and non-polluting, respects natural balances, animal welfare and the environment.

2.4 Coherence between product, brand and origin

The brand and the country of origin are attributes generally used as selection heuristics aimed at simplifying the product evaluation process.

The works exploring this theme have essentially focused on the effects of delocalising production in certain countries in relation to the perceived origin of the brands. The hypothesis underlying the interaction between country and brand is that changing a brand's country of origin affects major brands more than the weaker brands (Cordell, 1992; Tse and Lee, 1993). Another approach considers that the interaction between brand and country of origin can be explained by the congruence between brand and country. This is defined as the equality between the country of origin of the product and the country of origin of the brand (Häubl and Elrod, 1999). The authors measure the level of congruence between brand and country by the strength of association between the brand and its country of origin. Congruence has a positive effect on the evaluation of product quality over and above the effects of the brand and the country of origin. For example, if a consumer has the choice between a Samsung television set (South Korean brand) produced in Korea and a television of the same brand produced in France, the hypothesis of congruence suggests that the TV set produced in Korea will be seen as being of better quality than the set produced in France.

Just as brands are spontaneously associated with a country of origin, certain products are also closely linked to their country of origin. The perceived coherence between the country and the product can be linked to the equality of the image of the product and of the country (for example cars produced in Germany) as well as to the perceived notoriety of the country in manufacturing the product (for example perfumes from France).

The first authors to examine the question of coherence between a product and a country of origin were Roth and Roméo (1992). They measured the correspondence between a product category and a country. To do this, they used the same dimensions to measure the image of the products and that of the country. The underlying hypothesis is that if the image of the country corresponds to product characteristics considered to be important, then there is a correspondence between the product and the country.

Using elements of the image of the country of origin taken from previous works (Nagashima, 1977; Johansson and Nebenzahl, 1986; Han and Terpstra, 1988), the authors adopt 4 dimensions to measure the image of the country and its importance in consumer choices: innovation, know-how, prestige and price.

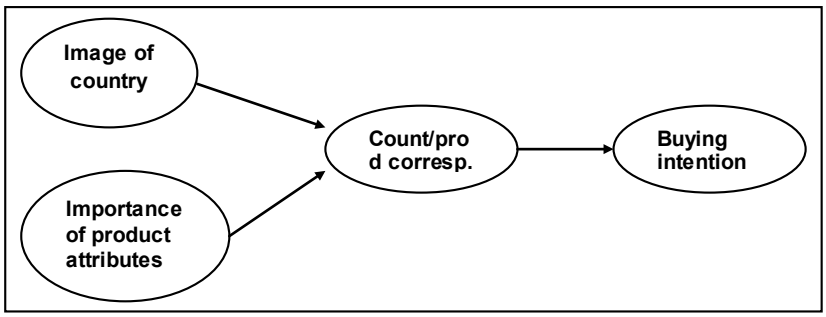
By crossing the evaluation of the country dimensions with that of the products, the authors identify 4 situations:

Table 1: Correspondence between country image and product image (Roth and Roméo, 1992)

		Dimensions of the country of origin	
		Positive	Negative
Dimensions as product characteristics	Important	Correspondence favourable	Correspondence not favourable
	Not important	Non-correspondence favourable	Non-correspondence not favourable

The 4 situations defined by the authors can be associated with different strategies for promoting products.
The advantage of this study is that we have explicitly endeavoured to measure the effect of perceived correspondence between products and countries on the evaluation of the products.

Figure 1: ***Conceptualisation of the effect of correspondence between country and product (Roth and Roméo, 1992)***



These studies show that coherence between quality signs plays an important role in the evaluation of products from the different countries. With regard to correspondence between the region of origin and food product of a specific origin (with PDO[118], PGI or simple product of origin), we can expect similar effects. The main characteristic of these products indeed lies in the strong link with their geographical origin and the fact that they are typical and unique. Each region is associated with a product (or a range of products). The reputation of each region corresponds to its perceived capacity to produce the product. This capacity may relate to the pedoclimatic conditions or to the know-how and skill of local producers (Van Ittersum et al, 2003).
We therefore formulate the hypothesis that, in the case of perceived inconsistency between the two labels, the valuation of the dual-label product is diminished.

H2: inconsistency between the place of origin and the product has a negative effect on the product valuation.

3. Methodology

Two studies were conducted to verify our hypotheses. The first, involving 120 people, called on experimental economics to measure the effect of dual quality labelling (organic and

[118] Protected Designation of Origin

fair trade) on product valuation. The second was a quasi-experimentation involving 720 people across 3 French regions intended to test the effect of coherence between product and origin on the evaluation of a branded product.

3.1 Study 1

We conducted an experiment enabling us to determine the WTP[119] for organic and fair-trade labels. The WTP concept is similar to the idea of an acceptable price. It represents the maximum threshold above which the consumer will not buy the product as he finds it too expensive for the utility he derives from it. Thus, the WTP can be seen as the maximum amount a consumer is willing to pay to purchase a good or service after having assessed both the positive and negative consequences of the purchase. Numerous experimental economics methods can be used to determine the WTP. Within the framework of our research, we opted for the Becker-DeGroot-Marschak mechanism or BDM auction as it is particularly suitable to field experiments and eliminates group effects (Combris and Ruffieux, 2005).

3.1.1 Experimentation protocol

The choice of products

Following an initial test with consumers and a detailed descriptive analysis in a sensorial analysis laboratory, 4 types of dark chocolate available on the market were used according to their appreciation level (hedonic scores):

- Two organic and fair trade products: BE1, appreciated, and BE2, not appreciated
- Two products without labels: ST1, appreciated and ST2, not appreciated.

Selecting the participants in the experimentations

The individuals were selected at random in the commune of Montpellier and its surroundings by telephone and using an advertisement left in an organic products outlet. This approach enabled us to obtain a sample of 120 people.

The procedure of the experimentations

The experimentations involved asking the participants to taste the products selected, gradually providing more information concerning the labels tested. The consumers were never told which brands of chocolate they were tasting.

In order to maintain the anonymity of the products, neutral packaging was produced and adapted to the different phases and informational needs of the consumers.

These experimentations were held in 13 sessions, each divided into 3 phases:

Phase 1: the four bars were tasted without any information being provided. The subjects gave a hedonic score and indicated their WTP for each chocolate.

Phase 2: the subjects indicated their WTP for each type of chocolate based only on the information presented on the labels.

The aim of this phase was to determine the subjects' WTP for "fair trade", "organic" and "organic fair trade" labels independent of the intrinsic characteristics of the product.

Phase 3: the 4 bars tasted in phase 1 were tasted again by the subjects who were now given all the information presented on the packaging of each chocolate. The subjects gave a hedonic score and indicated their WTP for each chocolate.

This auction phase allowed us to analyse the change in assessments between the intrinsic characteristics of the chocolates and the information provided on the "organic" and "fair trade" labels.

[119] Willingness To Pay

3.1.2 Study 2

We selected two product categories demonstrating large-scale consumption purchased regularly by the majority of consumers and generally associated with a specific French region: cheese, which can be classified as a product subject to little transformation, and cooked dishes, demonstrating a higher level of transformation.

We varied the perceived coherence between the product and the region of origin. A region perceived as a "coherent" origin for the product and a region perceived as "non-coherent" were selected for each product on the basis of a prior survey of 193 people.

In each product / coherent region pairing, we selected[120] a well-known brand within the product category.

Table 2: The final experimental protocol is as follows:

	Riches Monts * tomme cheese	William Saurin** cassoulet
Coherent region	Savoy	Toulouse
Non-coherent region	Alsace	Auvergne

**henceforth referred to as RM cheese*

*** henceforth referred to as WS dish*

4 products were thus provided for evaluation by 360 consumers for each category (tome cheese and cassoulet).

The main measures

To measure the consumer evaluations, we used a dependent variable frequently used in research works. Attitude is a synthetic measuring instrument of the affect associated with a product, a brand or an origin (Broniarczyk and Alba, 1994; Verlegh and Steenkamp, 1999; Czellar, 2003).

The scale includes 3 items: "I like…", "I appreciate…" and "I am in favour of…" on a Likert 5-degree scale. We also measured attitude towards the brand and region of origin in order to compare the evaluation of each product attribute.

4. Results and discussion

We will present the results of the two studies separately before undertaking a more general discussion of the results.

4.1 The case of "organic" and "fair trade" labels

Table 3 presents the average WTP for each chocolate during phase 1 (total absence of information) and phase 3 (full information). These data enable us to determine the influence of the "organic" and "fair trade" labels on the perceived quality and the valuation of the chocolates.

[120] *Thanks to three judges who gave their opinion on a list of 20 brands in each product category.*

Table 3: Average WTP for the four chocolates and variation between phases 1 and 3

Chocolates		Phase 1	Phase 3	Δ Phase 3 - Phase 1	t	ddl	sig
Neither organic nor fair trade	ST2	0.91	0.81	-0.10	3.082	101	0.009
	ST1	1.18	1.02	-0.16	2.660	101	0.003
Organic and fair trade	BE2	0.93	1.18	0.25	-4.776	101	0.000
	BE1	1.00	1.33	0.33	5.718	101	0.000

* *The WTP are expressed in euros*

The result of the rank equality test conducted on the average WTP during phases 1 and 3 demonstrates that the observed variation of the WTP is significant for all four chocolates. The average WTP for the chocolates which were neither organic nor fair trade (ST1 and ST2) fell significantly between phases 1 and 3 while the opposite effect was observed (significant increase) for the organic and fair trade chocolates (BE1 and BE2).

The information provided in phase 3 caused the WTP for BE2 to increase from 93 centimes to €1.18, i.e. an increase in value of 27%, while the WTP for BE1 increased from €1 to €1.33, representing an increase in value of 33% resulting from the information provided. This result highlights the impact of "organic" and "fair trade" labels in the consumers' valuation of the chocolates.

Furthermore, the average WTP when the chocolates are only organic or fair trade were respectively €1.25 and €1.31 and not statistically different, thereby showing that consumers are willing to pay just as much for organic products as for fair trade products.

By examining the differentials WTP between the standard chocolate and the chocolates carrying labels (organic, fair trade and organic fair trade) (table 4), we observe that combining the "organic" and "fair trade" labels on the same product gives rise to an additional WTP of €0.91, which is less than the sum of the additional WTP for the organic label (€0.55) and the fair trade label (€0.61), thus confirming the claims of Ruffieux (2004).

Our hypothesis H1 is therefore validated.

Table 4: Under-additivity of the organic fair trade WTP

	Organic chocolate (1.25)	Fair trade chocolate (1.31)	Organic fair trade chocolate (1.61)
WTP differential with standard chocolate (0.70)	0.55	0.61	0.91
Organic + fair trade > Organic fair trade	0.55 + 0.61 > 0.91		

This result demonstrates that, in economic terms, the increased value resulting from the combination of the two labels on a single product is lower than the sum of the increased values from the two labels individually. The test results show that at a 5% significance level, the marginal propensity to pay more for both labels together on the same product is less than the sum of the propensities to pay for each of the two elements considered separately. The combined valuation of the two labels on the same bar of chocolate represents an increase in the WTP of €2.04 whereas a separate valuation of these labels considering two individual bars of chocolate corresponds to an increase of €3.22. In other words, the addition of the second

label generates an additional value of 40 centimes, i.e. 25% of the value of a label when it is evaluated separately. These results confirm those obtained previously, i.e. that combining two labels on a single product leads to an under-additivity of the WTP.

4.2 The case of brand/region labels

Table 5 shows that the average attitude towards regions and brands is relatively high and varies between 3 and 4 on a 5-point scale. Attitudes were measured using the same scale, thereby eliminating the bias linked to the measuring instruments. The respondents demonstrated a generally positive attitude towards the products, brands and regions.

Table 5: Measurements of attitudes towards regions and brands

	Cheese		Dish	
	Average	SD	Average	SD
Attitude towards coherent region	3.65	0.97	3.33	1.04
Attitude towards non-coherent region	3.35	0.96	3.10	0.96
Attitude towards national brand	3.39	0.99	3.47	1.14

Having successively evaluated the regions and the brands, we examined the evaluations of products with different combinations of brand and region of origin.

Table 6: Evaluation of products carrying brand and origin

Attitude	RM cheese	Average test	WS dish	Average test
Coherent origin	3.44	T=27,46; ddl=355; p<0.001	3.38	T=27,46,; ddl=355; p<0.001
Non-coherent origin	2.62		2.74	

On a 5-point scale, we generally noted that a product with a coherent origin is awarded a significantly better evaluation than a product with a non-coherent origin.

In the case of the dish, we noted the same results, i.e. a significant fall for a branded product when it is associated with a region considered to be non-coherent.

Given that we measured attitude towards brands and regions individually, we then compared the evaluation of branded products with an origin in relation to evaluations of different attributes.

Table 7: Comparison of attitudes towards origin, the brand and a product carrying a brand and an origin for cheese

	RM cheese Coherent origin	RM cheese Non-coherent origin
Region attitude	**3.65**	**3.35**
Brand attitude	**3.39**	**3.39**
Product with brand and origin attitude	**3.44**	**2.62**

We can compare the attitude towards a branded product of a certain origin with the attitudes towards the region and the brand. We note that when the region associated with the product is coherent, the evaluation of the branded product of a given origin lies between that of the brand and that of the region of origin. These results echo those obtained by Johansson and Nbenzahl (1986).

In the case of a non-coherent region, the evaluation of the branded product of a certain origin demonstrates a significant fall much greater than that of the brand and of the origin. The protective effect of the brand with regard to non-coherence would appear here to be insufficient, a result which contradicts those obtained by Jo, Nakamoto and Nelson (2003).

Table 8: Comparison of attitudes towards origin, the brand and a product carrying a brand and an origin for the dish

	WS dish Coherent origin	WS dish Non-coherent origin
Region attitude	**3.33**	**3.10**
Brand attitude	**3.47**	**3.47**
PBO attitude	**3.38**	**2.74**

In the case of the dish, the attitude towards the branded product of a certain origin is greater than the attitude towards the product alone, thereby confirming the value added procured by the brand and the origin.

Once again, we observe an evaluation of the branded product of a certain origin lying between the evaluation of the brand and that of the region of origin when the region is perceived as coherent and an evaluation well below the attitudes to the brand and the region when the latter is perceived as non-coherent.

The table 9 below measures the differences in evaluation in the case of association with a coherent region and a non-coherent region.

Table 9 : Differences between the evaluations of coherent and non-coherent situations

	With logical origin	With illogical origin	Deviation	t	ddl	sig
Cheese	**3.44**	**2.62**	**-0.82**	**13.91**	**354**	**0.000**
Dish	**3.38**	**2.74**	**-0.64**	**13.20**	**360**	**0.000**

In the case of a non-coherent region, the effect of product / region congruence becomes the main factor. This result echoes the literature on the categorisation and processing of information, which is incongruent with the individual's category pattern. Thus, in an incongruent situation where no other information is available to solve the situation,

consumers will form their judgement according to the attribute, which seems to be the most prominent. In our case, there is congruence between the product and the region (Meyers-Levy and Tybout, 1989; Lee, 1995; Maoz and Tybout, 2002; Chakravarti and Janiszewski, 2003).
Furthermore, the brands concerned by the experimentation are very well-known. If the effect of the brand falls significantly when the congruence between the product and the region is weak, the brand alone is insufficient to hide the non-fit with the region of origin. This result contradicts the works of Jo et al. (2003).

5. Conclusion

The main conclusions to be drawn from the analyses provide us with a better understanding of the interaction effects between two quality labels on the same product.
The results show that this effect falls in conditions of perceived non-coherence of the product / region pairing. Thus, the theory of the power of the brand which can bear an origin perceived as incoherent is called into question (Jo et al, 2003).
When the region is non-coherent, the effect of product / region congruence is important irrespective of the brand and the product. This supports the literature on the fit effect between the product and the country of origin (Roth and Romeo, 1992) and more generally on the effect of the country of origin. Research on the effect of the country of origin generally shows that certain products receive a better evaluation when they come from a certain country without the congruence between the product and the country being explicitly measured. Our results suggest that it is not the direct effect of the country or the poor image of the country, rather the perceived coherence between the country and the product which comes into play. In the case of delocalisation of the production of goods, this means that if the country of origin appears non-coherent, this will result in a poor evaluation of the branded product with a specific origin (Haübl et Elrod, 1999), irrespective of the brand.

This work also provides information concerning the practice of organic and fair trade labelling. Our results show that the effects of interaction between the two labels are not always positive. Certain consumers buy organic products for health considerations and are not interested in fair trade. Others prefer chocolate which is only fair trade to chocolate from organic fair trade production because they do not trust the organic label. Consequently, dual labelling must not be a systematic process as most studies would suggest based on declarations. Organic and fair trade products both represent narrow markets and the intersection of the two markets can only be even more restricted. Dual labelling therefore requires greater caution and the market must not be overestimated.

In managerial terms, our research contributes to determining the role of the geographical origin of products in their valuation as well as the conditions of its use in a branding strategy. As we highlighted at the start this research, we observe a strong interest from companies in indicating the origin of their products. In this paper, we show that if the region of origin demonstrates high potential in product evaluation, it is not through its main effect but through the effects of interaction that it generates with the brand and the product. It is therefore not enough to rely on a favourable attitude towards geographical origin; it is important to ensure good congruence with the product and the brand.
With regard to organic and fair trade labelling, companies and distributors must be aware that it is preferable to separate the products into their respective fields in order to match the different consumer expectations concerning these labels.

Despite the lessons to be drawn from this study, it is important to underline its limitations. First, even if the experimentation closely reflects real selection conditions, the

conditions of the study remain experimental laboratory conditions in a different framework from that observed in a store. Furthermore, we deliberately disregarded other attributes such as the brand, price, etc. to avoid their interfering in the participants' decision-making process, although they nevertheless play an important role in reality both for organic and fair trade products.

The choice of products, the consumer samples and the labels tested all restrict the external validity of this research. Testing our hypotheses on other products and labels could help to strengthen the validity of our results.
Furthermore, in our research we only examined the immediate effects of non-congruence, although we are aware that the long-term effects on the brand image may be more significant.

6. References

Aaker D.A., & Keller, K. L. (1990). Consumer evaluation of brand extensions. *Journal of Marketing, 54*, 27-41.

Aurier Ph., Fort F., (2007), The effect of perceived congruity between origin, brand, and product on the purchase intention of a branded product of origin, Advances in Consumer Research, vol. 34, 55-63.

Aertsens J., Verbeke W., Mondelaers K. & Van Huylenbroeck G. 2009, Personal determinants of organic food consumption: a review, *British Food Journal*, 111(10), 1140-1167.

Barsalou, L.W. (1991), "Deriving categories to achieve goals," *The Psychology of Learning and Motivation*, 27, 1-64.

Bettman J. R. et Park C. W. (1980), Effects of prior knowledge and experience and phase of

Boush D. M., & Loken B. (1991). A process-tracing study of Brand Extension Evaluation. *Journal of Marketing Research,* 28 February, 16-28.

Broniarczyk S.M., & Alba J.W. (1994). The importance of the brand in brand extension. *Journal of Marketing Research,* 31(2), 214-228.

Canavari M., G. Nocella, & R. Scarpa, (2003), Stated Willingness-to-Pay for environment-friendly production of apples and peaches: Web-Based versus in-person surveys, *paper presented at the 83rd EAAE Seminar,* Chania, 4-6 september

Chakravarti, A. and C. Janiszewski (2003), "The influence of macro-level motives on consideration set composition in novel purchase situations," Journal of Consumer Research, 30 (September), 244-58.

Codron J.M, Sirieix L, Reardon T.,(2006), Social and Environmental Attributes of Food Products in an Emerging Mass Market: Challenges of Signaling and Consumer Perception, With European Illustrations, *Agriculture and Human Values* 2006, 23(3), 283-297.

Combris, C. and Ruffieux, B. (2005). "Comportement des consommateurs face aux O.G.M. dans les aliments : les enseignements de l'économie expérimentale." ISS n°4-5(janvier). *Consumer Research,* 7, 3, 234-248.

Cordell V. V. (1992), Effects of consumer preferences for foreign sourced products, *Journal of International Business Studies,* 23, (2), 251-269.

Czellar, S., (2003). Consumer attitude toward brand extensions: an integrative model and research propositions. *International Journal of Research in Marketing*, 20, 97-115.

De Pelsmacker P., L. Driesen & Rapp, G. (2005), Do consumers care about ethics? Willingness to pay for Fair-trade coffee, *Journal of Consumer Affairs*, 39: 2:363-385

Loureiro, M. & Lotade, J., (2005), Do Fair Trade and eco-labels in coffee wake up the

consumer conscience?, *Ecological Economics*, 53, 1, 129-138
Fiske, S.T. and M. Pavelchak (1986), "Category-based versus piecemal-based affective responses: developments in schema-triggered affect," in The handbook of motivation and cognition, Sorrientino & Higgins, Ed. New-York: Guilford Press.
Han, C.M. and V. Terpstra (1988), "Country of origin effect for uni-national and bi-national
Hassan, D. et Monier-Dilhan, S. (2005). National brands and store brands competition through public quality labels. Colloque PSDR Lyon, mars 2005.
Häubl, G., & Elrod, T. (1999). The impact of congruity between brand name and country of production on consumer's product quality judgments. *International Journal of Research in Marketing*, 16, 199-215.
Jo, M.S., K. Nakamoto and J.E. Nelson (2003), "The shielding effects of brand image against lower quality countries-of-origin in global manufacturing," *Journal of Business Research,* 56, 8, 637-646.
Hughner R.S., McDonagh P., Prothero, A. Shultz II C.J. & Stanton J., 2007 Who Are Organic Food Consumers? A Compilation and Review of Why People Purchase Organic Food, *Journal of Consumer Behaviour*, 6, 94-110

Johansson, J.K., and I.D. Nebenzahl (1986), "Multinational product: effect on brand value," *Journal of International Business Studies,* 17, 3, 101-126.
Johnson, M.D (1984), "Choice strategies for comparing uncomparable alternatives," Journal of Consumer Research, 11 (3), 741-53.
Komatsu, L. K. (1992). Recent views of conceptual structure. *Psychological Bulletin,* 112(3), 500-525.
Krystallis A., Chryssohoidis G., (2005), Consumers' willingness to pay for organic food: Factors that affect it and variation per organic product type, *British Food Journal*, Vol. 107, 5, 320 – 343
Ladwein, R. (1995). Gammes de produits, gammes de prix et image-prix. *Décisions Marketing,* 6, Septembre-decembre, 103-109.
Larceneux, F. (2003), Stratégies de signalisation de la qualité: l'impact des labels sur le processus de décision des consommateurs, PhD thesis, Université Paris IX- Dauphine, Paris 447p.
Lee, M. (1995), "Effects of schema congruity and involvment on product evaluations," Advances in Consumer Research, 22, 210-16.
Loureiro, M. & Lotade, J. (2005). Do Fair Trade and eco-labels in coffee wake up the consumer conscience?. *Ecological Economics*, 53(1) 129-138
Maoz, E. and A.M. Tybout (2002), "The moderating role of invovment and differentiation in the evaluation of brand extensions," *Journal Of Consumer Psychology,* 12 (2), 119-31.
Medin, D.L. & Smith, E.E. (1984). Concept and concept formation. *Annual Review of Psychology,* 35, 113-138.
Mervis, C.B., & Rosh E. (1981). Categorization of natural objects. *Annual Review of Psychology*, 89-115.
Meyers-Levy, J. and A.M. Tybout (1989), "Schema congruity as a basis for product evaluation," Journal of Consumer Research, 16 (1), 39-54.
Monroe, K.B. (1990). *Pricing: Making Profitable Decisions*. McGraw-Hill Book Company, Second Edition
Murphy, G. L. & Medin, D. L. (1985). The role of theories in conceptual coherence, *Psychological Review,* 97(2), 289-316
Nagashima, A. (1977), "A comparative "made in" product image survey among japanese businessmen," Journal of Marketing, 41, 95-100.

Peterson, R.A and A.J.P. Jolibert (1995), "A meta analysis of country of origin effects," Journal of International Business Studies, 26, 883-900.

Pirotte G., 2007. Consumption as a Solidarity-Based Commitment, The Case of Oxfam Wordshops' Customers, in Sustainable Consumption, Ecology and Fair Trade, Zaccaï E. (Ed), London Routledge

Pontier, S., & Sirieix, L. (2003). Les préoccupations éthiques des consommateurs et leur expression dans la consommation de produits biologiques. *16 th Association Française de Marketing congress*. Tunis.

Ratneshwar, S., L.W. Barsalou, C. Pechmann, and M. Moore (2001), "Goal derived categories: the role of personal and situational goals in category representations," *Journal Of Consumer Psychology*, 10, 147-57.

Roth, M.S. and J.B. Romeo (1992), "Matching product category and country image perceptions: a framework for managing country of origin effects," Journal of International Business Studies, Third quarter, 477-97.

Ruffieux B., (2004), Le nouveau citoyen-consommateur : que peut-on en attendre en termes d'efficacité économique ? *Sciences de la société*, 62, 93-117.

Schifferstein H. and P. Oude Ophuis, (1998), "Health-related determinants of organic food consumption in the Nederlands", *Food quality and Preference,* 9,3, 119-133

Tagbata, D; Sirieix, L. (2008) : Measuring consumer's Willingness to Pay for organic and fair trade products. International Journal of Consumers Studies, 714 (32), 479-490.

Tauber, E. M. (1988). "Brand leverage: strategy for growth in a cost-control world." *Journal*

the choice process on consumer decision processes: A protocol analysis, *Journal of*

Tse D. K. et Lee W. N. (1993), Removing negative country images: effects of decomposition, branding, and product experience, *Journal of International Marketing,* 1, (4), 25-48.

Tversky, A. (1977), "Features of similarity," Psychological Review, July, 327-52.

Van Ittersum, K., M.J. Candel and M.T. Meulenberg (2003), "The influence of the image of a product's region of origin on product evaluation," *Journal of Business Research*, 56, 3, 215-226.

verbal learning and verbal behavior, 8, 2, 240-248.

Verlegh, P. W. J., & Steenkamp J. B. (1999). A review and Meta analysis of country of origin research. *Journal of Economic Psychology*, 20, 521-546.

BUSINESS “STREET MARKET”: A STUDY IN THE CITY OF LAVRAS

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Abstract
The street market is one of the oldest forms of agricultural products trade. Lavras street market plays a role in supplementing the city’s supply by marketing food in retail. Moreover, it is known that it is precisely in these small markets that families commercialize production surplus. Another aspect of great importance regards these markets as a place for socialization and cultural expression. In this sense, it can be said that Lavras street markets pose as cultural heritage of a city that values the small-town old habit of "going shopping" and preserve the bonds of friendship established between the tradesmen and consumers over time. Finally, it is necessary to emphasize these markets as a field of labor. It is estimated that the Lavras free markets provide income for approximately 70 families, and, most of them living solely on funds from the activity as marketers. Due to the fact that street markets are composed of a large number of small farmers who cannot afford advertisement to attract consumers and are not able to get organized without the action of public agencies, they must be perceived as a social action of great value to the community, because in addition to the cultural heritage of a city and a different marketing channel they also offer a social and economical alternative for many small farmers and as a business, represents a powerful instrument of public policy and a major provider of labor and income for the city. In order to contribute to the improvement, evolution and development of Lavras, street market this study has the goal to survey the real situation of these markets and, from the obtained information, develop a joint action between university, city, technical assistance agencies and trade associations that will be scheduled so that measures can be taken to streamline the market, benefiting farmers and consumers in Lavras. Thus, this work represents part of a larger project to improve the Lavras street markets, and aims at identifying the reality of the business “Lavras street market”, and has as specific objectives identifying the profile of Lavras marketers, as well as the main difficulties faced by them in this line of work.

Key words: business, street market, trade, agricultural products, Lavras

BUSINESS “STREET MARKET”: A STUDY IN THE CITY OF LAVRAS

1. Introduction

The street market is one of the oldest forms of agricultural products trade. There are records of Sumerian people already using this process of commercialization in 3000 BC, making tradeoffs and bargains in a specific place the city, in a given day of the week.

The street market in Lavras, a city belonging to the Campo das Vertentes mesoregion in the state of Minas Gerais, started in 1966 as an initiative by the Secretaria da Agricultura do Município (Municipal Department of Agriculture), along with Emater (Company of Rural Technical Assistance of Minas Gerais). The Municipal Department donated 20 tents containing a counter and a canvas cover and Emater was responsible for mobilizing a group of small farmers to engage in trading activities.

At first, the small farmers traded what they produced in their properties, and what could be produced in a short period of time, such as fruits, vegetables, cereals, cheeses, sausages and pork. Later, the workers started planning and introducing vegetables, sweets and other delicacies, commonly sold at these markets.

The street market Lavras began to be held on Saturdays, near the central town square, and about a year later, it was already being held on Saturdays and Thursdays at different locations. Subsequently, the markets began to take place on Tuesdays, Thursdays and Saturdays, at strategic points over the city. The street market venues alternated widely over time (squares, streets and warehouses), to adapt to the growing number of consumers and merchants to the capacity of the locations where they were installed, which became too crowded and clogged the traffic in the city. Also because of this growth, the number of markets increased even more, as currently, there are six weekly markets: on Tuesdays at Praça Dr. Jorge (Dr. Jorge Plaza), on Wednesday at the Jardim Floresta (neighborhood), on Thursdays at Pitangui and Jardim Glória (neighborhoods), on Fridays and Saturdays at the Municipal Market.

Lavras street market plays a role in supplementing the city’s supply by marketing food in retail. Moreover, it is known that it is precisely in these small markets that families commercialize production surplus. Another aspect of great importance regards these markets as a place for socialization and cultural expression. In this sense, it can be said that Lavras street markets pose as cultural heritage of a city that values the small-town old habit of "going shopping" and preserve the bonds of friendship established between the tradesmen and consumers over time. Finally, it is necessary to emphasize these markets as a field of labor. It is estimated that the Lavras free markets provide income for approximately 70 families, and, most of them living solely on funds from the activity as marketers.

In order to contribute to the improvement, evolution and development of Lavras, street market this study has the goal to survey the real situation of these markets and, from the obtained information, develop a joint action between university, city, technical assistance agencies and trade associations that will be scheduled so that measures can be taken to streamline the market, benefiting farmers and consumers in Lavras.

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2. Theoretical Reference

A Street market is an outdoor market such as traditionally held in a market square or in a market town, and are often held only on particular days of the week. It can also be found in large enclosed spaces, instead of on a street. It is a traditional retail format, which has no physical stores and, therefore, take place in temporary stands, usually on the street and are located in strategic sites of the city, in specific days and times (COLLA et al., 2007; COÊLHO and PINHEIRO, 2009). Vedana (2004) considers the street market an important element in the social structure of the urban environment, since these constitute a specific dynamic of occupation and space. The author also states that the rise of cities is closely related to these markets, which represented "the embryo of a new overcrowding through the commercial activity" (Max Weber, 1979 apud VEDANA, 2004, p. 11).

The street market also became a channel to promotes the direct relationship between producer and consumer, so the producers can easily identify the needs and desires of their customers and thereby enhance productive and structural aspects (COLLA et al., 2007; COÊLHO and PINHEIRO, 2009).

In addition to the relationships between marketers and their customers, the relationship between marketers is also a relevant aspect. Sato (2007) states that the street market should be treated as "an ongoing organization, based on negotiations and agreements on cooperation and competition and implementation of unwritten rules" (p.99). The author adds that "the geographical proximity allows the establishment of agreements between neighboring stands. Among themselves, they build specific rules for coexistence, in general, valid only for the people who define them, making any attempt at generalization impractical. So, this way everything is agreed on, from scheduling assembly and disassembly of stands up to setting prices" (p.99).

A peculiar aspect to be added is the intrinsic novelty characteristic, which is not just an area of marketing, but also an environment conductive for meetings, conversations, articulations and fun. Ribeiro et al. (2005), according to observations made at Minas Novas' street markets, reported that many men go to the market for leisure, "to eat pie, see friends and chat" (p.7). For these authors, "markets are more than marketing sites for yielding family farming", it is also a public space for the "circulation" of food, goods, people and culture (p. 6).

From the urban population increase due to the phenomenon known as rural exodus, the street market began loosing ground to permanent retail formats such as malls and supermarkets, which grew and began to diversify its role as services provider (COÊLHO and PINHEIRO, 2009). Godoy and Anjos (2007), state that, with the internationalization of capital and market liberalization that occurred in the late 60's, the Brazilian government began to support the creation of self-service stores, in order to "exercise control over current prices of food trade, hitherto based in department stores, emporiums, grocery stores and markets, responsible for the majority of retail sales"(p.364). According to Jesus (1991), in 1989, approximately 78.2% of the food sold in retail in Brazil was made by supermarkets.

Still, the street market resists in small regions, where it is one of the main forms of marketing. Generally, "the smaller the municipality is, the biggest impact of the fairs is" (Ribeiro et al., 2005, p.6). For Vedana (2004), the daily routine of "going shoping" contains several symbolic elements that may explain the frequency of consumers at the fair, as the relationship of trust between the marketer and the consumer, the social relations that are established between them and even the idea of "purity", as it is "possible of touch it, pick it, try it with all the 'senses'" (p. 11). In addition, the author also mentions that this direct contact between the consumer and food to be purchased, as well as jokes between merchants and tradesmen with their customers, "shows a distinctive character of these purchases in the market over the supermarket or another establishment of trade"(p. 48). At the street market,

“the customers exchange recipes and touch the products that are laying over the stand – nothing like the plastic bags used by supermarkets” (Vedana, 2004, p. 48).

For Ribeiro et al. (2005), the street market allows farmers to ensure the marketing of their yields, which would otherwise be difficult, and that consumers benefit from the guarantee of regular supply, quality and, especially adapted to their eating habits. Moreover, local commerce gains, as these marketers acquire goods with income from their sales, which favors the permanence of money on the municipal level.

In this sense, it is important to consider the street market, above all, a business, and as such, should be subject to management principles so marketers, as entrepreneurs, ensure their survival in the market.

For Ricotto (2002) the participation of small farmers in decision making related to production, marketing, organization and funding contributes to the democratization of the rural society. The author also mentions that the integration between the rural communities and urban families, as well as the communication process that develops between them, creates better quality of life, both for farmers and families that live in the city. Ricotto synthesizes the importance of street markets stating that “ultimately, [the street markets] create a new development environment, dynamic and multidimensional, which exceeds the agricultural development and revalues the role of the family farmer in society” (p. 114).

Godoy and Anjos (2007) point out that the exchange of knowledge and experience between rural and urban and especially among the rural workers themselves, makes the street market a unique trade channel. Another important aspect presented by the authors, concerns the feeling of unity in this environment, where relations between marketers and between marketers and their customers has a high degree of trust. Based on observations made throughout his survey of ecological fairs, the authors declare: “It is common to see marketers dealing with consumers over the neighbor stand, selling the products of their colleague, making the change and putting the money in the drawer of this colleague” (p.366), which reveals another advantage of this type of marketing channel.

Such differences are commonly perceived by consumers in the street market, who usually appreciate this kind of closer relationship between buyer and seller. The latter, through direct communication, can better meet the needs and desires of his client, as shown by Ribeiro et al. (2005, p.6) "consumers say that no establishment of professional grocer or emporium replaces the marketer and this is because they find the products that are part of their eating habits." In this sense, the market is characterized as a distribution channel for unique products because these foods are still produced through methods that are almost a "craft", unlike the large scale production made by large landowners, which supply the other marketing channels. Thus, the possibility of finding natural products at more affordable prices represents an attraction, which "offer high quality food with no pesticides, no chemical additives and produced based on knowledge gathered throughout time, allows urban dwellers to have an alternative to improve their food" (Ricotto, 2002, p.7). In this context, production and marketing of organic food is highlighted and, increasingly, these kinds of products are growing in consumer preference.

The unrestrained quest for ever higher productivity rates, boosted in the 70's, accelerated the mechanization of agricultural practices and has an emerging market for food produced through intensive and uncontrolled use of artificial inputs such as pesticides and fertilizer (SCHULTZ et al., 2001). However, this model of mass production is already showing its unsustainability, both for its economic and social effects, as well as by environmental effects (RICOTTO, 2002).

In this scenario, there are compensatory solutions to the degradation already established, among them a conversion of conventional agriculture to an organic model, which proposes a "sustainability of the site in which it is included" (ASSIS, 2006, p. 77).

Thus, it became evident the increasing worldwide expansion of the market for organic products. For Brandenburg (2004, p. 273) it is "exactly the market that helps to reorganize the production system and beckons with the prospect of more space for organic products." Campanhola and Valarini (2001) suggest five reasons for the increase in demand for these products, which are the concern of consumers with their health and the risk of food containing chemicals; the organization of environmental groups, represented by NGOs, in order to establish certification and creation of sites for the farmers market organic food by themselves; the influence of religious cults in defense of human spiritual balance by eating healthy foods, so their production is performed in harmony with nature; actions against modern agriculture conducted by organized groups; and finally, the use of marketing tools used by large networks to induce demand for organic products in specific consumer segments.

Camargo Filho et al. (2004), in their studies found that the Brazilian organic producers were represented, in 90% of the cases, by small family farmers associations and groups linked to social movements and that they were responsible for 70% of Brazilian organic production. Large corporate producers linked to private companies, represent the other 10% of Brazilian organic producers. Research shows that in Brazil, there are 611 places where organic food is sold, in which 36.66% is organic food associations and markets (which is more than the percentage of supermarkets - which is 33.22%). The other stores 30.12% represent specialized shops and home delivery. In addition, the data obtained revealed a concentration of retail outlets for these products in the southeast (50%) and south (44%), which together account for 94% of all outlets for organic products in the country (Sebrae-RJ, 2004 apud MAPA / SPA / IICA, 2007).

Some obstacles still hinder the consolidation of this type of product in the market. A study by Ipardes (2007, p.110) points out "the lack of continuous technical assistance, difficult granting of funds to finance production and trade, logistics, transportation of goods, lack of advertisement and few site for sales" as the great difficulties encountered by organic farmers. Abramovay (2001) adds that the lack of a technical team responsible for development plans in rural areas makes the agricultural structure fragile.

Thus, organic products become more expensive than the products from conventional agriculture, and therefore less competitive. All this because, according to studies, the organic yield is up to 50% lower compared to conventional, also as the techniques are more manual and not so mechanical, it requires labor and this further increase the price of the product.

Still, there are consumers willing to pay more for healthier food that is not aggressive to health. According to the MAPA / SPA / IICA (2007, p.84), "the public of organic markets and specialized stores, both in terms of education and income, are part of a more intellectual and wealthier group. Thus, this public is more likely to pay a different price for the benefits from consuming organic products".

Therefore it is necessary to bring together producers and consumers through the broadcasting of information on how production and processing of organic products, in addition to offering guarantees regarding compliance with existing standards for these products, so that the consumer knows differentials and benefits of organic products and producers and marketers know who they are, how many, where and what are the consumer preferences and how much they are willing to pay for this type of product (MAPA / SPA / IICA, 2007).

This emerging market represents an opportunity for survival and even expansion of marketing through the marketplace. It is up to the marketers to take advantage of this niche, as well as all its differentials noted above, to ensure their own permanence in this highly competitive market structure. Support measures and incentives to these small producers are also necessary, because street markets rarely receive the attention of support programs (governmental or not) for rural development (RIBEIRO et al., 2005).

Campanhola and Valarini (2001, pgs.94-95) propose in their work actions that contribute for small farmers to exploiting new opportunities. Thus, for the authors, it would be up to the public sector and its institutions the establishment of mechanisms to facilitate the granting of credit and investments; the support, through the research institutions and the development of technical assistance and rural extension; the acquirement and / or adaptation of knowledge needed for organic farming; the design of a policy to encourage and support organic production; fostering the creation of trade sites for organic foods that serve only small farmers; and ultimately support through financial incentives the establishment of small agro-industries that gather small farmers to process their organic products. Also according to the authors, it would be the responsibility of small producers to create tools for local organization; implementation and / or strengthening of associations and cooperatives; the expansion of direct trade of organic products, targeting consumers and local retail outlets; the creation of "brands" and strengthening the credibility, looking for customer loyalty. Finally, the authors add that the effectiveness of the actions mentioned above, could be aided by institutions like the Sebrae (Brazilian Service to Support Micro and Small Enterprises), the Senar (National School of Rural Training) and Senac (National School of Commerce), which would collaborate in funding and training farmers and in "marketing" studies to identify the most prosperous activities and design strategies for advertising and selling products.

In fact, only with concrete actions in favor of those who have few resources available for production the street market will be consolidated. In this sense, it becomes critical to understand the street market as a social action, which provides economic and social benefits to small farmers, and as a business, it generate employment and income for the city.

In this context, in which each one has a share of responsibility, the academic participation by conducting scientific researches, can help to clarify the obscure aspects and bring to light the important role played by street markets in social and economic balance of cities and in maintaining their cultural identity.

3. Methodology

The study was developed through the conduction of a research that made use of qualitative and quantitative methods for defining the business "street market" as well as for determining the main difficulties faced by these people in this profession. According to Strauss and Corbin (1990) qualitative and quantitative methods can be used simultaneously in a research project. For Patton (1990), if on one hand quantitative research has the advantage of allowing the measurement, through a limited set of matters, of the responses from a relatively large group of people, which facilitates the understanding and usage of statistical data, qualitative research, on the other hand, has the capability to originate more detailed and richer information about a smaller group of people and cases.

Thus, to collect data mixed questionnaires were used, i.e. containing semi-structured and structured questions. In addition, the revealed non-participant observation was chosen, a research technique in which the researcher attends the group where individuals to be observed are part of, without, however, pretending to be one of them (Stacey, 1977) and making it clear to the observed subjects that they are being watched. The authors of this study chose to use both methods of research as a means of reducing the limitations inherent in each.

To evaluate the data a qualitative analysis of the observations collected during the research with previous theoretical basis was conducted and a statistical analysis of the data from the questionnaires, with the help of SPSS version 17.0 (Statistical Package for the Social Sciences) was carried out. The techniques of frequency analysis were used, which is the number of cases by category, i.e., the number of times they occur; crosstabs analysis, which allows the crossing categorical data between two or more variables; and simple correlation

analysis, a technique used "to determine possible relationships between variables" which are covered in the questionnaire (Alencar, 2000).

The development of this work began with the a literature review on the subject to be studied that allowed a more theoretical basis for setting up of the questionnaire and evaluating the collected data. According Sampieri et al (2006), “the literature review consists in identifying, obtaining and consulting the bibliography and other materials that are useful to the objectives of the study, from where the relevant and necessary information about the research should extract and compiled”.

Subsequently, mixed questionnaires with 72 questions were applied, which also contained a space intended for commentaries. The first section of the questionnaire regarded socio-demographic characteristics. In the second section, there were specific questions about the number of street markets held each week, motivation and time acting in the profession of. In the third section, the questions were about the variables that influence work, as health problems, marketing channels and promoting and supporting institutions.

The criterion used to select subjects was the presence of the marketer on the day of the interview and willingness to answer questions, thus being characterizing as a non-probability convenience sample, which consists of an informal selection procedure, which chooses individuals randomly, so they do not have the same probability of being interviewed, as the researcher's decision is what defines the representation of the population (SAMPIERI et al, 2006). 34 questionnaires were applied, 22 of them on Fridays, at the Municipal Market, and 12 on Tuesdays at Praça Dr. Jorge.

4. Results and Discussions

To obtain the results of the research on the business “Lavras street market”, the opinion of all marketers in the city was sought. However, factors such as the absence of certain workers on the research day and the refuse to answer a few questions, made it impossible to apply the questionnaires to the entire population. Thus, from the 72 marketers registered in the Secretaria Municipal de Agricultura e Abastecimento de Lavras (Municipal Bureau of Agriculture and Supply), 34 were questioned, 22 of them at the market held on Friday, at the Municipal Market, and 12 at the market on Tuesday located at Praça Dr. Jorge.

In order to emphasize the matters of greatest importance and to obtain a reliable parameter, this study focused only on results equal to or greater than 50% to define the business “Lavras street market”.

The results of the socio-demographic profile analysis of the marketers show that males are dominant in this activity, accounting for 60.6% of total interviewed. Most workers (60.6%) were born in Lavras, and 57.6% lives in the city. Ages ranged from 20 to 40 years, which corresponds to 60.6% of responses. Regarding marital status, 60.6% of the merchants said they were married or in a relationship. The number of children ranged between 0 and 2 children, representing 78.8% of respondents, where 57.6% of marketers declared they did not have dependent children or only one dependent child. 72.8% of the workers reported having at least one family member working at the market. The vast majority, 90.9%, are not studying at the moment and 69.7% claim they have never attended courses related to their profession. However, none of the respondents showed real interest in participating in lectures, seminars and courses on subjects of their interest. The major reason for such opinion was the lack of time to study and / or take courses. The monthly income (coming from the market) varies between R$510.00 and R$1,530.00; 93.9% of them do not have a formal contract.

When asked about the business “street market”, 57.5% of respondents reported working as a marketer for a period between 2 and 10 years, 51.5% were involved in one or two street markets per week (most are part of the two largest markets in the city, held at the

Municipal Market on Saturdays and at Praça Dr. Jorge on Tuesdays)ç 54.5% did not perform another type of activity.

Motivational aspects were also part of the business analysis, for example, what are the reasons for the subject to choose the profession. Continuity in the family business and the opportunity to have additional income as they already own land were the reasons for 54.6% of merchants to choose this activity. 69.7% of all respondents said they are completelly satisfied or satisfied with the profession, 90.9% evaluate the relationship with the other marketers excellent or good. When questioned about what they like the most in the profession, 66.7% mentioned the public relations, friendships made and "chatting" that take place in their daily lives in the market.

The last section of questions aimed at understanding the opinion of participants about the variables that directly influence the work environment and where they stand regarding such factors. Regarding the greater difficulties of the profession, the variables "getting up early" and "bad weather" were mentioned by most merchants, totaling 51.5% of responses. The vast majority, 63.6%, does not practice physical activities and the most common leisure activities are watching television and listening to music. Of all respondents, 69.7% say they do not have any health problem. Regarding the structure of the stand, 66.8% say they are totally satisfied, very satisfied or satisfied; 63.6% are completely or very satisfied with the location; 54.6% were satisfied or completely satisfied with the cleanliness; 63.6% are fully satisfied, very satisfied or satisfied with security. The marketers have also shown some resistance to use the supermarket as a complementary marketing channel. Of all respondents, 63.6% have never used this channel; however, 57.6% say they have no desire to make use of, or any other means, arguing that the price paid is not compensatory, and that they do not have regular production to supply the supermarkets as often as requested by these networks (supermarkets). When asked about the reasons why customers prefer the street market instead of other channels, 81.8% of respondents highlighted the quality of products, emphasizing the organic origin of products sold there. An interesting matter is that 66.7% of respondents believe their customers are fully satisfied with the provided service; the relation of friendship and trust is identified as competitive differentiators. Another unique feature to be highlighted concerns how prices are set in these places, which is done without any guidance for 78.8% of respondents. In theory, the vast majority (75.7%) claims to follow the movements of the market and competition. In practice, a “survey” for current prices is conduced in supermarkets and other local shops and so the price is set lower than that observed; if some other marketer sets his price even lower, the price is adjusted to the same value. Thus, there is a standardization of prices, which is considered a more "competitive" trading (although the prices are below the cost). Regarding the production, 66.7% of farmers own the land and 89.9% declare they produce what they sell. However, this aspect can be subject to inquiries, as there are complaints by many merchants who accuse professional colleagues to commercialize products from the Ceasa (Supply Center) in Belo Horizonte. They consider themselves wronged by competing with non-organic products purchased at prices well below the cost of small-scale production. Also, they consider dishonest the marketers who deceive customers into believing they are buying products of organic origin. Despite sharp differences between marketers who are also producers and those who do not produce, from the 34 questionnaires, only one respondent admitted to commercialize products from Ceasa; all others reported that they crop what they sell. Regarding guidance on property management, 78.8% of workers said they did not receive any; 54.5% of the respondents say they use conventional techniques (non-organic) for farming. Regarding the expected yield for the 2011 crop, 54.5% expect to maintain the same yield as before. The reasons are the constant demand and low expectations for this growth. Of all respondents, 63.6% say they have at least heard of EMATER. However, only 36.4% have used the services of this agency or the services of

another subsidiary agency. The vast majority does not know anything about nor can explain their purpose, duties and responsibilities. As for lines of credit, 54.5% claim to know some agency that provides this service, although only 18.2% of respondents have made use of it. 66.7% say they have no desire to take loans. The reason is usually related to uncertainties regarding the contraction of debts and interest payments.

After processing the frequency distributions of all variables, the most significant correlation analysis (95% and 99% between variables) will be presented at this stage of the article in order to identify the issues of greatest influence on Lavras marketers' profile.

From the correlations at 5% significance, it was observed that the higher the age, the greater the difficulties faced by respondents to act in this profession. This conclusion appears to be quite plausible if it is considered that this activity requires constant physical work.

It was also observed that more education was related to fewer children and higher monthly income obtained from market. It was also found that the greater the number of dependent children, the greater the number of days the marketers worked in each week. A curious observation concerns the negative correlation between the number of dependent children and perception of work as stressful. This means that the higher the number of dependent children, the lower the perception of work as stressful.

Another significant observation concerns the positive correlation between length of acting as a marketer and feeling of anxiety to end the day. Thus, the longer acting as marketer, the more the worker feels pressured to end his shift.

The correlations more significant than 1% show a direct correlation between the number of families working together and the feeling of pressure to end the shift. Thus, a bigger number of family members at the market means a greater desire for the shift to end soon.

Another relevant observation concerns the positive correlation between the variables "perception of work as stressful" and "willingness to use other means of marketing." Thus, the higher the perception of the marketer of his work as stressful, the more comfortable he feels about resorting to other means to distribute his of its products.

After conducting a correlation analysis between all variables, the most relevant correlation between variables will be presented in this next step of the article, in order to provide a thorough analysis for this study.

From the first correlation conducted, it was found that while only 25% of male respondents have no other source of income outside the market, 53.85% of women have the market as the sole source of income. Half of the male respondents had used the supermarket as an alternative marketing channel, while only 7.69% of women did the same. So when asked about the willingness to use other marketing channels such as supermarkets, 53.85% of women answered affirmatively, compared to only 35% of men, which shows the dissatisfaction of the merchants who have tried to use this channel as mentioned earlier, due to the low price paid for the goods and the lack of regular supply for this type of marketing structure.

Regarding satisfaction with the marketer profession, 84.21% of the male merchants say they are completely satisfied or satisfied with it and 60% did not consider their work stressful. As for the female respondents, 46.15% say they are partially or totally dissatisfied and satisfied and only 46.15% did not consider the job stressful. Half of the male respondents pointed to the variable "getting up early" as the biggest difficulty of the work as a marketer, and this was mentioned only by 23.08% of women, which revealed several factors, such as access to the market, inconvenient customers, conciliation of homework, work as merchants and child care, loading and unloading food products and cropping.

Finally, analyzing the questionnaires on what could be changed or improved in structuring the street markets and to improve the quality of work environment, it was found

that almost all the marketers who work at the Municipal Market see the need of creating another entrance to the market, which should be located "in the back". The reason pointed out to justify this need was a better distribution of customers flow (which, according to the marketers themselves, buy the products from the stands located in the "front" of the market, which harms business in the “back”. Another factor mentioned by workers is the lack of security, since in case of emergency, the existence of only one entry will be not enough for the number of people present on site and once again, it would be a damaging factor to workers located in the "back" of the market.

The marketers who work at Praça Dr. Jorge complain about the lack of toilets in the premises, which creates a great discomfort to all workers, since they are forced to ask to use the bathroom in a gas station nearby. So, chemical toilets were demanded for the days that the market is held so that the worker will not have to depend on the structure of others.

A common point of interest highlighted by the marketers is regarding the need to have an effective control over the goods sold at these markets in order to inhibit the entry of products from the Ceasa. This fact, as mentioned above, creates a situation where producers see injustice as the can not compete on prices with non-producers. In addition, the sale of food produced through conventional agriculture as organic products also disturbs these merchants, as they consider it “cheating” the consumers.

5. Conclusion

Due to the fact that street markets are composed of a large number of small farmers who can not afford advertisement to attract consumers and are not able to get organized without the action of public agencies, they must be perceived as a social action of great value to the community, because in addition to the cultural heritage of a city and a different marketing channel they also offer a social and economical alternative for many small farmers and as a business, represents a powerful instrument of public policy and a major provider of labor and income for the city.

Thus, this study sought to identify the reality of the business “Lavras street market”, by profiling the marketers and evaluating their proposals and suggestions. From the conducted analysis, it was possible to determine that, although these workers are quite satisfied with the profession and the work environment, they still face structural problems in their daily lives that could be sorted out with the adoption of some changes.

The first change concerns the opening of another entrance to Municipal Market, to better distribute the flow of customers and ensure greater security for all people who go to this place. Another measure to be taken is the effective control of the goods sold to inhibit the entry of products from the Ceasa, as many marketers feel wronged and many customers are lured by merchants who sell products purchased at Ceasa as if they were grown on their properties through organic agriculture. There was also a lack of toilets in the premises of the street market held at Praça Dr. Jorge, which is a great discomfort to workers, given that in their absence, these people are forced to ask to use the bathroom in a gas station nearby.

An aspect that was observed during this survey was the distance and disunity of the people in this sector, which cause problems and difficulties to worsen and make small complications that are easy to solve become large disturbances. There is no organization on behalf of marketers, or even formal rules and guidelines, which make difficult the mediation of conflicts and meet common interests. Thus, this research will continue through an extension project, which complies with the social role of researchers, seeking, along with the relevant departments of the city, to improve and come up with solutions required by local marketers and whole community, as necessary.

6.References

ABRAMOVAY, Ricardo. *Conselhos além dos limites*. Estudos Avançados, São Paulo, vol. 15, n°. 43, 2001.

ALENCAR, E. *Introdução à metodologia de pesquisa social*. Lavras: UFLA, 2000. 105p.

ASSIS, R. L. de. Desenvolvimento rural sustentável no Brasil: perspectivas a partir da integração de ações públicas e privadas com base na agroecologia. *Economia Aplicada*. Ribeirão Preto, vol.. 10, n°. 1, 2006.

BRANDENBURG, A. Sócio-ambientalismo e novos atores na agricultura. In. **CALZAVARA,O.; Lima, R.de O.** (Orgs.). *Brasil rural contemporâneo*: estratégias para um desenvolvimento rural de inclusão. Londrina: Eduel, 2004. p. 253-277.

COÊLHO, J.D.; Pinheiro, J.C.V. Grau de organização entre os feirantes e problemas por eles enfrentados nas feiras livres de Cascavel e de Ocara, no Ceará. In: *Congresso de Economia e Sociologia Rural – Sober*, 47, 2009, Porto Alegre: Anais. Porto Alegre: SOBER, 2009.

CAMPANHOLA, C.; VALARINI, P J. A agricultura orgânica e seu potencial para o pequeno agricultor. *Cadernos de Ciência e Tecnologia*. Brasília/DF. v. 18, n.03, p. 69-101, 2001.

CAMAGO FILHO, W.P. de.; Camargo, F.P.de.; Camargo, A.M.M.P. de.; Alves, H.S. Algumas considerações sobre a construção da cadeia de produtos orgânicos. *Informações Econômicas*, SP, v.34, n.2, fev. 2004.

COLLA, C.; Staduto, J.A.R.S.; Júnior, W.F.da R.; Rinaldi, R.N. A Escolha da feira livre como canal de distribuição para produtos da Agricultura Familiar de Cascavel - PR. In: *Congresso de Economia e Sociologia Rural – Sober,* 45, 2007, Londrina: Anais. Londrina: SOBER, 2007.

GODOY, I.W.; ANJOS. S.F. A importância das feiras livres ecológicas: Um espaço de trocas e saberes da economia local. *Rev. Bras. Agroecologia*, v.2, n.1, fev. 2007.

HERNÁNDEZ S.R.; FERNÁNDEZ C.C.; BAPTISTA, L.P. *Metodologia de pesquisa*. 3. ed. São Paulo: Mc Graw Hill, 2006.

IPARDES - Instituto Paranaense de Desenvolvimento Econômico e Social. *O mercado de orgânicos no Paraná*: Caracterização e Tendências. Curitiba: IPARDES, 2007.

JESUS, G.M. de. *O lugar da feira livre na grande cidade capitalista*: conflito, mudança e persistência. Rio de Janeiro: 1964 –1988. Instituto de Geociências, Universidade Federal do Rio de Janeiro. (Dissertação Mestrado). 1991.

MAPA/SPA/IICA. *Cadeia produtiva de produtos orgânicos*. Ministério da Agricultura, Pecuária e Abastecimento, Secretaria de Política Agrícola, Instituto Interamericano de Cooperação para a Agricultura; coordenadores Antônio Márcio Buainain e Mário Otávio Batalha. – Brasília: IICA: MAPA/SPA/IICA, 2007.

PATTON, M.Q. *Qualitative data analysis*. Londres: sage, 1994.

RIBEIRO, E.M.; Castro, B.S. de; Silvestre, L.H.; Calixto, J.S.; Araújo, D.P.; Galizoni, F.M.; Ayres, E.B. Programa de apoio às feiras e à agricultura familiar no Jequitinhonha mineiro. *Agriculturas*, v. 2, n. 2, jun. 2005.

RICOTTO, A.J. *Uma rede de produção e comercialização alternativa para a agricultura familiar:* o caso das feiras livres de Misiones, Argentina. Porto Alegre: UFRGS. (Dissertação de Mestrado). 2002.

SATO, L. Processos cotidianos de organização do trabalho na feira livre. *Psicologia e Sociedade*, 19 (edição especial 1), 95-102, 2007.

SCHULTZ, G.; Nascimento, L. F. M; Pedrozo, E.A. *As cadeias produtivas de alimentos orgânicos dos municípios de Porto Alegre/RS frente á evolução das demandas do mercado:* lógica de produção e/ou distribuição. Porto Alegre: UFRGS. (Dissertação de Mestrado). 2001.

STRAUSS, A.; CORBIN, J. *Basic of qualitative research*: grounded theory procedures and techniques. Londres: Sage. 1990.

VEDANA, V. "*Fazer a feira*": estudo etnográfico das "artes de fazer" de feirantes e fregueses da Feira Livre da Epatur no contexto da paisagem urbana de Porto Alegre/RS. Dissertação (Mestrado em Antropologia Social), Instituto de Filosofia e Ciências Humanas, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2004.

ANALYSIS OF COOPERATIVE MARKETING ACTIONS IN BRAZILIAN AGRIBUSINESS: A CASE STUDY IN THE BRAZILIAN TRADE AND INVESTMENT PROMOTION AGENCY (APEX – BRASIL)

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Abstract
Company cooperation has gained more importance in the current business scene due to the difficulties companies have faced to achieve their goals individually. Thus, cooperative marketing has become a management tool that fits in this context. The main objective of this research is to analyze cooperative marketing actions in Brazilian agribusiness developed by the Brazilian Trade and Investment Promotion Agency (Apex – Brasil). The research methodology has involved an exploratory-descriptive, qualitative "case study", based on both primary data (semi-structured interview with an assistant to Apex-Brasil Assistance Unit) and secondary data (concept research and documental research – data obtained from reports, statistics, web sites, and organization institutional material). The results are the following: a) Apex-Brasil develops 20 Sector Projects (PSIs) – management tools that mobilize Association Networks and cooperative marketing actions, comprehending 748 companies in the agribusiness segment; b) the objectives of PSIs are focused on increasing volumes and/or export markets, fostering and consolidating the products image; c) the main target markets are: USA, Germany, China, UK, Canada, Japan, Russia, France, Chile, Spain, and Mexico; d) the most used cooperative marketing actions are: Purchaser Project, Image Project, fairs and technical missions. In conclusion, this study has found evidence of the relevance of Apex-Brasil work in the Brazilian agribusiness segment.

Key Words: Cooperation networks, Co-marketing alliances, Alliance network, Internationalization, Business relationship.

ANALYSIS OF COOPERATIVE MARKETING ACTIONS IN BRAZILIAN AGRIBUSINESS: A CASE STUDY IN THE BRAZILIAN TRADE AND INVESTMENT PROMOTION AGENCY (APEX – BRASIL)

1. Introduction

The agribusiness segment, both in Brazil and in the world, comprehends diversified activities of the primary sector and processing until the products become available for consumers. Therefore, analyzing agribusiness from the systemic perspective allows for the identification of the complexity of those activities. From a systemic perspective, it is necessary to study actors' competitiveness, the inter-organizational relationships, the communication system and the coordination and governance between the links of the production networks.

For Lourenço and Lima (2010), the Brazilian agribusiness scenery is positive. According to Unctad[121] indices, Brazil will be the largest agricultural country in the world 10 years from now. In 2006, exports increased 19.29 percent as compared to 2005 in terms of balance; the increase in 2007 was around US$ 58.4 billion, i.e. 10.8 percent higher than in 2006, when it was US$ 52.04 billion. The country is the world leader in sugar, coffee, orange juice and soybean exports. Brazil has also attained leadership in beef and chicken production, after outweighing traditional competitors, such as the United States and Australia.

From the 1980's, with higher competition and increased effects of globalization, the need for cooperation among companies has become more important in business due to the difficulties the companies have found to achieve their goals by themselves (Balestrin & Verschoore, 2008). In this context, cooperative marketing actions may be an important tool for organizations to attain their goals. There are several approaches of cooperative marketing and they range from companies networks to strategic alliances between companies. It has been noticed that organizations collaborate with others aiming at a greater goal, one that is common to all of them.

Starting from these premises, the general objective of this research is to analyze cooperative marketing actions in Brazilian agribusiness developed by the Brazilian Trade and Investment Promotion Agency (Apex-Brasil). The specific objectives are the following:

a) To identify the action of Apex-Brasil in Brazilian agribusiness;

b) To characterize the process of development of Integrated Sector Projects (PSIs) in the agribusiness sector;

c) To discuss PSIs and cooperative marketing actions in agribusiness taken by Apex-Brasil.

This article has been structured as following: firstly, a literature review of concepts such as marketing, cooperation and cooperative marketing is carried out; the second section presents the research methodology; next, the case study is characterized, followed by the presentation of the results and a discussion; finally, the conclusions are presented.

[121] United Nations Conference on Trade and Development.

2. Literature Review

Marketing

Presently, competitiveness in the business world requires that organizations meet their customers' demands and even that they go beyond their expectations. In this context, marketing has emerged as an activity involved in the identification and satisfaction of individual and collective human needs. According to the American Marketing Association (AMA), marketing is the area of the organization that is in charge of activities involving creation, communication and delivery of value. It is also responsible for managing the relationship with customers, in order to satisfy both the target public and the organization (Kotler & Keller, 2006).

Marketing orientation has developed from 1950, when there was a transition from a philosophy centered on production, which had prevailed until then in business, to a philosophy focused on the customer. In order to follow this entrepreneurial philosophy, marketing actions apply tools focused on the target market, the so-called 4 P's of the marketing mix: Product, Price, Promotion and Place. The Product tool must search for the solution for the customer, considering the following variables: product variety, quality, design, features, brand name, packaging, sizes, services, warranties and return policies. The Price tool should consider the cost for the customer, defining list price, discount policy, allowances, payment period and credit terms. The Promotion tool should establish communication with the customers to attain results by using sales promotion, fairs and venues, advertisement, sales force management, public relations and direct marketing. Finally, the Place tool (or POS – point of sale) must take into account the customer convenience, analyzing the sales channels, market coverage, assortment, locations, inventory and transport (McCarthy, Lauterborn, apud Kotler & Keller, 2006).

The change from the old 'make-and-sell', or production-oriented philosophy, to the new 'feel-and-respond', or marketing-oriented philosophy, has caused a reconfiguration in business management. As part of this organizational change, in order to meet the customer wants and attain the companies' goals, the marketing area has taken over essential tasks, such as: developing strategies and the marketing plan; identifying market opportunities; establishing connection with customers; developing strong brands and offers to the market; delivering and communicating value to customers; and setting the company's growth in the long run. Each one of these tasks of modern marketing is described in detail below.

The development of Strategies as well as of the Marketing Plan is based on the identification of long-term opportunities for the company (SWOT Analysis – strengths, weaknesses, opportunities, threats). Firstly, the company develops its business strategy and, afterwards, sets up its marketing plan. The company's business strategy can be seen in several ways – as a long-term plan, a standard of action along a time period, a position to be reached, and even as a future perspective (Mintzberg, Ahlstrand & Lampel, 2000). The formal Strategic Plan generates a set of significant benefits for the companies, since it guarantees that at least the policies of the functional departments are directed towards a set of objectives (Porter, 1986). From these strategic goals, the marketing area establishes its plan of actions. To identify market opportunities, the company has to create a marketing information system in order to monitor the external environment. One of the ways most used by companies to meet this purpose is marketing research (or market research), because of the information acquired about consumer wants and behavior, as well as about the market size and its potential.

Connection with customers is established through the study of target markets, selection of market segments that must be satisfied, and creation of long-term relationship with customers. To develop strong brands, it is necessary to identify the brand's strengths and

weaknesses, to define a strategy for brand positioning and monitor the competitors' reactions. The development of offers to the market is based on the product tool. It comprehends product quality, design, resources, packaging, services (leasing, delivery, maintenance and training) and definition of price strategy.

In order to deliver value to the customer, channel activities are developed. The company makes the product available for the target market by managing wholesalers, logistics, retailers and distribution channels. To communicate value to the customer, the company must design communication activities aimed at the target market. The purpose of these activities is to inform, persuade and remind the customers (either directly or indirectly) of the brands marketed. Mass communication activities include advertisement, sales promotions, venues and public relations. Aiming at establishing long-term growth, the company must adopt a long-term perspective in relation to its products and brands, analyzing how its profits can be increased. In this way, the company sets up the development, testing and launch of new products, and analyzes opportunities and global threats.

In a context of strong, globalized competition, Kotler (2005) says that traditional marketing departments should adapt themselves to future market needs and, in order to do that, they must develop additional technical capacities. These technical capacities would be the brand construction, data management and mining, better relationship with customers, establishment of customer profitability, public relations and word-of-mouth, venue management, experiential marketing and direct mail improvement.

Cooperation

Entrepreneurs in general set up their businesses and or extend their activities when they identify a market opportunity. However, some entrepreneurs have difficulties to meet the customers' demand by using their own financial and operational resources. To compensate their internal inefficiencies and achieve the desired results, they establish business partnerships with other companies (Friman, Gärling, Millet, Mattsson & Johnston, 2002).

Business-to-business relationships are described as a network paradigm; Morgan & Hunt (1994) explain that such relationships concern activities directed towards the creation, development and maintenance of successful business processes.

According to the concepts above, one can say that cooperation among companies and organizations is established as a response of individual agents that attempt to attain their own goals. Thus, companies collaborate with each other in search of results that they would not be able to attain individually. Cooperation networks can be conceptualized as a group of independent companies that, together in a single structure and working collectively, form a new organization, which is as important as the companies involved (Balestrin & Verschoore, 2008). To have a better understanding of the context of inter-organizational relationship, the following factors are presented: the typology of Cooperation Networks (Balestrin & Verschoore, 2008, adapted from Marcon & Moinet, 2000), the configurations of Cooperation Networks, as developed by Balestrin & Verschoore (2008), and the Network Management instruments.

The Cooperation Networks can be classified as follows:

- Asymmetric networks: hierarchy dimension – networks with a clear hierarchical structure. The relations are similar to those established between a company headquarters and its branches, in which branches have little juridical and managerial autonomy, e.g. large integrated distribution networks, food distribution and banks.

- Symmetric networks: horizontality dimension, cooperation. They are cross-company cooperation networks constituted of companies that keep their individual

independence, but choose to coordinate certain specific activities conjointly, considering the following goals: create new markets, share costs and risks in research and development of new products, manage information and technology, define quality brands, defend interests, and carry out marketing activities, among others.

- Formal networks: contractual dimension. These networks are formalized by means of contracts establishing conduct rules among participants. Networks such as strategic alliances, export consortia, joint ventures and franchising are examples of strongly formalized networks.

- Informal networks: connivance dimension. They are networks that allow for informal meetings of economic actors (companies, professional organizations, institutions, universities, associations, etc.) that have similar concerns. In this dimension, the networks are formed with no kind of formal contract; they act according to cooperation interests.

In terms of configuration, Cooperation Networks can be organized as follows (Balestrin & Verschoore, 2008):

- Supply Networks: group of companies whose focus is on the essential competences of the leader company; the supplier network is responsible for parallel and complementary activities, for instance, GM Complex in Gravataí (RS, Brazil).

- Consortia: it is the union of organizations aiming at scaling revenues, but participants' individuality and autonomy are preserved. They are formalized through a specific contract with an equally specific objective; their duration period is related to the attainment of their formal objectives.

- Associative networks: They usually derive from increased structural difficulties of companies interested in their organization, based on the assumption that common opportunities or difficulties may be either achieved or eliminated, respectively, with the implementation of cooperative actions.

The instruments of Cooperation Network Management do not operate individually and need to be aligned to complement each other: contractual instruments (constitutional contract, internal rules, ethic code); strategic instruments (strategic planning, action plan, strategic implementation teams); decision-making instruments (management boards, assembly, network board of directors); and integration instruments (spaces for knowledge socialization and internalization, spaces for knowledge systematization and externalization, and integration of the network into its environment).

Cooperative Marketing

The present response of companies to the market challenges can be given by cooperative marketing, which is a set of marketing actions taken by a group of companies in association to seek for mutual benefits. In this section, some approaches of this management model are presented: Co-marketing Alliances, Strategic Alliances and Marketing Networks.

In Co-marketing Alliances, companies aggressively attempt to establish alliances with partners that have well-known brands that provide a strong, original, favorable association. A

co-marketing alliance is the creation of conjoint brand by means of technical cooperation of two or more brands, with equal status and independence. Co-marketing is different from both the conventional practice of brand extension and the traditional alliances. Several researchers and studies have pointed out that the co-marketing alliances may generate a synergic effect between brands, being able to enlarge and build users' knowledge about the benefits derived from those complementarities (Ahn, Kim *et al*, 2009).

The Strategic Alliances with emphasis on the market, like the conjoint development of products and co-branding, have increasingly spread in the current business scenery. The strategic alliances, as manifestations of inter-organizational cooperation strategies, imply sharing competences and resources in order to attain one or more goals related to the strategic objectives of company cooperation. The strategic alliance can be structured in two basic ways: as an organization that is distinct from the companies in which the alliance partners have a share of the capital; or as a distinct inter-organizational entity so that the partners of the organization contribute resources and competences, but without sharing capital in this relationship (Farrelly & Quester, 2005).

In Marketing Networks, the word 'net' can be used in several ways, depending on the context, even in trade (neural networks, franchising networks, industrial networks, retail networks, and so on). Here, it specifically refers to work relationships created and maintained by a company or organization which is usually defined as the 'network' company (Neves, 2007).

Studies by Kandemir, Yaprak *et al* (2006) have provided evidence that company alliances positively affect their performance by strengthening relationships and managing conflicts between partners. However, researches carried out by Yi, Lee & Dubinsky (2010) have pointed that, as these alliances are interdependent, if goals or interests of both partners are different, conflict may emerge among the alliance members. Recent work by Ton (2008), a researcher at Universidad de Wageningen, has emphasized the need for special attention to institutional arrangements at the interface between the vertical and horizontal coordination in food chains, mainly at the interface related to the strategies of producers' organizations towards intermediates, to achieve the quality required in modern markets and the effective use of technologies.

3. Methodology

The research is based on an exploratory-descriptive, qualitative case study, which attempts to analyze a given reality. The chosen analysis unit is the Brazilian Trade and Investment Promotion Agency (Apex-Brasil, Agência Brasileira de Promoção de Exportações e Investimentos) and the cooperative marketing actions performed by the Apex-Brasil – CNI[122] – FIERGS[123] Agreement Unity. The aim is to understand the process of development of the Integrated Sector Projects (PSIs) and the cooperative marketing actions taken by the entity. Secondary data were supported by literature review and documental research. The investigation procedures were the following:

a) Concept review – from ISI web of Knowledge, Scopus databases, Capes journals and specialized literature – marketing theories, cooperation, co-marketing and network marketing (which have been used as theoretical basis);

b) Documental research – which comprehends institutional statistics, reports, sites and documents – data on the evolution of Brazilian exports and marketing actions taken by

[122] CNI – National Confederation of Industry – Brazil.
[123] FIERGS – Federation of Industries of Rio Grande do Sul – Brazil.

Apex-Brazil in agribusiness (for preparation of demonstrative charts of cooperative marketing actions and analysis of those actions).

The case study, as an empirical observation, fits in the work method and allows for the research of the contemporary phenomenon in its actual context (Yin, 2005). According to Gil (2002), case studies provide flexibility to the research development, besides deepening and detailing the objectives.

CASE STUDY: APEX-BRASIL – RESULTS AND DISCUSSION

Results

Brazilian Trade and Investment Promotion Agency (Apex – Brasil)

The Brazilian Trade and Investment Promotion Agency (Apex-Brasil) is a Brazilian government agency that was constituted in 2003. It is linked to the Ministry of Development, Industry and Foreign Trade (MDIC). It was created with the purpose of fostering exports of Brazilian products and services, fomenting the internationalization of Brazilian companies and attracting direct foreign investments to Brazil.

The headquarters of Apex-Brasil are in Brasilia. There are 10 assistance units in state capitals to serve companies in Brazil and eight international business centers in capitals of countries in Central and North America, Europe, Asia and Middle East to serve companies that are at the internationalization stage. The agency supports companies of all sizes at their different internationalization stages, comprehending non-exporter, beginner, intermediate, experienced and internationalized companies.

The indices of the organization in 2009 were the following: 842 venues sponsored; 10,363 companies supported; 16.82 percent of participation in exports; 74 business sectors supported; 79 Integrated Sector Projects (PSIs); 357 actions for investment attraction; and 57 market studies performed.

The activities developed by Apex-Brasil involve a wide range of services to foment exports and the internationalization of Brazilian companies, including: technical market studies (country profile, group of products, opportunities by market, competitiveness and environment, etc.); technical qualification and assistance; trade promotion (Integrated Sector Projects – PSIs, multi-sector fairs, trade missions); Positioning and Image Projects; and support to internationalization (guidance and studies, support to local installation, business development, logistics and distribution).

The activity developed by Apex-Brasil that is the object of study in this article is the Integrated Sector Project (PSI). Its purpose is to provide the companies participating in the project with direct contact with international purchasers, aiming at increasing the companies' exports and or conquering new markets. The agency currently supports 79 sector projects, and 20 of them are related to food, beverages and agribusiness sectors.

The Integrated Sector Projects (PSIs) in agribusiness include 748 companies of the following industries: food and beverages; pets; cookies; coffee; special coffees; sugarcane; beef; chicken; pork; chocolate, cocoa and peanuts; Hereford and Bradford cattle raising; zebu raising; mate tea; vegetal fibers; fruit; honey; organic products; citric juices and wines. For the creation and development of PSIs, the companies look for support of the associations to which they belong in order to negotiate with Apex-Brasil. The associations of export and import industries of the above-mentioned segments represent Brazilian agribusiness (see Chart 1). In the next section, PSIs are described in detail.

Integrated Sector Project (PSI)

The Integrated Sector Project (PSI) is the main tool of Apex-Brasil that is presently used for trade promotion of Brazilian companies to export their products. According to information given by the Assistance Unit of Apex-Brasil in Porto Alegre, the Export Consortium was the tool for trade promotion until 2003. Although this tool presented positive

results, the program was discontinued due to the following reasons: the assistance was regionalized, which caused the financial resources to be regionally divided; lack of a unified action standard for companies; there was no maximum number of markets to be reached; block sales were obligatory. On their turn, PSIs present the following advantages: all the projects have a strategic sector planning; standardization of the industry action; a maximum of eight markets to be reached, concentrating the trade and market actions; sales are individualized by company, making the negotiations more flexible.

PSIs are projects based on agreements made between Apex-Brasil and the company associations, and each partner contributes 50 percent to the project value. The process of development of PSI begins when either a company association or a company leader of a certain industry contacts Apex-Brasil in Brasilia (see Figure 1). After the conclusion of the negotiations (involving political and institutional issues), the agreement that establishes the PSI is signed by the interested parts, and the PSI Management Committee is formed. The agreement usually lasts two years, and it may be renewed.

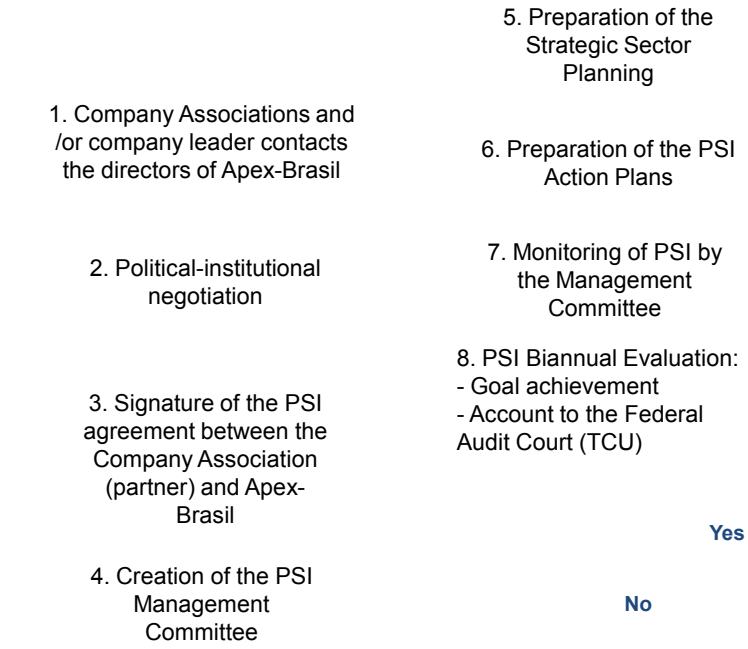

Figure 1. Flowchart of the Process of Development of PSIs (stages 1 to 4 – planning activities; stages 5 to 8 – execution and control activities)
Source: prepared by the author from data provided by Apex-Brasil

All PSIs have a Management Committee whose purpose is to design the Strategic Sector Planning, follow and control the execution of the Planning and the implementation of the action plans established in the projects. The committees are composed of a representative of Apex-Brasil; a representative of the entity; representatives of companies of the industry; a representative of Sebrae; a representative of the Federation of Industries of Rio Grande do Sul and a representative of the Ministry of Development (MDIC). The follow-up meetings of the Committees can be either monthly or quarterly, according to the peculiarities of each industry. The plans of action of PSIs are developed from the preparation of the Strategic Sector Planning.

The partner entidade empresarial of PSI is in charge of hiring the teams required for the project development and it manages its operation. At the end of the two-year period, Apex-Brasil assesses the PSI, considering the criteria of goals achievement and accounting to

the Federal Audit Bureau (TCU) Based on this assessment, the project may be either approved (and renewed for two more years) or cancelled. According to information provided by the Assistance Unity of Apex-Brasil, all of the projects have been renewed to date.

Also according to the Unit of Apex-Brasil in Porto Aelgre, the main programs and action plans developed in PSIs include the participation in multi-sector fairs, the Purchaser Project, the Seller Project and the Image Project. The Purchaser Project brings large importers to Brazil to participate in fairs in the country, know the companies facilities and promote business rounds; according to information provided by the Assistance Unit in Porto Alegre, this is the modality that generates most of the results. The Seller Project organizes business trips with the objective of visiting potential clients and negotiating sales contracts. The Image Project brings journalists and opinion makers from abroad to know the Brazilian companies and products, with the purpose of generating reports in specialized magazines and important newspapers.

As it was mentioned before, there are 20 agribusiness PSIs. They have been organized in this paper in four charts, based on the logic of the Strategic Planning: Charts 1 and 2 present the general objectives of the projects; the action plans are shown in Chart 3; and Chart 4 presents the results evaluation.

Charts 1 and 2 present the general characterization of PSIs, showing the project name, the partner entity, period, number of companies participating in and benefitting from the project and the general objective. For chronological purposes and to facilitate visualization, Chart 1 presents projects created between 2007 and 2009; Chart 2 presents projects carried out in 2010.

Chart 1 – Integrated Sector Projects (PSIs) developed by Apex-Brasil between 2007 and 2009

Project	Partner Entity	Period	No.	General Objective
BRAZILIAN PORK	**ABIPECS** Brazilian Industry Association of Pork Meat Production and Exports	Jul/07 Jun/10	21	Enlarge purchasing markets of Brazilian pork by presenting the "Brazilian Pork" brand, so that the country can surpass the fourth position as a world exporter of this product.
CLEAN AND RENEWABLE ENERGY	**UNICA** Brazilian Sugarcane Industry Association	Dec/07 May/10	105	Sponsor the image of Brazilian ethanol as a clean, renewable source of energy.
BRAZILIAN BEEF	**ABIEC** Brazilian Beef Export Industries Association	Set/08 Fev/10	21	Consolidate the "Brazilian Beef" brand in the international scenery and Brazilian *in natura* beef as healthy, high quality and safe meat. Increase Brazilian beef exports and consolidate the country as the largest beef exporter in the world.
BRAZILIAN BISCUIT	**ANIB** National Association of the Biscuit Industry	Nov/08 Jul/10	16	Increase significantly the volume and sales of the biscuit industry through the development of integrated actions of trade promotion in Brazil and abroad, thus enabling the enlargement of the exporting basis.
SWEET BRAZIL	**ABICAB** Brazilian Cocoa, Chocolate, Peanut and Candies Manufacturers Association	Nov/08 Nov/10	38	Extend the exportation borders to unknown markets (Southeast Asia and Oceania) or even through markets that have been little explored by the target public (Middle East, Eastern Europe, and Western Asia). As a result, an increase is expected both in the value of exportations to the target markets and in the number of jobs offered by the companies. The main objective is to attain increased participation in less known markets.
BRAZILIAN CATTLE	**ABCZ** Brazilian Zebu	Jan/09 Jun/10	11	Sponsor and present the Brazilian zebu genetics and products related to cattle raising in order to increase their exportation.

	Breeders Association			
SUGAR-ALCOHOL INDUSTRY	**APLA** Local Alcohol Producers Association	Apr/09 Apr/10	50	Effective increase in sales of equipments, products and services offered by the companies, generating jobs and, consequently, improvements in terms of life quality of the population, and also creating new markets to the country, projecting it as a world reference.
ORGANICS BRAZIL	**IPD** Development Promotion Institute	Apr/09 Apr/10	65	Promote the exportation of Brazilian organic products and position Brazilian brands in the main world markets. Develop and stimulate the addition of value to exported products and entrance in new markets and industry segments.
BRAZILIAN COFFEES	**ABIC** Brazilian Association of the Coffee Industry	May/09 Jun/10	25	Enable the evolution of industrialized coffee agribusiness from a historical commodity exporter profile to an exporter of better value products (roasted coffee, roasted and ground coffee, and instant coffee), enlarging the offer of higher quality products, bringing benefits to the production chain.
BRAZILIAN HEREFORD & BRADFORD	**ABHB** Brazilian Association of Hereford & Bradford	May/09 Jul/10	23	Promote the exportation of genetics of Hereford and Bradford races and products alike. The objective is to minimize or even eliminate barriers to the access to target markets, consolidating an image as both a producer and an exporter of quality genetics and beef.
BRAZILIAN COFFEES – SPECIAL GRAINS	**BSCA** Special Coffee Association	Jul/09 Jun/10	23	Improve the image of Brazilian Coffees all over the world and add valor to the Brazilian product. The objective is to add relevance to Brazilian raw coffee, by showing that Brazil has products that are as good as the best ones in the world.
MATE TEA FROM BRAZIL	**ABIMATE** Brazilian Association of Mate Herb Exporters	Jul/09 Jul/10	18	Promote and present the competitive insertion of the companies involved in the mate tea production chain into the world market, increasing their exportation capacity together with an increase in the added value of the products.
BRAZILIAN FIBERS	**SINDI FIBRAS** Industrial Union of Vegetal Fibers	Jul/09 Jun/10	25	Promote the competitive insertion of micro-, small- and middle-sized Brazilian companies working in the area of natural fibers into the world market, increasing their exportation capacity and diversifying their markets.
BRAZILIAN FRUIT	**IBRAF** Brazilian Fruit Institute	Ago/09 Jun/10	149	Promote Brazilian fruits and their main derived products in the world market by spreading information about the quality, diversity and nutritional value of those fruits, as well as showing the credibility of Brazilian fruit producers.

Source: prepared by the author from data provided by Apex-Brasil.

Chart 2 – Integrated Sector Projects (PSIs) developed by Apex-Brasil in 2010

Project	Partner Entity	Period	No.	General Objective
BRAZILIAN CHICKEN	**ABEF** Brazilian Chicken Producers and Exporters Association	Jan/10 Dec/10	31	Present the quality of Brazilian chicken by strengthening the "Brazilian Chicken" brand among international importers and consumers and associating it to attributes of good quality, good price and safety. Increase Brazilian exportations of chicken, consolidating the country as the world's largest exporter of this product.
PET & HORSE PRODUCTS BRAZIL	**ANFALPET** National Association of Pet Food Producers	Jan/10 Dec/13	36	Increase Brazilian exportations of pet products as well as the representativeness of those products in the world market.
ORANGE JUICE	**CITRUS BR** National Association of Citrus Juice Exporters	Apr/10a Mar/12	4	Increase the exported volume of concentrated and non-concentrated juice produced by the associated companies by means of a program of institutional communication to the main consumer markets.
ETHNIC BRAZIL	**ABBA** Brazilian Food & Beverage Exporters and Importers Association	May/10 May/12	24	Promote and present typical and traditional Brazilian products (food and beverages), by mobilizing and capacitating companies for exportation, preparation of presentation materials and participation in trade events.

WINES FROM BRAZIL	**IBRAVIN** Brazilian Wine Institute	May/10 Mar/12	39	Increase companies' exportations of fine wines and sparkling wines, with high added-value products, and consolidate Brazil's image as a producer of fine wines and quality sparkling wines.
HONEY FROM BRAZIL	**ABEMEL** Brazilian Association of Honey Exporters	Dec/10 Nov/12	24	Promote the competitive insertion of Brazilian honey and associated products, thus contributing to the internationalization of Brazilian companies.

Source: prepared by the author from data provided by Apex-Brasil.

Chart 3 shows an overview of plans of actions developed by the companies participating in PSIs. It shows the project, the target markets reached and the marketing actions developed in the projects.

Chart 3 – PSIs – Synthesis of the Action Plans developed in the projects

Project	Target Markets	Actions
BRAZILIAN PORK	Japan, Russia, Mexico and South Korea	Design of presentation material, business meetings in Brazil and abroad, Marketing Plan, international fairs and POS.
CLEAN AND RENEWABLE ENERGY	Germany, China, Japan, France, Spain, USA, India, Sweden, United Kingdom, Belgium and South Korea	Actions of sensitization to enhance exportable offers, commercial intelligence and image promotion.
BRAZILIAN BEEF	Saudi Arabia, Belgium, Chile, China, USA, Indonesia, Russia and Venezuela	Design of presentation material, Image Project, workshops, PR consulting, international fairs and project management.
BRAZILIAN BISCUIT	South Africa, Angola, Cuba, Arab Emirates, USA, Paraguay, Portugal and Venezuela	Market research; trade promotion (international fairs, purchaser projects); PSI web site (www.brazilianbiscuit.com.br).
SWEET BRAZIL	Angola, USA, Argentina, Ghana, Australia, Canada, Guatemala, Mexico, Russia and Dominican Republic	International fairs, Image Project, Purchaser Project, Seller Project, market prospection.
BRAZILIAN CATTLE	Egypt, Panamá, Equator, Costa Rica, South Africa and Nicaragua	International fairs, Buyer/Image Project, market prospection/ commercial intelligence.
SUGAR-ALCOHOL INDUSTRY	Colombia, Peru, Costa Rica, Venezuela, Dominican Republic and Mexico	Marketing Plan, specialized consulting, foreign missions, Image Project, Purchaser Project, and Project Coordination.
ORGANICS BRAZIL	Germany, Japan, Canada, France, USA and United Kingdom	POS actions, Purchaser Project, Image Project, international fairs, Marketing Plan and Project Management.
BRAZILIAN COFFEES	Saudi Arabia, Canada, Chile, USA, France, Japan, Portugal and Uruguay	Advertisement, Publicity and Public Relations, technical mission, Seller Project, international fairs, institutional actions, POS, Purchaser Project, sector sensitization actions, technical studies.
BRAZILIAN HEREFORD & BRADFORD	Argentina, Canada, Venezuela, Chile, Paraguay and Uruguay	International institutional fairs, promotion actions, Image and Purchaser Project, technical missions, mobilization and preparation of companies for exportation.
BRAZILIAN COFFEES – SPECIAL GRAINS	Germany, China, Japan, Italy, Canada, United Kingdom, Belgium, USA	Cup of excellence – Image Project and Virtual Purchaser.
MATE TEA FROM BRAZIL	Germany, France, Poland, Russia, Arab Emirates, Syria and USA	Exploratory trade mission, Purchaser Project, communication and technical habilitation.
BRAZILIAN FIBERS	Germany, France, Poland, Ukraine, Italy, Spain, Sweden and United Kingdom	Trade and technological mission, international fairs, Purchaser Project, communication and commercial intelligence.
BRAZILIAN FRUIT	Germany, England, USA, Russia, China, Angola, Portugal, Spain, Hong Kong, Canada, Arab Emirates, Saudi Arabia and Chile	Presentation materials, promotions of general and specific interests abroad (fairs, degustation, etc.) and Purchaser/Image Project.
BRAZILIAN CHICKEN	South Africa, Germany, Angola, China, Arab Emirates, India, Indonesia, Japan, Mexico and Nigeria	Fairs, Image Project and workshops.
PET & HORSE PRODUCTS BRAZIL	China, Japan, Russia, Italy, Spain, South Korea and USA	International fair, market study, habilitation through partnerships, *branding*, prospective mission and e trade mission.

ORANGE JUICE	USA, Japan, Russia, Poland, Spain, Italy, United Kingdom, France, Germany and Australia	Image actions and conjoint actions with juice purchasers.
ETHNIC BRAZIL	USA, Canada, Mexico and China	Product development and certification, market intelligence, international fairs, POS projects, technical and trade missions.
WINES FROM BRAZIL	USA, Canada, United Kingdom, Germany, Sweden, Poland, Holland and Hong Kong	Presentation material, mobilization and preparation of companies and products for exportation, international fairs, degustation and promotion activities in points of sales abroad, Purchaser/Image Projects.
HONEY FROM BRAZIL	Germany, Japan, France, Holland and United Kingdom	International fair, Image Project, Purchaser Project, preparation of companies, point-of-sales promotion.

Source: prepared by the author from data provided by Apex-Brasil.

Chart 4 presents a general overview of the results of each Project performed by the PSI Management Committee at the end of the period.

Chart 4– PSIs – Synthesis of Goals x Results Obtained through the Projects

Project	Goals	Evaluation of Results
BRAZILIAN PORK	- Increase export revenue from US$ Mil 665,250 to US$ Mil 750,000 in the target markets, until Jun/2009; increase the export volume from 267,689 tons to 326,689 tons until 2009.	- The project already exports to a large number of countries, but has found difficulties to open new markets due to technical (sanitary) barriers. Export value: (2008) US$6.4 Bi, (2009) US$4.2 Bi, (2010) US$ 970 Mi (until Mar/2010).
CLEAN AND RENEWABLE ENERGY	- Obtain a better positioning of Brazilian ethanol in strategic markets through the generation of favorable news in the world media e trade promotion actions; collaborate with the construction of a potential environment for the generation of business.	- Larger import market coverage of Brazilian ethanol in the USA and Europe; better knowledge of the benefits of the use of ethanol as a fuel.
BRAZILIAN BEEF	- Surpass the indices practiced in 2007, whose closure was US$ 4.4 billion, and increase the volume of exportations of Brazilian beef; perform the maintenance of 17 companies.	- ABIEC has developed three projects to promote beef exports with APEX-Brasil (2002/2003; 2004/2005 and 2006/2008); since 2004, Brazil is the world's largest beef exporter; the actions of the current project are directed towards the technical and sanitary areas, aiming at opening new import markets.
BRAZILIAN BISCUIT	- Increase exports of the companies in 15% until December 2009, as compared to the value exported in 2007; have 13 companies until the end of the project; create 50 work positions.	- Sixteen companies already participating; website on since May/2009; good participation in the main fairs, focusing on the markets defined.
SWEET BRAZIL	- Reach a 10% increase in export value until the end of PSI; enlarge the number of companies from 21 to 28.	- Thirty-six companies participating (above the goal); improved articulation between the companies and development of the Strategic Plan.
BRAZILIAN CATTLE	- Export value: (2009) US$ 105 Mi (2010) US$110.0 Mi; Number of Export companies: 2009=12; 2010 = 14.	- It is the third Project with the entity that has had excellent trade results, particularly with increased exportations and the extension of the line of products exported; number of companies is still limited.
SUGAR-ALCOHOL INDUSTRY	5% increase in the volume exported to Central and South America in two years	- Interaction with the production pole of Ribeirao Preto and Sertaozinho; participation of a larger number of companies in the project; integrated solutions due to the companies' characteristics in terms of productive arrangement.
ORGANICS BRAZIL	- Reach US$ 35 Mi (2011). Have 100 companies in 2011, and 50 of them should be exporters.	- Increased volume of exportation and diversification of products.
BRAZILIAN COFFEES	- Number of export companies: (2009) 20 and (2010) 25; FOB exports value: (2009) US$ 32.2 Mi; (2010) US$ 40.6 Mi.	- Exportation of industrialized coffees (roasted and ground coffee) has increased in importance in the area by means of Apex-Brasil; exportations of 2008 had an increase of 958% over the values found in 2002; companies of this sector are able to support a high quality offer standard; the main strategy is to strengthen the brand of Brazilian coffees.
BRAZILIAN HEREFORD & BRADFORD	- Increase the volume of exportations of genetic material and alike (2009) to US$ 500,000.00; increase the number of companies from seven to 12 until Dec/2009.	- Sale of embryos to Colombia; sale of living animals for reproduction to Uruguay; increase the number of companies to 21; Sector Strategic Plan is being prepared; opening of negotiations with the Russian Government for preparation of sanitary agreements.

BRAZILIAN COFFEES – SPECIAL GRAINS	- Export coffees from the 2009 Cup of Excellence Contest with values at least 5% higher than those obtained in 2008 (US$ 6.13 per pound); present the results of the contest in at least four international wide range media vehicles.	- SCAA has defined Brazil as the theme-country of the 2011 fair, intensively showing its image; in the 2009 auction, Cup of Excellence coffees obtained the third highest price paid for a sack in the world: US$ 7,300.00.
MATE TEA FROM BRAZIL	- Maintenance of the volume exported in 2008, at the approximate value of US$ 46 Mi; increase the number of companies from eight in 2009 to 12 in 2010.	- A 17% increase both in the volume exported and in the mean value in the last six months.
BRAZILIAN FIBERS	- Increase sisal exportations in 6% and de piassava in 30%; generate exportation of coconut fibers.	- Maintenance of sales of sisal in the world market; exhibition of Brazil as a producer of volume and diversity of fibers to the world.
BRAZILIAN FRUIT	- Export value: (2009) US$ 941.0 Mi (2010) US$ 1,178 Mi; Number of companies (2009) 145 and (2010) 160; new products: (2009) 03 and (2010) 05.	- Besides actions that are common to the whole industry, the project comprehends specific actions; the executing entity has become stronger and structured in recent years.
BRAZILIAN CHICKEN	- Increase the number of exporting companies from 22 (2008) to 26 (2010); increase FOB value from US$ 4,900.00 (2008) to US$7,400.00 (2010).	- In 2007, chicken exports reached the value of US$ 5,604,197,693.00; exportations of 2008 increased and in 2009 they suffered a significant reduction due to the world crisis. Values reached in 2007 are expected in 2010.
PET & HORSE PRODUCTS BRAZIL	- Exportation: (2010) US$ 50 Mi, (2011) US$ 200 Mi; Export companies (2010) 18, (2011) 23; internationalizations (2010) 3 (2011) 5.	- Exports around US$ 500 million; articulation between the *pet* and *horse* industry; Brazil seen as a reliable supplier.
ORANGE JUICE	- Have six companies participating in 2012; reach 1.35 tons of juice exported by 2012.	- Increased exportation of the orange juice image and at least maintenance of the current exportations.
ETHNIC BRAZIL	- 45% annual increase in the volume of exportations in a three-year period. - Increase the number of companies from 17 to 60 by the end of the period.	- Brazilian ethnic products became internationally known and started to be consumed (e.g. cheese bread, coconut water, acai); large offer of healthy products, which are the main trend in the world market.
WINES FROM BRAZIL	- Increase companies' exportations (US$ 6.0 Mi/ 2011); increase the number of export companies (between 25 and 45 until 2011); increase of image actions (450 reports in 2011).	- Project whose exportation value is still limited (from US$ 1.65 Mi in 2004 to US$ 5.8 Mi in 2009); intense growth in the number of companies since 2004, from six to 39. - High level of commitment of the companies both in the project actions an in the Strategic Sector Planning.
HONEY FROM BRAZIL	- Increase the export value; increase the number of export companies; structure the entity.	- No assessment of results; project is being analyzed.

Source: prepared by the author from data provided by Apex-Brasil.

4. Discussion

The analysis of the Integrated Sector Project (PSI) developed by Apex-Brasil considering the concept of cooperation has shown that it fits in the business-to-business paradigm described by Morgan and Hunt (1994), as organizations associate to respond to objectives they would not be able to accomplish individually. Therefore, the actions aiming at exports are a collective response. Considering the Typology of Cooperation Networks (Marcon & Moinet, 2000), PSI can be classified as a Symmetric Network, since the companies that are benefitted from the Project keep their individualities and coordinate conjoint actions to attain their goals (for instance, opening of new markets). As to the inter-organizational configurations proposed by Balestrin & Verschoore (2008), PSI is classified as an associative network, regarding the actions implemented by partner companies; the cooperative, shared actions are taken so that individual goals can be achieved.

Concerning the concepts of co-marketing alliances, one can notice that they do not adequately fit in the concept of PSI, as co-marketing involves the association of two brands, and this does not occur in this tool of Apex-Brasil. Yet, on associating brands of the companies benefitting from the Project with origin denomination, such as the association of

the company brand with Brazilian Beef or Brazilian Chicken, a synergic effect can occur, such as that described by Ahn, Kin *et al* (2009).

PSI can also be understood as a strategic alliance, due to the instrument that creates those partnerships among companies, since they share resources to attain common goals. As to the concept of network marketing presented by Neves (2009), one can say it generically fits in the practices applied by PSI's, as the companies that participate in the Project form networks.

PSI's management tools perfectly fit in the instruments of cooperation networks (Balestrin & Verschoore, 2008). They are the following: agreement between Apex-Brasil and Partner Entity (contractual instrument); strategic sector planning, action plans (strategic instruments); PSI management committee (decision-making instruments), and courses and training (integration instruments).

Considering management and marketing tools, PSI is identified as an inducer of business strategies of the companies. All of the actions derive from a Strategic Sector Planning that will generate coordinated plans of marketing actions (Porter, 1986; Mintzberg, Ahlstrand & Lampel, 2000; Kotler & Keller, 2006).

The analysis has also shown that the objectives can be classified as follows: in nine projects, the aim is to broaden markets and or the export volume; in eight projects, to enhance exports; and in five of them, sponsor and or consolidate the products image. Regarding the target markets, the 10 most important ones are: USA (13/20), Germany (11/20), China (9/20), United Kingdom (8/20), Canada (8/20), Japan (8/20), Russia (7/20), France (7/20), Chile (6/20), Spain (5/20) and Mexico (5/20).

Concerning the collaborative marketing actions used in PSI's, the ones that were more often applied in the plans of action were Purchaser Project (12/20), Image Project (12/20), Fairs (12/20) and External/Technical Missions (8/12). These marketing actions can be classified as promotion tools of the marketing mix; the other actions proposed in the action plans were related to the other Ps of the marketing mix (Kotler & Keller, 2006).

In qualitative terms, the results obtained by PSI's can be regarded as positive, since there has been a significant improvement in most of them. However, it is not possible to perform a quantitative analysis due the insufficiency of historical statistics.

5. Conclusions

Concerning the central purpose of this work – to analyze cooperative marketing actions developed by Apex-Brasil –, after the literature review and the exploratory study in the agency, it is possible to infer that there is evidence of the relevance of its action in Brazilian agribusiness. Besides, Apex-Brasil can be efficient in the organization of associative networks, aiming at broadening the action of agribusiness in Brazilian exports, such as 20 PSI's comprehending 748 companies (Balestrin & Verschoore, 2008).

The research has also identified the following aspects: the objectives of PSI's are concentrated on enlarging export volumes and or markets, and on sponsoring and consolidating the image of the products. The main target markets are USA, Germany, China, UK, Canada, Japan, Russia, France, Chile, Spain and Mexico. The cooperative marketing actions more often applied are Purchaser Project, Image Project, Fairs and Technical Missions.

One of the limitations of this work is the fact that the interview with an Apex-Brasil worker could not be recorded, and this may have caused some information loss. Besides that, the Assistance Unit did not have statistics of the results of each PSI, since the project management remains with the partner entity of the project.

In terms of suggestions, it would be important to enlarge the database about the theme discussed in this paper by approaching several cases and or quantitative studies, as well as

developing projects of dissertations and theses in agribusiness in Rio Grande do Sul and in Brazil.

6. References

APEX-BRASIL. (2010) Folder de divulgação institucional. Porto Alegre, RS

AHN, S. *et al.* Co-marketing alliances between heterogeneous industries: Examining perceived match-up effects in product, brand and alliance levels. *Journal of Retailing and Consumer Services* [S.I.], v. 16, n. 6, p. 477-485, 2009.

BALESTRIN, A.; VERSCHOORE, J. Redes de Cooperação Empresarial : Estratégias de gestão na nova economia. Porto Alegre: Bookman, 2008.

FARRELLY, F.; QUESTER, P. Investigating large-scale sponsorship relationships as co-marketing alliances. *Business Horizons* [S.I.], v. 48, n. 1, p. 55-62, 2005.

FRIMAN, M. *et al*. An analysis of international business-to-business relationships based on the Commitment–Trust theory. *Industrial Marketing Management* 31 (2002) 403– 409

GIL, A. C. Como elaborar projetos de pesquisa. São Paulo: Ed. Atlas, 2002. 175p.

KANDEMIR, D. *et al.* Alliance orientation: Conceptualization, measurement, and impact on market performance. *Journal of the Academy of Marketing Science* [S.I.], v. 34, n. 3, p. 324-340, 2006.

KOTLER, P. O Marketing sem segredos. Porto Alegre : Bookman, 2005.

KOTLER, P.; KELLER, K.L. Administração de Marketing. São Paulo : Pearson Prentice Hall, 2006.

LOURENÇO, J. C. & LIMA, C.E.B. Evolução Do Agronegócio Brasileiro, Desafios e Perspectivas. *Revista Académica de Economía*. *Obsertavório de la Economía Latinoamericana*. http://www.eumed.net/cursecon/ecolat/br/09/clbl.htm

MINTZBERG, H.; AHLSTRAND, B.; LAMPEL, J. Safári de Estratégia: um roteiro pela selva do Planejamento Estratégico. Porto Alegre : Bookman, 2000.

MORGAN, R.M.; HUNT, S.D. The Commitment–Trust theory of Relationship Marketing. *Journal of Marketing*, v. 58, , p. 20-38.

NEVES, M. F. Strategic marketing plans and collaborative networks. *Marketing Intelligence and Planning* [S.I.], v. 25, n. 2, p. 175-192, 2007.

PORTER, M. E. Estratégia Competitiva : técnicas para análise de indústrias e da concorrência. Rio de Janeiro ; Campus, 1986.

TON, G. Challenges for smallholder market access: A review of literature on institutional arrangements in collective marketing. *Stewart Postharvest Review* [S.I.], v. 4, n. 5, 2008.

YI, H. T. *et al.* An empirical investigation of relational conflicts in co-marketing alliances. *Journal of Business-to-Business Marketing* [S.I.], v. 17, n. 3, p. 249-278, 2010.

YIN, R. K. Estudo de caso: planejamento e métodos. 3ª ed. Porto Alegre: Bookman, 2005.

http://www. Apexbrasil.com.br/

http://www.mdic.gov.br/sitio

AN EMPIRICAL ASSESSMENT OF THE DETERMINANTS OF FARMERS' SATISFACTION WITH THE ORGANIC CERTIFICATION PROCESS IN LATIN AMERICA

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Abstract
Certification schemes currently play a key role as quality assurance instruments in the food industry. This is particularly important in organic production, as this is a process-oriented attribute that can not be verified at the end product level. Farmers may benefit from the use of organic certification, especially those from developing countries, but also perceive negative effects of adopting such a scheme. In other words, organic certification may not always meet farmers' expectation with detrimental consequences on farmers' satisfaction with the control system. Given that Latin America is an important supplier of organic products, it seems to be reasonable to assess the farmers' satisfaction with the certification system in this market. Therefore, we develop and analyse a structural equation model using data collected in four Latin American countries. In total, 281 organic farmers were surveyed on their perceptions about organic certification. The findings show that he majority of the organic farmers are satisfied with the organic certification. We also observe that the most important factors affecting farmers' satisfaction are the relationship with buyers and market access. Our findings further reveal that the reliability of the certification scheme relies on the reputation of the control body and auditor, the social monitoring done by internal sources of control, and the perceived risk of fraud in the organic sector. Based on the results of this study we develop recommendations for the public and private sector.

Key words: Latin America, organic certification, partial least squares, satisfaction

AN EMPIRICAL ASSESSMENT OF THE DETERMINANTS OF FARMERS' SATISFACTION WITH THE ORGANIC CERTIFICATION PROCESS IN LATIN AMERICA

1. Introduction

Organic production methods are becoming very popular as a way of providing safer and environmentally friendly food products. About 37 million hectares were certified organically, and 1.8 million farms were reported growing according to organic principles worldwide in 2009. In terms of value, by the same year, the global market for organic food products reached over 54.9 billion U.S. Dollars (Willer, 2011). Although the demand for organic produce is concentrated in North America and Europe, the local supply in those regions is unable to meet the increasing domestic demand (Barrett *et al.*, 2002). This represents a market opportunity for those countries exporting organic produce (García Martínez and Bañados, 2004). In particular, farmers in developing (e.g. Latin American countries) countries could benefit from this market imbalance (Barrett *et al.*, 2002).

Organic production is classified as a process-oriented attribute that can not be detected in the end product (Jahn *et al.*, 2005). Thus, the information about the nature of the product is asymmetric. While producers know whether the product is organic or not, consumers and even retailers do not. This means that buyers can not detect the organic characteristic (when it is presented) even after purchase and use of the product (Giannakas, 2002). To reduce information asymmetries in the food market, and ensure that the end product meets the appropriate process and product standards, third-party certification[124] (TPC) arises as an institutional framework for monitoring and enforcing food quality and safety regulations (Lohr, 1998; Hatanaka *et al.*, 2005; Giannakas, 2002; Jahn *et al.*, 2005; Anders *et al.*, 2007). As some authors argue (Janh *et al.*, 2004a, 2005), a crucial point for the success of the certification system is to guarantee its reliability.

Given that certification as institutional mechanism is relatively young (Jahn *et al.*, 2004a; Jahn *et al.*, 2004b), there have been some attempts to evaluate the performance of various certification standards in the agribusiness sector from different perspectives. Some authors analyse the factors determining food companies to adopt quality assurance systems (e.g. Canavari *et al.*, 1998; Jahn and Spiller, 2005; Karipidis *et al.*, 2009; Herzfeld *et al.*, 2011). There are other researchers who focus on the analysis of the reliability and effectiveness of third-party certification, and the quality of the audit process (e.g. Jahn *et al.*, 2004a; Jahn *et al.*, 2004b; Jahn *et al.*, 2004c; Jahn *et al.*, 2005; Albersmeier *et al.*, 2009a). Enneking *et al.* (2007) address the study of farmers' satisfaction with three different quality assurance systems in Germany. In the same way, Gawron and Theuvsen (2006), and Schulze *et al.* (2008) investigate the judgments agrifood firms make on the International Food Standard (IFS) in the European market. Although, the literature addresses critically the role and impact of standards and certification systems in the food industry, just few studies investigate issues concerning with the certification in the organic food sector. While the majority of the studies focus on aspects related to the acceptance (e.g. Schulze *et al.*, 2007; Schulze and Spiller,

[124] Certification is defined as "the (voluntary) assessment and approval by an (accredited) party on an (accredited) standard" (Meuwissen *et al.*, 2003). Similarly, according to Giannakas (2002) certification is "a process through which unobservable product characteristics (such as the process through which they have been produced) are "guarantee" to consumers through a label. To avoid conflicts of interest, the guarantee is usually issued by a third (private or public) independent party whose ability to verify producer claims is grater than that of an individual".

2010) and reliability (e.g. Albersmeier *et al.*, 2009b) of organic certification systems, and the impact of organic standards on developing country exports (Barrett *et al.*, 2002; García Martínez and Bañados, 2004), only one study implicitly assesses how satisfy are organic growers with the organic certification system, including the evaluation of some drivers of satisfaction in Latin America (Albersmeier *et al.*, 2009b). Farmers may benefit from the use of organic certification, especially those from developing countries, but also perceive negative effects of adopting such a control scheme. In other words, organic certification may not always meet farmers' expectation with detrimental consequences on farmers' satisfaction. Dissatisfaction with the organic certification system may encourage farmers to change the current certification agency or shift back to conventional agricultural practices with implications for the private and public sector. Under these circumstances it seems to be reasonable to assess the farmers' satisfaction with the certification system and the factors driving it. Therefore, we develop and analyse a structural equation model using data collected in Latin America. Unlike the study undertaken by Albersmeier *et al.* (2009b), we give particular attention to the evaluation of satisfaction and extent the analysis up to four Latin American countries. Particularly, we test the causal relationships in the proposed model employing partial least squares (PLS) analysis. The following sections of this article detail the role of certification in the organic sector and the importance of organic farming in Latin America. The research model and hypotheses are then described; follow by the methodology and presentation of results research. Finally we draw the conclusion of our empirical analysis and develop some implication for the public and private sector.

2. The role of certification in the organic food industry

Since 1990's there have been in several countries a proliferation and evolution of food safety and quality standards in the food industry (Henson and Readon, 2005), basically in response to the various food crisis and scandals that have undermined consumer confidence in food quality and safety, because pioneer quality management meta-schemes (e.g. ISO 9000) did not meet the requirement of the industry (Jahn *et al.*, 2004b), because the internationalization of trade in foods and agricultural products (Anders *et al.*, 2007), because consumer increasing focus on a broader array of product attributes when assessing product quality (Jahn *et al.*, 2004b; Henson and Readon, 2005; Jahn *et al.*, 2005), among other reasons. Many of the new product attributes used by consumer to assess quality can be classified as credence or Potemkin characteristics[125]. Organic faming is defined as a process-oriented attribute or Potemkin characteristic (Jahn *et al.*, 2004b; Jahn *et al.*, 2005). In others words, organic products are characterised by the asymmetry of the information about the nature of the product, i.e., while producers know whether the product is organic or not, in most cases the presence or absence of the organic characteristics are not detectable by consumers in the end product, even after purchase and use of it (Giannakas, 2002). In this context, TPC arises as a credible signalling institution that may facilitate the reduction of uncertainties related to information asymmetries in credence/Potemkin attributes (Lohr, 1998; Giannakas, 2002; Janh *et al.*, 2005; Anders *et al.*, 2007). Furthermore, TPC is viewed as a way for monitoring and enforcing food quality and safety standards (Hatanaka *et al.*, 2005; Janh *et al.*, 2005). In the organic market, third party certifiers control the compliance of the farmer through criteria regarding certification standards. In the case of a positive event, an (organic) certificate is issued (Albersmeier *et al.*, 2009b).

[125] Jahn *et al.* (2004b, 2005) provide a comprehensive classification of product attributes.

3. Certification in Latin America

Latin America represents a key actor in the world's organic production. According to Willer (2011), Latin American countries contribute currently with 23 per cent of the total organic land and groups around 16 per cent of the world's organic producers. The leading countries in the region are Argentina (4.4 million hectares), Brazil (1.8 million hectares) and Uruguay (930'965 hectares). The domestic demand for organic products is mainly concentrated in big urban centres and in many countries the domestic demand is still incipient. Therefore, most organic production from Latin American countries is exported to organic consumption markets where the demand is concentrated (Europe, North America and Japan). The strict regulations impose by foreign costumers have encouraged the institutionalization of organic farming and the development of local norms and laws in the region (e.g. the Organic Brazilian Law N° 10.831; the Organic Chilean Law N° 20.089, among others) to improve market access. Actually, 18 countries have legislation on organic farming (Willer, 2011). Costa Rica and Argentina hold special position in the region because they both possess Third Country Status. In other words, the local regulations in these two countries are recognized as equivalent with the organic standard of the European Union, making easier the process of exportation. Latin American countries supply different organic markets with tropical fruits, grains and cereals, coffee, cocoa, sugar, and meats (Willer, 2011).

4. Theoretical framework

4.1. Customers satisfaction with certification schemes in the food industry

Satisfaction of customers with products and services of a company is considered one of the most important factors leading towards competiveness and success (Hennig-Thurau and Klee, 1997). Although customer satisfaction studies arte restricted in many cases by monetary and time constraints, they are not rare in the agrifood sector. (e.g. Juhl *et al.*, 2002; Gilbert *et al.*, 2004; Spiller *et al.*, 2006; Lülfs-Baden *et al.*, 2008). However, there are few studies addressing issues regarding customer satisfaction with certification schemes in the food industry. Enneking *et al.* (2007) address the study of hop farmers' satisfaction, and its determinants, with three different quality assurance systems in Germany. They found that gains in image, in sales and in production efficiency are key factor influencing famers' satisfaction with the assessed quality systems. Schulze *et al.* (2007), assessing the organic farmers' acceptance of the organic certification in Germany, found that the perceived bureaucratic costs, effectiveness and usefulness of the organic certification are major factors determining farmers' satisfaction. In addition, Schulze *et al.* (2008) reported that the cost/benefit ratio, the evaluation of the catalogue of requirements, the perceived communication of the standard owner, the perceived expertise of the auditor and the perceived costs of the certification affect significantly the overall evaluation (measured in a satisfaction scale) of the International Food Standard. In this case, managers and quality assurance staff of European agrifood companies participated in the study. Studies using causal analysis with latent constructs to evaluate farmers' satisfaction with the organic certification (e.g. Schulze and Spiller, 2010) also indicate that the perceived bureaucratic costs, effectiveness and usefulness of the system are key determinants of farmer's satisfaction. In the next paragraphs we present a model and a set of hypotheses that hypothetically describe the effects several factors on farmers' satisfaction with the organic certification process have.

4.2. Development of hypothesis and research model

The core variable in our theoretical causal model corresponds to farmers' satisfaction with the organic certification process. Satisfaction in this study is conceptualized as the affective reactions of individuals toward the use of the organic certification. Satisfaction is defined as "an evaluation of an emotion" (Hunt 1977), indicating that it reflects the degree to which a person believes that the position and/or use of a system evokes positive feelings (Rust and Oliver, 1994). As we describe in the previous section, some factor have been identify affecting costumer satisfaction with certification standards in the food sector. Here we extent the analysis of satisfaction by adding new hypotheses, by decomposing variables previously assessed and by including the perception of Latin America organic farmers.

Despite the usefulness of certification by reducing information asymmetry within the market, it creates also incentive for opportunistic behaviour (e.g., the mislabelling of conventional foods as organic) (Giannakas, 2002; Getz and Shreck, 2006; Anders *et al*., 2007). Cases of mislabelling in the organic food sector are reported by some authors (Giannakas, 2002, Jahn *et al*., 2005). Given that the success of any certification system mainly depends on trust relationships (Jahn *et al*., 2005), events of opportunistic behaviour affect negatively the consumer perception of the scheme and, therefore, lead to detrimental consequences for the market acceptance of organic foodstuffs (Giannakas, 2002). Additionally, perceived low reliability in the organic certification may create conflicts and distrust relationships among the different actors of the organic food supply chain, on the one hand, and affect the conversion of farmers from conventional to organic agriculture due to the scheme's low acceptance, on the other hand. Therefore, we state that:

H1: The greater the perceived reliability of the organic certification, the greater the satisfaction with the organic certification process.

Customers may perceive benefits and costs by using certification standards (Canavari et al., 1998; Getz and Shreck, 2006; Gawron and Theuvsen, 2006; Hammoudi *et al*., 2009). On the one hand, various studies indicate that benefits can be divided in internal (e.g. improvement in firm management, increasing income) and external benefits (market access and improvement in relationship with clients). Unlike previous empirical studies (Schulze *et al*., 2007, 2008; Albersmeier *et al*., 2009b), we decompose the perceived benefit or usefulness of the certification system in three main constructs and evaluate their effect of satisfaction. Thus, we hypothesize that:

H2: The better the perceived farm management, the greater the satisfaction with the organic certification process.

H3: The better the perceived relationship with buyers and access to market, the greater the satisfaction with the organic certification process.

H4: The higher the perceived farm income, the greater the satisfaction with the organic certification process.

On the other hand, costs can be interpreted as economic and bureaucratic costs. While bureaucratic aspects are commonly related to the use of quality assurance schemes (Theuvsen, 2004), economic costs arise from implementation of the standard (e.g. new infrastructure, personal training) and the fee customers must pay for the inspection service. The cost of the inspection fee is of special interest in developing countries because in most of the cases customers must use internationally accredited inspection bodies increasing the cost of certification (Barret *et al*., 2002). Considering this, we postulate that:

H5: The higher the perceived economic costs, the lower the satisfaction with the organic certification process.

H6: The higher the perceived bureaucratic costs, the lower the satisfaction with the organic certification process.

Previous empirical studies have reported that years of experience in the organic sector affect significantly farmers' satisfaction with the organic certification process (Albersmeir *et al.*, 2009b). According to Ferguson et al (2005), less experience organic growers are less satisfied with the third-party-certifier. Based on this antecedent, we hypothesize that:
H7: The more experience farmers in the organic sector have, the greater the satisfaction with the organic certification process.

According to Jahn *et al.* (2005) and Anders *et al.* (2007), the objectivity, experience and independence of the executive certification bodies (CBs) are crucial determinants of the reliability of TPC. This is also valid for auditors or inspectors in charge of carrying out inspections at the client's place. For developing countries supplying organic food products to high-value markets, reliable certification is critical (Anders *et al.*, 2007). Nevertheless, the outbreak of food-born diseases and the continuous scandals affecting the food industry point out that CBs and the audit process are susceptible to fail. Poor inspection quality not only may undermine the reputation of a particular CB or auditor but also affect negatively the reliability of the whole system as the probability of mislabelling is higher. In other words, reliability of the certification procedures depends on the way auditing processes are carried out (Jahn *et al.*, 2004a). However, the thoroughness of the audit process often varies considerably among different third-party certifiers (Jahn *et al.*, 2005). Empirical evidence shows that there are significant difference between the auditing judgments of different certification bodies in the organic (Zorn *et al.*, 2009) and the conventional food industry (Albersmeir *et al.*, 2009a). Considering this information we state that:
H8: The better the certification body reputation, the higher the perceived reliability of the organic certification.
H9: The better the auditor reputation, the higher the perceived reliability of the organic certification.

Mislabelling and cheating in the organic sector can increase potential negative market effects depending on the potential risk (e.g. public health problem) and the amount of public attention (Jahn *et al.*, 2004a). If farmers are afraid of mislabelling, i.e. increase in fraud practice, due to opportunistic behaviour of other organic growers, we can expect that they evaluate negatively the reliability of the system. Therefore, we postulate that:
H10: The higher the perceived risk in the organic sector, the lower the perceived reliability of the organic certification.

Finally, we believe that some sources of internal and external pressure enforcing the compliance with the organic standard may affect positively farmers' perception of the reliability of the certification system. In organic certification the government is the standard-setting (García Martínez and Bañados, 2004). Therefore, we can expect that the governmental institutions play a key role in monitoring the compliance with the rules. Getz and Shreck (2006) highlight the importance of farm associations and farmers as a source to enforce compliance with the organic standard. Furthermore, suppliers of organic products are under constant pressure because of the great number of customer demands. Similar to farmers' association, the families of organic growers have special interest in the correct function of the certification system since they may also suffer from economic loses in case of fraud (Albersmeir *et al.*, 2009b). Considering this background, we state that:

H11: The greater the perceived buyer pressure, the higher the perceived reliability of the organic certification.
H12: The greater the perceived government pressure, the higher the perceived reliability of the organic certification.
H13: The greater the perceived farmers pressure, the higher the perceived reliability of the organic certification.
H14: The greater the perceived family pressure, the higher the perceived reliability of the organic certification.

Figure 1 summarizes the hypothetical research model.

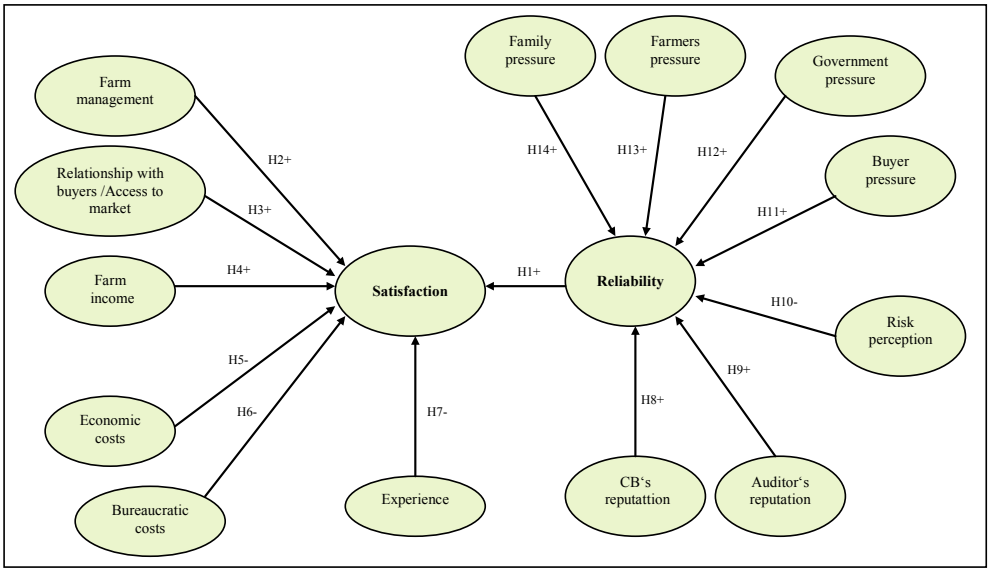

Figure 1. Research causal model

5. Methodology

5.1. Data collection

Between November 2007 and January 2009, 281 farmers were surveyed in four Latin American countries: Brazil, Chile, Colombia and Costa Rica. Due to geographical difficulties, different survey techniques were employed to collect the data in Costa Rica and Brazil. In this case, 75 face to face interviews, 14 telephone interviews and 60 e-mail surveys were applied. While in Colombia data were collected via face to face interviews (66) and e-mail surveys (5), in Chile only face to face interviews (60) were carried out. Given that in Chile and Colombia the most of the surveyed farmers were concentrated in just one geographical region; this made easier the use of the face to face interview technique. In total 62 organic growers out of 3,987; 87 of around 14,000; 71 of around of 4,500; and 60 out of 529 were surveyed in Costa Rica, Brazil, Colombia and Chile, respectively. Considering that respondents were not randomly selected in their respective countries, the sample corresponds to a non-probabilistic one. In other words, we use a convenience sample approach. However, the sample allows for differential statistical analysis.

To test our hypotheses a structured questionnaire with multiple scale items was designed. For each respondent, personal and farm structure aspects were also recorded. The instrument was designed in English language. Afterwards, it was translated into Spanish and Portuguese, and special attention was put on typical wording used in each country. Before administering the questionnaire, a pilot test was performed in order to check for inconsistency.

The survey provided information from organic famers working with the main organic crops produced in each country (coffee, banana, berries, vegetables, etc.) and affiliated to the most important certification bodies operating in Latin America (BCS ÖKO-GARANTIE GMBH (30.6%), Ecocert (24.2%), Eco-LOGICA (16.7%), etc). The questionnaire was completed mainly by farm owners (71.2%). The respondents who went to primary or secondary school account for 64.8%, while those holding bachelor degree or went to technical schools among for 23.5% and 6.8%, respectively. On average surveyed subjects are 45.7 years old and have practices organic farming for 10.4 years. On average farms are 109.3 (sd = 645.0) hectares and the number of workers averages 21.1 (sd = 181.2). The high standard deviations (sd) for the number of hectares and workers indicate that the sample groups small as well as big organic operations. The majority of the respondents are organized in farm associations (47.7%), while independents operations amount for 31.7%. Main marketing channels are local farmers markets, export companies and cooperatives. Statistics for each country are displayed in Table 1.

Table 1. General sample description for each country

Country	Age (years)	Gender (female/male)	Experience with organic farming (years)	Size of farm (ha)	Number of workers/employees (#)
Brazil	42.8	16/71	9.5	230.7	53.7
	12.6	18.4%/81.6%	*6.5*	*626.3*	*326.9*
Costa Rica	42.9	16/47	10.8	153.1	7.4
	11.0	25.4%/74.6%	*6.9*	*1132.9*	*22.7*
Chile	49.1	8/52	7.0	21.7	9.5
	12.3	13.3%/86.7%	*5.2*	*37.7*	*16.6*
Colombia	49.0	14/57	14.1	4.4	4.1
	10.5	19.7%/80.3%	*8.7*	*6.1*	*2.8*

Source: Authors' calculations
Standard deviation in *cursive*

5.2. Measures

Items used to captures the latent variables of the conceptual model were adopted from measurement scales that have been tested in previous studies dealing with famers' acceptance and their assessment of different quality assurance systems in European agribusiness (e.g. Jahn and Spiller 2005; Schulze and Spiller, 2010). The latent variables of the conceptual model were captured by means of Likert scales and semantic differential items (-3 to +3). All of them were examined beforehand using exploratory factor analysis. Items with double loading those loading on improper factors were excluded from further analysis.

5.3. Statistical approach

Structural equation modelling (SEM) is a quite general analytic framework that allows identifying causal relationships through the combination of multiple regression, path analysis, and confirmatory factor analysis (Tomarken and Waller, 2005). Estimation of causal models with latent constructs can be performed either by covariance-based or variance-based SEM techniques (Gefen *et al.*, 2000; Reinartz *et al.*, 2009). In this study we use partial least squares (PLS), a variance-based method, because it is appropriate for exploratory studies and due to its flexibility as it relaxes the distributional assumptions required by covariance-based approaches (Gefen *et al.*, 2000; Henseler *et al.*, 2009; Reinartz *et al.*, 2009; Hair *et al.*, 2011). Analysis and interpretation of PLS models consider two steps: i) the assessment of the reliability and validity of the measurement model (outer model); and ii) the assessment of the goodness of fit of the structural model (inner model) (Hulland, 1999; Henseler *et al.*, 2009;

Hair *et al.*, 2011). The statistical software SmartPLS version 2.0 M3 was used to analyse the data (Ringle *et al.*, 2005).

6. Data analysis and results

The majority of respondents show some level of satisfaction with the organic certification procedure. While 24.9% and 43.8% partially agree or agree, 20.3% totally agree with the statement *I am satisfy with the organic certification*. In the following sections with develop de results of the assessment of the causal model.

6.1. Assessing the measurement model

We evaluated the reliability of the measures by checking the factor loadings of each measurement item on their respective latent construct (see Appendix). The measure loadings were above the recommended threshold (Chin, 1998a; Hulland, 1999, Henseler *et al.*, 2009; Hair *et al.*, 2011). We assessed construct reliability using Cronbach's alpha (CRA) and composite reliability (CR) (Werts *et al.*, 1974). However, CRA usually exaggerates unreliability of measurement and thus CR is considered to be a better indicator of construct reliability (Baumgartner and Homburg, 1996; Chin *et al.*, 1996; Henseler *et al.*, 2009, Hair *et al.*, 2011). The recommend threshold for a sufficient construct reliability in the early stages of research is 0.7 or above (Nunnaly, 1978). CR in this study reaches values greater than 0.7 (see Table 2).

Table 2. Assessment of the measurement model

Latent construct	N° items	CRA (>= 0.7)	CR (>= 0.7)	AVE (>=0.5)
Auditor's reputation	3	0.67	0.82	0.61
Bureaucratic costs	3	0.79	0.83	0.63
Buyers pressure	2	0.65	0.85	0.74
Buyers/Market	4	0.77	0.85	0.59
CB's reputation	2	0.63	0.84	0.73
Economic costs	2	0.71	0.87	0.77
Experience	1	1.00	1.00	1.00
Family pressure	1	1.00	1.00	1.00
Farm income	2	0.55	0.81	0.68
Farm management	4	0.74	0.83	0.56
Farmers pressure	3	0.70	0.83	0.62
Government pressure	1	1.00	1.00	1.00
Reliability	3	0.69	0.83	0.62
Risk perception	4	0.71	0.82	0.54
Satisfaction	1	1.00	1.00	1.00

Source: Authors' calculations

Convergent validity is assessed through the average variance extracted (AVE) (Fornell and Larcker, 1981). We found satisfactory values of AVE for all the latent constructs. To assess discriminant validity we used the Fornell-Larcker criterion (Fornell and Larcker, 1981) and cross loadings. The Fornell-Larcker criterion postulates that a latent construct shares more variance with its assigned indicators than with another latent variable in the structural model. There is no evidence of correlation among any two latent constructs larger than the square root of AVE of these two constructs (data not shown). The second criterion requires that an indicator's loading with its associated construct should be higher than its loadings with all the

remaining constructs. Data analysis shows that there is no evidence of cross loadings (data not shown). Therefore, discriminant validity is supported, which means that all constructs in the research model are indeed measuring different concepts.

6.2. Testing the hypothesized structural model

We use the R^2 and the algebraic sign, size and significance of the path coefficients to assess the goodness of fit of the structural model (Baumgartner and Homburg, 1996; Henseler *et al.*, 2009, Hair *et al.*, 2011). Good structural model fit exists when i) there is high explanatory power (R^2) and ii) statistically significant t-values associated to the path coefficient estimates. Table 3 displays R^2 scores for all latent constructs.

Table 3. Explained variance of the latent constructs

Endogenous latent constructs	R^2
Reliability of the organic certification	**0.40**
Satisfaction with the organic certification	**0.34**

Source: Authors' calculations

The structural model was able to explain 40 per cent of the variance in the perceived reliability of the organic certification process and 34 per cent of the variance in satisfaction with the organic certification process. In PLS models R^2 scores of 0.19, 0.33 and 0.67 are considered weak, moderate and substantial, respectively (Chin, 1998b). Recently, more restrictive criterion to assess R^2 values is reported by Hair *et al.* (2011) (0.25, 0.50, and 0.75). Given the explorative character of this study we consider the R^2 scores reported in Table 3 to be acceptable.

Table 4 reported the path estimates for the different drivers of satisfaction and reliability. To assess the significance of path estimates we employed the SmartPLS bootstrapping routine with 5000 samples and 281 cases (Henseler *et al.*, 2009; Hair *et al.*, 201). Parameters estimates of the drivers of satisfaction, except for bureaucratic costs, are statistically significant. Furthermore, all of them follow the hypothesized direction. Among the perceived benefits by using organic certification, relationship with buyers/market access (0.30***) exerts the highest impact on farmer's satisfaction.

Table 4. Structural path estimates

	Latent constructs	Endogenous constructs	Parameter estimate	Standard error	*t*-statistics
H1	Reliability	Satisfaction	0.19	0.07	2.695**
H2	Farm management	Satisfaction	0.17	0.06	2.649**
H3	Relationship with buyers/Market access	Satisfaction	0.32	0.06	5.326***
H4	Farm income	Satisfaction	0.15	0.06	2.349*
H5	Economic costs	Satisfaction	-0.11	0.05	2.264*
H6	Bureaucratic costs	Satisfaction	-0.07	0.07	0.985^{ns}
H7	Experience	Satisfaction	-0.11	0.05	2.202*
H8	CB reputation	Reliability	0.20	0.05	3.780***
H9	Auditor reputation	Reliability	0.24	0.06	4.245***
H10	Risk perception	Reliability	-0.13	0.05	2.279*
H11	Buyers pressure	Reliability	0.05	0.05	0.982^{ns}
H12	Government pressure	Reliability	0.06	0.05	1.052^{ns}
H13	Farmers pressure	Reliability	0.32	0.06	5.393***
H14	Family pressure	Reliability	0.12	0.07	1.700^{ns}

* Parameter is significant at $p < 0.05$; **parameter is significant at $p < 0.01$; *** parameter is significant at $p < 0.001$; ns = parameter is not significant.

Source: Author's calculations

As we postulate, the costs of certification, measured as economic and bureaucratic costs, negatively influence farmer's satisfaction. However, only economic costs (-0.11*) affect significantly this endogenous construct. Years of experience in the organic sector (-0.11*) is also a relevant factor determining farmer's satisfaction showing also a negative impact. The reliability of the certification process (0.19**) plays a significant and positive role on satisfaction with the organic certification scheme. The another endogenous construct in our model, i.e. the reliability of the certification process, is significantly influenced by the reputation of the CB and the auditor, the perceived risk in the organic sector and the pressure (control) exerts by famers and farm associations. This last variable has the highest impact (0.32***) on the perceived reliability of the organic certification.

7. Conclusions and Implications

Our results show a high level of satisfaction with the organic certification system in Latin America. This is not really surprising since previous empirical evidence indicate that the acceptance of the organic certification scheme is higher and less controversial in Latin America than in Europe (Albersmeier *et al.*, 2009b). Given that satisfaction is a complex multidimensional construct, we recommend, however, including more statements to assess farmer's satisfaction in further investigations. This might also be a way to increase the relative low explained variance reported here.

Our findings indicate also that the perceived benefits are more important than the perceived costs when assessing farmer's satisfaction. Previous studies have reported similar results (e.g. Enneking *et al.*, 2007). The most important benefit affecting farmers' satisfaction is the improvement of the relationship with buyers and market access. The quasi-voluntary character of the organic certification may explain this finding. Food suppliers, specially small a medium scale, in developing countries are requested to comply with strict public/private quality food safety and quality regulations to access more profitable markets in response to the demand of their customers (Barret *et al.*, 2002; García Martínez and Bañados, 2004; García Martínez and Poole, 2004; Hatanaka *et al.*, 2005, Henson and Reardon, 2005). Furthermore, organic certification can help to build trust between actors in the supply chain (Hatanaka *et al.*, 2005) and, thus, improve their business relationships. In this context, the role that local governments and international organizations may play in assisting small medium farmers in Latin American counties is crucial to i) increase supply of organic foods from this region and ii) encourage the participation of less protect farmers in high-value markets. The proper communication of other benefits associated to the use of the organic certification (e.g. improve of farm management and income) may help to increase farmers' satisfaction with the system. This should be of special interest for certifiers whose long-term profit depends on the clients' loyalty with the CB and organic system. Although bureaucratic aspects are commonly related to the use of quality assurance schemes (Theuvsen, 2004), we found that they do not exert a significant impact on satisfaction. However, Schulze *et al.* (2007) and Schulze and Spiller (2010) found that the perceived bureaucratic costs affect significantly the organic farmers' overall satisfaction in Germany. In contrast, we found that the perceived economic costs associate to the use of the organic certification system affect significantly farmers' satisfaction with the scheme. This points out that in Latin American countries monetary costs play a more important role than the bureaucratic costs when assessing farmers' satisfaction with the organic certification. This is not rare because one of the main barriers food suppliers

from developing countries face to enter high profitable markets is the high cost of the service given by internationally accredited CBs (Barret *et al.*, 2002). Moreover, our sample account for organic farmers from Costa Rica, a country with status of Third Country to export to the EU. According to Barret *et al.* (2002), having Third Country status facilitate the export process by reducing bureaucracy. Therefore, harmonization of local organic legislations with regulations working in the most important consumption markets (USA, EU) are necessary not only to reduce bureaucracy but also to reduce economic costs. The public sector in Latin American countries has a major responsibility in this task.

Contrary to what Ferguson *et al.* (2005) point out, our results indicate that more experienced farmers seem to be more frustrated with the organic certification process than less more experience producers. However, our findings are in agreement with those previously reported in Latin American countries (Albersmeir *et al.*, 2009b).

In disagreement with what Schulze and Spiller (2010) report in the German market, the perceived reliability of the organic certification process is highly important for the evaluation of satisfaction in Latin America. As Giannakas (2002) states, when consumers' trust in certification falls below a certain threshold, consumer welfare and demand decrease, which can result in a market collapse with detrimental consequence for organic producers. A high reliable inspection system may enhance the image of the organic sector and, thus, increase the satisfaction of those farmers participating in the organic business by assuring consumer demand. As our results show, however, the reliability of the certification scheme depends on several factors. The internal control carried out by famers and farmers' organizations and the reputation of the CB and inspectors play a critical role. While the quality of audits is a key factor for ensuring a reliable inspection system (Jahn *et al.*, 2004a; Jahn *et al.*, 2005; Albersmeir *et al.*, 2009a), internal control sources arise as a way of performing additional monitoring with positive consequences for the perceived reliability of the certification scheme. The findings further reveal that external sources of control (buyers and government) have no significant impact on the perceived reliability. The risk perceived by farmers regarding fraud practices in the organic sector is also a determinant of the perceived reliability. This is not strange since opportunistic behaviour is still an important matter in the organic sector (Giannakas, 2002, Jahn *et al.*, 2005).

Finally, different population parameters are likely to occur for different subpopulations as countries or cultures (Henseler *et al.*, 2009; Hair *et al.*, 2011). Therefore, we recommend considering in further investigations the heterogeneity of observations in the sample. In this way, a more clear and valid picture of farmers' satisfaction with the organic certification procedure in Latin America can be provided.

8. References

Albersmeier, F., Schulze, H., Jahn, G. and Spiller, A. 2009a. The reliability of third-party certification in the food chain: from checklists to risk-oriented auditing. *Food Control* 20:927-935.

Albersmeier, F., Schulze, H. and Spiller, A. 2009b. Evaluation and reliability of the organic certification system: perceptions by farmers in Latin America. Sustainable development 17:311-324.

Anders, S., Souza-Monteiro, D. and Rouviere, E. 2007. Objectiveness in the market for third-party certification: what can we learn from market structure? Paper presented ate the

105th EAAE Seminar: *International Marketing and International Trade of Food Quality Products*, Bologna, Italy, 8-10 March 2007.

Barrett, H., Browne, A., Harris, P. and Cadoret, K. 2002. Organic certification and the UK market: organic imports from developing countries. *Food Policy* 27:301-318.

Baumgartner, H. and Homburg, C. 1996. Applications of structural equation modeling in marketing and consumer research: a review. *International Journal of Research in Marketing* 13: 139-161.

Chin, W., Marcolin, B. and Newsted, P. 1996. A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and voice mail emotion/adoption study. In DeGross, J., Jarvenpaa, S. and Srinivasan, A. (eds), *Proceedings of the Seventeenth International Conference on Information Systems*, Cleveland, Ohio, 16-18 December 1996, 21-41.

Chin, W. 1998a. Issues and opinion on structural equation modeling. *MIS Quarterly* 22: 7-16.

Chin, W. 1998b. The partial least squares approach to structural equation modeling. In Marcoulides G. (ed), *Modern Methods for Business Research*, Hillsdale, NJ: Lawrence Erlbaum Associates, 259-336.

Enneking, U., Obersojer, T. and Kratzmair, M. 2007. Faktoren für die Zufriedenheit mit Qualitätssystemen aus Sicht der Primärerzeuger. *Agrarwirtschaft* 56:112-124.

Ferguson, S., Wessen, S. and Storey, G. 2005. Organic producer perceptions of the role of certification bodies. Available at http://organic.usask.ca.

Fornell, C. and Larcker, D. 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* 18:30-50.

García Martínez, M. and Bañados, F. 2004. Impact of EU organic product certification legislation on Chile organic exports. *Food Policy* 29:1-14.

García Martínez, M. and Poole, N. 2004. The development of private fresh produce safety standards: implications fro developing Mediterranean exporting countries. *Food Policy* 29:229-255.

Gawron, J. and Theuvsen, L. 2006. The international food standard: bureaucratic burden or helpful management instrument in global markets?- empirical results from the German food industry. Paper presented at the 98th EAAE Seminar: *Marketing Dynamics within the Global Trading System: New Perspectives*, Chania, Crete, Greece, 29 June-2 July 2006.

Gefen, D., Straub, D. and Boudreau, M. 2000. Structural equation modeling and regression: guidelines for research practice. *Communications of the Association for Information Systems* 4:1-78.

Getz, C. and Shreck, A. 2006. What organic and fair trade labels do not tell us: towards a place-based understanding of certification. I*nternational Journal of Consumer Studies* 30:490-501.

Giannakas, K. 2002. Information asymmetry and consumption decisions in organic food product markets. *Canadian Journal of Agricultural Economics* 50:35-50.

Gilbert, G., Veloutsou, C., Goode, M. and Moutinho, L. 2004. Measuring customer satisfaction in the fast food industry: a cross-national approach. *Journal of Services Marketing* 18:371-383.

Hair, J., Ringle, C. and Sarstedt, M. 2011. PLS-SEM: indeed a silver bullet. *Journal of Marketing Theory and Practice* 19:139-151.

Hammoudi, A., Hoffman, R. and Surry, Y. 2009. Food safety standards and agri-food supply chains: an introductory overview. *European Review of Agricultural Economics* 36:469-478.

Hatanaka, M., Bain, C. and Busch, L. 2005. Third-party certification in the global agrifood system. *Food Policy* 30:354-369.

Henning-Thurau, T, and Klee, A. 1997. The impact of customer satisfaction and relationship quality on customer retention: a critical reassessment and model development. *Psychology and Marketing* 14:737-764.

Henseler, J., Ringle, C. and Sinkovics. R. 2009. The use of partial least squares path modeling in international marketing. *Advances in International Marketing* 20: 277–319.

Henson, S. and Reardon, T. 2005. Private agri-food standards: implications for food policy and the agri-food system. *Food Policy* 30:241-253.

Herzfeld, T., Drescher, L. and Grebitus, C. 2011. Cross-national adoption of private food quality standards. *Food Policy* 36:401-411.

Hulland, J. 1999. Use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal* 20: 195-204.

Hunt, H. 1997. CS/D-overview and future directions. *In* Hunt, H. (ed.), *Conceptualization and Measurement of Consumer Satisfaction*, Cambridge, MA: Marketing Science.

Jahn, G., Schramm, M. and Spiller, A. 2004a. Trust in certification procedures: an institutional economics approach investigating the quality of auditings within food chains. Paper presented at the Annual IAMA World Symposium, Montreux, Switzerland, 12-13 June 2004.

Jahn, G., Schramm, M. and Spiller, A. 2004b. Differentiation of certification standards: the trade-off between generality and effectiveness in certification systems. Paper presented at the Annual IAMA World Forum and Symposium, Montreux, Switzerland, 12-13 June 2004.

Jahn, G., Schramm, M. and Spiller, A. 2004c. The quality of audits – a comparative study of auditing and certification schmes in the food sector. Paper presented at the 84th EAAE Seminar: *Food Safety in a Dynamic World*, Zeist, The Netherlands, 8-11 February 2004.

Jahn, G., Schramm, M. and Spiller, A. 2005. The reliability of certification: quality labels as a consumer policy tool. *Journal of Consumer Policy* 28:53-73.

Jahn, G. and Spiller, A. 2005. The adoption of the QS system in German agriculture: exploring attitudes and the behaviour-intention relation. Paper presented at the 92nd EAAE Seminar: *Quality Management and Quality Assurance in Food Chains*, Göttingen, Germany, 2-4 March 2005.

Juhl, H., Kristensen, K. and Østergaard, P. 2002. Customer satisfaction in European food retailing. *Journal of Retailing and Consumer Services* 9:327-334.

Karipidis, P., Athanassiadis, K., Aggelopoulos, S. and Giompliakis, E. 2009. Factors affecting the adoption of quality assurance systems in small food enterprises. *Food Control* 20:93-98.

Lohr, L. 1998. Implications of organic certification fro market structure and trade. *American Journal of Agricultural Economics* 80:1125-1129.

Lülfs-Baden, F., Spiller, A., Zühlsdorf, A. and Mellin, M. 2008. Customer satisfaction in farmer-to-consumer direct marketing. *International Food and Agribusiness Management Review* 11:49-72.

Meuwissen, M., Velthuis,A., Hogeveen, H. and Huirne, R. 2003. Traceability and certification in meat supply chains. *Journal of Agribusiness* 21:167-181.

Reinartz, W., Haenlein, M. and Henseler, J. 2009. An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of research in Marketing* 26:332-244.

Ringle, C., Wende, S. and Will, A. 2005. SmartPLS 2.0 M3. Available at http://www.smartpls.de.

Rust, R. and Oliver, R. 1994. Service quality: insights and managerial implications from the frontier. *In* Rust, R. and Oliver, R (eds), *Service Quality: New Directions in Theory and Practice*, New York: Sage Publications, Inc.

Schulze, H., Jahn, G. and Spiller, A. 2007. Institutional framework and acceptance of the organic certification system. Perper presented at the International Conference on Organic Agriculture and Food Security, FAO, Rom, Italy, 3-5 May 2007.

Schulze, H., Albersmeier, F., Gawron, J., Spiller, A. and Theuvsen, L. 2008. Heterogeneity in the evaluation of quality assurance systems: the international food standard (IFS) in European agribusiness. *International Food and Agribusiness Management Review* 11:99-138.

Schulze, H. and Spiller, A. 2010. Farmers' acceptance of the organic certification system in Germany: a partial least squares model. *Journal of International Food and Agribusiness Marketing* 22:7-36.

Spiller, A., Bolten, J. and Kennerknecht, R. 2006. Customer satisfaction and loyalty as success factors in organic food retailing. Paper presented at the 16th Annual IAMA World Forum and Symposium: *Agribusiness, Food, Health, and Nutrition*, Buenos Aires, Argentina, 10-13 June 2006.

Theuvsen, L. 2004. On good and bad bureaucracies: designing effective quality management systems in the agrofood sector. Paper presented at the 84th EAAE Seminar: *Food Safety in a Dynamic World*, Zeist, The Netherlands, 8-11 February 2004.

Tomarken, A. and Waller, N. 2005. Structural equation modeling: strengths, limitations, and misconceptions. *Annual Review of Clinical Psychology* 1:31-65.

Werts, C., Linn, R. and Jöreskog, K. 1974. Intraclass reliability estimates: testing structural assumptions. *Educational and Psychological Measurement* 34:25-33.

Willer, H. 2011. The World of Organic Agriculture 2011: summary. *In* H. Willer and L. Kilcher (eds), *The World of Organic Agriculture. Statistics and Emerging Trends 2011*, IFOAM, Bonn, and FiBL, Frick. 26-32.

Zorn, A., Lippert, C. and Dabbert, S. 2009. Analyse der Kontroll und Sanktionshäufigkeiten Grosser Ökokontrollstellen in Deutschland. Paper presented at GEWISOLA Annual Conference: *Agrar und Ernährungsmärkte nach dem Boom*, Kiel, Germany, 30 September-2 October 2009.

Appendix. Measurement items for the constructs in the conceptual model

Latent constructs and measurement items	Mean	Satandard deviation	Factor loading*
Satisfaction with the organic certification process			
I am satisfied with the organic certification	1.60	1.23	1.00
Reliability of the certification process			
The certification process is reliable.	1.83	1.10	0.87
Inspectors are able to notice if other farmers sometimes do not follow the guidelines.	1.62	1.14	0.75
Cheaters are discovered during the control.	1.27	1.61	0.73
Farm management			
Organic certification standards enhance the effectiveness of my organic practices.	1.60	1.43	0.85
The organic certification standard improves my productivity.	1.10	1.64	0.75
The auditor gives me good ideas to improve the management of my farm.	1.04	1.82	0.69
I do a better quality management since I got the organic certification	1.72	1.40	0.69
Relationship with buyers/Market access			
Our course of business becomes clearer through the certification process.	1.45	1.46	0.82
I have a better relationship with my buyers since I got the organic certification.	1.37	1.46	0.81
I need the organic certification to be able to sell my products.	0.86	2.14	0.71
Since I farm organic, my business relations have increased.	1.14	1.59	0.71

Farm income*			
My income has increased since I got the organic certification	0.65	1.67	0.92
I had more gains with conventional agriculture than with organic agriculture.***	-0.88	1.55	0.72
Economic costs*			
The fee for the certification process is not so high.***	-0.83	1.72	0.92
The cost for the organic certification is too high.	1.38	1.47	0.83
Bureaucratic costs*			
The time expenditure for the certification process is exaggerated.	-0.45	2.00	0.89
The required documentation by the organic certification is exaggerated.	-0.45	2.05	0.83
The organic certification control system is very bureaucratic.	0.51	1.93	0.64
Years of experience			
For how many years have you practice organic agriculture?	10.43	7.39	1.00
CB's reputation*			
I chose this CB because it has a good reputation.	1.29	1.27	0.88
In comparison to other CBs ours is more thorough.	0.65	1.22	0.82
Auditor's reputation*			
The performance of the auditor during the inspection is very accurate.	1.93	1.08	0.85
The auditor is an expert in organic production.	1.51	1.48	0.75
Our auditor tries to find the weak points in my farm.	1.89	1.07	0.74
Risk perception*			
I do not believe that all organic producers are trustworthy	0.46	1.97	0.81
Not every organic farmer has the same level of reliability.	0.65	1.98	0.79
I am worried that the number of "black sheeps" in the organic sector is increasing.	0.24	1.90	0.72
Nowadays there are more farmers who do not follow the organic guidelines.	-0.73	1.59	0.61
Buyers pressure*			
My buyer controls that I keep close to the guidelines.	1.20	1.92	0.86
My buyer warns me frequently about the consequences of cheating.	0.59	2.09	0.86
Government pressure*			
The government does not monitor if farmers comply with the organic certification.	1.23	1.77	1.00
Farmers pressure*			
If my neighbors discover that I do something wrong, they would denounce me.	1.54	1.45	0.83
Producers are aware that if any of them cheat, that could be detrimental to the name of the association.	2.18	1.13	0.79
My organic certified neighbors monitor that I comply with the requirements of the certification.	0.86	1.81	0.75
Family pressure*			
My family cares that I fulfill the requirements of organic farming.	1.60	1.54	1.00

Source: Authors' calculations

* Results of the PLS confirmatory factor analysis

** Respondents assessed each item using a seven-point Likert scale with totally disagree (-3) and totally agree (+3) as anchors

*** Scale items are reverse coded

PROPOSIÇÃO DE UM MODELO DE INCENTIVOS EM CANAIS DE DISTRIBUIÇÃO

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Abstract
This article aims to propose an incentive model in distribution channels. With this objective, some existing theories will be studied, contextualizing the concepts of distribution channels, as well as the reasons to opt for the use of incentives models along the canal. Following this rationality, it will be developed and analyzed two existing models in the current theory. From the integration of all these factors and professional life experiences, a new model is proposed. The study is structured in the form of multiple case studies, focusing in six companies. In the model proposed five phases are contemplated, namely: (a) external analysis focusing in network, (b) defining the value strategy, (c) performance goals, (d) benefits, (e) management of special channels.

Key words: Marketing administration, marketing channels, incentives marketing.

PROPOSIÇÃO DE UM MODELO DE INCENTIVOS EM CANAIS DE DISTRIBUIÇÃO

1. Introdução

Incentivos em canais de distribuição são definidos como "comportamentos ou políticas descritas em acordos padrão do fornecedor que são desenhadas para motivar o suporte ativo do intermediário à agenda do fornecedor" (GILLILAND, 2003, p. 56).
Incentivos são utilizados pelo fornecedor para alocar recursos e funções entre membros de canais de distribuição, alcançar objetivos, controlar as ações dos distribuidores, administrar conflitos e promover a adaptação dos distribuidores.
Construir e sustentar parcerias com distribuidores é um aspecto vital para diversas empresas que têm em canais de distribuição a forma de acessar o mercado consumidor.
Crucial para construir e manter o relacionamento em canais é a capacidade de cada empresa em proporcionar uma vantagem relativa a potenciais parceiros alternativos, tanto distribuidores como fornecedores (THIBAUT; KELLEY, 1959).
É errado, todavia, pensar em distribuidores como agentes completamente sujeitos às estratégias de fabricantes que os selecionarem. São empresas autônomas com gestão e tomada de decisões independentes. Fabricantes podem possuir produtos e marcas tradicionais, mas distribuidores possuem o conhecimento sobre os clientes finais e o potencial de garantir o diferencial dos produtos de um fornecedor específico para este cliente final (COUGHLAN et al, 2002).
Em outras palavras, em muitos casos distribuidores dependem menos de fornecedores do que o contrário (PELTON et al, 1997) e a fidelidade do cliente final pode estar concentrada na relação com o distribuidor e não com o fabricante (WEISS; ANDERSON, 1992).
A questão do poder pode influenciar em muito a forma que a transação entre o fabricante e distribuidor será governada e, por conseqüência, os incentivos que estarão em jogo (SHERVANI, FRAZIER, CHALLAGALLA, 2007).
Essa situação de mais poder e independência de varejistas em relação a fabricantes e o desafio de trabalhar de forma integrada com distribuidores, ganhou uma denominação particular em marketing que é o trade marketing, como sendo o marketing (com suas variáveis de preço, produto, comunicação e distribuição), aplicado a distribuidores (ALVAREZ, 2006). Um plano de incentivos é uma ferramenta dentro do trade marketing, para construção do relacionamento com canais.
Este artigo assume que programas de incentivos incluem o que é pedido pelos fabricantes aos distribuidores e o que é oferecido aos distribuidores em troca pelo desempenho destes. Essa concepção é inspirada na perspectiva de trocas sociais já amplamente utilizada em canais de distribuição, que olha custos e benefícios de um relacionamento (THIBAUT; KELLEY, 1959). Assim, pretende-se com este artigo propor um método de incentivos no canal a partir da utilização de teorias e modelos já existentes.

2. Referencial Teórico

2.1 Canais de distribuição e incentivos

Canais de distribuição são definidos de acordo com Stern et. al. (1996) como um conjunto de organizações interdependentes envolvidas no processo de disponibilizar um produto ou serviço para uso ou consumo.
Para entender a existência de distribuidores é preciso analisar sob duas perspectivas, a dos clientes e a dos fabricantes, conforme Bucklin (1965). Ambos podem ter interesse na existência de canais. Começando pelo cliente, estes conseguem comprar em uma quantidade

menor do que comprariam de fabricantes (lotes menores), com uma diversidade maior (distribuidores combinam diferentes produtos), com um tempo de espera menor, com um tempo de procura pelo produto menor, já que sabem onde encontrar e, finalmente, com a possível opção do financiamento do canal. Considerando o fabricante, este precisa do distribuidor para atender o desejo do seu cliente nos pontos citados acima, mas também para reduzir o número de transações de venda (reduzindo riscos e facilitando as transações), como conhecedor do mercado local e por isso importante fonte de informações.
Deve-se entender que um fabricante que adota canais indiretos de distribuição por necessidade (ou seja, não vendendo diretamente ao consumidor final, justificadamente pelos pontos colocados acima) está compondo a variável de marketing distribuição com outras empresas. Ou seja, ele também depende do trabalho de um distribuidor (agente externo) para alcançar o equilíbrio e integração com o composto de marketing.
Crucial para construir e manter a parceria, é a capacidade de cada empresa em proporcionar uma vantagem relativa a potenciais parceiros alternativos, tanto distribuidores como fornecedores (THIBAUT; KELLEY, 1959). Se uma empresa oferece uma vantagem em resultados comparados a alternativas existentes, ela oferece a vantagem da parceria com canais de distribuição (SETHURAMAN; ANDERSON; NARUS, 1988). Oferecer a vantagem da parceria em canais pode ser uma fonte fundamental de vantagem competitiva.

2.2 Proposta de Narus e Anderson (1988)

Narus e Anderson (1988) elaboram um programa de incentivos para construir a vantagem da parceria, composto de quatro passos, sendo estes (1) a definição do que se quer do distribuidor; (2) a escolha de um posicionamento para os canais de distribuição, (3) construção de um pacote de oferta ao canal; (4) a comunicação ao canal. Esta sequência permite a empresa trabalhar a fidelidade e motivação do distribuidor, ao mesmo tempo em que trabalha estes conceitos para o consumidor final.
No passo 1, é colocado que os fornecedores devem primeiro pensar nas expectativas que têm sobre o trabalho de um distribuidor. Essas expectativas são classificadas em três grupos, sendo nível de penetração de mercado (vendas no território, vendas a segmentos específicos, participação de mercado, desenvolvimento de novos clientes, visitas a potenciais clientes e evolução das vendas em relação a um período anterior), ampliação do produto (assistência para reparos, pessoal capacitado tecnicamente e em markeitng) e profissionalismo gerencial (competências dos distribuidores em planejamento estratégico, marketing, operações, finanças, recursos humanos).
No Passo 2, os autores colocam que os fornecedores devem selecionar um posicionamento de canais com uma clara vantagem aparente. A posição de canal deve ser construída identificando as competências da empresa, bem como seus objetivos e estratégias. A seguinte sequência de atividades é sugerida: (1) o fornecedor revisa seu posicionamento atual com canais identificando falhas em satisfazer necessidades dos distribuidores ou diferenciar a empresa, inconsistências com a estratégia geral de marketing e mudanças das condições locais do mercado; (2) a empresa compara as necessidades dos distribuidores com o posicionamento oferecido pelos principais competidores, com o objetivo de isolar alguns hiatos encontrados; (3) o fornecedor deve definir o posicionamento desejado considerando principais hiatos oferecidos existente com relação a concorrentes e suas principais competências. Alguns posicionamentos dados como exemplo pelos autores são “suporte técnico”, “fornecedor de serviço completo”, ou ainda, “sistemas de rede”, com soluções automatizadas.
No Passo 3, o método sugere que seja construída a oferta para o distribuidor. A oferta para o canal é composta de três principais seções que são os elementos centrais de canal, programas para construção de competências e programas de incentivo. Os elementos centrais de canais são os retornos financeiros oferecidos (baseados em descontos funcionais oferecidos, giro dos

produtos, prêmios por desenvolver tarefas adicionais), produtos de qualidade, preços competitivos, entrega confiável do fornecedor ao distribuidor e reputação nacional da marca do fornecedor. Como programas de construção de capacidades estão inseridos tópicos como suporte promocional (propaganda cooperativa), treinamentos técnicos e comerciais, pesquisa de mercado, políticas da empresa, assistência técnica, sistemas de resposta ao mercado. Finalmente, os programas de incentivos seriam colocados de três tipos, ou seja, incentivos para a força de vendas do fornecedor trabalhar com os distribuidores, incentivos para a empresa de distribuição e, finalmente, incentivos para a força de vendas dos vendedores dos distribuidores

Narus e Anderson (1988) falam da baixa capacidade de incentivos conquistarem a vantagem da parceria e que estes geralmente são comportamentos de curto prazo. Os autores claramente privilegiam a questão dos elementos centrais e construção de competências. Como Passo 4, os autores sugerem a comunicação do posicionamento de canais aos distribuidores.

Este modelo, apesar de antigo, tem preocupações bem atuais com a construção de vantagens competitivas usando canais de distribuição e com uma visão mais estratégica e menos de curto prazo. Os autores deixam claro diversos erros estratégicos de empresas que tiveram resultados abaixo do esperado porque usaram incentivos errados como, por exemplo, quando, ao desenvolver novos clientes, deram descontos especiais para algumas linhas e o resultado foi somente perda de margem, ou estocar com produtos os canais de distribuição por excessos de incentivos imediatos e falta de visão de longo prazo (NARUS; ANDERSON, 1988).

Existe uma disputa por distribuidores com diferentes pacotes de benefícios e esforços relacionados e o fornecedor deve estar atento para isso. Existe uma diferença entre fazer "marketing com distribuidores" e fazer "marketing para os distribuidores". A empresa deverá conquistar a vantagem da parceria em canais, que pressupõe distribuidores dispostos a realizarem esforços na linha do esperado pelos fornecedores (NARUS; ANDERSON, 1988).

Todavia, os esforços serão na direção do esperado pelo fornecedor. Se ele acredita que um bom posicionamento para canais seja o de suporte técnico deverá investir nisso. A seleção de um posicionamento para canais de distribuição deve ser semelhante ao feito para consumidores finais, com seleção de um ponto de vantagem claro, que faça diferença, seja perceptível e coerente (NARUS; ANDERSON, 1988).

Uma empresa que busca se diferenciar no mercado como a melhor em termos de serviços técnicos de suporte, deve se posicionar para os seus distribuidores da mesma forma. Ou seja, ela deverá ser a líder em suporte técnico para os distribuidores.

2.3 Proposta de Gilliland (2003)

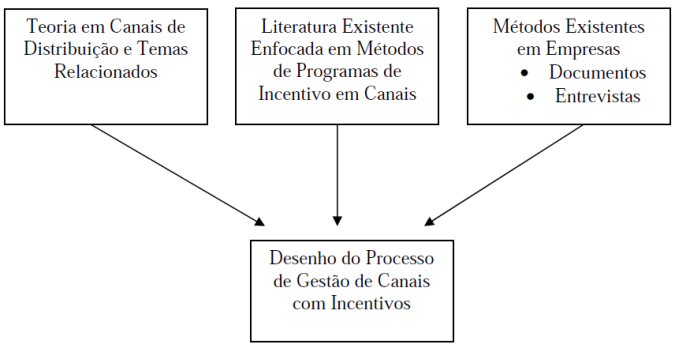
Gilliland (2003), já em um trabalho mais recente, traz uma perspectiva diferente na proposição de um método para criação de incentivos para canais de distribuição. O método é composto por quatro etapas: a identificação dos requisitos de desempenho do distribuidor; a identificação das bases de rejeição de programas de incentivo; a consideração de todos os fatores de desempenho que podem levar a rejeição; e, finalmente, o desenho dos incentivos de forma que os tipos propostos se relacionem adequadamente com as bases para a rejeição.

Sobre o Passo 1, o autor coloca que distribuidores têm comumente, quatro requisitos de desempenho, baseado fortemente nos trabalhos de Kumar (1992) e Quinn e Rohrbaugh (1983) op cit Gilliland (2003): o alcance de objetivos financeiros em sua atividade relacionado com crescimento de vendas e lucros; a necessidade de integração interna e externa dos seus negócios, mantendo a estabilidade; os distribuidores têm necessidade de ter bons relacionamentos e um baixo nível de conflitos com participantes da rede de negócios; os distribuidores também têm necessidade de liberdade para serem flexíveis e inovar conforme as mudanças nas condições de mercado para poderem capturar valor nas diferentes situações. Segundo Gilliland (2003), este primeiro passo se baseia em identificar qual é o requisito

primordial de desempenho do distribuidor.
No Passo 2, Gilliland (2003) sugere relacionar os requisitos encontrados com as bases para a rejeição. Ou seja, cada requisito de desempenho que não encontre seu correspondente nos objetivos do distribuidor serão rejeitados. Se um distribuidor está focado em objetivos financeiros deverá rejeitar uma proposta possivelmente porque ela não é forte o suficiente em termos de magnitude ou rapidez que o incentivo é dado, e assim por diante com relação aos outros objetivos. Por isso quem foca estabilidade irá reclamar pela desestabilização no sistema que o incentivo provocou. Quem foca em manter padrões irá reclamar de promessas inadequadas com a proposta de negócio do distribuidor e para quem está procurando inovar provavelmente irá reclamar em função de perder a liberdade em inovar e mudar ao adotar o programa daquele fornecedor.
Já no Passo 3, o autor sugere que a forma de rejeição encontrada derivada dos objetivos e bases para rejeição (Passos 1 e 2) sejam detalhadas minuciosamente para permitir ao fornecedor pensar em estratégias corretas para a criação do incentivo.
Finalmente no Passo 4, o autor sugere a criação do incentivos. Para isso ele busca relacionar os objetivos dos distribuidores, bases para rejeição e finalmente, a categoria saliente que deve estar presente no programa de incentivos.

3. Procedimentos Metodológicos

Foram desenvolvidos seis estudos de caso com foco central no programa de incentivos utilizado pela empresa com seus canais de distribuição. Sendo três empresas no Brasil e as mesmas três nos EUA no setor de defensivos agrícolas e seus programas de incentivo em canais foram compreendidos e comparados, com o uso de análise documental e entrevistas pessoais.
Estudo de caso é definido por Yin (2001) como um método de pesquisa empírico que "investiga um certo fenômeno contemporâneo dentro do seu contexto de vida real, especialmente quando as fronteiras entre o fenômeno e o contexto não estão claramente definidas (...), lida com uma situação tecnicamente única onde existem muito mais variáveis de interesse do que dados disponíveis, e como resultado, é baseado em diversas fontes de evidência, (...) e ainda recebe o benefício de proposições teóricas desenvolvidas anteriormente que devem conduzir ou direcionar a coleta e análise de dados".
Sobre a escolha de casos múltiplos, Yin (2001) coloca que a opção pelo estudo de caso múltiplo permite evidências mais concretas, quando comparado ao caso único, mas também requer mais tempo e recursos.
Além disso, para a proposição de um método para gestão de canais de distribuição foi feita uma busca de um método de gestão, baseado em processos em marketing e abordagem de interação.
O esquema, a seguir, representa como um programa de incentivos em canal, composto por uma sequência de atividades ou processos de negócio, foi construído:



Esquema representativo da construção do método de gestão de canais com incentivos
Fonte: Elaborado pelo autor

Por fim, o artigo faz uso dos conceitos teóricos de diversas linhas em canais de distribuição e dos estudos de caso para propor uma seqüência de etapas para a elaboração de um programa de incentivos em canais.

O motivo do estudo comparativo se dá pela oportunidade de investigar como programas de incentivo podem ser diferentes e semelhantes e, dessa forma, entender as principais variáveis que os definem.

O setor escolhido é o de defensivos agrícolas. Os produtos vendidos por estas empresas são classificados nas categorias de herbicidas, acaricidas, fungicidas e inseticidas. O setor movimenta cerca de US$ 32 bilhões globalmente com vendas crescentes e cada vez mais concentradas. As nove empresas que possuem perto de 95% do mercado global são Bayer, BASF, Syngenta, Dow, Monsanto, DuPont, Arista e FMC. Existe forte tendência de crescimento em função da necessidade de maior produção em volume e produtividade de alimentos e bioenergia (AKRIDGE, 2007).

Este setor utiliza primordialmente distribuidores varejistas para distribuição aos produtores agrícolas, mas também conta com atacadistas, cooperativas e agentes (brokers), vendas diretas e, mais recentemente, a Internet. Os canais de distribuição vivem uma concentração horizontal e vertical nos dois países.

As três empresas selecionadas são responsáveis por cerca de 50% das vendas globais de defensivos químicos. Por motivos de confidencialidade essas empresas são denominadas neste trabalho de B1, B2 e B3 para o Brasil e E1, E2 e E3 para os EUA. B1 e E1 são empresas ligadas à mesma multinacional e assim por diante.

Sobre a pesquisa documental, materiais foram coletados das seis empresas investigadas. Esses materiais foram passados pelas próprias empresas, pelos seus canais de distribuição ou por especialistas de mercado, uma vez que foram solicitados pelo pesquisador, após a explicação do objetivo da pesquisa e garantia de não abertura de informação quanto à identidade dos envolvidos. Também foram feitas entrevistas com canais de distribuição varejistas no Brasil e nos EUA.

Para as entrevistas foram desenvolvidos roteiros semi-estruturados contendo um guia de perguntas ao entrevistador em português e em inglês, o roteiro buscou permitir ao entrevistado adicionar pontos extras a serem considerados no problema em análise.

4. Resultados

Composição dos Programas	**Segmento C**	**Segmento B**	**Segmento A Interdependência**
Itens de Controle / Desempenho O que fabricantes irão demandar de distribuidores?	• Medidas de Resultado	• Medidas de Resultados • Poucas medidas de atividades	• Medidas de Resultados • Medidas de atividades
Benefícios O que fabricantes irão oferecer em troca pelo	• Nível básico de benefícios	• Nível médio de Benefícios	• Alto nível de benefícios

bom desempenho?			
Exclusividade Fabricantes irão estabelecer territórios exclusivos e obter exclusividade de produto do distribuidor?	• Pouco presente	• Alguma prioridade mútua	• Prioridade absoluta
Formalização Quão formal e explícito será o acordo ou contrato?	• Menos explícito mais informal	• Construção de um acordo	• Detalhamento Superior: ferramenta instrutiva

Ilustração 16: O Método em Evolução de Gestão de Canais Especiais com Incentivos
Fonte: Elaborada pelo autor.

O método insere a perspectiva de segmentação baseada em itens de controle. Na descrição do método a literatura de controle será denominada de desempenho do canal de distribuição por representar melhor o objetivo do método. Dessa forma, para diferentes níveis de desempenho (A, B ou C) existem diferentes benefícios associados (A, B ou C).
O método sugere que diretores de relacionamento com canais de distribuição irão implementar itens de gestão estratégica de canais especiais sendo responsáveis pela trajetória de um canal de um segmento C para um segmento A (a seta na figura com o termo gerência de canais especiais denota a responsabilidade desse gerente), onde existem maiores benefícios em função do canal ter atingido um nível superior de desempenho nas medidas de controle estabelecidas. Um canal no segmento A deve atingir um nível de relacionamento superior, quando interdependência é estabelecida porque ambos, fabricante e distribuidor, têm a perder pelo término do relacionamento. Por isso vale a pena acomodar diferenças e resolver conflitos.
A ênfase no papel do gestor estratégico de canal se dá pela constatação de que as pessoas envolvidas no processo, dos dois lados, são fundamentais para o bom encaminhamento do programa. Os aspectos centrais do programa estão baseados nas medidas de controle ou metas de desempenho selecionados, nos benefícios oferecidos, na definição e alcance de um nível de exclusividade e na formulação de um acordo explícito e claro para ambas as partes. Cada um dos componentes varia conforme se avança no relacionamento.
Antes, porém, de passar ao gestor de canais, as tarefas relacionadas à sua missão de alinhamento e construção de relacionamento com o distribuidor, o fabricante precisa estruturar a lógica do programa, conforme as seguintes etapas: Análise externa e da rede, definição da estratégia de valor, metas de desempenho, benefícios e gestão de canais especiais.
Cada uma das suas cinco etapas, com seus subitens, são explicadas a seguir.

4.1 Análise externa e da rede

A primeira etapa é composta pelo desenho da rede, análise do ambiente externo, análise dos clientes finais, análise dos canais e a análise dos canais da concorrência.
O desenho inicial da rede da empresa do fabricante é fundamental para que todos os membros de canal sejam identificados, bem como prestadores de serviços, fornecedores alternativos, entre outros possíveis agentes.
Uma vez a rede desenhada, é importante entender como as tendências existentes nos macroambientes político, econômico, social e tecnológico podem alterar a competitividade

dos membros de canal através de ameaças e oportunidades e, também, a situação de dependência relativa de distribuidores e fabricantes.
Uma vez entendida a rede e os impactos decorrentes da análise do ambiente é necessária uma análise mais detalhada do comportamento de compra dos clientes finais, já que estes serão alvos centrais os quais trabalharão, conjuntamente, fornecedor e distribuidor para entrega de mais valor do que a concorrência. Assim, deve-se entender como se dá o comportamento de compra desde a identificação de necessidades, busca de informações, decisão de compra, a compra e o comportamento pós compra (ENGELS et al, 1995).
Tal como a análise do consumidor final, também é necessária uma análise das necessidades e objetivos dos canais utilizados pela empresa. Essa análise é uma espécie de diagnóstico da situação atual dos canais de distribuição.
A última etapa da análise do ambiente com enfoque de rede tem relação com o desenvolvimento de um conhecimento razoável dos modelos de distribuição utilizados pelos principais concorrentes em termos de tipos de distribuidores, regiões, programas de incentivo utilizados (metas de desempenho e benefícios fornecidos), existência de contratos, entre outras informações relevantes.

4.2 Definição da Estratégia de Valor

A criação de valor é subdivida em três diferentes etapas sendo "análise de margens e captura de valor", "oportunidades para a criação de valor" e "posicionamento de canais". É adotada uma perspectiva de criação de valor através da cooperação entre empresas (WALTERS; LANCASTER, 2000
A análise de margens e captura de valor é baseada no trabalho de Consoli e Neves (2006) que propõem um método que primeiro identifica as responsabilidades de cada membro de canal sobre os fluxos de marketing, chegando a um coeficiente de trabalho do membro de canal em todo o sistema. Segundo, as margens reais médias são calculadas. Dessa forma, tem-se uma visão sobre o montante de responsabilidades que um membro de canal tem sobre o fluxo físico de produtos, comunicação de marketing, entrega de serviços, busca de informações de mercado, recebimento de pedidos, fluxo financeiro e de risco nos canais e o valor financeiro atual que o membro de canal captura.
Estando entendido como o valor é criado e capturado nos canais de distribuição, a próxima etapa é pensar em oportunidades para aumentar a geração de valor para o canal. A criação de valor em relacionamento com canais de distribuição foi denominada por Anderson e Narus (1990) como obtenção da vantagem da parceria. Ou seja, se a empresa for a melhor opção como fornecedora possuirá maior atenção do distribuidor e o interesse dele em estar vinculado ao fornecedor. O quanto um fornecedor oferece em termos de vantagem de parceria, ou seja, o quanto ele é melhor que uma segunda alternativa, para o distribuidor, segundo eles é uma reflexão que deve ser sempre buscada.
Um fornecedor é avaliado, sobretudo, pelos produtos que oferece ao distribuidor criando receita para o distribuidor, pelos programas de treinamento que pode oferecer aos distribuidores para que os tornem mais competitivos, pela criação de mercados alternativos para o distribuidor e pela disponibilização de novos serviços.
O posicionamento com canais de distribuição é semelhante ao conceito de posicionamento aos clientes finais de Ries e Trout (1995), mas ele busca o "marketing para distribuidores e não com distribuidores". Conforme Narus e Anderson (1988) propuseram como segunda etapa do método de incentivos proposto por eles. Assumir o posicionamento com canais significa buscar ser a melhor solução em apoio técnico em programas educacionais, o melhor custo benefício, entre outras possíveis alternativas.
O posicionamento deve buscar construir uma mensagem em que fique claro quem é alvo da empresa para utilização da marca, em que situações a marca ou a empresa deva ser considerada, porque a empresa deva ser escolhida em detrimento de outras empresas

concorrentes e, finalmente, porque a escolha da empresa ajudará o cliente a atingir os seus objetivos.

4.3 Metas de desempenho

Para a definição das metas de desempenho é importante ter uma visão mais detalhada sobre o que se espera do distribuidor. O escopo de atividades deve ser pensado em termos de papel estratégico do distribuidor para o cliente final baseado nas análises de criação de valor e nas etapas anteriores. É uma consolidação do conjunto de informações geradas nas etapas anteriores.

Narus e Anderson (1988) colocaram a identificação de expectativas de desempenho como a primeira tarefa em seu método de desenho de programa de incentivos e se referem à participação de mercado, profissionalismo do distribuidor e *mix* de produto trabalhado pelo distribuidor. Gilliland (2003), por outro lado, coloca os requisitos de desempenho com base nas expectativas dos distribuidores, assumindo que estes estarão relacionados com as necessidades dos clientes finais dependendo do contexto de mercado em que os distribuidores estão inseridos. A etapa proposta aqui é uma consolidação sobre o conjunto de expectativas do distribuidor que vem da análise do comportamento de compra do cliente final, do distribuidor e das necessidades dos fabricantes fornecedores (etapa 1) e, por fim, as possibilidades estratégicas de agregação de valor (etapa 2). Esse alinhamento deve ser traduzido em metas de desempenho de resultados (controle de resultados) e desempenho de atividades (controle de atividades) baseado na literatura de controle de canais (CELLI; FRAZIER, 1996).

A primeira parte da definição das medidas de desempenho se trata da busca dos indicadores de resultados. Basicamente, a literatura de administração de vendas coloca que resultados são relacionados a volumes físico e financeiro de vendas, participação de mercado e margem de lucro alcançada por um canal (CRAVENS et al. 1993, CHURCHILL, 2000).

Para a definição desses valores, sobretudo volumes e participação de mercado, existem etapas anteriores importantes como o cálculo de potencial de mercado baseado em um território de vendas, a estimativa de capacidade de vendas do distribuidor e as expectativas de crescimento ou manutenção do fornecedor. A definição de objetivos de distribuição quanto a resultados não difere das metas de força de vendas, podendo ser usado o mesmo raciocínio. Um objetivo deve ser realista e desafiante, mas alcançável. Deve-se refletir sobre o tamanho médio dos clientes no território (grandes e poucos clientes exigem "menos" trabalho que pequenos e diversos), bem como, o nível de concorrência, gastos da empresa em propaganda no território e, por fim, a história da empresa fornecedora na região (uma história positiva favorece resultados positivos) (CHURCHIL et al., 2000).

A segunda parte da definição das medidas de desempenho se trata da busca dos indicadores de resultados de desempenho de atividades, que requerem um grau maior de dedicação e comprometimento deste distribuidor, porque se corre o risco da atividade desviar o distribuidor dos objetivos centrais de resultados que espera para sua empresa. Por isso, espera-se que o fabricante tenha desenvolvido suficiente vantagem de parceria através da criação de valor e que também selecione corretamente as atividades existentes (CRAVENS ET AL, 1993).

Muito embora o método de incentivos com canal seja um processo de alinhamento e capacitação com o canal, o qual o objetivo central é levar o canal de um segmento inferior para o superior, a divisão dos canais em grupos segundo variáveis, é claramente uma estratégia relacionada com segmentação em marketing.

Entender o objetivo principal do processo de segmentação e garantir que este esteja alinhado com o negócio da empresa em geral e com a estratégia de marketing é vital para o sucesso de sua implementação. Dentre os diversos objetivos colocados para segmentação de mercado colocado por Sausen et al. (2005), o método proposto está relacionado com desenvolver o

potencial de clientes (neste caso os canais de distribuição) e aumentar a lucratividade deles, tornando-os mais satisfeitos com a parceria com o fornecedor.
A implementação do método de incentivos em canais, requer uma segmentação baseada em variáveis operacionais de desempenho dos canais. É necessário um levantamento sobre a situação do conjunto de canais da empresa e sua classificação em três ou quatro grupos conforme nível de desempenho em atividades ou resultados. Pode-se pensar em um nível mínimo de desempenho, eliminando provavelmente um conjunto de distribuidores que não irão participar inicialmente do programa e um nível de desempenho excelente que será o segmento mais elevado a ser alcançado por um distribuidor. Dois ou três segmentos complementares deverão ser colocados como segmentos de transição (desempenho médio) da situação de nível de desempenho baixo para alto.
A segmentação por desempenho dos canais de distribuição é proposta porque o objetivo maior é conseguir levar todos os canais de distribuição participantes ao segmento mais elevado.

4.4 Benefícios

Os benefícios significam as recompensas que canais de distribuição irão buscar no relacionamento com fornecedores. Narus e Anderson (1988) dividiram os benefícios entre centrais, apoio à formação do canal (treinamentos) e os incentivos propriamente ditos. Nessa proposta de método é seguido o modelo conceitual teórico colocado no capítulo 2 desta tese que classificou benefícios em 5 possibilidades, sendo benefícios de alto impacto, penalidades, troca de informações, investimentos específicos e suporte de mercado. A variação do uso desses benefícios será conforme a evolução do relacionamento e progressão do canal nos segmentos.
Todavia para se tratar em termos gerais, pode-se dizer que no início do relacionamento pode-se pensar em benefícios mais operacionais focados, principalmente, em incentivos de alto impacto para motivar o crescimento do relacionamento e despertar a atenção do distribuidor. Depois conforme o canal alcança nível maior de desempenho e maior comprometimento já existe, pode-se pensar na penalidade no sentido da perda dos benefícios de alto impacto primeiramente obtidos e ao mesmo tempo sinalizações através de investimentos específicos leves e suporte de mercado para encorajar o canal a se comprometer em retorno com o fornecedor. Finalmente, com o canal no nível mais elevado de desempenho, usa-se o completo leque de benefícios e espera-se que o comprometimento mútuo justifique a maior probabilidade de continuidade da relação, com negociação aberta, acomodação de diferenças e crescimento de ambas as partes. Espera-se que atividades feitas em conjunto, como, por exemplo, planejamento, marketing e comunicação, extrapolem o requisito mínimo do relacionamento e caracterizem uma parceria rica (WILSON, VLOSKY, 1997).

4.5 Gestão de canais especiais

O tópico de gestão de canais especiais aglutina todo o trabalho sobre preparar um gerente de canal especial para implementar o programa com o canal de distribuição selecionado. O gerente de canal especial é assim denominado pela associação com a literatura em marketing de relacionamento, gestão de contas especiais, ou *Key Account Management.* Trata-se de um processo altamente individualizado com implementação de ferramentas customizadas para um cliente buscando sua satisfação e conseqüente fidelização ao fornecedor.
Alvarez (2006) denomina os gerentes de canais de distribuição como sendo os *trade marketers* e os colocam como gerentes de negócio e consultores, com profundo conhecimento sobre seus clientes e prontos para discutir tópicos relacionados a produtos, promoção, logística, aspectos financeiros do negócio e de preço.
Existe uma grande missão desses gerentes de relacionamento que é a construção de confiança, aprofundamento do relacionamento, com forte troca de informações para abrir diversas possibilidades para o trabalho conjunto. A demonstração de credibilidade e benevolência, a

comprovação ou reforço positivo da reputação que o fornecedor possui em relação a canais de distribuição foram alguns dos indícios da análise de Palmatier et al. (2006) em sua meta análise da criação de relacionamentos com clientes, que devem ser incorporados pelo gerente de canal especial.

5. Conclusão

Este artigo buscou atingir os objetivos de melhor entender programas de incentivo, e propor um método de gestão para ser utilizado por fornecedores que queiram usar incentivos para a construção da vantagem da parceria.

O artigo contribui com a teoria de canais de distribuição ao oferecer uma nova forma de entendimento de programas de incentivo de canais com a composição de diferentes linhas de pesquisa antes tratadas em grande parte da literatura de forma separada.

Uma segunda contribuição está no oferecimento de um método de gestão composto de um conjunto de processos seqüenciais orientando gestores de marketing a construírem programas de relacionamento baseados em incentivos

Uma terceira contribuição está relacionada à oportunidade de comparação de canais de distribuição existindo em dois diferentes ambientes institucionais, mesmo não tendo sido o foco do artigo.

6. Referências

ALVAREZ, F. J.S.M. A Aplicação das Variáveis do Trade Marketing Mix nas Empresas de produtos de Consumo no Brasil: Um estudo da Freqüência de Aplicação. Anais do 1º. Encontro de Marketing da Anpad (EMA), Rio de janeiro, 2006.

ANDERSON, E.; WEITZ B. The Use of Pledges to Build and Sustain Commitment in Distribution Channels. Journal of Marketing Research. Vol. XXIX, February 1992, pág 18-32.

BUCKLIN, L. P. Postponement, Speculation and the Structure of Distribution Channels. Journal of Marketing Research. v. 2, (1), p. 26-31, feb. 1965.

CELLY, K. S.; FRAZIER, G. L. Outcome- Based and Behavior-Based Coordination Efforts in Channel Relationships. Journal of Marketing Research Vol. XXXIII (May 1996), pag 200-210

CHURCHILL, A.G.; FORD, N.M.; WALKER O.C., JOHNSTON M. W., TANNER J. F. Sales Force Management. Boston: Irwin McGraw-Hill, 6a. ed., 727p., 2000.

CONSOLI, M. A.; NEVES, M. F. Análise da Captura de Valor nos Canais de Distribuição: Utilização como Ferramenta de Auxílio ao Planejamento de Canais. Publicado nos Anais do 1º. Encontro de Marketing da Anpad (EMA), realizado no Rio de janeiro, Junho 2006.

COUGHLAN, A. et al. Canais de Marketing e Distribuição. 6 ed. Porto Alegre: Bookman, 2002.

CRAVENS, D. W.; INGRAN, T.N.;LAFORGE R.W.;YOUNG C. E. Behavior-based and outcome-based sales force control systems. Journal of Marketing, Vol. 57, p.47-59, October, 1993.

ENGELS, J. F.; BLACKWELL, R.D; MINIARD, P.W. Consumer Behaviour.New York: Dryden, 1995, 789 P

GILLILAND, D. I. Towards a Business-to-Business Channel Incentive Classification Scheme. Industrial Marketing Management. V 32, 2003, pag. 55-67.

NARUS, J. A. ANDERSON, J. C. Strengthen Distributor Performance through Channel Positioning. Sloan Management Review, Winter 1988, 29, pág 31-40.

PALMATIER, R.W; DANT. R. P. ; GREWAL, D. EVANS, K. R. Factors Influencing the

Effectiveness of Relationship Marketing : A Meta Analysis. Journal of Marketing. Vol 70, (October 2006), pág 136-153.
PELTON, L. E.; STRUTTON, D.; LUMPKIN, J. R. Marketing Channels: A Relationship Management Approach. Boston: McGraw-Hill, 1997. 728 p.
RIES, A.; TROUT, J. – Positioning. The Battle for Your Mind New York: Warner Books. 1995, 154 pg.
SAUSEN, K; TOMCZAK, T.; HERRMAN, A. Development of a Taxonomy of Strategic Market Segmentation: A Framework for bridging the implementation gap between normative segmentation and business practice. Journal of Strategic Marketing, V 13, September 2005,151-173 pág.
SETHURAMAN, R. ANDERSON, J. C. NARUS, J. A. Partnership Advantage and Its Determinants in Distributor and Manufacturer Working Relationships. Journal of Business Research 17, (1988) pág. 327-347.
SHERVANI, T. A.; FRAZIER, G.; CHALLAGALLA. The Moderating Influence of Firm Market Power on The Transaction Cost Economics Model: An Empirical Test in a Foward Channel Integration Context. Strategic Management Journal . n. 28, 2007, pág 635-652
STERN, L. W.; EL-ANSARY, A. I.; COUGHLAN, A. T. Marketing Channels. 5th ed. Upper Saddle River: Prentice Hall, 1996. 576 p.
THIBAUT, J. W. KELLEY, H. H. The social Psychology of Groups, New York: Wiley, 1959.
WALTERS, D.; LANCASTER, G.. Implementing value strategy through the value chain. Management Decision, v. 38, n. 3, pág 160 – 178. 2000.
WEISS A. M.; ANDERSON E.. Converting from independent to employee salesforces: the role of perceived swiching costs. Journal of Marketing Research, Vol. XXIX, pág. 101-115, February 1992
WILSON, E. J. VLOSKY, R. P. Partnering Relationships Activities: Buiding Theory from Case Study Research. Journal of Business Research 39, 1997, pág 59-70
YIN, R.K.; Estudo de Caso: Planejamento e Métodos. Porto Alegre: Bookman, 2a. ed, 205 p, 2001.

THE DEVELOPMENT OF ORGANIC FOOD SECTOR IN WESTERN BALKAN COUNTRIES – RESULTS OF DELPHI METHOD

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Abstract
The organic system of food is one of the systems which will contribute to the improvement of the quality of human life; preservation of natural environment and protection of the animal. This system works in accordance with the principles of sustainable development.
The production of organic products started to develop in Western Balkans countries recently. The market for organic products is still a niche market. The population consumption of organic products is still limited and at very low level but with the expectations of growth.
As consumers of organic products is difficult to identify in all Western Balkan countries, and the data on the organic market is not statistically available, aim of this paper is to better understand consumer demand as well the situation on the market through an expert's survey. This expert's survey is the main tool of the study, built according to the Delphi methodology.
The paper is organized in five parts. The first part provides general Country data and the description of the food market in WBC. Second part is related to an overview of the current situation of the organic sector in WBC. In the third part, methodology of the Delphi approach is described. Forth section analyses the Delphi study results providing the details about all 6 WB countries included in the study. The main conclusions that can be drawn about organic food development in the WBC are presented in the fifth part.

Key words: organic food sector, Delphi method, Western Balkan Countries

THE DEVELOPMENT OF ORGANIC FOOD SECTOR IN WESTERN BALKAN COUNTRIES – RESULTS OF DELPHI METHOD

1. General country data and the food market in western balkan coutries

Western Balkan Countries (WBC) are consisted of six countries: Bosnia and Herzegovina, Croatia, Macedonia, Monte Negro, Slovenia and Serbia.

Serbia is the most populated country with about 7 millions of inhabitants followed by Croatia with about 4.5 millions. Bosnia and Herzegovina follows, with about 3.8 millions and Macedonia and Slovenia with about 2 million (respectively). Montenegro is the smallest Western Balkan country with about 620 000 inhabitants.[126]

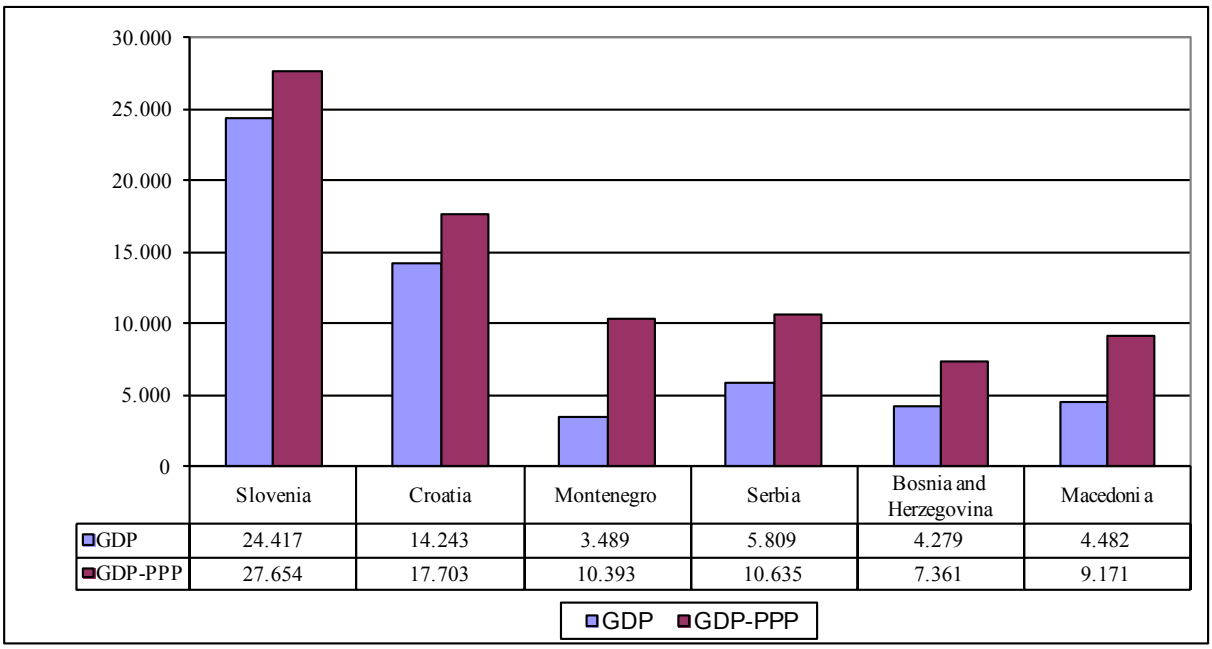
There are some trends concerning the size of population amongst the countries. In Serbia as in Croatia the size of population is on the decrease, while Slovenia's population is growing. In the other countries the population is stagnating. The average household size is about three persons per household, with the exception of Macedonia, which has an average household size of four members.

The differences on the basis of the level of Gross domestic product per capita are pretty high. Slovenia has the highest GDP which is about 21,000 €, followed by Croatia with about 11,000 €, Montenegro with 4,900 € and Serbia with about 4,500 €. Bosnia and Herzegovina have about 3,300 € and Macedonia's GDP / capita amounts to some 3,000 €.

A slightly different picture results of the comparison of the GDP-PPP (gross domestic product corrected by purchase power parity).

[126] http://icsc.un.org/resources/pdfs/2009/pp/bosnia%20and%20herzegovina-09.pdf;http://icsc.un.org/resources/pdfs/2009/pp/macedonia;9.pdf;http://icsc.un.org/resources/pdfs/2008/pp/montenegro-08.pdf; Central bureau of statistics of Croatia; Statistical office of the Republic of Serbia and EUROSTAT

Figure 1: GDP / PPP per capita in US $ (2009)



For comparison:

	Denmark	France	Spain
GDP	56.115	42.747	31.946
GDP-PPP	35.757	33.679	29.689

Source: own graph on the basis of: own compilation according to http://icsc.un.org/resources/pdfs/2009/pp/bosnia%20and%20herzegovina,09.pdf;http://icsc.un.org/resources/pdfs/2009/pp/macedonia;9.pdf;http://icsc.un.org/resources/pdfs/2008/pp/montenegro-08.pdf; Central bureau of statistics of Croatia; Statistical office of the Republic of Serbia and EUROSTAT

The purchase-power – corrected GDP in the reference countries Denmark, France and Spain is, for most WBC, three or four times higher, indicating clearly a higher level of wealth. The average purchase-power – corrected GDP in the WBC is 13,820 US $, while the average value of EU-27 countries reaches 23,600 US $.

The food market in Western Balkan Countries

In most WBC about one third of all consumption expenditures are spent for food. In Serbia, the share of food consumption seems to be higher (42 %) and in Slovenia, significantly lower and reaches the level of the EU-27 average. The following table compiles the weight of food expenditures in WBC and in selected EU countries.

Table 1: The weight of food expenditures in WBC and in selected EU countries

Country / region	Weight of food expenditures as % of all expenditures

BiH	33.4 %
Macedonia	35.6 %
Montenegro	33.7 %
Croatia	32.1%
Serbia	41,8 %
Slovenia	19.0 %
EU-27	19.4 %
Denmark	15.2 %
France	15.7 %
Spain	20.3 %

Source: own compilation according to http://icsc.un.org/resources/pdfs/2009/pp/bosnia%20and%20herzegovina-09.pdf;http://icsc.un.org/resources/pdfs/2009/pp/macedonia;9.pdf;http://icsc.un.org/resources/pdfs/2008/pp/montenegro-08.pdf; Central bureau of statistics of Croatia; Statistical office of the Republic of Serbia and EUROSTAT

2. An overview of the current situation of the organic sector in western balkan countries

The Western Balkan Countries organic markets are, compared to some of the organic markets in Western Europe, relatively young, very small and in an early stage of market development.

In the last twenty years "organic production" existed in form of single farmers or small groups of farmers, who experimented with alternative ways of agriculture, without using agrochemical input. Their main concerns were their own health, the quality of the products and the health of customers. They searched actively for new ways to produce process and market food but, at this early stage, the alternative ways of agriculture were not necessarily called "organic" production. During the last decade, from the year 2000 onwards, the organic movement in most WBC countries experienced new dynamics, pushed by farmers associations, market supply chain actors, consumer groups, or agro food policy. [127]

Significant influence comes from the legal framework established in the European Union (EU), which WBC policy makers often want to adapt to. But, as well, entrepreneurs and market actors from WBC and foreigners, who invest in WBC organic supply chains, want to have an EU-compatible legal framework established in WBC. These forces pushed towards official recognition and labelling of organically produced and processed products. Once a legal and institutional framework on production and labelling established, an enhancement of produced quantities and qualities can be observed.

Among the WB countries Slovenia was apparently the first to establish a legal framework about organic agriculture. Slovenia is, today, the only WBC being member of the EU. It is

[127] www.focus-balkans.org

well developed with regard to the GDP per capita and other macro-economic criteria. As well, the share of organic production is higher than in the other WB countries and very close to the EU-European average. However, the domestic supply does not cover the demand. That's why a lot of imported products, mostly processed food items, are sold in supermarkets, health shops and online shops. The distribution of organic products started very early in conventional retail and now dominates with a market share of 60% the distribution channels. The conventional supermarkets play an important role in raising awareness of Slovenian consumers on organic products. The number of specialized organic shops is growing slowly.[128]

The first consumers of organic products were a small group strongly motivated by ecological and health concerns. Around the year 2000 organic consumption started to broaden. Now, Slovenian organic consumers can be characterized as trend-followers with high-income. To know the origin of the products, with preference to domestic products, and the producers, is important for them. They mostly consume organic products for health reasons. In the future it is important to strengthen the domestic supply, to increase the offer of Slovenian organic products.[129]

Croatia is the second best developed economy in WBC, with regard to macro-economic criteria. As the other countries in WB, Croatia has good predisposition for organic production because of a low level of agrochemical usage in agriculture in general. Farmers are, thus, less dependent on the agrochemical input and can more easily convert towards organic agriculture, and the conversion rates are elevated the channels of distribution are also quite much developed, with wholesalers, retailers, specialized supermarkets for organic products, specialized retail shops and even on-line selling. Consumers are more and more interested in buying organic products and further market growth is expected in Croatia.[130]

In Serbia, after the Law on organic food was established, the production, labelling and selling of organic products was regulated so that the organic food is available now in all bigger towns, as well in supermarkets, specialized retail shops and in the traditional open green markets. The most important organic products are wild and cultivated fruits and berries, but also wild and cultivated medicinal and aromatic plants. The lion's share of the production is exported as raw material to EU countries. In Serbia, organic products are traditionally sold directly (farm-gates and open markets) or health food shops. On the contrary, conventional retail plays a minor role in the marketing of organic products. Consumers or organic products are described as being younger (aged 20-40 years), well educated, urban people, mostly female and with high income level. Organic products are in concurrence with products from specific regions. Most Serbians are unwilling to pay elevated price premiums for organic

128 http://www.stat.si, www.mkgp.gov.si

129 Slabe, A.: Consolidated (EU countries) report. V: Second Seminar on ≈Organic Food and Farming research in Europe ≪ How to improve transnational cooperation, November 26th 2004; Brussels; http://europa.eu.int/comm/research/agriculture/pdf/off_research_in_europe_consolidate_

130 http://www.hr/hrvatska/gospodarstvo/poljoprivreda; http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=41673, http://www.poslovni.hr/142346.aspx; www.mps.hr; www.focus balcans.orghttp://www.hr/hrvatska/gospodarstvo/poljoprivreda

products. Awareness rising of consumers and the amelioration of the infrastructure are important future tasks.[131]

Bosnia and Herzegovina (BiH) seems to have a big potential for more organic farming. Because of the low consumption of fertilizers and pesticides, BiH's traditional small-scale agriculture can quite easily convert towards organic farming. But today, mainly wild collection for the export of raw plant materials markets is developed. Due to the complex politico-administrative situation of the country, a legal framework for the organic sector exists only in one entity of BiH (in Republic Srpska). Farmers' associations for organic agriculture push towards a better structuring and a better framework for organic farming. A control body is working according to IFOAM standards. The organic sector is dynamic and linked up internationally. There is wide panoply of small market actors who are mainly implemented in the collection of wild fruits, plants and mushrooms, in the conditioning and processing of these products and their export to western European countries. The scope of production is very wide, with a lot of different products, but often small quantities. The domestic supply chains for main commodities like milk, cereals, beef, and vegetables are still in an early stage of development, like on farm sales or sales on green markets, with often no price premium for the organic produce. The practices of organic farming and processing and the quality of products have still to be improved. Consumers are increasingly aware of health and sustainability issues, but their willingness to pay more for organic products is strongly limited, due their low purchase power. A national regulation, better labelling and clearer information about organic could enhance consumption.[132]

In Montenegro the starting position in terms of preconditions for organic agriculture is similar to BiH's. The organic production is still in its beginning and dominated by wild collection. But the important in-conversion surfaces show the high potential and growth perspectives of organic agriculture in Montenegro. The organic market has started in 2001. In this time, priority was given to information and education. After that the focus lay on the establishment of laws and certification structures. The absence of expertise and infrastructure for distribution and processing and the fact that most activities are done by foreign companies give distinction to an export orientated market. The domestic market develops slowly so that just a few selling points of organic products exist.[133]

Macedonia is, as well, in an early stage of organic agriculture and food marketing. Further growth and development of organic food are expected. A well structured NGO for organic farming and a committed national policy push the organic sector. Domestic processing is concentrated on the conditioning of the products of wild collection. The sector is traditionally linked to international supply chains and is export-oriented. Domestic supply chains are short

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[131] : Statistical Yearbook 2009, RZS; Ministry of Agriculture, Forestry and Water Management, Republic of Serbia; Census 2002;
http://moan.iamb.it/FCKeditor/UserFiles/File/MOAN%201st%20meeting/MOANPosters/14serbia.pdf
http://www.ifoam.org/growing_organic/2_policy/case_studies/serbia_cases_studies.php

[132] Organic food production – generator of rural development in bosnia and herzegovina. Institute of economics Sarajevo. 2007; Agency for Statistics of Bosnia and Herzegovina, ISSN 1840-104X, Sarajevo, 2009; Agency for Statistics of Bosnia and Herzegovina,Anketa o potrosnji domacinstva u B&H 2007; European Commission (editor, 2009): Bosnia and Herzegovina - Agriculture and Enlargement. In:
http://ec.europa.eu/agriculture/enlargement/countries/bosnia_herzegovina/profile_en.pdf (viewed in June 2010)

[133] Ministry of Agriculture, Forestry and Water Management; IFOAM & FIBL 2010; http://www.organic world.net/montenegro.html

and lack, on the hand, sufficient quantities to produce and, on the other, sufficient marketing possibilities. Organic distribution is in its beginnings, farmers' markets play a pioneer role. There is little knowledge about the Macedonian consumers' position towards organic products.[134]

Generally there is a growing interest by the consumers to buy organic food products in WBC. This goes along with the overall trend towards a more health-oriented life style and growing concerns about sustainable development.

Committed market actors, farmers associations, stakeholders in rural development an environmental protection, consumer associations and policy makers act in favour of the expansion of the organic sector.

But a series of major problems still constitute hindering factor for further development, more or less strongly from country to country:

lack of information about organic products,

the distrust to the information on the label and

lack of promotional activities that could inform consumers more about organic food

lack of purchase power and little acceptance of paying price premiums for organic products,

lack of the availability of the organic products,

lack of domestic supply chains foremost with regard to main commodities

Once these barriers removed, the organic sector in WBC is likely to undergo comparable developments as in other European and world countries.

3. Delphi methodology

The objective of Delphi approach is the reliable and creative exploration of ideas or the production of suitable information for decision making. The method has been mainly used to generate forecast in different fields.[135] The Delphi method was introduced by Olaf Helmer and Norman Dalkey of the Rand Corporation in 1953 for the purpose of addressing a specific military problem.[136] Today is also used for environmental, marketing and sales forecasting. The object of the Delphi method is to obtain a reliable response to a problem from a group of experts.[137] The process guides the group towards a consensus.[138]

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[134] http://www.vitalia.com.mk/; http://www.arbotravel.com/mk/2009-11-03-19-37-39; http://www.macedonia export.com/CompetitiveProducts-Healthy.html; http://www.ramstore.com.mk/hypermarket/en/zdrav-zivot.html

[135] Landeta, J. (2006) Current validity of the Delphi method in social sciences; Technological Forecasting and Social Change Volume 73, Issue 5, Pages 467-482

[136] Dalkey, N; (1963) An experimental application of the Delphi method to the use of experts Management Science Vol. 9, No. 3, Apr., 1963

[137] Okoli, C.; Pawlowski, S. (2004) The Delphi method as a research tool: an example, design considerations and applications Information & Management 42, pg. 15–29

[138] The method is explained in detail in Linstone, H.A. and Turoff, M. (eds.) (1975). The Delphi method:
techniques and applications. Reading, Mass.: Addison-Wesley

3 "rounds" were planned for the Delphi approach in this research. The procedure of application of Delphi method was as follows:[139]

1. Experts identification and recruitment
2. Definition of 1st round questionnaire
3. The issue of the questionnaire introduced to the panel of experts
4. Collection of individual opinions of the experts on this issue.
5. Preparation of the first round report from each country. In this research on the basis of the first round the relevant items were posted. These items (questions) have been offered to each expert for relevant opinion. Majority of experts should have agree upon each particular item offered. Classification was carried out through marking of answers from 1-5 Likert scale. Level of consensus for each particular question have been calculated by counting of agreed answers (which include grades 4-agree and grade 5- strongly agree).
6. Rounds continue until pre-determined consensus level, stability of opinion, until no further consensus was reached.
7. McKenna[140] suggests that consensus should be over 50% of agreement among respondents. Sumsion[141] recommended 70 %, while Green at al. (2000) [142] suggested 80 %. For this research the minimal acceptance level was taken to be 50 percent and more.
8. Delphi technique used to have 3 to 4 rounds (in 1978). Later evidence appeared to show that 2 or 3 rounds are preferred (1994-1998). Latest experience (Proctor and Hunt[143]; Beach[144]; Green at al. suggest that in majority of cases 2 rounds are sufficient. Numbers of rounds differ from case to case depending on number of experts, subject in question, complexity of issues involved etc.
9. Expert panel sizes frequently 8 – 20 (for less developed market as WB markets it could be 4-12 because of the smaller number of experts).

The main task of this research was to identify questions which have predominant support (or reached level of consensus – above 50%) from the experts. So the experts had to say do they agree or not with each particular question (assuming minimal level of consensus is 50%).

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[139] Padel, S., Seymour, C. and Foster, C. (2003) Organic Marketing Initiatives and Rural Development QLK5-2000-01124 SWP 5.1: Report of all three rounds of the Delphi Inquiry on the European Market for Organic Food*

[140] McKenna H.P. (1994) The Delphi technique: a worthwhile approach for nursing? *fournal of Advanced Nursing* 19, 1221— 1225.

[141] Sumsion T. (1998) The Delphi technique: an adaptive research tool. *British foumal of Occupational Therapy 61{'i),* 153-156.

[142] Green B., Jones M., Hughes D. & Willimas A. (1999) Applying the Delphi technique in a study of GP's information requirements. *Health and Social Gare in the Gommunity* 7(3), 198-205.

[143] Proctor S. & Hunt M. (1994) Using the Delphi survey technique to develop a professional definition of nursing for analysing nursing workload, *foumal of Advanced Nursing* 19, 1003-1014.

[144] Beech B.F. (1997) Studying the future: a Delphi survey of how multi-disciplinary clinical staff view the likely development of two community mental health centers over the course of the next two years, *foumal of Advanced Nursing* 25, 331-338.

As the method is based on a structured process of collecting knowledge from a group of experts through a series of questionnaires the aim was the elaboration of prospective reflection in their field of activities. In this research three different questionnaires were applied:

- A first questionnaire was applied to the group of experts in each of the WBC;
- After that the report was prepared and sent it to the same group of experts in order to get first feedback. At this stage a second questionnaire was also applied;
- After processing the data collected on the basis of the second questionnaire the third questionnaire was prepared and sent it to the same group of the experts in order to get final feedback.

All three questionnaires were very well adapted to the general objectives of the survey and have allowed from the experts' point of view the answers about: a) The current situation of the organic market in each country and the organisation of the supply chain; b) The forecasts of the experts related to organic market development. Questionnaires were prepared for the first, second and third round.

Delphi Round 1- Questionnaire was short with a limited number of questions. The questions were opened and it was expected to get qualitative answers. The first round questionnaire aimed:

- To complete the description of the current situation of the organic production, including history of the development and analysis of the current state of the organic market.
- To get the first analysis of the organic market development
- To get the insight of the consumers motivations towards organic food
- To get the insight of the measures able to enhance the development of this market, through questions related to influence of organic production on disadvantaged areas and key success factors of the organic supply chain

In pre-testing the questionnaire, the experts expressed the email technique as the best way of contact. The survey for the 1st round started at the end of April 2010 and was finished at the beginning of May of 2010.

Round 2 – Questionnaire (229questions) was split in 6 different parts of common thematic titled as:

1. Government & Policy Impact
2. Production
3. Market
4. Trends
5. Supply chain
6. Consumer behaviour

The aim of the **first part** was to analyze current and future impact of government and policy on the organic agriculture development; political support to the organic sector; state incentives for organic production; the influence of EU agricultural policy on organic farming

in each country; the development stage of control and certification system and existence of National development strategy.

In the **second part** the main aim was to analyse what is the current and future interest and motives of producers to convert to organic food production; what kind of knowledge and education they need and what kind of problems they have in producing the organic food.

In the **third part** of the questionnaire the organic markets were described concerning the different range of domestic organic products, imported products and influence of official labelling of organic products on the market development. The importance of marketing activities (product, promotion, distribution and price) was analyzed as well. The final intention was to find out the relation between supply and demand of the organic market today and in the future.

The aim of the **fourth part** was to study the trends of organic agriculture concerning the level of wealth of each country, new possibilities for income and employment etc.

The **fifth part** had the intention to investigate the weaknesses of supply chain management, specifically the distribution channels for organic products, importance of each of them and the factors influencing the development of the organic markets distribution channels.

In the **sixth part** the aim was to study the consumer motivations and behaviour towards organic market and demographic characteristics in order to establish specific profile or segment of consumer to apply better to their needs.

The survey for the 2nd round started at the end of February 2011 and was finished at the beginning of March of 2011.

Round 3 – questionnaire was consisted of 10 repeated questions from 2nd round. The questionnaire was based with aim to:

- To apply some important questions to get more clear answers from the experts,
- To test some of the questions from second round in order to see if higher level of consensus is possible and
- To get final feedback from the WBC experts regarding future expectations. It is to be noted that the question 2. Was presented in turned over form because of high level of common disagreement of experts on the same question in second round (q.8).

The survey for the 3nd round started in the May 2011 and was finished at the beginning of July of 2011.

Description of expert's identification and recruitment

The experts were involved in three rounds of Delphi using three successive questionnaires. Experts' responses to the questionnaires were anonymous. In a Delphi study, the participants do not interact to each other.

The selection of experts is usually very rigorous procedure which relies on the experts experience, knowledge and their willingness to participate to the research.

Members of the experts' panel in 6 WB countries were selected in an informal way asking the different institutions for the experts in organic food and on the basis of the experience and knowledge and the personal contacts of the leaders in each country. Experts selected in this study were the key stakeholders of the organic supply chain in each country. As a high level of expertise was needed, experts were strongly involved in organic production and supply chain. They personally involved in organic food have more ability to understand the current situation and plan the future. Experts participating to the survey can be split into three categories:

- Stakeholders of the organic supply chain: producers (or representatives of producers), processors, wholesalers, retailers, importers (distributors of foreign organic products) and exporters
- Policy makers/ regulators/ NGO's: Authorities, Certifying organisations, Public Health institutes, Consumers organisations
- Researchers: academics, private agencies

Table 2 Sample characteristics of Delphi 1st, 2nd and 3rd round

	N° of experts			Gender		Institution where experts are employed	How long experts are involved in organic sector (years)
	1st round	2nd round	3rd round	Female	Male		
BOSNIA AND HERZEGOVINA	**6**	**6**	**6**	**3**	**3**	**1.**Public Health Institute Bosnia and Herzegovina; 2.Ministry of Agriculture Republika Srpska; 3.Faculty of Agriculture Banjaluka 4.Private Company certified organic	5 -10
CROATIA	**8**	**8**	**8**	**6**	**2**	**1.**Faculty of Agriculture; **2.**Faculty of Economics & Business; **3.**Food Agency; **4.**Podravka; **5.**Bio&Bio; **6.**Konzum; **7.**Ministry of Agiculture; **8.**Croatian Consumer Association.	5 - 30
MACEDONIA	**4**	**3**	**3**	**3**	**1**	**1.** Faculty of veterinary and medicine; 2.Ministry of agriculture; **3.**Private organic farmer; 4.Certifying body.	10
MONTENEGRO	**3**	**5**	**5**	**2**	**3**	**1.**Monteorganica" –public certification body ; **2.**Ministry of Agriculture, Forestry, and Water Management ;3.Biotechnical Faculty Podgorica ; 4.„Biomontnegro"NGO"Healthy foodproduction" ; 5."Agrovita Eco".	5 -10
SERBIA	**8**	**8**	**8**	**5**	**3**	**1.** Ministry of Agriculture, Forestry and Water Management Republic of Serbia ; 2.Bioagricert, Belgrade - Organic certification body ; 3.Bioplanet, Belgrade – Association for organic production and trade; 4.Zdravo Organic doo, 5.National Association of Organic Producers – Serbia Organica, Novi Sad; 5. Selenca - Agricultural producer and processor ; 6.Biomarket Tartufo - Trader of organic products, Belgrade; 7.US Embassy Belgrade – Agricultural; 8.Fond Organska Srbija, Belgrade - Association of agricultural producers Specialist	3 -10
SLOVENIA	**10**	**14**	**14**	**6**	**8**	**1.** Ministry of Agriculture, Forestry and Food of the Republic Slovenia; 2. Control / Certification body – Institute KON-CERT Maribor; 3. Biotechnical Faculty ;4. Department of Animal Science of Biotechnical Faculty; 5. Chamber of Agriculture and Forestry of Slovenia; 6. Agriculture Extension Service of Slovenia; 7. Union of Slovenian Organic Farmers Associations (USOFA); 8. MERCATOR d.d. ; Ljubljana 9. TUŠ d.d., Celje; 10. Organic shop "Kalček", Ljubljana 11. Chamber of Agricultural and Food Enterprises, Ljubljana; 12. IKC (Institute for the control and certification of University of Maribor) ; 13. Consumer Association of Slovenia; 14. Biotechnical Centre Naklo (with organic farm and organic shop)	5 -15
TOTAL	**39**	**44**	**44**	**25**	**20**		

Source: own compilation

4. Results of delphi methods of development of organic food sector in western balkan countries

DELPHY 1st ROUND RESULTS IN WBC

After analyzing the results of the first Delphi round it is possible to conclude following:

1. The most important influences that have shaped the development of the organic market in the WB countries in the past were: implementation of National and EU policies and regulations concerning organic production and processing; government initiatives for certification organic food and incentives through the financial support to the organic food farmers, through the refund of certification costs, costs of promotional materials, organization of the fairs and the facts that organic products are recognised by consumers as healthier than conventional food and that the organic way of production is preserving environment.

2. Regarding the answers of the experts, organic market of WBC is in the initial phase of development, although some countries are more developed then the others, but still comparing to the developed European countries there is a big difference in production and consumption.

3. All the WBC have good precondition for organic production because of the very clean soil.

4. Export of the raw organic material, import the processed organic food, the faster development of number of organic farms and increase in consumption will influence the development of the organic market in all the countries.

5. There is a limited organic products offer (in terms of diversity and quantity).

6. Producers have no awareness and enough knowledge about how to produce those products. There are not many professionals and there are no enough consultants with an experience in this field.

7. Respondents stated that the biggest problem at the moment is the fact that organic products market is not sufficiently organized and it lacks the support from the state.

8. Experts are aware of many opportunities for market development as for example: tourism, agro ecotourism, public procurement (schools, hospitals, door to door, internet etc.)

9. Over the next ten years, the importance of the organic market will grow. Consumers will trust local producers the most as the latter are more easily monitored. Therefore, mainly the local market (marketplaces) will gain importance. In the supermarkets the offer will be also larger and more diverse.

10. Consumer's motives for buying organic food are health, trend, prestige and environmental awareness. The population with higher revenues, 25 t0 40 years of age is the

group that represent main consumer group, since they tend to provide healthy food for whole family. Educated, more wealthy and urban part of society became aware of importance of Use of organic products in their nutrition due to the better health and environment protection. Organic production has great influence on the economic, ecological and social development because of the creation of new niche market which will offer new possibilities for employment and healthier food for the consumers with the positive influence on the environment as well.

11. According to the experts opinion there is a lack of good distribution channels in WBC

12. To develop a distribution channel of organic food is necessary to intensify the contacts between farmers and consumers through supermarkets and exporters of agricultural products.

13. Consumers need to be more informed about organic way of food production. (To visit organic farms with their children, play there and consume fresh organic food).

DELPHY 2nd ROUND RESULTS IN WBC

After analyzing the results of the second Delphi round it is possible to conclude following:

1. National Development Strategy for organic farming is very important and experts expect even more in the future. Regional/local government support will be very important for development of organic agriculture as well. State and local government can significantly improve the market by buying organic food and products for schools and hospital kitchens. Experts think that the Government should put special emphasis on the control system and certification of organic food. B&H and Croatia feel great lack of political support and adequate state incentives for organic sector. They do not expect any better in the future. The government should put special emphasis on the control system and certification of organic food in the present as well as in the future situation.

2. Motivation of the producers is important for development of organic sector. The experts expect the same in the future. Teaching and training for organic farming is very much needed as in the present also in the future situation. Financial consolidation of organic farms is necessary and farmers will be more motivated to switch to organic farming because of higher subsidies. Horizontal cooperation among organic farmers is not much required in all countries except Macedonia. In the future it will be very much needed in the entire WB countries.

1. Clear labelling of organic products is necessary to enhance market development. Even more is expected in the future. Distributors have higher bargaining power then producers. Somewhat less is expected in the future. The organic market is increasing. Practically none of investigated countries consider meat as a market for organic products. Similar situation is with milk, fruit, vegetables and baby food (there are significant differences among countries.

In the future are expected strongly positive changes. There is no market for organic products in urban touristic towns, rural touristic areas, rural remote areas and rural close to urban centres. In the future expectations are higher.

2. Marketing for organic products has to be improved. No changes in the future are to be expected. The same conclusions go for the statement that organic market development depends on general level of wealth. Organic sector brings new possibilities for income and labour. Vertical cooperation and definition of strategy are important for development of organic sector. Even more is expected in the future. Eco tourism is important for development. Significantly more is expected in the future. Organic farming is not factor of too much success for agricultural sector in all WB countries. In the future it is expected to be slightly higher.

3. Quality management and traceability are important for a better organisation of supply chain of organic products. Even more important are expected to be in the future. Practically none of investigated countries agree that distribution channels for organic products are numerous and diversified. Expectations for the future go in strongly opposite direction.

4. Health concerns are very strong motives for buying organic food. The same is expected in the future. Key promotional activities are education and information to consumers. Even more is expected to be in the future. The main characteristic of organic consumer is high level of formal education. It is expected to be less important in the future. Local agriculture, traditional agriculture, small scale agriculture and traditional processing in Croatia and Macedonia don't present motivation for buying organic food. It is expected that this motivations increase significantly in the future.

DELPHY 3rd ROUND RESULTS IN WBC

After analyzing the results of the third Delphi round it is possible to conclude following:

1. The influence of EU Agriculture Policy will push the organic farming in WBC. There are split opinions among experts in different countries regarding State incentives and Political support for organic sector. In round 2 satisfactory "State incentives" resulted only in Montenegro with higher level of consensus. After turning this question in reverse meaning, three countries (B&H, Croatia and Montenegro) resulted with consensus level over 50 percent. That means the experts in these countries don't expect that the State incentives will be adequate in the future and in the three other countries (Macedonia, Serbia and Slovenia) will be completely opposite.

2. Any of the experts are satisfied with political support in the present situation. In Croatia, Macedonia and Serbia they expect political support to be higher in the future and in the other three WB countries B&H, Montenegro and Slovenia experts don't expect any better in this sense.

3. It seems that the experts think the most important market variables are the adequate marketing activities and clear labelling of organic products. The market for organic products will be in urban areas and somewhat less in tourist areas. Concerning certain categories of organic products the experts rank them as follows: fruit, vegetables and imported organic products which will dominate the markets even in the future. The lowest support is visible just for meat.

4. The channels of distribution reached the highest level of consensus in all the examined countries because of their importance to the organic sector development. There are five items which are particularly highly supported by the experts. The highest possible scores (100%) were obtained in all countries for the case of "Importance of the distribution channels – organic food store". Barely lower scores are in case of "Importance of distribution channels", "Better organisation of the supply chain – transparency", "Better organisation of the supply chain – traceability" and "Better organisation of the supply chain – quality management". The lowest interest is in case of "Importance of discounters".

5. Concerning consumer behaviour eight items show full support from the experts in all countries, ranking high in level of consensus. The most pronounced among them are: "Motivations – health concerns" and "Promotional activities in education and information of consumers". The other items supported by experts in all countries are: "Consumers awareness of organic food is increasing", "Consumers trust toward organics depends on labels/certificates", "Consumers trust toward place of purchase", "Consumers trust toward brand", "Consumers are more aware of health" and "Organic consumption will became a part of lifestyle". The lowest support in all countries is in the case of "The main organic consumers will be elderly people" and "Prices of organic products will be too high.

5. Conclusion

There is a growing interest by the consumers to buy organic food products in WBC. This goes along with the overall trend towards a more health-oriented life style and growing concerns about sustainable development.

Committed market actors, farmers associations, stakeholders in rural development an environmental protection, consumer associations and policy makers act in favour of the expansion of the organic sector in all WBC.

After analysing the results of three Delphi rounds about the present and future development of organic sector in WBC, all experts reached the consensus that organic market in WBC is in the initial phase of development, but with great preconditions for production in the future. Consumer's motives for buying organic food are health, prestige and environmental awareness.

In the future, the importance of the organic market will grow in WBC (tourism, agro ecotourism, schools, and hospitals). Concerning certain categories of organic products which will dominate the market in the future, the experts rank them as follows: fruit, vegetables and imported organic products. The lowest support is given for the meat.

For the development of organic sector in WBC, all experts reached the consensus that National strategy for organic farming is needed, as well as regional and local government support. They all highlighted the important parts for the strategy: teaching and training producers and consumers, motivations of producers, financial consolidation and horizontal cooperation, labelling of organic products.

Very strong motives for buying organic food in WBC are health concerns. In the future all experts consider increasing promotional activities, education and information of consumers.

The influence of EU Agriculture Policy will push the development of organic sector in WBC according to all experts in this research.

6. References

[1] Gladvin, T.; Kennelly, J.; Shelomith-Krause, T. (1995); Shifting paradigms for sustainable development: Implications for management theory and research; Academy of Management Review 1995. Vol. 20, No. 4, 074-907.

[1] http://icsc.un.org/resources/pdfs/2009/pp/bosnia%20and%20herzegovina-09.pdf;http://icsc.un.org/resources/pdfs/2009/pp/macedonia;9.pdf;http://icsc.un.org/resources/pdfs/2008/pp/montenegro-08.pdf; Central bureau of statistics of Croatia; Statistical office of the Republic of Serbia and EUROSTAT

[1] www.focus-balkans.org

1 http://www.stat.si, www.mkgp.gov.si

[1] Slabe, A.: Consolidated (EU countries) report. V: Second Seminar on ≈Organic Food and Farming research in Europe≪ How to improve trans-national cooperation, November 26th 2004; Brussels; http://europa.eu.int/comm/research/agriculture/pdf/off_research_in_europe_consolidate_

[1] http://www.hr/hrvatska/gospodarstvo/poljoprivreda; http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=41673, http://www.poslovni.hr/142346.aspx; www.mps.hr; www.focus balcans.orghttp://www.hr/hrvatska/gospodarstvo/poljoprivreda

[1] : Statistical Yearbook 2009, RZS; Ministry of Agriculture, Forestry and Water Management, Republic of Serbia; Census 2002; http://moan.iamb.it/FCKeditor/UserFiles/File/MOAN%201st%20meeting/MOANPosters/14serbia.pdf http://www.ifoam.org/growing_organic/2_policy/case_studies/serbia_cases_studies.php

[1] Organic food production – generator of rural development in bosnia and herzegovina. Institute of economics Sarajevo. 2007; Agency for Statistics of Bosnia and Herzegovina, ISSN 1840-104X, Sarajevo, 2009; Agency for Statistics of Bosnia and Herzegovina,Anketa o potrosnji domacinstva u B&H 2007; European Commission (editor, 2009): Bosnia and Herzegovina - Agriculture and Enlargement. In: http://ec.europa.eu/agriculture/enlargement/countries/bosnia_herzegovina/profile_en.pdf (viewed in June 2010)

[1] Ministry of Agriculture, Forestry and Water Management; IFOAM & FIBL 2010; http://www.organic world.net/montenegro.html

[1]http://www.vitalia.com.mk/; http://www.arbotravel.com/mk/2009-11-03-19-37-39; http://www.macedonia export.com/CompetitiveProducts-Healthy.html; http://www.ramstore.com.mk/hypermarket/en/zdrav-zivot.html

[1] Landeta, J. (2006) Current validity of the Delphi method in social sciences; Technological Forecasting and Social Change Volume 73, Issue 5, Pages 467-482

[1] Dalkey, N; (1963) An experimental application of the Delphi method to the use of experts Management Science Vol. 9, No. 3, Apr., 1963

[1] Okoli, C.; Pawlowski, S. (2004) The Delphi method as a research tool: an example, design considerations and applications Information & Management 42, pg. 15–29

[1] The method is explained in detail in Linstone, H.A. and Turoff, M. (eds.) (1975). The Delphi method: techniques and applications. Reading, Mass.: Addison-Wesley

[1] Padel, S., Seymour, C. and Foster, C. (2003) Organic Marketing Initiatives and Rural Development QLK5-2000-01124 SWP 5.1: Report of all three rounds of the Delphi Inquiry on the European Market for Organic Food*

[1] McKenna H.P. (1994) The Delphi technique: a worthwhile approach for nursing? *Journal of Advanced Nursing* 19, 1221—1225.

[1] Sumsion T. (1998) The Delphi technique: an adaptive research tool. *British foumal of Occupational Therapy 61{'i),* 153-156.

[1] Green B., Jones M., Hughes D. & Willimas A. (1999) Applying the Delphi technique in a study of GP's information requirements. *Health and Social Gare in the Gommunity* 7(3), 198-205.

[1] Proctor S. & Hunt M. (1994) Using the Delphi survey technique to develop a professional definition of nursing for analysing nursing workload, *foumal of Advanced Nursing* 19, 1003-1014.

[1] Beech B.F. (1997) Studying the future: a Delphi survey of how multi-disciplinary clinical staff view the likely development of two community mental health centers over the course of the next two years, *foumal of Advanced Nursing* 25, 331-338.

BRANDING BEEF: A PROGRAMMED NUTRITION APPROACH

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Abstract
This paper proposes an innovative, integrated approach to animal nutrition to aid Latin American beef producers in adding value to their product chain. Instead of an ad hoc, or piecemeal, approach to the addition of nutritional supplements the Programmed Nutrition Approach pioneered by Alltech provides three advantages. It offers improved animal health to the farmer with a way to increase the value and profitability of protein products (meat, milk, eggs) on the farm. Secondarily, from a society point of view it offers the ability to achieve this with a production system which is more acceptable to consumers, with reductions in the use of antibiotics, the use of more natural nutrition and less environmental waste. Finally, this approach helps beef producers enhance brand value and recognition of foods by the consumer, through improved meat quality and brand recognition, in a manner that deepens the relationships and partnerships between food processors and food marketers with the farmers that supply them.

Key words: Alltech, Nutrigenomics, Programmed Nutrition, Alltech Angus, Added-Value Beef Products

BRANDING BEEF: A PROGRAMMED NUTRITION APPROACH

1. Introduction- Alltech and Nutrigenomics

Founded in 1980 by Dr. T.P. Lyons, Alltech is now the 8th largest firm in the animal health industry globally, and the only company among the top 20 entirely committed to 'natural nutritional solutions'. Starting with an investment of just $10,000, Dr. Lyons forecasts a future of $1 billion in sales. Today Alltech markets its solutions in 116 countries, through 86 of its own offices, employing over 2,600 people. Alltech has invested over $10 million in the World's 1st Animal Nutrigenomics Center at its headquarters in Kentucky. Nutrigenomics is the measurement of how genes may be up or down regulated through changes in nutrition. Epigenetics is the study of how these changes in gene expression may be passed on from generation to generation. Both of these are the underpinnings of a radical change in how we understand the effects of nutrition on gene expression with profound implications for the production of meat, milk and eggs.

2. The Programmed Nutrition Approach – Imprint, Perform, Enhance

Alltech's Programmed Nutrition approach uses specific feeding and feed management strategies to manage growth, health and product quality through a 3 stage process. These stages involve imprinting gene expression, animal performance and enhancing the meat, milk or eggs produced through the process. Beginning with the imprinting phase, the Programmed Nutrition strategy naturally conditions their genes which changes the way in which animals absorb and utilize the nutrients they consume, providing a radically different mechanism for controlling nutrients absorption during the subsequent growth and finishing stages.

In beef cattle, following the imprinting or gene conditioning diets the animals are fed 3 diets. Phase 1 diet is for the cow-calf operator, Phase 2 concerns the transition to the feed yard, and Phase 3 is designed for the finishing stage of the operation. The links between each phase are a key component of creating traceability along the journey from farm to consumer, and adding value to the entire chain. Thus, during the first phase, the program is tied to a performance testing scheme which incorporates full traceability while feeding the animal to its genetic potential; in the second phase, the feed yard utilizes the feeding program, preparing to supply meat packers and distributors with traceable, branded beef.

Research has demonstrated the additional benefits of the Programmed Nutrition approach, for both the producer and the consumer. For the consumer, laboratory tests have demonstrated that the meat has higher total levels of antioxidants, better meat coloration, better retention of moisture whether 'on the shelf' or during cooking, and finally a more neutral p.H. level. For the producer, formulating diets to maximize nutrient digestibility and utilization presents positive impacts for manure and waste management issues. And, importantly, these benefits are achieved through diets with similar or even lower costs than traditional diets.

Essentially, a superior quality meat product can be developed by implementing the Programmed Nutrition strategy throughout the life cycle. Although there are real and significant opportunities to apply this model with a range of breeds, such as Charolais, Brahman and Nelore, the strategy was developed using Angus beef.

3. Developing 'Alltech Angus'

The Alltech Angus brand developed in Kentucky, USA is a tangible demonstration of the Programmed Nutrition life-cycle approach. Alltech sells Alltech Angus Farm-Pak (a combination of natural feed additives manufactured by Alltech) to Angus farmers based in Kentucky raising cows and their calves. The performance of these cow-packs in producing healthier, more robust cattle has been demonstrated already using gene chip technology through Alltech's Nutrigenomics research. When ready for selling on to the feedlots for fattening an independent intermediary called 'The Beef Connection' then grades and approves livestock according to agreed criteria such as marbling quality, fat content and drip-loss.

Currently cattle are fattened out of state before being returned for finishing, but as the program scales up from pilot to full production; all stages of the process will be performed within the state of Kentucky. Finally, cuts are packed and branded Alltech Angus and sold locally to restaurants and consumers in Kentucky under the Kentucky Proud label. These cuts of meat can earn significant premiums over generic box-ready or even case-ready cuts of meat.

Alltech Angus has been promoted by one of the region's leading meat retailers such as Krogers and most of the leading restaurants throughout central Kentucky. Additionally, it can be purchased online for delivery by mail. Testing conducted at the University of Kentucky by scientists confirmed that the levels of fat, cholesterol and calories when using programmed nutrition produces a product with a meat with characteristics closer to that of chicken than beef. Meat tenderness is increased, a fact demonstrated by examining the measuring its PSI number or Pounds per Square inch. In fact Alltech Angus beef really can be cut with a spoon!

Table 1: **WHAT'S FOR DINNER? ALLTECH ANGUS OR CHICKEN?**

Type of Meat	Fat (g)	Cal (kcal)	Cholesterol (mg)
Strip Steak	15.95	232	58
Boneless Chicken Breast	9.25	172	64
Alltech Angus	7.36	150	50 *

A MORE TENDER BEEF

	NY STRIP PSI**	RIBEYE PS1**
Certified Angus Beef	7.32	10.12
Alltech Angus	3.48	4.67*

* But the taste remains!
**lower pounds per square inch (psi) means more tender beef

Sales of Alltech Angus have grown steadily, propagated by word-of-mouth and supported by some local advertising. There has been significant positive feedback on Alltech Angus, indicating that consumers see it as a superior tasting, high-quality product. In a post-purchase survey, 93% said that they would purchase Alltech Angus again. The Alltech Angus story describes how the Programmed Nutrition strategy can benefit the constellation of stakeholders in the beef value chain. Even more interesting, however, is the ways in which it can be used in other markets, breeds and even species.

Table 2: Added Value from Programmed Nutrition

Stakeholder	Added-value
Farmer	Better weight gains Less feed per weight gained (Feed efficiency) Better cow health More consistent performance Similar or lower cost nutrition
Society/Environmental	Less excretion of minerals and nutrients in the manure No need for subtherapeutic antibiotics.
Processor/Consumer	Tastier meat Natural Similar cost

4. The Case for Brazil and Argentina

Alltech's Programmed Nutrition concept is ideally suited to help address challenges in Argentina and Brazil's beef industries. Despite fundamental differences between the two (notably, the breeds of cattle reared), the development of consumer economies in both regions indicate opportunities for high-quality branded beef products not least because carne asada and the churrasquero are intrinsic to the diets and lifestyles of both countries.

In Brazil, an export-oriented industry responsible for 25% of the world beef trade, some 85% of the national herd, or 155 million cattle are from the hardy tropical Cebu-breed called Nelore. Benefiting from a commodity boom and prudent government policies, millions have entered Brazil's middle classes fuelling a new consumer driven economy – for example, approximately half the population now owns a credit card. Meanwhile, annual per capita beef consumption of about 35 kilos is second only to poultry as a protein source in Brazil. With expected sustained economic growth, opportunities for branding and differentiation are opening up in the domestic market of nearly 200 million people. Programmed Nutrition can also play a role in creating an enhanced beef product for export by leading Brazilian foods companies pursuing global market strategies.

In Argentina's case, the country's love affair with beef is legendary. Only recently has consumption dropped from a sustained 30 year high of 70 kilos per person annually. Consequently, price and beef supply have historically been of national strategic importance, accentuated by the fact that 85% of output is destined for the local market. In terms of exports, about 28,000 tons of premium quality beef is shipped to the EU under the Hilton Quota arrangement, but the export sector is deemed to be under-performing compared to other countries. The 55 million strong national herd is about 85% Angus and Hereford breeds. Recently, the sector has been in turmoil however, coping with general inflationary pressures, corresponding tax and regulatory issues, as well as the fact that farmers can get higher

margins from growing soybeans on the same land for the country's $20 billion export-oriented industry. Similarly the tradition of the gaucho roaming the grassy Pampas is facing extinction in the inexorable transition to more intensive feedlot farming, as businesses focus on consistency and yield per animal. It is estimated that within 5 years, some 80% of Argentinian cattle will be finished on feedlots.

In a recent survey the vast majority of Argentinians expressed interest in taste, traceability and adequate labelling, and 45% saw branding as an important element. However, there is no government certification system in place. Tailored applications of Alltech's Programmed Nutrition approach can help Argentinian suppliers and consumers to address some of these issues and produce a more consistent and higher quality product for both the internal and export markets. Alltech is already working with several mid-sized Angus beef farmers in this respect.

5. Conclusion

Alltech's Programmed Nutrition approach uses specific feeding and feed management strategies to manage growth, health and product quality through a 3 stage process. These stages involve imprinting gene expression, animal performance and enhancing the meat, milk or eggs produced through the process. Beginning with the imprinting phase, the Programmed Nutrition strategy naturally conditions their genes which changes the way in which animals absorb and utilize the nutrients they consume, providing a radically different mechanism for controlling nutrients absorption during the subsequent growth and finishing stages.

INVESTIGATING THE FUNCTIONAL FOOD MARKET IN A DEVELOPING COUNTRY

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Abstract
This study aims at investigating the market for functional foods (FF) in a developing country. Brazil is one of the leading countries in food production and consumption, and the market for functional foods has been growing by 10% per year, three times more than the market for conventional foods. Although this food category is considered mature in some developed markets (such as in Japan, in the Nordic countries and in the U.S), it is still unknown for many consumers, especially those located in developing countries. Since the market demands a better understanding of this trend, this study has investigated consumers' motivations, attitudes and intention to buy functional foods. A survey with 450 consumers was conducted and provided quantitative insights. The survey has shown that the respondents presented positive attitudes towards functional foods as well as enough purchasing power to buy them. The claims the food industry make are often mistrusted. Hence, nutritionists and other health professionals who have high credibility could help inform consumers about the benefits of particular categories of functional foods. Finally, this study shows that the understanding of Brazilian consumers is fundamental to help food companies define their strategies. To map the most accepted categories of functional foods is also important, aiming to avoid the "trial and error" approach.

Key words: market, functional foods, developing country, consumers, retail

INVESTIGATING THE FUNCTIONAL FOOD MARKET IN A DEVELOPING COUNTRY

1. Introduction

In recent years, the quest for increased competitive advantage has driven many organizations to innovate (Castilhos and Passos, 1998). The economic growth, traditionally attached to supply and demand, is now a synonymous of imbalance and detachment a company can obtain in its own industry, if compared to the others (Schumpeter, 1982).

Technology, up to this point incidental, became a crucial tool in the strategic management and market positioning. Innovation also became increasingly dynamic due to the short lifecycle of products (Castilhos and Passos, 1998; Cooke, Uranga and Etxebarria, 1997). By definition, innovation is the implementation of new (or significantly improved) product (or service), process or organizational method (OECD, 1997). This, however, is not obtained by a company on an isolated perspective, but by the interrelation of that company with several other factors and agents, contributing to diverse functions in the development or diffusion of innovations (Nelson, 1993; Freeman, 1995; OECD, 1997).

Innovation provides corporate vitality, enhanced performance and a much needed opportunity to differentiate from competitors. Particularly in the food industry, innovation is an important source of differentiation and a value-adding opportunity for managers to develop new products (Matthyssens et al., 2008, Trail and Grunert, 1997). Hence, innovation constitutes a competitive advantage in the globalised agri-food scenario (De Barcellos et al., 2009).

Health has been named as the most significant trend and innovation driver in the global food and drinks market. Brazil is one of the leading countries in food production and consumption, and the market for functional foods has been growing by 10% per year, three times more than the market for conventional foods (Euromonitor, 2010). Functional foods therefore make up an important segment for innovation, since these foods are not intended only to satisfy hunger and provide humans with necessary nutrients, but also to prevent nutrition-related diseases and increase physical and mental well-being of consumers (Menrad, 2003).

In spite of such expressive growth and increasing interest by multinationals and retail chains, the innovation system of functional food and this food category, in particular, is still unknown for many consumers, especially those in developing countries. In this paper, we thus outline consumers' motivations, attitudes and intention to buy functional foods in southern Brazil, as it is regarded the market demands a better understanding of this trend.

This paper is structured in the following way: firstly, we present a brief description about the concept of functional food. Following this, consumer behaviour in southern Brazil and consumers' attitudes towards functional foods are then discussed in the light of the literature. Finally, a methodological section is presented, followed by results, discussion and main conclusion of this study.

2. Functional Foods

In last century, advanced research in nutrition led to the discovery of nutrients and their requirements for the development, growth and maintenance of the body. The concept of a "balanced diet" has been the main driving force in support of the elaboration of dietary recommendations and food guidance. But, at the turn of the 21st century, new challenges arise in nutrition science. The definition of health is no longer restricted to the absence of disease,

but it includes physical as well as mental and psychological well-being. Food is not only required for body development, growth and maintenance, but it is also recognised to play a key role in the quality of life (Ashwell, 2002).

"Food feeds more than the body; it also feeds our moods, our self-image, and our relationships. Since humans moved from being 'hunters and gatherers' to social animals, food has played a significant part in human relationships and has a complex stream of social meanings around it. It is often used as a transactional gift in relationships which carry emotional benefits of major significance" (IPA, 1994)

The term "Functional Foods" (FF) was first introduced in Japan in the mid-1980s and refers to processed foods containing ingredients that aid specific body functions, in addition to being nutritious. Currently, there is no universally accepted term for functional foods. A variety of terms have appeared world-wide such as nutraceuticals, medifoods, vitafoods and the more traditional dietary supplements and fortified foods. However, the term functional food has become the predominant one even though several organizations have attempted to differentiate this emerging food category (FAO, 2007).

Therefore, the term "functional food" refers to a food that provides a health benefit as well as nutrients. The term can also refer to whole foods, to fortified, enriched or enhanced foods, and dietary supplements that have the potential to improve mental and physical well-being and reduce the risk of diseases. The ingredients responsible for this benefit can be naturally present or may have been added during processing. The levels of nutrients in foods can be increased beyond their natural levels to create an enriched product. Fortified products contain nutrients or ingredients that were not present in the original food (FAO, 2007).

The concept was further developed in the United States and in Europe, although nowadays there is a global (and growing) market for 'functional foods'. Functional food is a dynamic market, which offers excellent prospects for growth for well-positioned food and drink manufacturers. The value of sales has risen by 40% over the 2003-2008 period.

According to data published by FAO (2007), the functional markets grow steadily each year, with annual growth rate estimates varying between 8% and 14%. This trend is likely to continue as changing population demographics (e.g. an ageing population) and the effects of lifestyle diseases create greater demand for food products targeting health and wellness.

Williams et al., (2006) indicate that demand for functional foods within the developing countries is growing, presenting a lucrative opportunity to develop domestic markets. For instance, India, with its strong tradition of eating healthy foods, ranks among the top ten nations in buying functional foods and the market size is expected to nearly double in the next five years. In Brazil, the sector is relatively young, but grows rapidly with sales value estimated to reach US$1.9 billion by 2009. In China, the functional foods market is estimated to reach a value of US$ 9 billion by 2013 (Just-Food, 2008)

2.1 The Dynamics of the Innovation System for the Functional Food Market

The functional food market is still in an experimental phase. It is characterised by a very high level of product failures, even from experienced and well-established food companies, such as Nestlé (LC1) (Just-Food, 2008).

Typically, the more successful products tend to have a fairly mainstream positioning. They are marketed through mass-market distribution outlets (such as supermarkets, rather than health food shops), are produced by a well-known food company or as a brand extension of a well-known brand, and they are positioned as generally contributing to wellness, rather than targeting a specific illness. Products which have fared less well tend to have taken the opposite positioning, which has left them restricted to a niche market positioning. Overly clinical products, which appear closer to medicines than to food, tend to deter consumers. This includes foods launched by pharmaceutical companies, those focused on alleviating a

particular complaint and those that use doctor recommendations and overly scientific explanations of their benefits. Although these may offer more cutting-edge benefits, they are not well understood by the consumer, and are not perceived as "food" in the same sense (Euromonitor, 2004).

Successful products do not promote their health benefits in a vacuum – they also pay close attention to other selling points, such as taste, convenience and price. For a functional food to perform well, it should be competitive even without the health benefit factor (Verbeke, 2006). In addition, consumers tend to reject too much novelty in food, thus constituting strong barriers to genuine innovation (De Barcellos et al., 2010; Van Wezemael, 2010). Besides, consumers also present a slow rate of change on eating preferences and habits. Nonetheless, innovative consumers represent a key market segment. They play an essential role in the success of a new product by legitimizing the novel product to other consumers (Huotilainen, Pirttilä-bäckman and Tuorila, 2006).

Hence, innovation in the food sector is still a challenge. Costa and Jongen (2006) state that the European food and beverage industry is quite conservative in the type of innovations it introduces to the market, displaying much lower research and development (R&D) investments than industries in other sectors. Some possible explanation, according to studies by Cooper (1994) and Costa and Jongen (2006), is that many food product introductions fail. Research across six European countries shows that only a fifth of new launches are successful (defined as achieving monthly sales of 80 per cent of the average for the category in question). These launches include completely fresh brands, line and flavour extensions and new pack sizes (Benady, 2008).

As a consequence of such negative product introduction results, the food sector strategy is characterised by a parsimonious development of innovations. Much of the innovation is based on brand extensions of the same product line which is a less risky strategy (Grime, Diamantopoulus and Smith, 2002). Previous study in Brazil identified that food industry could be missing an opportunity by not being innovative enough. The innovative products launched by the drinks and beverage sector seemed to be leading consumers' experiences, therefore pointing to the food industry that more could be developed (De Barcellos et al., 2009).

Finally, it is important to state that the successful introduction of functional food in the market also depends on regulatory aspects. The regulatory issues regarding these categories are quite different among different countries. In Latin America, Brazil was the first country to issue legislation regarding functional food. Legislation asks for safety and efficacy demonstration of food products. All alleged functional food products must be registered and approved by the health authority, the National Sanitary Surveillance Agency (ANVISA). Therefore proper regulation and consultation with health care providers is key challenge for these products at a global level (Kaushik and Kaushik, 2010).

2.2 The functional food consumer

The functional food market can be characterised as being "technology-push", which is predominately oriented by the research of new opportunities for innovative products by companies and, in a smaller proportion, by consumers' demand. For Scholderer and Barcellos (2008), a great part of R&D activities is still accomplished in an experimental concept, following the logic of trial and error, with a very small effective use of applied research in consumer's behaviour. Consequently, there is a high failure rate in the release of new products, even those coming from expert and well-established companies, such as Nestle (LC1) (Raud, 2008).

In general, the key factors influencing the intention to consume functional foods (Urala and Lahteenmaki, 2007) are flavour, quality, price/value, convenience and expected

health effects. Therefore, functional foods must simultaneously attend consumers' desires for convenience, health and flavor, (Gray et al., 2003).

Researches in consumer's behaviour area (Verbeke, 2005; Frewer et al., 2003) indicate that successfully established functional ingredients which have a more general health claim are more likely to be accepted than non-familiar ones or those just attractive to consumers with advanced medical and nutritional knowledge. Therefore, it becomes easier to obtain the acceptance from consumers of functional foods enriched with bioactive composts already known from its benefits to health (for example calcium, vitamin C or Omega-3) than composts unknown for the general public (as peptides, Selenium and Xylitol).

In addition, consumers do not always accept the 'combination' between the 'carrier' food (the base-food, as yogurt in the probiotic case) and the functional ingredient (Siegrist et al., 2008). The main reason behind it is the fact that consumers create an disadvantageous expectation related to taste when there is an incompatibility between the carrier and the functional ingredient (for example, when a fruit yogurt is enriched with Omega-3, it creates the immediate association to the extraction of the ingredient from fish oil and it could, consequently, change negatively the yogurt flavor).

Finally, it is overall believed that consumers evaluate functional foods the same way they do conventional food. It means that functional benefits can add value, but should not exceed the natural sensorial properties of food, as flavor (Verbeke, 2006).

2.2.1 Attitudes toward functional food

The attitudes related to functional foods have been internationally studied and consistent research results have been described on literature (Urala and Lahteenmaki, 2003, 2004, 2007). In 2007, Urala and Lähteenmäki validated a scale formed by 25 variables and four main dimensions were identified. According to the authors, the dimensions can be described as follows:

- Reward for the consumption of functional food (FF REW): The main focus is that health, humor and welfare can be promoted by the consumption of functional foods. The pleasure resulted from the idea of consuming functional food to take care of themselves is crucial to consumers' sensation of 'reward';
- Necessity of functional food (FF NEC): Describes the necessity for functional foods as the necessity for medicines. This dimension measures how necessary or unnecessary are the functional foods to society in general;
- Confidence in functional food (FF CON): Describes the confidence of consumers on functional foods as foods which promotes health and the reliability of research related to them and;
- Safety of functional food (FF SAF): This dimension (Urala and Lähteenmäki, 2004) focus the possible nutritional risks when functional foods are consumed.

Thus, Urala and Lähteenmäki (2007) correlates attitudes toward functional foods with background attitudes, aiming a deeper comprehension about the consumption behaviour of this kind of food. For this purpose, the authors used scales of General Health Interest (GHI and also interest in natural products) from the Roininen, Lähteenmäki and Tuorila (1999) study, which showed positive and moderate correlation for GHI itself and negative correlation of 'interest in natural products' with attitudes toward functional food. The attitude towards innovation in food was measured by the Food Neophobia Scale (FNS, from Pliner and Hobden, 1992) and did not present correlation to the attitudes toward functional food in the analysed sample.

According to Urala and Lähteenmäki (2007), through the understanding of consumers' attitudes, it is possible to predict the intention about the consumption of functional food.

Consumers' attitudes can also be strategically used in the initial stages of the new products development, as a support tool in the selection of alternatives for further progress.

3.Method

3.1 Characterisation of the study

We applied a survey, descriptive in nature, to consumers of functional foods. The objective was to map the consumption of functional foods in a sample of this population. As previously discussed, little is known about functional food consumers in developing countries. The survey was conducted in Porto Alegre, capital of Rio Grande do Sul, the southernmost state in Brazil. The city has 1.3 million inhabitants and it is considered a city with highest quality of life in Brazil by the United Nations (UN). It has more than one million trees in its streets and has more than 80 awards and titles that qualify it as one of the best Brazilian cities to live, work, do business, study and enjoy. Its quality of life indicators are highlighted in the main indices of human development: health, sanitation, education, environment and economy (Portoweb, 2009).

We chose to perform this research in Porto Alegre, as it was already subject of previous investigation on a related topic (De Barcellos et al., 2009) for its convenience and for it being a cosmopolitan city, capital of this state and with potential for significant consumption of functional foods.

3.2 Survey: Data collection and analysis

The survey was conducted with 450 consumers in Porto Alegre, and we aimed to assess consumers' motivations, attitudes towards functional foods and purchase intention to consume it. Churchill and Gilbert (1999) and Malhotra (2001) comment that the method of cross-sectional survey is the most popular and widely used in descriptive research, and it is characterized by collecting information from a sample of the population only once. The method provides a "snapshot" of the variables of interest at a given moment in time.

Consumers were approached by trained researchers who administered the questionnaire personally, with the aid of scales and printed material support. The interviews took place over one week (from 18 to 24 October 2010), in sites close to supermarkets and stores specializing in food products. In total, 25 sites were selected within the city 's urban area, aiming to obtain greater variability in the sample. However, to comply with the proposed objective of the investigation, only consumers who have reported to have effectively consumed functional foods were interviewed. To assure the understanding of the concept, a written definition of functional food was provided to the respondents at the beginning of the interview, along with examples of real products. If the respondent had confirmed the consumption of any of the products cited, the interview progressed further.

The questionnaire was based on European studies of Urala and Lahteenmaki (2004, 2007) who developed a scale to measure attitudes specifically in relation to functional foods. In particular, it is important to note that in this study, for cultural reasons (and already documented in previous studies conducted in Brazil) items that contained potentially negative meaning were reversed to positive statements. Brazilian consumers are rather optimistic about life and have difficulty in dealing with reversed statements. For them, it seems difficult to disagree with this kind of "negative" alternatives, whose answers are usually located in the extreme left of the scales.

In our questionnaire, the first question investigated the frequency of consumption of functional foods, followed by a set of questions related to motivations and attitudes towards functional foods. Next, we investigated the respondents' the degree of confidence in the different stakeholders of the innovation system regarding functional foods.

Finally, in the last section of the questionnaire socio-demographic questions about the respondents were asked.

3.3 Data analysis

Data were initially treated aiming to detect possible non-random missing data and outliers. Normality and multicolinearity checks were also applied aiming to reduce any "noise" that could negatively interfere with further analysis. No problems were identified in this stage. Following this stage, univariate and multivariate statistics analysis were performed using the software SPSS v18.0. Interpretation of results and conclusions are presented in the next sections.

4. Results from Functional Food Consumer survey in Porto Alegre

Demographic profile of the sample

Table 1 presented the demographic profile of the sample. The sample is predominantly feminine (68.2%), corresponding to 307 of the 450 interviewed individuals. Males therefore represent 31.8% of the total. In terms of age, most respondents are adults from 25 to 64 year old, being 43.8% between 25 and 44 years and 34% between 45 and 64 years old. The smallest group was composed by respondents above 65 years old (9.1%) and younger than 24 years old constituted 13.1% of the sample. Respondents who have completed secondary education represented 38.7% of the sample, followed by 33.6% of individuals with higher education. Respondents with primary school were 11.8% and a minority had technical education (6.4%). Respondents with post-graduate degree were nearly 10% of the total.

A question about household situation helped us understand their familiar structure. 23.8% of the sample lived with their spouse/husband, while 16.4% lived with their parents. 14.7% lived alone and 9.8% livde with their sons/daughters.7.3% lived with their spouse and children. Only 3.1 % lived with friends, indicating a predominantly familiar structure of the sample. In terms of the number of people residing in a household, the same indicates that respondents in households with 2 to 4 residents made up 76.4% of the cases, of which 29.3% was habited by only 2 persons. These results indicate small family units. Such information, combined with monthly household income reinforces the indicative notion of high per capita income and consequent high purchasing power. People living alone represented significant 14.9% of the sample, and respondents living with 5 or more people were only 8.7%. Finally, with an almost egalitarian division, household income between US$ 1.750 and US$ 3.000 and above US$ 3.000 made up 29.8% and 24.9% of the sample respectively. This indicates that more than 50% of the sample has the disposable income to buy food products with added higher value. However, most of the remaining respondents declared to have a low income between US$ 600 and 1.750 (38.4% of the total). The lowest grade (up to US$ 600) was made up by only 6.9% of the sample.

Table 1. Distribution frequency of the socio-demographic profile and number of respondents interviewed.

Variable	Categories	Frequency (%)	Number (n)
Gender			
	Female	68,2	307
	Male	31,8	143
	Total	100,0	450
Age			
	25-44 years old	43,8	197
	45-64 years old	34,0	153
	Less than 24 years old	13,1	59

	More than 65 years old	9,1	41
	Total	100,0	450
Highest Education Attained			
	Secondary (High school)	38,7	174
	Superior (University degree)	33,6	151
	Primary (Basic education)	11,8	53
	Post-Graduate Degree	9,6	43
	Certificate Program (Technical)	6,4	29
	Total	100,0	450
Household situation			
	Other	24,9	112
	I live with my partner, spouse	23,8	107
	I live with one/both of my parents	16,4	74
	I live alone	14,7	66
	I live with my son/daughter	9,8	44
	I live with a friend	3,1	14
	Other (Spouse and kids)	7,3	33
	Total	100,0	450
Number of people living at your residence			
	2	29,3	132
	3	25,3	114
	4	21,8	98
	1	14,9	67
	5	5,6	25
	More than 5	3,1	14
	Total	100,0	450
Monthly household income			
	From US$ 600 to US$ 1.750	38,4	173
	From US$ 1.750 to US$ 3.000	29,8	134
	More than US$ 3.000	24,9	112
	Less than US$ 600	6,9	31
	Total	100	450

Frequency of consumption and motivations to consume

The first question the interviewed individuals answered refers to the frequency they consume functional food. Table 2 presents the results.

Table 2. Frequency of consumption of functional food in Porto Alegre.

	Frequency (%)	Number (n)
Daily	64,4	290
Weekly	27,1	122
Fortnightly	4,9	22
Once a month	2,7	12
Rarely	0,9	4
Total	100,0	450

The frequency of consumption is notably very high, as 64.4% of the 450 respondents indicated to consume functional foods on a daily basis, while 27.1% consumed it weekly. Together, both groups represented 91.5% of the sample, indicating to have both familiarity and high penetration of functional food in the households. Based on this data, it was important to identify their main motivations to consume, as indicated in the following table.

Table 3. Motivations to consume functional foods from consumers in Porto Alegre

	Mean	S.D.
To help in the maintenance of a healthy gut function	4,15	0,91
To keep a healthy lifestyle	4,13	0,90
To increase the wellness	4,06	0,87
To enhance the physical and mental performance	4,03	0,92
To help cholesterol reduction / prevent heart diseases	3,95	1,04
To prevent diseases (in the individual or in the family)	3,90	0,99
Habit or tradition	3,87	0,94
To improve physical appearance	3,81	0,99
To control appetite and body weight	3,65	1,05

To 'help in the maintenance of a healthy gut function' was the most cited motive, followed by general health and wellness motivations, indicating that consumers from southern Brazil expected to achieve these benefits through healthy eating – this is a valuable information for the functional food industry. To 'enhance the physical and mental performance' was also mentioned, indicating again some good prospect for the development of 'mood' foods, not necessarily through the current energy drinks' offer. Motivation to 'reduce cholesterol' and 'prevent diseases' were also indicated, although with lower means. Motivation by 'habit/tradition' was less cited together with the reason to 'improve physical appearance' and to 'control appetite and body weight'.

In fact, these results confirm the findings from products displayed in the retail sector, since probiotics and fiber are the most common categories available. Communication strategies from multinationals are also regarded responsible for the popularity of probiotics: Advertising campaigns launched by Activia, Danone, promoting the benefit to gut health have greatly informed and educated consumers through different media (television, magazines, newspapers) thus stimulating their consumption. In addition, the Brazilian market (different from the Japanese, for instance) has very few functional food options aiming at the beauty function and potential weight control. Products promoting fibers' attributes, in this regard, are commonly used aiming at the good functioning of the intestines, and not as much claimed as weight control and sense of satiety.

Attitudes towards functional foods

Table 4 presents the obtained results of attitudes towards functional food from consumers in the area surveyed.

Table 4. Attitudes towards functional foods from respondents in Porto Alegre

	Mean	S.D.
The benefits promoted by functional foods are real	5,65	1,38
Functional foods make it easier to follow a healthy lifestyle	5,63	1,30
The growing number of functional foods on the market is a positive trend for the future	5,6	1,32
Even for a healthy person, the consumption of functional food is necessary	5,55	1,33
The idea that I can take care of my health by eating functional foods	5,48	1,42

gives me pleasure.		
Functional foods are absolutely necessary	5,48	1,35
My performance improves when I eat functional foods	5,45	1,33
I can prevent disease by eating functional foods regularly	5,44	1,33
Functional foods promote wellness	5,43	1,30
The functional foods benefits of to health are clear	5,42	1,28
It is great that modern technology allows the development of functional foods	5,37	1,32
I believe that functional foods ful fill their promises	5,36	1,31
Functional foods can repair the damage caused by an unhealthy diet	5,30	1,45
The safety of functional foods has been very thoroughly studied	5,28	1,33
The consumption of functional foods is completely safe	5,28	1,31
It is important to add benefits (as vitamins, probiotics, omega-3) to otherwise unhealthy food	5,10	1,39
Not enough information is being given about the benefits of functional foods	5,04	1,42
Functional foods are high-technology products	5,03	1,39
Functional foods help to improve my mood	5,02	1,514
I am prepared to compromise on the taste of a food if the product is functional	4,80	1,71
I prefer to eat foods with medicine-like effects	4,75	1,50
I actively seek out information about functional foods	4,73	1,68
Functional foods are consumed mostly by people who have real need for them	4,57	1,71
Even if used in excess, functional foods cannot be harmful to health	4,22	1,91

Overall, the results indicate a positive attitude towards functional foods from individuals interviewed in Porto Alegre (most answers with means above 5.0 on a 7-point scale). Items with higher means were associated to health and wellness provided by functional foods. These, besides being the main motivations, are also particularly important to women, as indicated by previous studies (Bech-Larsen; Scholderer, 2007: Frewer et al., 2003). Since in this survey women are the majority, such result is somehow confirmed.

In order to analyse the structure of attitudes and to reduce observable variables into latent ones – factors - an exploratory factor analysis (EFA) was applied. A Principal Component Analysis (PCA) with Varimax Rotation Method was performed and the obtained matrix and respective factor loadings are presented in the following table.

Table 5. Exploratory Factor Analysis of the Attitudes towards Functional Food in South Brazil: Factors and Loadings

Factors	1 Reward (FF Rew)	2 Trust (FF Tru)	3 Medical (FF Med)
The idea that I can take care of my health by eating functional foods gives me pleasure.	0,831		
Functional foods are absolutely necessary	0,830		
Functional foods make it easier to follow a healthy lifestyle	0,828		
I can prevent disease by eating functional foods regularly	0,812		
The benefits promoted by functional foods are real	0,804		
My performance improves when I eat functional foods	0,78		
The growing number of functional foods on the market is a positive trend for the future	0,769		
Even for a healthy person, the consumption of functional food is necessary	0,754		
Functional foods can repair the damage caused by an unhealthy diet	0,685		

Functional foods help to improve my mood	0,677		
The safety of functional foods has been very thoroughly studied		0,778	
The consumption of functional foods is completely safe		0,768	
I believe that functional foods ful fil their promises		0,746	
It is important to add benefits (as vitamins, probiotics, omega-3) to otherwise unhealthy food		0,733	
The functional foods benefits of to health are clear		0,704	
It is great that modern technology allows the development of functional foods		0,703	
Functional foods are high-technology products		0,695	
Functional foods promote my welfare		0,694	
Not enough information is being given about the benefits of functional foods		0,605	
Functional foods are consumed mostly by people who have real need for them			0,766
Even if used in excess, functional foods cannot be harmful to health			0,762
I am prepared to compromise on the taste of a food if the product is functional			0,698
I actively seek out information about functional foods			0,673
I prefer to eat foods with medicine-like effects			0,549
Reliability of the attitudes' factors (Cronbach'a alpha)	0,958	0,938	0,824

As indicated in the rotated matrix, three factors were generated, which explain 70.85% of the phenomenon. Besides the clear dense factor loadings (a factor loading is the correlation between a variable and a factor that has been extracted from the data, and loadings above 0.4 are good indicators of this fit), the Kaiser-Meyer-Olkin (KMO) and Bartlett's test indicated significant results in 0.961 (p = 0.000). The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. The Bartlett's test of sphericity is significant at p=0.000 indicating that the correlation matrix is not an identity matrix. Reliability was tested using Cronbach's alpha measures and we can say that the obtained factors are reliable, since the alphas were higher than 0.8, a highly satisfactory result.

Our results are somehow similar to those found by Urala and Lähteenmäki in 2004 and 2007, which identified four attitude factors towards functional foods in the 2004 study (reward from using functional food - FF Rew, confidence in functional food - FF Con, necessity for functional food – FF Nec, and functional food as medicine FF Med) and four factors in 2007 (reward from using functional food - FF Rew, confidence in functional food - FF Con, necessity for functional food- FF Nec and safety of functional foods FF Saf).

In our case, we found three factors in a particular combination. Factor 1 "reward from using functional food" (FF Rew) is the strongest, linked to the benefits of wellness and health coming from functional foods consumption, as found in the original studies. Factor 2, named "trust in functional foods" (FF Tru) combines items reflecting consumers' confidence and safety in functional foods, both in its function and in relation to risk of use. Aspects related to technology are gathered in this factor. Finally, factor 3 "functional food as medicine" (FF Med) would be equivalent to the original factor found by the authors in 2004 combined with the "necessity" factor, indicating that in this case, consumers choose functional foods mainly due to their medicinal benefits. One possible explanation for the unification of these concepts into three factors in relation to the original study may be the incipient stage of market development in the southern Brazil case. Although familiar to some product categories (such as probiotics, as described earlier), consumers may not properly discriminate between the factors and technical aspects related to the product. The Brazilian food safety organisation,

ANVISA, sets up strict guidelines in respect of food labeling and the use of claims by the food industry to avoid consumption stimulated by alleged benefits products might provide.

In terms of statistical difference, no difference has been found between groups regarding gender, indicating similar positive attitudes between females and males. However, significant differences were found with regards to respondents' age. Consumers above 65 years old have more positive attitudes (5.9) in reward from using functional foods, if compared to the younger group (less than 24 years old) (mean 5.19). The same is true for functional food as medicine, with the mean from older group being 5.1 and from the younger 4.01. The physiological health of the youngsters and their lower disease expectation might explain such differences.

Trust in stakeholders

The next question was related to respondents' confidence on the different innovation system agents related to functional food. Respondents should indicate their degree on a 7-point scale, ranging from 'Do not trust al all' being equal to 1 to 'Completely trust' being equal to 7. Table 6 presents results through their respective mean and standard deviation.

Table 6. Confidence on the different innovation system agents related to functional foods

	Mean	S.D.
Dieticians/nutritionists	5,62	1,16
Medical professionals	5,49	1,13
Scientists	5,41	1,17
National health authorities (Ministry/Secretary of Health, ANVISA)	5,19	1,19
Information from the media (e.g. national TV shows, others)	4,90	1,25
Retailers	4,78	1,26
Medicine manufacturers/companies	4,76	1,52
Food manufacturers	4,67	1,46

Based on a 7-point scale

Confidence in dieticians/nutritionists and professionals from the medical area is higher, followed by scientists and national health authorities. For instance, health professionals can promote positive attitudes about functional foods by providing information about the benefits of these products. Uptake of functional foods may also be encouraged by distributing messages of approval from important groups, such family doctors and personal dieticians. For example, communication with the public about these health products could include messages of endorsement from representatives of medical practitioners or from groups perceived to be peers (O'Connor and White, 2010).

National health authorities came in 4th place, represented by the Ministry of Health and by the Brazilian National Sanitary Surveillance Agency (ANVIS). In spite the fact consumers trust these agents, intersections in food legislation, especially with respect to functional and new food products, lead to misunderstandings and even omissions on the part of ANVISA In Brazil, clearer rules for the industry are necessary so that the consumer is not deceived by false cure promises (da Silveira et al., 2009).

Media, retailers and private companies (medicine and food sector) had the lowest confidence rate. This could be explained by consumers' perception of these agents' commercial interest, consequently affecting their credibility. Such results indicate the need for articulation and governance from the agents of the innovation system for functional food in Brazil, aiming to establish a common denominator on the benefit. Even though both the industry and retailers are the main figures in functional food product development, they are the least trusted agents.

5. Conclusions

In general, the scenario for functional foods in Brazil is highly positive. The functional food industry in Brazil had a growth rate of 11% in the period 2006 and 2007, with a market size estimated at over US$ 6 billion (Euromonitor, 2007). There is much potential for growth, which is increased by an aging and more educated population, attentive to information about nutrition and health. For instance, sales of health and wellness food and beverages are expected to record a good performance in the 2009-2014 period, driven by better economic indicators, such as low unemployment, low inflation and higher disposable income.

Our survey shows consumers have a propensity to consume and have generally a positive attitude towards functional foods. The Brazilian population is getting older and their concerns about health are growing accordingly, as indicated by previous studies (Frewer et al., 2003). The cultural diversity in Brazil demonstrates a fertile ground for innovation and as the population increases the disposable income and becomes more educated it shows a higher demand for quality food products.

The food R&D and innovation system is developing, although stronger governance and co-ordination strategies are needed. Regulation bodies in Brazil are quite demanding in terms of nutritional labeling information (Coutinho et al., 2002), what is somehow shown through the respondents' high degree of confidence. Health professionals are also considered a trusted source whenever addressing functional foods, and their credibility could be better used by the functional food industry. Nutritionists and other professionals could help inform consumers about the benefits of particular categories of functional foods, since the food industry itself is not regarded as the most trustworthy source. Considering the Brazilian context of system fragmentation, this question brings back the necessity of articulation between the different agents.

Specifically, with regards to our survey results, the sample was predominantly composed by female respondents, who according to secondary data, are mostly responsible for the purchase of food in the households. Results from this research are therefore typical of the target-public aimed by the food companies. The respondents presented positive attitudes towards functional foods and enough purchasing power to acquire it. Accordingly, frequency of consumption was generally high, with 64.4% of the sample indicating to consume generic functional food on a daily basis. Yet, frequent consumption of selected products produced by local food industries in South Brazil was very low. One explanation might be the lack of communication strategies and promotional actions, in a way that consumers are able to recognize the brand and identify its beneficial, if compared to conventional products (from the same company) or functional food products produced by multinationals (such as Red Bull and Danone Activia).

Finally, surveys aiming at better characterizing Brazilian consumers are fundamental to help food companies to define their strategies. To map the most accepted food categories provides valuable information in order to companies to avoid the "trial and error" approach. A good example could be attributed to the results obtained from energy drinks coming from our survey. One of the main motivations to consume functional food is to enhance the physical and mental performance, but apparently few products are exploring other carriers to provide such benefit. Brazil has a rich biodiversity, especially in plants, and native energetic compounds and superfruits such as mate, guaraná and açaí berry could be better utilized in new product development process of functional food products.

Urala and Lähteenmaki (2007) suggest that as the products become more familiar, more regular consumers' monitoring is needed to ascertain how the attitudes towards functional foods are developing in emerging markets such as Brazil. In this regard, we

recommend further studies to keep monitoring consumer attitudes towards functional food in Brazil and other emerging countries in Latin America and elsewhere.

6.References

Ashwell, M. (2002). *Concepts of Functional Foods*. ILSI Europe Concise Monograph Series. Ed. Walker, R. Retrieved October 10, 2008, from http://www.ilsina.org.

Bech-Larsen, T. and Scholderer, J. (2007). Functional foods in Europe: consumer research, market experiences and regulatory aspects. *Trends in Food Science & Technology*, 18, 231-234.

Benady, D. (2008). New product launches in the food sector: the recipe for success. *Warc Exclusive April, 2008.*

Castilhos, C. and Passos, M. (1998). Competitividade e inovação na indústria gaúcha. FEE, 1998.

Churchill, J. and Gilbert, A. (1999). Marketing research: methodological foundation. Orlando: The Dryden Press, 1999.

Coutinho, D., Monteiro, C. and Popkin, B. (2002). What Brazil is doing to promote healthy diets and active lifestyles. *Public Health Nutrition,* 5(1A), 263-267.

Cooke, P., Uranga, M. and Etxebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Research Policy,* 26, 475-491.

Cooper, R. G. (1994). New products: factors that drive success. *International Marketing Review*, 11(1), 60-76.

Costa, A.I.A. and Jongen, W.M.F. (2006). New insights into consumer-led food product development. *Trends in Food Science & Technology*, 17(8), 457–465.

Da Silveira, T.F.V., Vianna, C.M.M. and Mosegui, G.B.G. (2009). Brazilian legislation for functional foods and the interface with the legislation for other food and medicine classes: contradictions and omissions. *Physis*, 19 (4). Available from <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S010373312009000400015&lng=en&nrm=iso>. Access 26 June 2011

De Barcellos, M.D., Aguiar, L.K, Ferreira, G.C. and Vieira, L.M. (2009)Willingness to Try Innovative Food Products: a Comparison between British and Brazilian Consumers. Brazilian Administration Review, 6,(1), 50-61.

De Barcellos, M.D., Kügler, J.O., Grunert, K.G., van Wezemael, L., Pérez-Cueto, F.J.A., Ueland, Ø. and Verbeke, W. (2010). European consumers' acceptance of beef processing technologies: A focus group study. *Innovative Food Science and Emerging Technologies*, 11(4), 721-732.

Euromonitor (2004). *The world market for functional food and beverages* (January 2004): 63p.

Euromonitor (2007) *State of the Market: Global Health & Wellness Products*. London: Euromonitor, (May 2007), 24p.

Euromonitor (2010). *New health and wellness sales fuelled by developing markets of China, Mexico, and Brazil* (April 2010).

FAO (2007). *Report on Functional Foods.* Retrieved April 1th, 2008, from http://www.fao.org.

Freeman, C. (1995). The National System of Innovation in historical perspective. *Journal of Economics,* 19, 5-24.

Frewer, L., Scholderer, J. and Lambert, N. (2003). Consumer acceptance of functional foods: issues for the future. *British Food Journal,* 10, 714–731.

Gray, J., Armstrong, G. and Farley, H. (2003). Opportunities and constrains in the functional food market. *Nutrition & Food Science,* 33, 213–218.

Grime, I., Diamantopoulus, A. and Smith, G. (2002) Consumer evaluation of extensions and their effect on core brand. *European Journal of Marketing*, 36(11/12), 1415-1438.

Huotilainen, A., Pirttilä-Bäckman, A.M., and Tuorila, H. (2006). How innovativeness relates to social representation of new foods and to the willingness to try and use such foods. *Food Quality and Preference,* 17(5), 353–361.
IPA (1994) IPA Guide to Best Practice, Food & Beverages.
Just Food (2008). Global market review of functional foods – forecasts to 2013. Report. Available at: http://www.just-food.com/market-research/global-market-review-of-functional-foods-forecasts-to-2013_id62137.aspx. Accessed 25 June 2010.
Kaushik, N. and Kaushik, D. (2010). Functional Foods: Overview and Global Regulation. *International Journal of Pharma Recent Research*, 2(2), 47-52.
Malhotra, N. (2001). *Marketing research: an applied orientation*. Upper Sadle River: Prentice Hall.
Menrad, K. (2003). Market and marketing of functional food in Europe. *Journal of Food Engineering*, 56, 181–188.
Nelson, R. (1993). National innovation systems: a comparative analysis. Oxford: Oxford University Press.
O'Connor, E. L., White, K.M. (2010). Willingness to trial functional foods and vitamin supplements: The role of attitudes, subjective norms, and dread of risks. *Food Quality and Preference,* 21,75-81.
OECD (1997). National Innovation Systems, OECD Publications, Paris.
Pliner, P. and Hobden, K. (1992). Development of a scale to measure the trait food neophobia. *Appetite*, 19(2), 105-120.
Portoweb (2009). Porto Alegre é legal. Prefeitura Municipal de Porto Alegre - PROCEMPA. Available at: http://www1.prefpoa.com.br/pwcidadao/default.php?reg=26&p_secao=135 Accessed 10 June 2011.
Raud, C. (2008). Os alimentos funcionais: a nova fronteira da indústria alimentar - análise das estratégias da Danone e da Nestlé no mercado brasileiro de iogurtes. *Revista Sociologia e Política,* 16(31), 85-100.
Scholderer, J. and de Barcellos, M.D. (2008). Feasibility study for meat-derived functional ingredients (Restricted). MAPP, Aarhus School of Business, Denmark.
Schumpeter, J.A. (1982). *Teoria do desenvolvimento econômico*, São Paulo: Abril Cultural.
Siegrist, M., Stampfli, N. and Kastenholz, H. (2008). Consumers' willingness to buy functional foods. The influence of carrier, benefit and trust. *Appetite*, 51(3), 526-529.
Trail, B., and Grunert, K. G. (1997). Product and process innovation in the food industry. London: Chapman & Hall.
Urala, N. and Lahteenmaki, L. (2003). Reasons behind consumers functional food choices. *Nutrition & Food Science, 33, 148–158*.
Urala, N. and Lahteenmaki, L. (2004). Attitudes behind consumers' willingness to use functional foods. *Food Quality and Preference*, 15, 793–803.
Urala, N. and Lahteenmaki, L. (2007). Consumers changing attitudes towards functional foods. *Food Quality and Preference, 18, 1–12*.
Van Wezemael, L., Verbeke, W., Kügler, J.O., De Barcellos, M.D. and Grunert, K.G. (2010). European consumers and beef safety: Perceptions, expectations and uncertainty reduction strategies. *Food Control*, 21, 835-844.
Verbeke, W. (2005). Consumer acceptance of functional foods: socio-demographic, cognitive and attitudinal determinants. Food Quality and Preference, 16, 45–57, 2005.
Verbeke, W. (2006). Functional foods: Consumer willingness to compromise on taste for health? *Food Quality and Preference*, 17(1,2), 126-131.
Williams, M., Pehu, E. and Ragasa, C. (2006). Functional Foods: Opportunities and Challenges for Development Countries. *Agricultural & Rural Development*, 19, 2006.

SOCIAL CLASS, MEAT CONSUMPTION AND ATTITUDES TOWARDS MEAT

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Abstract
It is commonly accepted that social class has influences on the behavior of consumers. Nevertheless, no recent studies exist, examining the differences between social classes concerning attitudes towards meat and meat consumption.
Hence, this paper aims to analyze which attitudes are of importance in combination with social classes in western societies. Additionally, we infer if social class causes variations in the proportions of meat in the total diet and in the proportions of the different meat types. Moreover it is examined if a distinction between the upper, the middle and the lower classes is possible according to the stated attitudes towards meat, such as animal welfare or health and environmental awareness.
For this, a sample of 990 German consumers, regarded as representative for the German population, were interviewed in spring 2011 about their eating and food buying behavior, their attitudes towards meat and about social demographic dimensions.
The results show that no significant differences in meat consumption can be detected between the social classes in this study. Regarding the attitudes it is striking that animal associated issues such as 'Animal Welfare Awareness' and ethical problems with the 'Eating of Animals' are significantly less worried about in the upper class.
Generally it can be stated that the idea of social classes is not sufficient anymore to explain consumer behavior with the focus on meat in western societies.

Key words: social class, meat consumption, attitudes, consumer behavior

SOCIAL CLASS, MEAT CONSUMPTION AND ATTITUDES TOWARDS MEAT

1. Introduction

Whereas in emerging countries the per capita meat consumption increases with the per capita Gross Domestic Product (GDP) (FAO, 2009), the curve stagnates for countries with a GDP of more than about 25,000 US$ PPP (Purchasing Power Parity). In these countries not only income, used as a proxy of social class, but also other factors seem to affect meat consumption. A multitude of attributes and beliefs, such as animal welfare, health or environmental effects concerning the consumption of meat are discussed in this context (e.g. Richardson et al., 1993; Lea & Worsley, 2001; Guenther at al., 2005; De Boer et al., 2007).

Hence, this paper aims to analyze which attitudes are of importance in combination with social class in western societies. Additionally, we infer if social class causes differences in the proportions of meat in the total diet and in the proportions of the different meat types. Furthermore it is examined if a distinction between the upper, the middle and the lower class is possible based on the stated attitudes towards meat, such as animal welfare or health and environmental awareness. Therefore a survey of 990 German consumers was undertaken in spring 2011.

While consumer attitudes towards meat and meat consumption have been studied to some extent (e.g. Woodward, 1988; Richardson et al., 1994; Verbeke & Viande, 1999; Grunert, 2006; Verbeke et al., 2010), studies focusing on impacts of social class are rather rare (Gossard & York, 2003). This is, to our knowledge, the first study combining the concept of social classes with the consumption of and attitudes towards meat.

The paper proceeds as follows. In the next section the idea of social classes is described and a brief overview of the research concerning its impact on consumer behavior is given. The state of research concerning consumer attitudes towards meat is then summarized. The section of the empirical analysis outlines the applied research design and the description of the sample. In the subsequent section, the results of the data analysis are presented. The article concludes with a discussion of the results and some implications for further research and meat marketing.

2. Social class: state of research concerning food consumer behavior

The idea of social classes and their impact on consumer behavior has been studied since the 1940s (Warner & Lunt, 1941). Even though it has been commonly accepted for decades that the concept of social class helps to understand the consumer, research on social classes has been minimal since the early 1980s (Rich & Jain, 1968; Williams, 2002). Despite the societal development with increasing numbers of households that fall outside the marital-couple mold and the general difficulties of its measurement, Coleman (1983) supported the continuing significance of social class to marketing: “social class is worth troubling over for the insights it offers on the marketplace behavior of the nation’s consumers.” Since then, interest in social class research has been rekindled and diverse studies published (Williams, 2002).

Social class is thereby regarded as more appropriate than income to segment the market for areas of consumer behavior that do not include high expenditures, such as food and beverages (Schaninger, 1981; Coleman, 1983).

Analyses of the food sector illustrate that social class differences in food consumption exist (Hupkens et al., 2000) and that food consumption can be regarded as a characteristic of class culture (Bourdieu, 1984; Tomlinson & Wade, 1993).

Concerning meat, few studies have examined the influence of social structural factors on the consumption in western societies (Gossard & York, 2003). Gossard and York (2003), who used data from the Continuing Survey of Food Intakes by Individuals conducted in 1996 by the U.S. Department of Agriculture, Agricultural Research Services, found that social class has substantial impacts on beef and total meat consumption. In their study, those in laborer occupations and people with a low level of education ate more beef and meat in general than people in service or professional occupations and people with a higher level of education. Furthermore, beef consumption increased with higher income, whereas the total meat consumed was not affected by income. According to Bourdieu (1984) their findings showed that eating habits reflect individual class positions.

In Germany, the National Nutrition Survey II interviewed approximately 20,000 German speaking residents from 14 to 80 years of age (MRI, 2008) and offers the latest insights of social class influences on meat consumption. The findings reveal that men belonging to the lower class ate 20% more meat and meat products than men belonging to the upper class.

As to women, there is a minimal difference of 7 grams per diem between upper and lower class (MRI, 2008).

The above-mentioned studies analyzed the difference in meat consumption between social classes. However, a combination of social class, meat consumption and attitudes towards meat has, to our knowledge, so far not been investigated. The target of this study is therefore to gain first insights into whether attitudes towards health, animal welfare or environmental issues related to meat differ between social classes.

3. Consumer attitudes towards meat and meat consumption

As described above, a multitude of studies deal with consumer attitudes towards meat and meat consumption (e.g. Woodward, 1988; Richardson et al., 1994; Verbeke & Viande, 1999; Grunert, 2006; Verbeke et al., 2010). These studies regard various attitudes as relevant for building an image of meat in general or of special meat types or product variations. Likewise, the impact of attitudes on meat consumption is analyzed, particularly since a reduction of meat consumption in western populations can be observed (FAO, 2009).

Besides increased health and aesthetic awareness, animal welfare concerns and environmental awareness have been discussed (Richardson et al., 1993, 1994; Lea & Worsley, 2001; Guenther et al., 2005; Grunert, 2006; De Boer et. al, 2007). Also, the negative image of meat (Andersen et al., 2005) and the bad reputation of the agri-food industry (in Germany) (Albersmeier & Spiller, 2010) are considered as responsible for the fall in demand.

Further aspects affecting meat consumption are seen in the influence of reference groups (Richardson et al., 1994) and in lacking trust in information sources (Lea & Worsley, 2001). Likewise, cost considerations were given as reason for a reduction in consumption (Woodward, 1988).

In contrast to the traditional view of meat as being tasty (Richardson et al., 1994), a dislike of the taste of meat and the disgust of preparing a dead animal are seen as factors leading to a reduction or avoidance of meat (Woodward, 1988; Richardson et al., 1994).

However, according to Richardson (1994) meat choice or avoidance motives are often multi-layered and therefore no single issue should be considered separately: “Views might be classed as ethical, philosophical, aesthetic, psychological, political, economic, cultural,

ecological, nutritional, medical, and countless ways besides. Which influences are of primary relevance, and how they are categorized, depends largely on context and orientation of the research."

This study focuses on attitudes that were considered as most influential according to the literature study and expert discussions.

4. Empirical analysis

Research design

In the present study 990 consumers were interviewed online with a standardized questionnaire in spring 2011. The respondents were recruited with the help of a private panel provider in order to obtain an almost representative sample.

In order to prevent the risk of common method bias (cf. Soehnchen, 2009), the statements and attributes were retrieved from various scales (Likert scale, ranking, percentages, slider). Predominantly five-point Likert scales from -2 to +2 were used though (cf. Weijters et al., 2010).

The questions were constructed based on a literature study and expert discussions and pre-tested with 66 respondents. The questionnaire developed subsequently contains diverse questions concerning attitudes towards meat and meat products, eating, buying and cooking habits as well as socio-demographic variables. Data analysis was conducted with the statistical program SPSS (Version PASW Statistics 18) by means of uni-, bi- and multivariate methods (cf. Backhaus et al., 2008).

For grouping the respondents into different social classes, an index was used as an objective classification criterion (e.g. Rich & Jain, 1968; Coleman, 1983; Williams 2002; Kroeber-Riel & Weinberg, 2003). Since social class is seen as a conceptual tool for consumer research this simplified proxy measure can be accepted (Coleman, 1983).

In the literature, social class is usually based on education, occupation and income (Hupkens et al., 2000; Kroeber-Riel & Weinberg, 2003). These variables were chosen likewise in the present analysis. But in contrast to previous studies, in this study the 'personal' education, occupation and income of the respondent was taken into consideration and not the household income or the occupation of the head of the household. Due to increasing two-income families, independent young singles, retired people, etc. (Coleman, 1983), these variables are considered as more appropriate.

The allocation of index points was made following the German National Nutrition Survey II (MRI, 2008). In view of the fact that a division into three classes is regarded as useful (Coleman, 1983), the respondents were grouped into lower, middle or upper class. Taking into account the assumed proportion of 20% to 60% and to 20% in western civilizations (Kroeber Riel & Weinberg, 2003), 19.6% of the participants were assigned to the lower class, 56.1% to the middle class and 24.4% to the upper class. Missing values were replaced by an expectation-maximization algorithm (cf. Dempster et al., 1977).

In order to explore class differences, an analysis of variance (ANOVA) was undertaken, comparing attitudes concerning meat (factors) that can be regarded as relevant due to the literature study (e.g. Richardson et al., 1993; Lea & Worsley, 2001; Guenther at al., 2005; De Boer et al., 2007) and expert discussions. These factors were established by a confirmatory principal component analysis respecting the common quality values (see A1; Backhaus et al., 2008; Field, 2009). Likewise the proportion of meat in the total diet and the proportion of the different meat types (beef, pork, poultry, other meat) in the total meat consumption were analyzed. Furthermore some additional variables of interest, such as the knowledge about meat production, were included in the comparison of means.

The results of the Levene-Test show that homogeneity of variances cannot be assumed, hence the test T2 (Tamhane) was chosen for a post-hoc multiple group comparison. This test offers the same results as the conservative Bonferroni-Test if the variances are homogeneous and enables pair-wise comparisons on the grounds of a t-test (cf. Backhaus et al., 2008; SPSS, 2003).

Referring to Tomlinson and Warde (1993), a discriminant analysis was eventually conducted, in order to see how effectively the class model predicts the group to which the respondents belong on the basis of their attitudes and consequently also serves as a criterion for a valid measurement. Tomlinson and Warde (1993) stated in their study that if classes exist, the number of correctly classified respondents should be greater than the a priori probability of 33.3%.

Sample description

In order to draw conclusions about the German population from the sample, the participants were chosen by socio-demographic quota specifications. The gender ratio in the sample is 48.8% men and 51.2% women. 30.7% of the respondents are 18 to 40 years old, 36.9% are between 40 to 60 years old and 32.4% older than 60 years. 16.0% of the respondents live in Northern Germany, 27.5% in Southern Germany, 20.5% in Eastern Germany and 36.1% in the Western part of Germany. The majority – with 41.7% of the participants – lives in a village with less than 20,000 inhabitants. 27.6% live in a city with 20,000 to 100,000 inhabitants and 30.7% in a large city with more than 100,000 inhabitants. Thereby the mentioned proportions approximately comply with the German population (Statistisches Bundesamt, 2009).

Regarding further characteristics not included in the selection, such as marital status, size of household and available income, good conformances with the German average were found, whereas higher educational level are overrepresented (method wise).

34 individuals identified themselves as vegetarian and were therefore excluded from the analysis, since the motives of vegetarianism were not subject of this study. Hence, 956 respondents were taken into consideration for the present analysis. For the majority of these respondents meat is a fundamental part of their diet, with only 12.5% disagreeing with this statement.

Results of the analysis

The results of the ANOVA show that five of the eight attitude factors (Preference for Meat, Trust in the Agri-Food Sector, Environmental Awareness, Figure Awareness and Normative Influence) do not differ significantly between the three classes (see Table 1).

Concerning the construct ‘Health Awareness’ it can be stated that the middle class is significantly more concerned about a balanced and healthy diet than the lower class, whereas the upper class captures an intermediate position. Furthermore, the upper class has significantly less problems with the ‘Eating of Animals’ than the other two classes. According to this position the upper class is aware of ‘Animal Welfare’ to a lesser extent than the middle class.

The stated proportion of meat in the total diet as well as the proportion of the different meat types (pork, beef, poultry, other meat) does not vary significantly between the three social classes. By trend, the middle class consumes most meat in general and pork and poultry in particular, whereas the upper class eats more beef and other meat, such as lamb or game than the other two classes.

Table 1. Results of the ANOVA

	Lower Class (l)	Middle Class (m)	Upper Class (u)	Total
Attitudes towards meat				
[1]Preference for Meat [n.s.]	-0.33	-0.02	0.03	0.00
[1]Trust in the Agri-Food Sector [n.s.]	-0.45	0.04	-0.06	0.00
[1]Environmental Awareness [n.s.]	-0.11	0.02	0.06	0.00
[1]Health Awareness*	-0.17[m]	0.07[l]	-0.04	0.00
[1]Figure Awareness [n.s.]	-0.12	0.04	0.00	0.00
[1]Eating of Animals***	0.20 [u]	0.01[u]	-0.19[lm]	0.00
[1]Normative Influence [n.s.]	-0.12	0.05	-0.03	0.00
[1]Animal Welfare Awareness*	0.02	0.05[u]	-0,14 [m]	0.00
Meat consumption				
[2]Proportion of meat in the total diet [n.s.]	22.27	23.42	20.99	22.60
[2]Proportion of pork in the total meat consumption [n.s.]	39.32	39.38	37.68	38.96
[2]Proportion of beef in the total meat consumption [n.s.]	18.76	18.70	20.24	19.09
[2]Proportion of poultry in the total meat consumption [n.s.]	35.78	37.36	34.82	34.75
[2]Proportion of other meat (e.g. lamb, game) in the total meat consumption [n.s.]	4.80	5.73	6.11	5.64
Other variables				
[3]Knowledge about meat production (self estimation)**	2.92[u]	2.76	2.64[l]	2.76
[4]Nowadays everybody can afford to eat meat every day.*	0.04[u]	0.25	0.31[l]	0.22

significance level: * = $p \leq 0.05$, ** = $p \leq 0.01$, *** = $p \leq 0.001$, n.s.= not significant, letters indicate significant difference to the specified class (post-hoc test after Tamhane on the significance level 0.05), [1] factor, [2] percentage, [3] scale from 1 = very good to 5 = very poor, [4] scale from -2 = totally disagree to +2 = totally agree

As regards different meat types, the respondents estimated that on average 38.9% of their meat consumption is of pork, 34.8% poultry, 19.1% beef and 5.6% other meat, such as lamb or game. Compared to the official data, the per capita consumption of pork is underestimated in the sample and the consumption of poultry is overestimated (DBV, 2010).

The self estimated knowledge about meat production significantly varies between the lower and the upper class. Thereby the lower class assesses their knowledge the least (2.92), followed by the middle class (2.76) and the upper class (2.64).

The estimation of the relative costs of meat differs significantly between the upper class, whose members on average agree more to the statement that everybody can afford to eat meat on a daily basis nowadays (0.31) than the lower class (0.04). The middle class, with a mean of 0.25, does not differ significantly from the upper class.

Taking solely attitudes (factors) into consideration, 40.1% of the respondents were classified correctly on the basis of these constructs (see Table 2). Thereby 847 cases were used in the discriminant analysis due to missing values. The classification herewith works better than a classification by chance (33.3%) (Tomlinson & Warde, 1993).

Detailed examination indicates that it was impossible to classify the respondents belonging to the middle class, whereas about half of the cases of the upper class (48.5%) and the lower class (52.4%) were classified correctly.

Table 2. Classification results of the discriminant analysis

		Predicted Group Membership		
Actual Group	Number of Cases	Lower Class	Middle Class	Upper Class
Lower Class	170	**89 (52.4%)**	34 (20.0%)	47 (27.6%)
Middle Class	477	166 (34.8%)	**154 (32.3%)**	157 (32.9%)
Upper Class	200	52 (26.0%)	51 (25.5%)	**97 (48.5%)**

5. Discussion and limitations

Although former studies, such as the German National Nutrition Survey II (MRI, 2008), examined social class differences in the amount of meat consumed, the present analysis found no significant distinction. Since in the study undertaken the proportion of meat within the total diet was analyzed as well as the proportion of the different meat types in the total meat consumption, there might be variations in the total amount of the consumed meat, despite the homogeneity of the composition of the personal diet.

The results show that the consumption of beef and special meat increases from the lower to the upper class. Gossard and York (2003) found that especially beef consumption is inversely related to education, but that it rises with income. For further research it would therefore be suggested to analyze the impact of the classification variables separately in order to prevent possible mutual neutralization. Nevertheless, for marketing purposes it can be assumed that for beef or lamb a sophisticated advertisement and the creation of an 'upper class image' might be useful to appeal to this target group.

The significant difference in the self estimated knowledge about meat production can be explained by the generally higher educational background of the middle and especially the upper class in comparison with the lower class. Also, the assessment of the relative costs of meat consumption can be explained by the higher income of the middle and upper class individuals compared to the lower class.

Interestingly a higher social class with more possibilities regarding cost considerations and higher knowledge does not lead to more concerns about the consumption of meat in general. Particularly animal associated issues like 'Animal Welfare' and 'Eating of Animals' are significantly less worried about in the upper class.

Even though the success rates of correct case classifications in the discriminant analysis was considerably higher than a classification by chance in the border classes (lower and upper class), the idea of social class cannot be regarded as an appropriate predictor to explain differences in the individual's attitudes towards meat.

Considered as a whole, it appears that the per capita meat consumption does not only stagnate at a certain level of per capita GDP of a country as a proxy of social status (FAO, 2009), but rather in a western civilization, such as Germany, meat cannot be seen as a luxury good anymore. Therefore the consumption of meat does not reflect the social status in general. A differentiation, which links to the demonstration of a particular class position (Bourdieu, 1984) is possibly taking place through the consumption of certain cuts of meat (e.g. entrecote or rump steak), special process qualities (e.g. organic or regional production), special preparations (e.g. wood-fired) or special meat types (beef, lamb, game), taking the present results as a lead.

In summary, the present study shows, that the concept of social class is not adequate anymore to explain either attitudes towards meat or meat consumption in western societies. In this context, life style approaches, such as the food-related life style, might allow deeper insights (e.g. Grunert et al., 1993; Grunert, 2006) than the concept of social class.

6. References

Albersmeier, F. and Spiller, A. (2010). Die Reputation der Fleischwirtschaft in der Gesellschaft: Eine Kausalanalyse. Schriften der Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaus e.V. (45), 181-193.

Andersen, H.J.; Oksbjerg, N. and Therkildsen, M. (2005). Potential quality control tools in the production of fresh pork, beef and lamb demanded by the European society. Livestock Production Science 94 (1-2), 105-124.

Backhaus, K.; Erichson, B.; Plinke, W. and Weiber, R. (2008). Multivariate Analysemethoden – Eine anwendungsorientierte Einfuehrung. Berlin/Heidelberg, Springer.

Bourdieu, P. (1984). Distinction – A Social Critique of the Judgement of Taste. London, Routlegde & Kegan Paul.

Coleman, R.P. (1983). The Continuing Significance of Social Class to Marketing. The Journal of Consumer Research 10 (3), 265-280.

De Boer, J.; Hoogland, C.T. and Boersema, J.J. (2007). Towards more sustainable food choices: Value priorities and motivational orientations. Food Quality and Preference 18 (7), 985-996.

Dempster, A.P.; Laird, N.M. and Rubin, D.B. (1977). Maximum Likelihood from Incomplete Data via the EM Algorithm. Journal of the Royal Statistical Society. Series B (Methodological) 39, 1-38.

Deutscher Bauernverband (DBV) (2010). Situationsbericht 2011 – Trends und Fakten zur Landwirtschaft. Berlin.

Field, A. (2009). Discovering Statistics using SPSS. London, Sage Publications.

Food and Agricultural Organization of the United Nations (FAO) (2009). The State of Food and Agriculture. Livestock in the Balance. Rome.

Gossard, M.H. and York, R. (2003). Social Structural Influences on Meat Consumption. Human Ecology Review 10 (1), 1-9.

Grunert, K.G.; Brunso, K. and Bisp, S. (1993). Food-related life style: Development of a cross-culturally valid instrument for market surveillance. MAPP working paper No12.

Grunert, K.G. (2006). Future Trends and Consumer Lifestyles with Regard to Meat Consumption. Meat Science 74 (1), 149-160.

Guenther, P.M.; Jensen, H.H.; Batres-Marquez, S.P. and Chen, C.F. (2005). Sociodemographic, Knowledge, and Attitudinal Factors related to Meat Consumption in the United States. Journal of the American Dietric Association 105 (8), 1266-1274.

Hupkens, C.L.H.; Knibbe, R.A. and Drop, M.J. (2000). Social class differences in food consumption. The explanatory value of permissiveness and health and cost considerations. European Journal of Public Health 10 (2), 108-113.

Kroeber-Riel, W. and Weinberg, P. (2003). Konsumentenverhalten (8th Edition). Munich, Verlag Franz Vahlen.

Lea, E. and Worsley, A. (2001). Influences on meat consumption in Australia. Appetite 36 (2), 127-136.

Max Rubner-Institut (MRI) (2008). Nationale Verzehrs Studie II. Ergebnisbericht Teil I. Karlsruhe, Bundesforschungsanstalt fuer Ernaehrung und Lebensmittel.

Rich, S.U. and Jain, S.C. (1968). Social Class and Life Cycle as Predictors of Shopping Behavior. Journal of Marketing Research 5 (1), 41-49.

Richardson, N.J.; Shepherd, R. and Elliman, N.A. (1993). Current Attitudes and Future Influences on Meat Consumption in the U.K. Appetite 21 (1), 41-51.

Richardson, N.J.; MacFie, H.J.H. and Shepherd, R. (1994). Consumer Attitudes to Meat Eating. Meat Science 36 (1-2), 57-65.

Schaninger, C.M. (1981). Social Class Versus Income Revisited: An Empirical Investigation. Journal of Marketing Research 18 (2), 192-208.

Soehnchen, F. (2009). Common Method Variance and Single Source Bias. In: Albers, S. et al. (eds.). Methodik der empirischen Forschung. Wiesbaden, Deutscher Universitaets-Verlag, 137-152.

SPSS (2003). SPSS Advanced Models 12.0. In: http://support.spss.com/ProductsExt/SPSS/Documentation/SPSSforWindows/German/SPSS%20Advanced%20Models%2012.0.pdf. Viewed 16.05.2011.

Statistisches Bundesamt (2009). Statistisches Jahrbuch 2009. Fuer die Bundesrepublik Deutschland. Wiesbaden.

Tomlinson, M. and Warde, A. (1993). Social Class and Change in Eating Habits. British Food Journal 95 (1), 3-10.

Verbeke, W. and Viande, J. (1999). Beliefs, Attitude and Behaviour towards Fresh Meat Consumption in Belgium: empirical evidence from a consumer survey. Food Quality and Preference 10 (6), 437-445.

Verbeke, W.; Pérez-Cueto, J.A.; de Barcellos, M.D. and Krystallis, A. (2010). European citizen and consumer attitudes and preferences regarding beef and pork. Meat Science 84 (2), 284-292.

Warner, W.L. and Lunt, P.S. (1941). The Social Life of a Modern Community. New Haven, CT: Yale University Press.

Weijters, B.; Cabooter, E. and Schillewaert, N. (2010). The effect of rating scale format on response styles: The number of response categories and response category labels. International Journal of Research in Marketing 27 (3), 236-247.

Williams, T.G. (2002). Social class influences on purchase evaluation criteria. Journal of Consumer Marketing 19 (3), 249-276.

Woodward, J. (1988). Consumer Attitudes towards Meat and Meat Products. British Food Journal 90 (3), 101-104.

World Health Organization (WHO) (2011). BMI classification. http://apps.who.int/bmi/index.jsp?introPage=intro_3.html. Viewed 17.05.2011.

7.Appendix

A1. Results of the principal component analysis

Preference for Meat (CA: 0.791, MSA: 0.783, TVE: 55.05%)	
Variables	Loadings
Meat is a source of vitality.	0.772
Meat always tastes good.	0.754
I can never have enough meat in a meal.	0.754
A juicy steak is better than anything else.	0.751
Meat is essential for a balanced diet.	0.675
Trust in the Agri-Food Sector (CA: 0.779, MSA: 0.660, TVE: 69.38%)	
Variables	Loadings
I have a great deal of trust in the meat sector.	0.886
The information provided by meat producers is reliable.	0.839
I am certain that the majority of farmers look after their animals well.	0.770
Environmental Awareness (CA: 0.805, MSA: 0.714, TVE: 63.13%)	
Variables	Loadings
Eating a lot of meat and sausage is very bad for the climate.	0.890
I restrict my meat consumption to protect the climate.	0.831
Animal husbandry pollutes the environment.	0.812
Living sustainably is important to me.	0.619
Health Awareness (CA: 0.668, MSA: 0.622, TVE: 50.19%)	
Variables	Loadings
People who do not eat meat are healthier.	0.761
People who eat a lot of meat are damaging their body.	0.756
A balanced diet is more important to me than taste.	0.655
I am very health-conscious in what I eat.	0.654
Figure Awareness (CA: 0.553, MSA: 0.570, TVE: 52.84%)	
Variables	Loadings
I look for low calorie food products.	0.816
I am very conscious of my figure.	0.729
I find meat too fatty.	0.623
Eating of Animals (CA: 0.723, MSA: 0.739, TVE: 54.70%)	
Variables	Loadings
I can't bear the sight of dead animals.	0.779
If I'm going to eat meat products, I'd at least rather not be able to see that it was once an animal.	0.758
I find raw meat disgusting.	0.723
I avoid eating meat as much as possible because it means that an animal must be killed.	0.696
Normative Influence (CA: 0.679, MSA: 0.691, TVE: 51.82%)	
Variables	Loadings
I adjust what I eat at a restaurant according to what the others at my table are eating.	0.671
Meat eating is out of fashion.	0.795
Whether I eat meat depends on what my family thinks about it.	0.761
When the media reports about scandals such as the dioxin contamination, this influences my eating behavior.	0.641

Animal Welfare Awareness (CA: 0.706, MSA: 0.741, TVE: 54.00%)	
Variables	Loadings
Recoded: I find meat and sausage from factory farming ok.	0.788
Recoded: To be honest, I don't think about animal welfare much.	0.773
I have often thought about eating less meat because I feel so sorry for the animals.	0.709
Animals should be kept in accordance with their natural needs.	0.663

CA = Cronbach´s Alpha, MSA = Measure of Sampling Adequacy, TVE =Total Variance Explained

Human Resources




CONTEXTUALIZED THEORY AS AN INNOVATIVE TOOL TO IDENTIFY THE FORCES OF SHAPING HUMAN RESOURCE MANAGEMENT: AN EXPLORATORY STUDY IN WINERIES FROM THE NORTHEAST OF BRAZIL.

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Abstract
This paper investigated the influence of contextual forces in shaping models adopted in the management of Human Resources in wineries from the northeast of Brazil. For that the Contextually Based Human Resource Theory- CBHRT (Paauwe, 2004) was applied as an innovative tool to understand the HR strategies at the organizational level. This theory highlights the influence of some contextual factors, thus combining an 'inside in' with an 'inside out' approach to strategic HRM. In-depth semi-structured interviews were conducted with ten informants representing five out of six wineries that compose the population presented in this study – which have between 11-120 employees. Data analysis followed the technique of content analysis. The configuration of the categorization themes were influenced by the CBHRT. This research suggests that the greater impact on modeling human resource forces is the culture of heritage management where shareholders and owner hold the ruling power of decisions making. The competitiveness of the wine market, the rivalry aspects of the imported wines and the demands of international buyers was also identified by CBHRT as the second force pushing the modeling of HRM practices. The sector´s regulatory legislation and the inspections of regulators are forces acting in a constraint form. Finally, the interpretation of results showed results that might not be compatible with the context of competitiveness of the wine sector.

Keywords: Human Resource Management, Contextually Based Human Resource Theory, Innovation, HR models

CONTEXTUALIZED THEORY AS AN INNOVATIVE TOOL TO IDENTIFY THE FORCES OF SHAPING HUMAN RESOURCE MANAGEMENT: AN EXPLORATORY STUDY IN WINERIES FROM THE NORTHEAST OF BRAZIL.

1. Introduction

Research on Human Resources Management practices in Brazil is being reset even counting with a low strategic involvement in large firms (Cesar et al., 2006). There is diversity in practices on HRM in developing countries, changes and transformations in the area should be perceived and understood within the context in which they are inserted. The design and implementation of policies and practices on HRM are influenced by economic, technological and political areas (Paauwe, 2004). Even so, many of the Brazilian academic research in HR has followed the strategic and behavioral concepts of people management (Fischer, 2002; Fischer and Albuquerque, 2001; Lacombe and Tonelli, 2000; Lacombe 2006; Lacombe and Chu, 2008). Other approaches that consider multiple perspectives, *configurational* (Mintzberg et al., 1998), *evolutionary* (Whittington, 1993) and *Resource-Based View* (Barney, 1991; Wright et al., 1994) for example, may bring answers problems that could not be foreseen if adopting a single framework of reference (Rosseto and Rosseto, 2005; Lacombe, 2006).
A model that considers the importance of context and the influence of factors such as competitive mechanisms, legislation, shareholders, unions, etc., in the design and implementation of policies of HRM is a Contextually Based Human Resource Theory – CBRH (Paauwe, 2004).This theory aims a functionalistic way of analyzing organizations acts by examining the relationship between the economic, educational, financial, legal, political and cultural relationship. The CBRH provides a picture that shows the influence of multiple internal and external pressures on the crafting of organizational architectures.
The purpose of this paper is to apply and test a model (CBRH) that examines which are the forces that influence the shaping of human resource management practices in small firms and how that implicates in the manner of how they actually behave. It is also innovative in the sense that it might be the first time testing this theory in Brazilians Northeast firms and the results might serve as guide and insights to future research.
In the first part of the paper, the theoretical perspective of CBRH is exposed and used to reveal that societal context is important in understanding the link between strategy and HRM. In the second part of the paper, it is presented a qualitative results on a pilot study of HRM practices in wineries from northeast of Brazil. The paper concludes with recommended directions for further research.

2. The importance of HRM and its practices for the organization

According to Oliveira and Farias (2001) is not possible to think of improving productivity and work quality without enhancing good practices of Personnel Management. For Guest et al. (2003), due to great competition now faced by organizations, one of the key tasks of the companies will still be an effective people management, ensuring positive results for the organization and the individuals that it encompasses.
To act more effectively, Ulrich and Brockbank (2005) consider that the area of HRM needs to redirect the focus of their practices, working more intensively in the organizational value

chain, this consist of key stakeholders which helps in organizational performance (Teixeira and Zaccarelli, 2007; Ulrich et al, 2008).
The view of many executives is to make their company a reference for their stakeholders (interested parties such as employees, shareholders, customers and society). To ensure a leading position the company must have sources of competitive advantage to ensure higher customer attractiveness than its competitors (Prahalad and Hamel, 1990; Huselid, 1995; Kamochi, 1996; Fleury and Fleury, 2004).
A strategic asset capable of promoting competitive advantage is people. They are individuals with past experiences, internalized norms that are not necessarily those of the employing organization, they have skills, knowledge, creativity and their behavior is only partially governed by the institutions they work for (Paauwe, 2004; Teixeira and Zaccarelli, 2007).
Human resource management is one of the major organizational functions and should focus on managing the exchange relationship between employee and organization. Relationship that involves not only economic rationalities (money, labour and time), but competences, knowledge, information, voice and well being (Paauwe, 2004). The practice of HRM should be encompassed by all individuals throughout the organization, especially supervisors, managers and other in the front line so in this way they can add value and develop a sense of corporate citizenship among all who work within the organization (Purcell and Hutchinson, 2007; Ulrich, 1998; Paauwe, 2004; Ulrich and Brockbank, 2005; Ulrich et al., 2008).
Lacombe (2006, p.27) presents the practices traditionally associated with Human Resources: recruitment, compensation, hiring, training, employment security, performance management systems and dismissal. Ulrich (1998) attached others practices concerning the organizational field, for example, rewards and recognition, executive development, employment and labor relations and diversity management. Guerrero and Barraud-Didier (2004) included practices based on commitment and involvement of people, such as: empowerment (through job enrichment more autonomy, for example), compensation based on the recognition tasks or goals (involving profit sharing, stock, bonus team, social benefits, etc..) and communication (such as information comes to the employee if he has voice within the company, etc.).
For Tanure et al. (2007) the practices of human resource management are more context specific than the practices of production, financial, or even marketing. What means that HRM is the field of administration more sensitive to local context, which implies that some practices in the area are more tied to cultural issues than others. Therefore it is preferred to harmonize global practices with local adaptations.

3. Innovative Conceptual Framework

The main goal of the present paper is to create a better understanding of the organization contextual forces in shaping the variations of HRM practices among wineries in the Northeast of Brazil. It was applied the Contextually Based Human Resource Theory (CBHRT) as an innovative tool capable to elucidate the contextual forces in this study.
Paauwe (2004) conceives of organizations as open systems and therefore the structuring of practices and HRM policies should be influenced by the internal and external environments.
The Contextually Based Human Resource Theory (CBHRT) has been used empirically in studies that attempt to identify forces and actors that impact on the modeling of HRM and the extent to which the restriction limits the room of manoeuvre to act in this area. More precisely in his theory two dimensions of the environment more or less dominate the crafting of HRM and they depend on the degree of leeway.
Loiola et al. (2007: 134) argues that there is a close relationship between voluntarism, determinism and strategic choice. Voluntarism implies a process of planned change, in which the leader has a primary role in the choices of strategy. Determinism, in turn, presupposes a

process of change emerging in which environmental forces limits this role. Thus, one can infer that voluntarism is composed by maximum choice and formulated strategies (deliberate), as determinism is about minimum choice concern strategy (emerging). The approach of CBHRT may vary between the two criteria depend on the forces acting on the unique configuration of each organization.

Paauwe (2004) recommends the use of this model mainly in the descriptive qualitative research of an explorative nature. The main idea of this theory is that market forces and the social environment, legal and cultural factors must be important in the elaboration and implementation of HRM models.

As he recommends, in this research the theoretical part used was the one that addresses the shaping of HRM (See Figure 1). In which is possible to generate insights in the forces and the actors that have an impact on the structure of HRM and use these results as a starting point for establishing plans and goals that add value for all stakeholders involved (Paauwe, 2004).

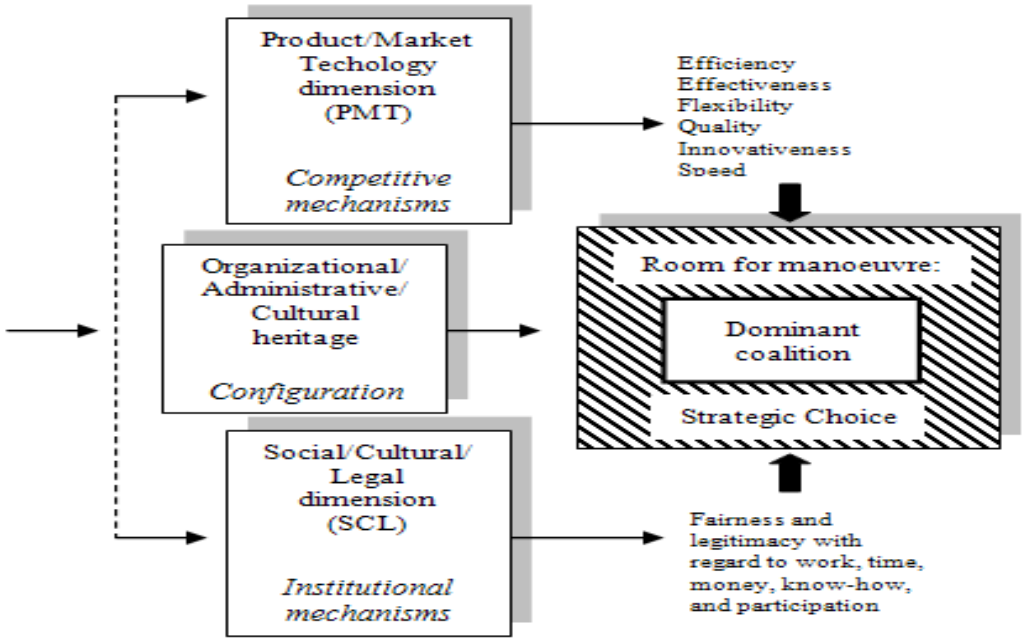


Fig 1. The contextually based human resource theory
Source: Adapted from Paauwee (1994;1998)

In the CBHRT, the drawing area concerns the influences of competitive mechanisms PMT (products, market and technology), SCL (social, cultural and legal dimensions) and the organization, which is embedded of historical and cultural heritage. Given these conditions of context, the ruling dominant coalition will have more or less room to manoeuver (freedom of action).

Yet, the Paauwe theory (2004) emphasizes the inherent tension between economic rationally (PMT) and relational rationality (SCL) in crafting the practices of HRM. It is conceived as the goal of relational rationality an establishment of a reliable and sustainable relationship with 'inside in' and 'inside out' stakeholders (internal and external).

Coupled with these two dimensions (PMT, SCL); the influence of administrative and historical heritage should not be ignored in construction of policies and practices of HRM. The existing settings in the organizational structures also need to be perceived from the results obtained through a series of choices and decisions made in the past.

The influence of the dominant coalition does not settle that the actor only adapts to market demands, administrative legacy or institutional environment. According to the model, the

shaded area of the graph represents the leeway that the ruling coalition has to make their own strategic choices in HRM matters. The degree of freedom/ margin of actions are impacted by the financial health of the company, market positioning and capital-labor ratio, for example.
The dominant coalition is challenged to build policies and practices of HRM that enhances results that contributes positively to organizational performance (Paauwe, 2004). Taking into account that each organization has its own model of HRM, the idea is to seek a better relationship between individual/organization in order to generate results that will empower the organizational performance. This unique shape can also be called organizational uniqueness and, according to Barney (1991), if this singularity is valuable, rare, inimitable and difficult to replace in short term, the company sustainable advantages would be guaranteed.

4. Research Methods

Stake (2005) suggests an approach of case studies when the attempting to investigate a phenomenon, population or general condition. Individuals collected may be similar and should be chosen because their knowledge can enable researchers to better understand, and perhaps better theorizing, about a large collection of cases. From the case study one can trace the processes of change, identifying and analyzing the forces historical, contextual pressures and dynamics of stakeholders in the acceptance or opposition to such procedures. The case study has an inductive approach in the process of collecting and analyzing data. The information is gathered by researchers through the perceptions of local actors on the subject being studied (Godoy, 2006).
To capture a representative picture of the winery sector studied, in-depth semi-structured interviews were conducted and recorded with ten informants representing five out of six wineries that compose the population presented in this study – which have between 11-120 employees. In the absence of jobs specifically related to human resources, the sample was composed of: managers or owners, winemakers and employees who deals in some way with aspects of HRM.
The interviews were inspired by the theoretical base of the CBRH of Paauwe (2004). The purpose of these interviews was to develop an understanding of the forces that dominate the crafting of HRM. In addition field notes were taken to gather off records statements and information exposed before and after the interviews. And documents, including newspaper, web pages and articles were collected to gather information about the strategies associated with managing the wineries. Although the different data sources were valuable for triangulation purposes, data collection was limited by the lack of structured jobs design for HRM.
Data analysis followed the qualitative process of familiarization, open coding, categorization and refinement (Bardin, 2008). The configuration of the categorization themes were influenced by the Contextually Based Human Resource Theory (Paauwe, 2004). All interviews were audio recorded, transcribed, and read multiple times by the researchers. The involvement of two researchers in the analysis process provided opportunities for interpretative triangulation, which increases the confidence of the findings (Denzin, 1984).

5. Findings

Description of the wineries of São Francisco Valley

According to Souza and Ramalho (2008), the wine industry in Brazil is just the beginning of its reconfiguration revealing both significant advances as difficulties in increasing trade liberalization. The country has seven wineries clusters in the states of Rio Grande do Sul, Sao

Paulo, Parana, Santa Catarina, Pernambuco, Bahia and Minas Gerais. The most important is the Rio Grande do Sul, followed by the San Francisco Valley (Larousse do vinho, 2004; Melo, 2007).
The Valley's wine industry has developed in an area called São Francisco Sub-middle, which covers areas of the States of Bahia and Pernambuco. More precisely at a latitude of 9 degrees south, near the cities of Petrolina and Juazeiro. It is the most arid region of the São Francisco, ranking of arid and semi-arid, with very irregular rainfall between 350 to 600mm, with the average temperature around 26.5 degrees Celsius (Codevasf, 2007).
The wine is produced in this region for about 25 years. However, only in the last ten years, the San Francisco Valley has joined the world geography of wine as a cluster of new lattitude wine producer. After the Valley of the Vineyards, in Rio Grande do Sul it is the second most productive region of the country.
The winery industry in Brazil has its own model of development. It is pinpointed the continuity of the productive cycle of the grapes in San Francisco Valley through two and half harvests a year, resulting in stable and fixed workers involved in continuous production. Souza and Ramalho (2008) argues that this industry is in "counter-cycle" with the model of the traditional producer countries of the European Union whose development logics is based on the concept of "terroir" (a designation of origin) and also with the models called "new farmers" which has among its features an industrial production of high volumes, specializing in fine wines and anchored in the brand of so-called universal varieties.
In the study the two largest wineries has international capital (through joint ventures), and high rates of exporting products. The other three wineries are smaller and have poor access to credit. In the world of wine, more important than companies are the regions, so rather than being a successful producer, there is a concept of a region of good wine production, like Bordeaux, Rioja and Napa Valley. The two largest companies has a important role by publicizing the wines of the San Francisco Valley (Tropical and New Latitude wine), specially in foreign markets, the others who doesn´t participate in this action ends up benefiting from this work, which economically is called positive externality (McMillan, 2004).
For better understanding, the findings are discussed within the main shaping forces present in the CBRHT theory: the competitive (PMT) and institutional (SLC) mechanisms, and the administrative cultural heritage configuration.

The dimension PMT (product, market and technology)

This dimension comes from the configuration of the competitive market in which the company operates. This is a factor external to the organization. This dimension includes the combination of product, market and technology.
The global wine industry is quite competitive. In Brazil is only beginning to reconfigure, it reveals significant advances in the trade, but also difficulties inherent in the growing competition. The fine wine market has undergone profound changes in the demand profiles. Due to changes in lifestyle and consumption of people, there is a greater concern about health and preference for light and high quality wines with fruity and aromatic characteristics (Souza, Ramalho, 2008).
Respondents were asked which market/ competitive mechanisms have had a direct impact on the shaping the organization. The interviewees perceive the competition as a factor that interferes directly on the development of management strategies. Two out of five wineries exports their products to foreign consumption and its marketing strategy is consolidated in the

sales of wines called “tropical” formulated to meet changing consumptions patterns already mentioned. All the wineries have to deal with forces of competition and customers, especially with the competitive prices of South American wines like Argentinean and Chilean that are much cheaper. Reports indicate that the concern for these forces (competition and customer) implies a continuous search for quality and product innovation.
Concerning the shaping of HRM the findings indicate that the technology of the task as responsible for shaping the practices inside the organization. In all wineries surveyed the most common structure found is a division into three hierarchical levels: the administrative (managers, supervisors and winemakers), the industrial (production, quality, bottling) and the rural workers (farmers, harvesters, etc.).
As observed in this study, the wine industry uses technology in processing and making wine. But in the Northeast´s wineries this production chain only the technical staff are knowledge holders, like the winemaker and agronomists are able to drive production process. The remaining tasks of this process can be divided roughly into: manual (planting, harvesting, packing); mechanics (transfer of the must into different tanks to crush, ferment, filter, etc.) and automatic (bottling). The hierarchical levels recognized were very simples with no more than four levels.
In general terms all the companies felt that they were facing increasingly market competition and the main reaction observed is working with a reduced and low skills work-force. The findings suggest that in dealing with opportunities and threats posed by environment, the wineries of the study concentrates on manufacturing process rather than HRM practices that would get the most out of the workers.

The dimension SCL (Social, cultural, legal)

This dimension includes the social factors that are regulated by the way society treats each work and their relationships, for example: the culture of work in the Brazilian society, Labor Legislation, the Regulatory Agencies and the State. Importantly, firms operate within a social, cultural and legal context (SCL). Where prevail the different values and standards, the institutional channel and social restrictions as influencing the actions and organizational decisions.
In the wineries of San Francisco Valley, the Ministry of Agriculture, the governments of the states of Bahia and Pernambuco, the Health Surveillance are, among others, the main institutions governing the study object (Melo, 2007). The Brazilian Labor Legislation is very restricting and it is not possible freely hire purchase and sale of a service. According to Fendt (2007), labor legislation and the operation of Labour Court impose costs and uncertainty to business activity. One problem is the minimum wage, among others, which prevent higher formal signings. Another negative point is the high demission costs what causes a reduction in admissions. Also according the author (ibid) the law itself, by preventing the freedom of contract encourage the conflict, creating many labor dispute every year.
Another aspect in the SCL dimension is the cultural heritage. The thinking of the top executives of an organization is capable to influence the way people are managed. The management philosophy is made from the explicit or implicit beliefs of its key executives on the nature of the business, the company´s role in society, how the business should be managed and, particularly, how employees are treated and availed. The management style also has its part in shaping the management of people, for the ways how executives behave, communicate and interact affect the policies and practices of the organization (Beer et al. 1985).
The questions to identify the forces of this dimension were based on the Paauwe (2004) examples that consist in asking which institutional mechanisms have a direct impact on the shaping of your organization (legislation, rules, procedures, covenants and influence of social

partners). Participants were also inquired to answer about the key characteristics of their organization configuration (organization´s age, management philosophy, mission and strategy of the founders, current ownership structure and critical incidents in the past).
The findings reveal that family values are very strong and the family history is intertwined with the history of the company were the brand/name of the wine has the founding family name. The influence of administrative heritage can also be perceived by the succession of these companies. In all five wineries researched at least two members belonging to the founding family was found on the board of directors. According to Guerrero (1992), in family business there are often a strong overlap between business life and family life. The family incorporates their daily lives the company as its center of gravity (Guerrero, 1992).
Reports also indicate that all of the wineries surveyed feel too much pressure of demanding conformations imposed by the regulatory legislation in the sector (Law of Wine) and the regulators (Ministry of Agriculture, Federal Police and INMETRO – Instituto Nacional de Metrologia, Normatização e Qualidade Industrial). The constraints occur in all stages of production cycle, from planting to bottling and distribution. But the myriad of regulatory standards imposed by a variety of actors is in fact a characteristic of the wine industry worldwide (Larrouse do vinho, 2004; Economist, 2007; Wiseman and Ellig, 2007). On managers perceptions were that the constant surveillance hinders the progress of business. They also consider the relationship with these bodies as confrontational and its role as punitive. Therefore, legislation about security and manipulation of these industries surveyed are important forces that can guide many practices of HRM.
Finally, the considerations about the relationship with the wineries surveyed and the unions, the testimonies reveal that the standards imposed by legislation are met and that the unions do not interfere in the management of these companies. Note that in the wineries at San Francisco Valley the labor union does not play an important role and the adoption of formal collective bargaining arrangements can be taken into a flexible way.

Cultural Heritage Configuration

Paauwe (2004) consider his heritage an important influential factor (for better or for worse) in the ongoing organizational structure which includes the HRM. Each organization has a unique configuration that results from interaction of policies and practices of people management and other organizational characteristics (ex. Organizational structure and culture).
This dimension also includes an actor´s perspective: is the dominant coalition. This coalition is composed by top management, middle and lower management teams, works councils and the department of human resource management. And it is involved in crafting and selecting what are the HRM practices that fits better on their organization. It is important to bear in mind that the three forces have a direct impact on the dominant coalition (PMT, SCL and Cultural Heritage Configuration).
The dominant coalition in the wineries studied were identified as administrative managers (two) and winemakers (three), the last category carry out technical functions and administrative management roles at the same time. They were inquired with respect to the strategic HR choices in their organization and what is their leeway or room for manoeuvre considering those choices.
Overall, respondents have relative freedom to make decisions in a more operational level. However, other issues they may receive guidance and even if they can often share the decisions, it is recognized that the founding shareholders have the final word in decision making. These issues are confirmed by Macedo (2002), for whom family organizations in the Brazilian decision-making tends toward a pattern more spontaneous and improvised, seeking consensus and participation, and finally, suddenly deciding on impulse. Likewise under

subsidiary organizations, relatively autonomous, decision-making can be centralized at the headquarters, but the manufacturing strategy can be defined at the regional level (Fleury and Fleury, 2004). In sum, the degree of leeway that management has in determining its HRM policies, and policies in other areas, is more or less determined by the owner and the founder´s culture which has its own specific characteristics on centralization of decision making.
The insights derived from the research can be resumed in the figure 2, which exposes an example of force field analysis of the San Francisco Wineries and its possible HRM outcomes.

6. Conclusion

Although the small sample may preclude generalizations, it is hoped that the use of in-depth case studies guided by a new and innovative theory should prove illustrative. This study should be seen as an in-depth exploratory study and any findings should not necessarily be viewed as applicable to small wineries or similar organizations. Since most of the companies operate in dynamic environment. And organizations have to cope with the constant changes by continually adapt their business strategy to the turbulent environments (Boon et al., 2007).
This research suggests that the greater impact on modeling human resource forces is the culture of heritage management where shareholders and owner hold the ruling power of decisions making. The finding supports the literature on family Brazilian business and their culture working traits (Guerrero, 1992; Tanure et al, 2007), where power focuses predominantly on the summit of these companies. In the findings, the decision-making process was perceived as centered at the top of the hierarchy, but this trait should not be identified as negative. Probably, the perceived flexibility and affectivity in work relationships confirmed in literature (ibid cit.) mitigate the discomfort caused by the concentration of power in the hands of the controllers of these companies.
The competitiveness of the wine market, the rivalry aspects of the imported wines and the demands of international buyers was also identified by CBHRT as the second force pushing the modeling of HRM practices. This contributes to seeking continuous improvement on the wine product, which may require a constant alignment in production practices with strategic objectives and finally in the way people perform at work.
Then, the sector´s regulatory legislation and the inspections of regulators (Ministry of Agriculture, Federal Police, INMETRO) are forces acting in a constraint form. The impact may be perceived as coercive forces that delimit and shape the way the wineries studied organizes and plans the work. For this reason, the human resource management must consider the requests and demands of these regulatory actors to maintain the legitimacy of their firms.
The overall results were identified in all the organizations surveyed. The CBHRT allows access to information that can be used to improve decision-making process of the organization as a whole. It is concluded that the modeling of human resource management policies and practices are products of reconciling these influences forces, what must be understood ad monitored to avoid that pressures compromise the freedom to elaborate best practices of people management. In the view of Paauwe (2004), better practices should include ethics, justice and fairness, feelings that enable the development of organizational citizenship behavior (Organ et al. 2006).
The Contextually Based Human Resource Theory perspective leads to anticipating and understanding the action of different forces which crafts and change the people management process in the organization. What means that continuous attention must be paid in monitoring changes and options pursued by the dominant actors around the adoption of best practices in people management. In other words, once having decoded the present situation more

legitimate emerging solutions may be archived by the commitment of the various stakeholders. The present theory offers and analytical framework that can be a useful support for managing change and contribute to a sustained competitive advantage and a viable organization in the long run (Paauwe, 2004).

While this study provides insights about the forces of the various players which comprise the principal decision-makers in the choice of human resource management strategy, it generates more questions that merit further study. Additional studies that take into account the role of human agency in changing institutions and how the firms administers the pending forces of internal and external regulation and employment relations are warranted. For example, what are the threats found among the relationship with the members of the dominant coalition and the others stakeholders? Furthers studies that could examine the range of strategic responses and their effectiveness in reacting to institutional pressures would also be valuable. Markedly, furthers evaluations that contribute to understanding the firms behaviors concerning human resource management and its role in achieving firm-specific and organizational legitimacy are defensible.

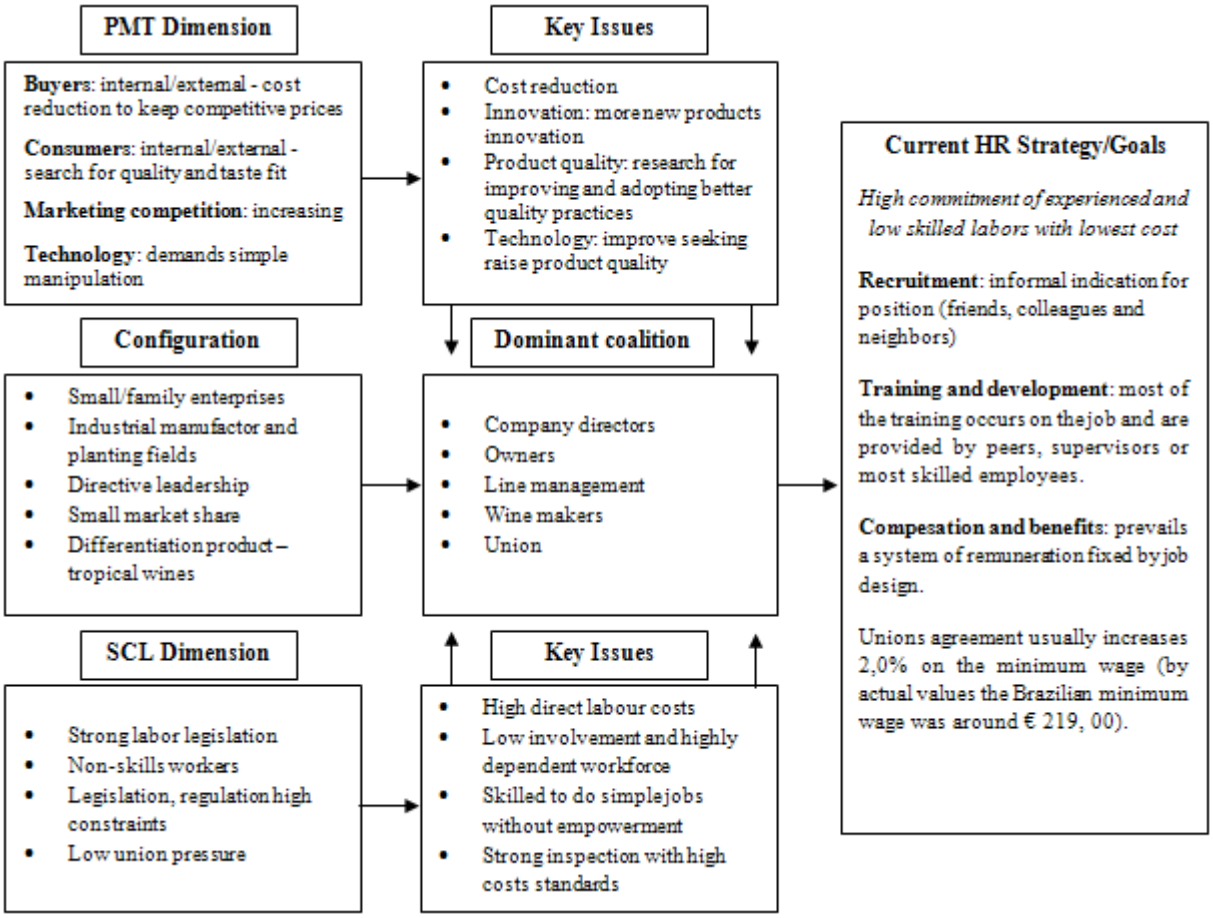


Fig 2. Force Analysis of Shaping HRM
Source: Adapted from Paauwe (2004, p. 104)

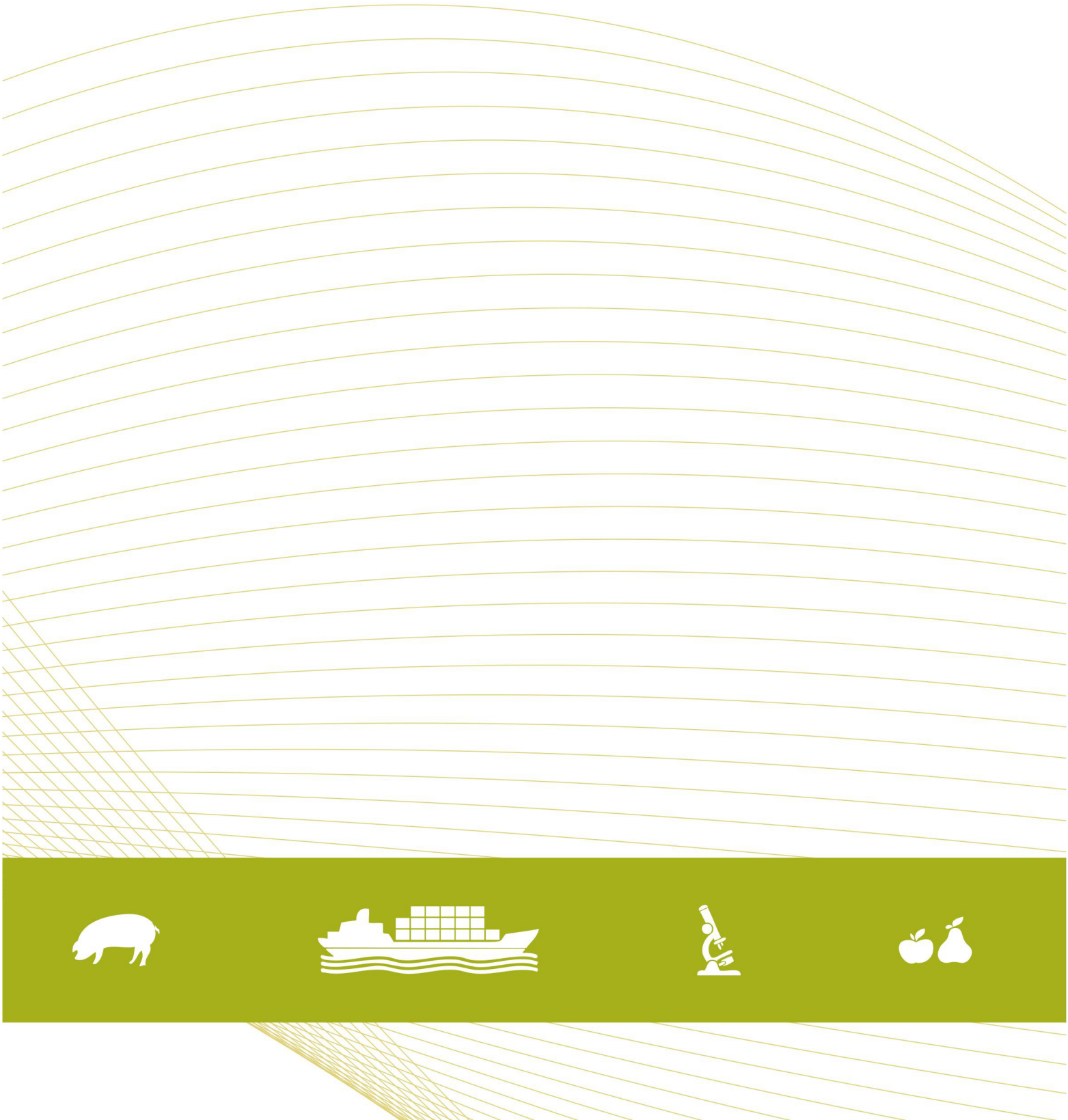
7. References

BARDIN, L. (2008). Análise de conteúdo. 4ed. Lisboa: Edições 70.
BARNEY, J. B. (1991). Firm resources and sustainable competitive advantage. Journal of management. v. 17, n.1, p. 99-120.
BEER, M.; SPECTOR, B.; LAWERENCE, P.R.; MILLS, D.Q.;WALTON, R.E. (1985). Human Resources Management: A General Manager´s Perspective – Text and Cases. New York: The Free Press.
BOON, C.; BOSELIE, P.; PAAUWE, J.; HARTDOG, D.D. (2007). Measuring Strategic and Internal Fit in HRM: an alternative approach. Academy of Management Proceedings. Report.
CÉSAR, A.M.R.V.C.; CODA, R.; GARCIA, M.N. (2006). Um novo RH? – Avaliando a atuação e o papel da área de RH em organizações brasileiras. FACEF – pesquisa, v. 9, n. 2.
CODEVASF. (2008). Disponível em: < http://www.codevasf.gov.br/osvales/vale-do-sao-francisco/clima> Acesso em: 27/09.
DENZIN, N. (1984) . On Understanding Emotion. San Francisco: Jossey-Bass, 1984.
ECONOMIST. (2007). In vino veritas. 00130613, 16/6, Vol. 383, Issue 8533.
FENDT, R. (2007). O que está travando nosso crescimento? Think Tank – A Revista da Livre Iniciativa. Ano X, n. 38, mar/abr/mai, p.25-29.
FISCHER, A. L. (2002). Um resgate conceitual e histórico dos modelos de gestão de pessoas. In: FLEURY, M. T. (cordenadora). As pessoas na organização. São Paulo: Editora Gente.
_____.; ALBUQUERQUE, L.G. (2001). DELPHI – RH 2010: Tendências na gestão de pessoas. São Paulo.
FLEURY, A.; FLEURY, M.T. (2004). Estratégias empresariais e formação de competências: um quebra-cabeça caleidoscópio da indústria brasileira. 3ed. São Paulo: Atlas.
GODOY, A.S. (2006). Estudo de caso qualitativo. In: GODOI, C.K.; BANDEIRA-DE-MELO, R.B; DA SILVA, A.B. (organizadores). Pesquisa qualitativa em estudos organizacionais: paradigmas, estratégias e métodos. São Paulo: Saraiva.
GUERRERO, M.D. (1992). Trajectórias Sociais e relações familiares empresários de PME. Sociologia Problemas e práticas. n.11, pp. 63 – 77.
GUERRERO, S. BARRAUD-DIDIER, V. (2004). High-involvement practices and performance of French firms. The International Journal of Human Resource Management, v.15, Issue 8. December, pages 1408 – 1423.
GUEST, D.E.; MICHIE, J.; CONWAY, N.; SHEEHAN, M. (2003). Human resource management and Corporate Performance in the UK. British Journal of Industrial relations. v. 41, n.2, p. 291-314.
HUSELID, M.A.(1995) The impact of human resource management practices on turnover, productivity, and corporate financial performance. Academy of Management Journal. v. 38, n. 3, p. 635-672.
KAMOCHE, K. (1996). Strategic Human Resource Management within a resource-capability view of the firm. Journal of Management Studies. March, p. 213-233.
LACOMBE, B.M.B.; TONELLI, M.J. (2001). O discurso e a prática: o que nos dizem os especialistas e o que nos mostram as práticas das empresas sobre os modelos de gestão de recursos humanos. Revista de Administração Contemporânea, v. 5, n.2, p. 157 – 174. EAESP - FGV
_____. (2006). Avaliação e mensuração de resultados em Gestão de Pessoas e a relação com o desempenho organizacional: um estudo com as maiores empresas brasileiras. São Paulo. Relatório de pesquisa. Escola de Administração de Empresas de São Paulo, Fundação Getúlio Vargas.

_____. (2006). Políticas e práticas de gestão de pessoas: as abordagens estratégica e institucional. In: ENANPAD, 30, 2006, Salvador. Anais. Salvador: ANPAD.
_____. ; CHU, R. (2008). Políticas e práticas de gestão de pessoas: as abordagens estratégica e institucional. Revista de Administração de Empresas, v. 48, n.1.
LAROUSSE DO VINHO. (2004). São Paulo: Larousse do Brasil.
LOIOLA, E.; BASTOS, A.V.B.; QUEIROZ, N.; SILVA, T.D. (2007). Dimensões básicas de análise das organizações. In: ZANELLI, J.C.; BORGES-ANDRADE, J.E; BASTOS, A.V.B. (organizadores) Psicologia, organização e trabalho no Brasil. 2ed. Porto Alegre: Artmed.
MACEDO, K.B. (2002). Cultura, poder e decisão na organização familiar brasileira. RAE – eletrônica, Volume 1, n 1, jan-jun.
MCMILLAN, J. (2004). A reinvenção do Bazar: uma história dos mercados. Rio de Janeiro: Jorge Zahar Ed.
MELO, O.M.R. (2007). A relação entre o Estado e a indústria de vinhos do Vale do São Francisco sob a ótica da Teoria do Principal-Agente. 2007. 128f. Dissertação (Mestre em Administração) – Programa de Pós-Graduação em Administração da Universidade Federal de Pernambuco, Recife.
MINTZBERG, H.; AHLSTRAND, B.; LAMPEL, J. (1998). Strategy Safari: A Guided Tour through the Wilds of Strategic Management. New York: Free Press.
OLIVEIRA, L.M.B de; FARIAS, S.A. de. (2001). Políticas e práticas de recursos humanos e satisfação dos clientes: um estudo no setor de serviços e hotelaria na região metropolitana do Recife. Relatório de pesquisa para CNPQ. Recife: UFPE.
ORGAN, D.W.; PODSAKOFF, P.M.; MACKENZIE, S.B. (2006). Organizational Citizenship Behavior: Its nature, antecedents, and consequences. California: Sage Publications, Inc.
PAAUWE, J. HRM and Performance: Achieving long term viability. Oxford: Oxford University Press, 2004.
PRAHALAD, C. K.; HAMEL, G. (1990)The core competence of the corporation. Harvard Business Review. p. 79-93, May/June.
PURCELL, J.; HUTCHINSON, S. (2007). Front-line managers as agents in the HRM-performance casual chain: theory, analysis and evidence. Human resource Management Journal. v 17, n. 1, p. 3-20.
ROSSETTO, C.R.; ROSSETTO. (2005). Teoria institucional e dependência de recursos na adaptação organizacional: uma visão complementar. Revista de Administração de Empresas- eletrônica, v4, n.1, Art. 7.
SOUZA, A.J.;RAMALHO, P.P. (2009). Globalização e estratégias para o sector vitivinícola Brasileiro. O pólo emergente do Vale do São Francisco. In: 2º Encontro SLADE Brasil/Encontro Luso-Brasileiro de Estratégia, Nov. 2008. Disponível em <http://www.facape.br/artigos/artigo07.pdf > Acesso em 05/03.
STAKE, R.E. (2005). Qualitative Case Studies. Handbook of qualitative research. Thousand Oaks, Sage.
TANURE, B.; EVANS, P.; PUCIK, V. (2007). Virtudes e pecados capitais: a gestão de pessoas no Brasil. Rio de Janeiro: Elsevier.
TEIXEIRA, M.L.M.; ZACCARELLI, L.M. (2007). A nova ambiência competitiva. In: HANASHIRO, D.M.M; TEIXEIRA, M.L.M; ZACCARELLI, L.M. (organizadoras). Gestão do Fator Humano: uma visão baseada em stakeholders. São Paulo: Saraiva.
ULRICH, D. (1998). Os campeões de Recursos Humanos: inovando para obter os melhores resultados. São Paulo: Futura.
_____. (2005). BROCKBANK, W. The HR value proposition. Boston: Harvard Business School Publishing.

_____. (2008). [et al]. HR competencies: mastery at the intersection of people and business. Society for Human Resource Management.
WHITTINGTON, R. (1993). What is Strategy, and Does it Matter? London: Routledge.
WISEMAN, A.E.;ELLIG, J. (2007). The Politics of Wine: Trade Barriers, Interest Groups, and the Commerce Clause. *The Journal of Politics*, Vol. 69, No. 3, p. 859–875, Agosto.
WRIGHT, P.M.; MCMAHAN, G.C.; MCWILLIAMS, A. (1994). Human resources and sustained competitive advantage: a resource-based perspective. International Journal of Human Resource Management, n 5, p. 301-326, 1994.

Logistics



LOGISTICS IMPACT ON ETHANOL COMPETITIVENESS FROM NEW PRODUCTION AREAS IN GOIÁS – BRAZIL

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Abstract
This paper provides an overview of the sugar cane and ethanol sector, analyzing from a logistics and transaction costs point of view the competitiveness of the ethanol produced in Goiás state, one of the most important sugar cane expansion region, which is receiving massive investments of new plants. Logistical factors and transaction costs, as cost and transportation options, ethanol supply and demand conditions, prices negotiated by the mills and tax incentives interfere in the possibilities of destinations of ethanol produced in different new productions areas in Brazil. Moreover, we discuss the logistical alternatives as well challenges to transport the production at this state to other consumer areas and exports. This paper is addressed to researchers and professionals looking for biofuels and ethanol production and logistical alternatives in Brazil.

Key words: Ethanol production, transportation alternatives, Brazilian competitiveness

LOGISTICS IMPACT ON ETHANOL COMPETITIVENESS FROM NEW PRODUCTION AREAS IN GOIÁS – BRAZIL

1. Introduction and Problem Statement

For centuries, sugar cane has proved as one of the main thrusts of the Brazilian economy. Currently handles 4.6% of GDP, representing a figure of $ 87.6 billion per year. According to a mapping and quantification survey of sugar-energy sector in 2009, conducted by Neves, Trombin and Cônsoli (2010), the country is responsible for half of world sugar exports and the trend is growing, reaching 60% in the next five years. In the 2008/09 harvest, the total mill revenues reached approximately $ 23 billion. The ethanol has being responsible for about $ 12.4 billion, followed by the sugar with $ 9.7 billion, bioelectricity with $ 389 million and end yeast, additives and carbon credit with $ 67 million. Despite ethanol higher production volume, sugar is still the most exported sugar cane product by Brazil, with $ 5.49 million. The Russian market is the largest importer with 25% of the volume, followed by Nigeria, Egypt and Saudi Arabia. The ethanol contributed $ 2.37 billion and the main buyers were U.S. (34%), Netherlands (26%), Jamaica (8%) and El Salvador (7%)(NEVES; TROMBIN; CONSOLI, 2010).

The sugar-energy sector,in addition to generate income and position the industry as a highlight in Brazil, still helps to keep the Brazilian trade balance positive, because it exports more goods than they need to import raw materials. Analyzing data from the mapping study of the sector (NEVES et al, 2009), is possible to notice that there is a decrease in mill own planted area and an increase in the share of sugarcane suppliers which may indicate a better distribution of income in the sector. Moreover, due the economical attractiveness of the sugar cane business, recently, several Brazilian states began an expansion process of sugarcane production, such as Goiás, MatoGrosso, MatoGrosso do Sul and Minas Gerais.

Considering the new sugar cane agricultural frontiers, we observed that the state of Goiás has shown significant growth in the of sugar cane production in recent years. According to INPE (National Institute for Space Research) together with the CTC (Sugarcane Technology Center) and UNICA (Union of Industrial sugar cane) it was the state with the highest level of planted area expansion, reaching in 2010 a 39.9%increase when compared to the 2007/08 harvest.With 432,000 hectares, it is the fourth largest sugar cane producer in the south central region, behind the states of São Paulo, Paraná and Minas Gerais.

Taking into account that these new sugar cane areas are distant and logistically less served to supply both internal and external ethanol markets, the problem statement addressed is: *Which is the logistical impact on the ethanol competitiveness produced in the new sugar cane frontiers in Brazil, mainly at Goiás state?*

2. Objectives

The main purpose of our study is analyze the logistical impacts of ethanol produced at new agricultural areas in Brazil, evaluating ethanol supply and demand in the production areas and other regions in Brazil, focusing the point of view from Goiás state. We also aim to evaluate transportation costs and modals that will probably define the main destines for the ethanol originated in the new areas.

3. Procedures

This paper aims to be exploratory in nature and quality, as it is intended to have an understanding aspect as the precepts of Hair et al. (2006). Figure 1 presents a scheme of the methodological procedures applied to our research.

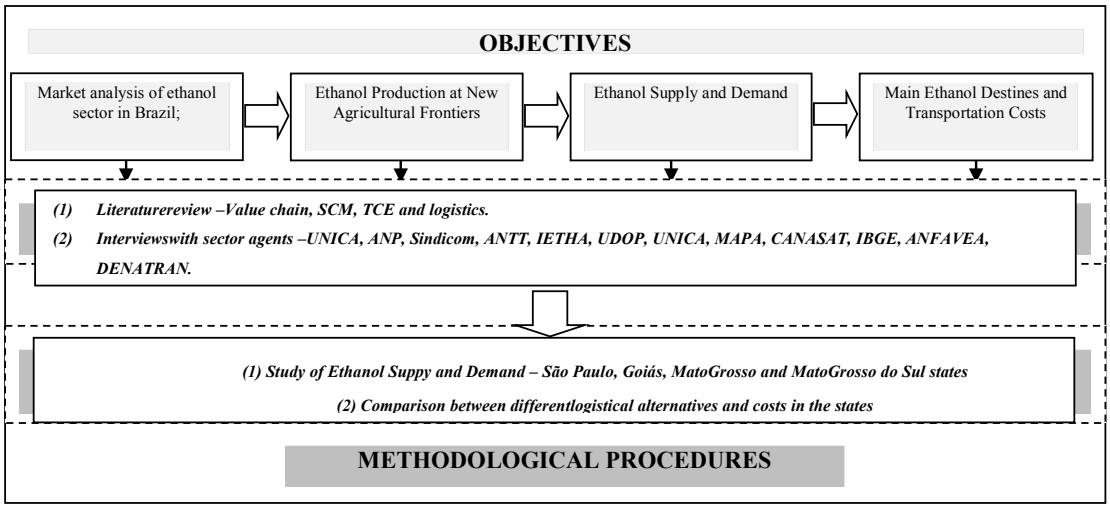


Figure 1: Methodological Procedures and Objectives.
Source: Elaborated by authors.

Most of the data were collected through secondary sources and interviews with sector agents at the Brazilian ethanol industry like (*UNICA-Sugarcane Industry Association , ANP-National Petroleum Agency, Sindicom-National Union of Fuel and Lubrificant Distributors, ANTT-National Agency of Land Transportation, IETHA-International Ethanol Trade Association, UDOP-Union of Biofuel Producers, MAPA-Ministry of Agriculture, Livestock and Supply, CTC-Sugarcane Technology Center, IBGE- Brazilian Institute of Geography and Statistcs, ANFAVEA- National Association of Automotive Vehicles Manufactures, DENATRAN-National Bureau of Traffic*.

Data analysis were performed using the hypothetical-deductive method, proposing a reflective thinking as described by Cooper et al. (2003), aiming to transform data into knowledge addressed to the current research problem.

4. Theoretical Background

It is indicated for applied studies in Agribusiness Systems (ASY) a joint analysis of existing internal transactions in processing and analysis of the external environment that is exposed to the organization. The joint action of these factors can affect the organization and competitiveness in the face system.

In conducting this article, we have deepened the relationship between the Agricultural/Industry/Distribution Channels by checking the standard internal transactions of an organization that operates in the ethanol industry, making use of the theoretical basis for the Economy Transaction Costs developed by Williamson (1985).

5. Transaction Costs Economics

Azevedo (1996) argues that transaction costs are all costs not directly related to production, but they emerge as agents relate to each other and problems on coordinating their actions appears. It refers, therefore, possible opportunistic behavior of the agents themselves, which often occur due to the asymmetry of information. One of the first authors to introduce the concept of transaction costs was Oliver Williamson (1985), which defines the perspective of the organization of the firm, through the efficiency of contracts (WILLIAMSON, 1985). To minimize the effects of these costs, managers seek to identify and establish best governance structure, Williamson (1994) proposes to conduct a macro analysis, focusing on the institutional environment of the organization, and a micro analysis, represented by the action of their own productive organization, and only by following these two tests, choose the governance structure. It was from this analysis, called the "Scheme of Three Levels" by Williamson (1985), which Farina, Saes and Azevedo(1997) emphasize that the whole governance structure is developed within the limits imposed by the institutional environment and the assumptions of their own individuals.

In this sense, transaction costs are, according to Knap (1989), an alternative to analyze the strengths of a firm, and the efficiency is based on control over economic actors than in the proper perspective of the market or the hierarchy, this proposition accepted by Collin (2007) regarding the final governance strategy adopted. Understand, therefore, the structures that shape the ethanol industry in Brazil, detailing the institutional variables are shown in understanding the ways in which these variables relate to the governance structure established by requiring the establishment of a specific institutional arrangement (Table 1).

Environment	Oppotunity	Threat
Political-Legal	- Goals of reducing emissions of greenhouse gases - Increase the addition of ethanol in Brazil to 30% - Isonomy tax among the Brazilian States (12%) - Interest-compatible domestic international interest - Prohibition of burning (Environmental Protocol) - Performance of electrical energy regulator - Incentives for energy cogeneration - Development of the poorest countries through the ethanol - Public transportation from ethanol-powered engines	- Discontinuance of tax incentive programs - Lobby of oil, food industry and ONGs - Lack of consensus in the pattern of socio-environmental certification - High taxes in the country - Legal Environment slow and biased - Difficulties in supervision of irregularities - Environmental legislation and extremely rigid social - Lack of buffer stocks - Risk of reversal and increase the tax on ethanol
Economic-Natural	- Instability in oil prices - Internationalization - Increased income from Brazil - Export of technology and plants outside of Brazil - Growth in industrial consumption of sugar - Ability to export gasoline with anhydrous ethanol - Concentration in industrial plants - Focus on core competence of agribusiness - Corporate governance practices - Availability of land for expansion of the sector in Brazil - Energy balance and positive carbon - Expansion of agricultural frontier in Brazil - Expansion and improvement of infrastructure	- global economic crisis - High volatility of commodity prices and currency exchange rates - Case inflation in food products - High cost of inputs - No credit capacity for expansion - Concentration of ethanol sales a few large markets - External resistance to the use of ethanol - Increased disease or pests in the cane - Climate change brings a reduction of areas available - Competition of ethanol and sugar industry with other industries - Poor infrastructure for the flow of new agricultural production (distribution channels).
Sócio-Cultural	- Sector employer and generator of income - Increased awareness of global warming - International pressure against global warming - International communication - Training of manpower in the factories - Protection of sustainable food chains - Improving the image of employment in the sugarcane harvest - Improving the image of the occupation of land - Combating the Image of "monoculture"	- Growth of NGOs with destructive purposes (bioterrorism) - Requirement of socio-environmental certification - High cost of certification - Excess manpower idle due to mechanization - Xenophobia on Brazilian ethanol - Society go to defend a new protectionism
Technological	- Using satellites, soil maps and precision agriculture - Innovation in harvesters for rough terrain - Genetic modification of sugarcane for resistance to drought - Intensive use of biofertilizers	- Gains in the efficiency of competing technological cane - New technologies that generate energy more competitive - Growth of fleet to diesel, natural gas and hybrids - Growth in the fleet of hybrid vehicles (electric).

	- Use straw for co-generation of energy - Generation or expanding the use of the cane - Improvement of fermentation technologies - Integrating biodiesel plant and sugar and ethanol - Improving the efficiency of flex-fuel cars - Focus on energy efficiency - Innovation in technology for truck engines and motorcycles - Increased agricultural efficiency - Use of waste and water savings	

Table 1: Macro environment Ethanol Sector in Brazil.
Source: Extracted from Conejero e Neves (2010).

Among the events identified in the macro environment, one that highlights the competitiveness of ethanol in Brazil: the poor logistical infrastructure in the new agricultural areas.

For many years, the sugar industry was concentrated in the states of São Paulo and Pernambuco. From the past few years, the ASY ethanol has experienced an expansion of its borders to the interior of Brazil, reaching the states of Goiás, Mato Grosso and Mato Grosso do Sul. The development occurred in these states have allowed the local population increased income, improvement in living conditions and greater purchasing power (event characterized by the acquisition of a motor vehicle).

However, the development experienced by the sector and the population residing in those areas was not accompanied by the institutional environment, portraying this imbalance in the lack of any supply chain. Monczka, Trent and Handfield (2002) argue that supply chains are essentially a series of related suppliers and users, where each user is the supplier of the downstream organization until a product reaches the end user. The supply chain has in its primary function, the maintenance of competitive all productive activity, directly impacting the proper ratio of staff through the different levels of decision making, as evidenced Omta, Trienekens and Beers (2001).

In Brazil, ethanol has the obligation to pass a Distribution Center of the National Petroleum Agency (ANP) before going to final consumption. Therefore, the variable location is highly relevant to the competitiveness of agribusiness. However, when observing the fate of ethanol with the identification of state consumer and the existing differences in taxes, production costs tend to internalize the final product price, the cost of inefficiency in the production chain. Therefore have an efficient supply chain, with special attention to logistics, it is extremely important because it reduces the transaction cost increases trust among network members and reduces uncertainty (MENTZER; MIN BOBITT, 2004)

6. Results

It is well known that Brazil has its sugar cane production concentrated in state of Sao Paulo, which currently accounts for 60% of national production. Because of the emergence of a potential international demand for ethanol and rising domestic consumption, caused mainly after the innovation of dual-flex vehicle, other states have investing heavily in new production areas, as can be seen in Table 1.

	Sugar Cane (Ton)					Etanol Total (Thousand Liters)				
	Harvest			Variation		Harvest			Variation	
State	**00/01**	**07/08**	08/09	**00/01 - 08/09**	**07/08 - 08/09**	**00/01**	**07/08**	**08/09**	**00/01 - 08/09**	**07/08 - 08/09**
São Paulo	148.256.436	296.242.813	346.292.969	134%	16,89%	6.439.113	13.334.797	16.722.478	160%	25,40%
Paraná	19.320.856	40.369.063	44.829.652	132%	11,05%	799.364	1.859.346	2.048.752	156%	10,19%
Minas Gerais	10.634.653	35.723.246	42.480.968	299%	18,92%	485.063	1.774.988	2.167.616	347%	22,12%
Goiás	7.207.646	21.082.011	29.486.508	309%	39,87%	318.431	1.213.628	1.726.080	442%	42,22%
Mato Grosso	8.669.533	14.928.015	15.283.134	76%	2,38%	464.357	894.381	952.171	105%	6,46%
Mato Grosso do Sul	6.520.923	14.869.066	18.090.388	177%	21,66%	314.777	876.773	1.076.161	242%	22,74%
Region	**00/01**	**07/08**	08/09	**00/01 - 08/09**	**07/08 - 08/09**	**00/01**	**07/08**	**08/09**	**00/01 - 08/09**	**07/08 - 08/09**
Mid-South Region	207.099.057	431.113.603	504.962.891	144%	17,13%	9.064.364	20.333.466	25.101.963	177%	23,45%
Northeast Region	50.522.960	64.609.676	64.099.738	27%	-0,79%	1.528.671	2.193.358	2.410.999	58%	9,92%
Brazil	257.622.017	495.723.279	569.062.629	121%	14,79%	10.593.035	22.526.824	27.512.962	160%	22,13%

Table 3: Sugar cane and ethanol production in Brazil.
Source: Unica

Due to the central location and having borders with important states like Sao Paulo and Minas Gerais, Goiás state has shown a recent fast expansion and sugar cane and ethanol

production, mainly hydrated ethanol for direct fuel consumption. According to data from UNICA and MAPA, its production of total ethanol increased 42% in the volume in the 2008/09 harvest compared to the previous one and increased more than 5 times if compared to 2000/01 data, reaching a volume of 1.72 billion liters in 2008/09 harvest. Still about this state, it is possible to affirm that has the largest number of new mills projects, 27 in 2010. The second largest state is Minas Gerais with 12 new projects and after, Mato Grosso do Sul with 11. This finding may confirm that these new frontier areas are receiving many green field investments.

When analyzing the marketing in the new producing states, two factors were must be considered: (i) the demand for ethanol, which can occur both domestically and in foreign markets and (ii) the production in border regions and the subsequent flow of production to other consuming regions.

Analyzing the market of Mato Grosso do Sul and Goiás states is possible to realize an stagnation in the hydrated ethanol consumption and an increase on production. Considering the ethanol production estimates, Mato Grosso do Sul may start stabilizing it production peak about 2013/14, however at Goiás state this production behavior here not identified yet, still showing a trend of production growth to the next years. According to this information is possible to affirm that these states will have to develop new ethanol marketing strategies for other states or for export. In this way, due to ethanol production and consumption estimates, it is possible to verify that ethanol sales outside Goiás state may be necessary because the projected demand is lower than the increasing production. These projections can be viewed at Figure 2:

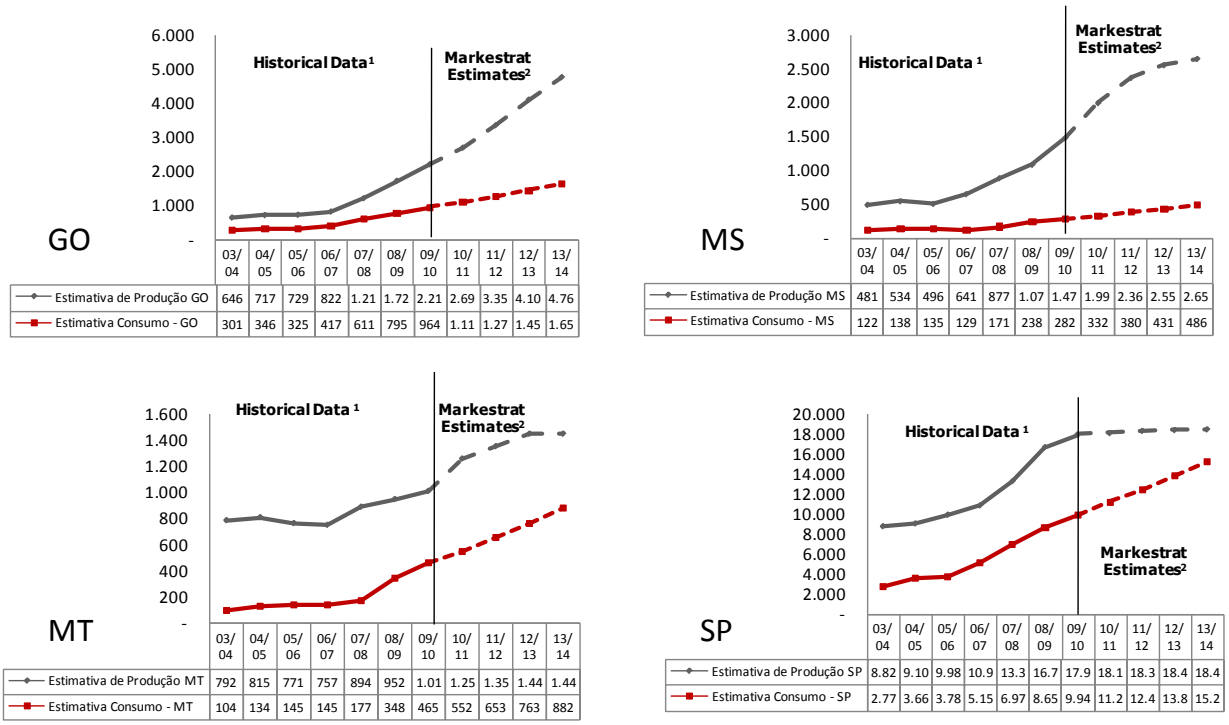


Figure 2: Estimated Ethanol Supply and Demand – Goiás, Mato Grosso do Sul, Mato Grosso and São Paulo State.
Source: Markestat. Estimated based on UDOP and Unica, considering 27 projects by 2014 and ANP Historical data. Estimated regression performed considering: Fleet +8% per year; GDP + 3% per year; Population + 1,5% per year.

On the other hand, Mato Grosso states shows tendency of increasing linear consumption and a production stabilization that may occur on 2013/14 harvest. Due to this

data, it can observe a slight tendency that the consumption will reach the supply, indicating a need for increased production or acquisition of other producing states

The same way it can be observed that São Paulo state presents a quite linear tendency of growth on ethanol consumption and a stagnation of production at 2009/10 harvest, mainly due land availability and costs. The state presents the largest vehicle fleet, and as demand and supply will reach soon, this might mean an opportunity for mills in the neighboring states which has more production than consumption like Goiás and Mato Grosso do Sul.

Another important information is that in Brazil the growth fleet is evidenced by the increase in the number of new vehicles licensed, which was 78% flex-fuel vehicles, has boosted the consumption of ethanol in the domestic market. According to the vehicle fleet, is possible to observe that Goiás state growth rate exceeds the national average, but São Paulo still has the biggest fleet. So, according to this information, São Paulo is the state with the highest demand and consumption growth in the country, but has limited capacity to expand supply.

In addition to the study, to evaluate the logistical impacts of ethanol produced at new agricultural areas in Brazil is necessary examine GPD in the study state over the years as con be seen in the Table 2.

	2003				2004				2005			
	GPD(R$ billion)	*GPD per capita (R$)*	Growth Rate.	Vehic. Licensed.	GPD (R$ billion)	*GPD per capita (R$)*	Growth Rate.	Vehic. Licensed	GPD (R$ billion)	*GPD per capita (R$)*	Growth Rate.	Vehic. Licensed.
Goiás	42,84	*7.647,56*	0%	31.964	48,02	*8.382,42*	7%	34.251	50,53	*8.291,11*	5%	35.986
Mato Grosso	27,89	*11.525,34*	0%	12.392	36,96	*15.725,48*	17%	14.464	37,47	*15.066,95*	-3%	14.013
Mato Grosso do Sul	19,27	*9.189,20*	0%	13.548	21,11	*9.582,27*	12%	15.202	21,65	*9.348,61*	1%	15.376
São Paulo	579,85	*10.517,21*	0%	400.921	643,49	*11.190,68*	7%	427.315	726,98	*11.984,50*	8%	459.386

	2006				2007			
	GPD (R$ billion)	*GPD per capita (R$)*	Growth Rate.	Vehic. Licensed.	GPD (R$ billion)	*GPD per capita (R$)*	Tx. Cresc.	Vehic. Licensed.
Goiás	57,06	*8.730,08*	20%	43.078	65,2	*10.401,33*	39%	59.936
Mato Grosso	35,26	*13.189,05*	-6%	13.166	42,69	*15.349,45*	50%	19.738
Mato Grosso do Sul	24,34	*10.182,08*	9%	16.735	28,12	*11.592,85*	28%	21.375
São Paulo	802,65	*13.745,03*	12%	512.441	902,78	*15.052,90*	28%	655.440

Table 2:Market analyses – GDP and Vehicles sales.

Source: Elaborated by Markestrat/USP (Project and Research in Marketing and Strategy Center) from data collected from ANFAVEA – National Agency for Automotive Vehicle Manufacturers and IBGE – Brazilian Institute of Geography and Statistics, 2010

Is impossible to observe that all evaluated regions, especially in São Paulo State, has been presented the fleet and GDP growth, with good future prospects that is possible to say that there is space for more ethanol.

Regarding logistical alternatives – destines, costs and modals, Table 3 presents a comparison of main possible ethanol distribution centers that could be used by companies producing in Goiás. Assuming that current ethanol demand is lower than supply in Goiás state (the gap will keep increasing) the best economical alternative is focus on Sao Paulo market (for internal consumption and/or export), prioritizing the distribution centers (DC) of São José do Rio Preto and RibeirãoPreto, served by road transportation, at least in the short run (~3-5 years). These DCspresent lower transportation costs, storage capacity and are better located both for internal consumption as well connected to Santos port modals.

TRANSPORTATION ROUTES Origin Sugar Mill at South of Goiás	Total
*Paulínia – SP (773 km)	100
Ribeirão Preto – SP (535 km)	67
S. J. Rio Preto – SP (438 km)	53
Goiânia – GO (242 km)	30
Brasília – DF (435 km)	53
Alto Taquari – MT (610 km)	80
Cuiabá – MT (971 km)	128
Campo Grande – MS (862 km)	110

* Base value

Table3: Transportation costs analysis - main ethanol distribution center from Goiás (Relative costs – Paulinia-SP = 100).

Source: Elaborated by authors.[1]Total price relative to the displacement of 1 truck (57 ton), transport under responsibility of sugar mill, with outsourced hiring service

Nevertheless, the south region of Goiás, an important ethanol area in this state is close to the FCA railway (Ferrovia Centro-Atlântica), which configures future option, increasing the competitive advantage of the region, but this alternative still depends on higher frequency of trains, wagons availability and production scale in the region. Moreover, one additional alternative is the use of the Tietê-Paraná waterway on medium term, that requires some structural adjusts and political issues to be overcame. Finally, the future alternative is the use of pipeline to transport ethanol from long distances. Even it can improve competitiveness with logistical gains, several projects are still in the paper and feasibility studies, beingthe south region of Goiás located only 50-150 km far from ethanol pipeline terminal of projected at Buriti Alegre.

Additionally, the logistics analysis shows that in the short run road transportation is still the main alternative; however the railroad network has been better developed in the surroundings. It can be seen that freight costs are relatively low due the absence of tolls, even road quality are not good when compared to São Paulo. However, due to distances, long road shoots are required what can reduce attractiveness of commercializing to some markets, like Sao Paulo or other regions, due to high transportation costs. Notwithstanding, the state of São Paulo have better highway and railroad networks (if compared to other country regions) both for internal market destination and exports, however despite better road conditions, frequent tolls raise freight costs.

In this study also noted that the production usually stay in producing state and it can be confirmed by Goiás's production unities, which production usually stays in Goiás or goes to São Paulo State, and a minor part goes to Brazil's North and Northeast. The states of Mato Grosso and Mato Grosso do Sul presents difficulty to sell because of factor linked with logistics and taxes. In the case of São Paulo's production unities it is possible to affirm that the production usually stay in state of São Paulo or goes to export.

Generally, the mills have preference for distributors registered in Sindicon (National Union of Utility Companies, Fuel and Lubricants), because they are more reliable. Is important to notice that, on average, 20% of marketing is done under contract and about 80% is traded in the spot market and the distributor choice depends on the negotiation and not to its location. It has been observed that there isn't a principal in the negotiation because the trade starts both ways, by the distributor that demand to purchase or the mill that wants to sale, it will depend on necessity.

7. Final Remarks and Considerations

The possible conclusions to the factors studied are diverse and there is no single correct. Logistical factors and transaction costs, as cost and transportation options, ethanol

supply and demand conditions, prices negotiated by the mills and tax incentives interfere in the possibilities of destinations of ethanol produced in different new productions areas in Brazil. The conclusions made were based on productions of the state of Goiás, because it is the state with the highest rates of growth and new projects.

Looking at the logistics possibilities and transaction costs, the best option is leave the ethanol in the own state, sending to Brasília and Senador Canedo's distributors by trucks. But, another option is send the product, by trucks, to state of São Paulo, being that São José do Rio Preto has the lowest transportation cost. However, this distribution center doesn´t have aenough storage capacity, so a good alternative could be the distribution center of Ribeirão Preto. Ifan specific mill intend to send it products by train, the best option is the distribution center of Paulínia. To this same distribution center, waterway Tietê-Paraná may be a good option for the medium term, however political issues need to be suppressed, with is increasing transaction costs in the sector.

Examining supply and demand issues, production in Goiás state should grow 115%, while consumption should grow about 70%. As probably will be too much product in the state, a good alternative is to send the ethanol to Brazil's North and Northeast region. Another possibility, in the short term, is send to state of São Paulo, while in medium and long terms, external market configure a good alternative. Other nearby states, as Mato Grosso and Mato Grosso do Sularen't recommended because they exhibit the same characteristics of Goiás state (ethanol surplus in the short term).

Besides these factors, is important to evaluate the prices paid to producers and the tax incentives. To the first, was found that there is three important taxes that are part of ethanol market, PIS, COFINS and ICMS. PIS and COFINS are the same independent the buyer state. ICMS varies according to the state being São Paulo and Goiás states the best rates.

It can be seen that, due to the strong internal ethanol market (flex fuel cars, growing income etc.) and the strategic relevance of São Paulo state, the ethanol production from other states close to São Paulo, specially Goiás, trend to be commercialized to São Paulo or other states in the southeast region, were demand is higher and logistical structures are better.

In case of increase on exports in the short run, most of ethanol production will probably be originated in São Paulo, which presents better logistical structure and lower distances to the main port (Santos Port), while production from new sugar cane frontiers will supply the internal market. Although, in some years from now, the logistical infrastructure, low cost (logistical and transaction costs) alternatives will need to be implemented to increase ethanol competitiveness from these new agricultural frontiers in the internal and external markets.

8. References

AZEVEDO, P. F. **Integração vertical e barganha.** 1996. 220 f. Tese (Doutorado em Economia) - Faculdade de Economia e Administração, Universidade de São Paulo, São Paulo, 1996.

COLLIN, S. O. Governance strategy: a property right approach turning governance into action. **Journal of Management Governance**, Amsterdam, v. 11, n. 3, p. 215-237, Nov. 2007.

FARINA, E. M. M. Q.; AZEVEDO, P. F.; SAES, M. S. M. **Competitividade:** mercado, estado e organizações. São Paulo: Singular, 1997. 286 p.

KNAP, T. **Hierarchies and control:** a new interpretation and reevaluation of Oliver Williamson's. The Sociological Quarterly, Oxford, v. 30, n. 3, p. 425-440, Autumn, 1989.

NEVES, M.F.; TROMBIM, V.G.; CONSOLI, M.A. Measurement of Sugar Cane Chain in Brazil International Food and Agribusiness Management Review – IFAMR. ISSN: 1559-2448, College Station, Texas A&M Uniersity-Department of Agricultural Economics/Estados Unidos, v. 13, edição 3, p. 37-53, set 2010.

NEVES, M.F. & CONEJERO, M. A. – Estratégias para a Cana no Brasil: Um Negócio Classe Mundial– Editora Atlas, 288 pag, 2010.

NEVES, M. F.; TROMBIN, V. G.; CONSOLI, M. A.; JULCA-BRICEÑO, B. M.; NOGUEIRA, J. G. A. Mapping And Quantification Of The Brazilian Sugarcane Industry In: INTERNATIONAL FOOD AND AGRIBUSINESS MANAGEMENT ASSOCIATION, IAMA – 20th Annual World Forum and Symposium – Navigating the Global Food System in a New Era, 2010, Boston, Estados Unidos. Available in: http://www.ifama.org.

MENTZER, J. T.; MIN, S.; BOBITT, L. M. Towards a unified theory of logistics. International. **Journal of Physical Distribution and Logistics Management**, v. 34, n.8, p.606-627, 2004

MONCZKA, R., TRENT, R., HANDFIELD, R. **Purchasing and supply chain management.** 2nd ed. Cinccinati: Thomson Learning, 2002. 760 p.

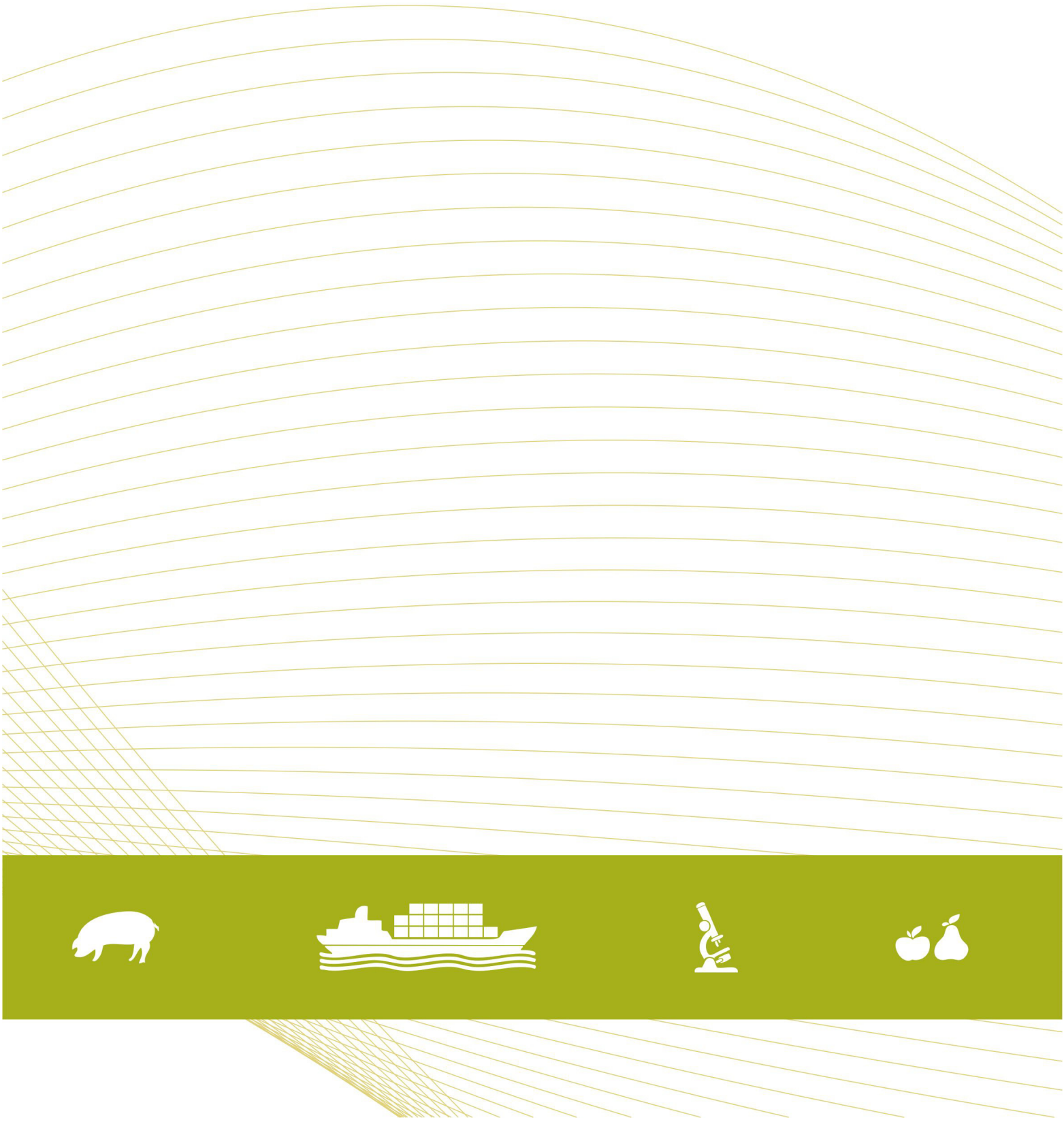
OMTA, S. W. F. (Onno); TRIENEKENS , J. H., BEERS, G. Chain and network science: a research framework. **Journal of Chain and Network Science**, v. 1, n.1, p. 1-6, 2001

WILLIAMSON, O. E. **The Economic Institutions of Capitalism:** Firm, Markets, Relational Contracting. New York: The Free Press, 1985. 450 p.

_____. **The institutions and governance of economic development and reform.** New York: The World Bank Research Observer, 1994. p. 171-198.

Websites:
INPE - http://www.inpe.br/
CTC - http://www.ctcanavieira.com.br/site/
UNICA - http://www.unica.com.br/
ANFAVEA - http://www.anfavea.com.br/Index.html
IBGE - http://www.ibge.gov.br/home/
SINDICON - http://www.sindicom.com.br/pub_sind/cgi/cgilua.exe/sys/start.htm?tpl=home
CANASAT - http://www.dsr.inpe.br/laf/canasat/

Collective Actions and Social Capital



TOWARDS A SOCIAL CONSTRUCTION OF COMPETITIVE ADVANTAGES IN THE BRAZILIAN BEEF CATTLE INDUSTRY: AN APPROACH OF LOCAL AGRO-ALIMENTARY SYSTEMS

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Abstract

Due to its heterogeneous resources, the peculiarity of a certain Region or Country provides specific attributes to a product (quality), possibly generating competitive advantages. Consequently, the definition of these attributes supposes the existence of coordination between a large number of agents in which the negotiation of rules and norms define the social construction of competitive advantages. Therefore, the article aims to identify how the coordination of strategic territorial assets established by the Producers Association in the beef cattle production chain in Rio Grande do Sul has contributed for the social construction of competitive advantages. The research comprises a case study, with the application of in-depth interviews with members of the Association. The results point out that a local agro-alimentary system can be considered more or less articulate depending on which quality conventions – or combination of conventions – are present throughout the system. These dynamics are linked to the legitimacy of its governance forms, or in other words, the acceptance of the firm's resource organization models and the coordination of inter-firm resources. The specificity of the product therefore derives from the variety of ways the strategic territorial assets are coordinated.

Key words: social construct, Brazilian beef cattle, local agro-alimentary systemic

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1. Introduction

The sanitary crises that have occurred in the beef cattle sector have caused consumers to react in different ways. The immediate reaction was to reduce the consumption of beef. Other reaction, which took longer to occur but had lasting effects, was to demand higher safety and quality standards for the meat, as well as more information. These demands have lead to the need of guarantee traceability and the development of specialty brands (origin denominations, natural and organic meats, breed seals, among others), wherein the trust in the process is the basic tool for competence.

In this direction, the increment on the demand for food safety and rigid regulatory control has forced the production chains to develop safe solutions for the global food system. Therefore, food safety administration systems are fundamental to control potential sanitary risks associated to the product and also to guarantee the effectiveness of safety legislations, retail standards and other safety procedures.

Another dimension regarding quality guarantee is focused on the competitivity of the product, other than on the health of the food source or the consumer. However, health aspects are also considered, treated within another dimension, the generation of competitive advantages. With the increasing internationalization of food production and consumption, food safety concerns have brought about competitive advantages derived from trustworthy food safety systems (SPRIGGS; ISAAC, 2000).

One must consider, however, that programming and maintaining a food safety system imply high costs. This affirmative leads to the belief that regions or countries where safety systems can be carried out more efficiently, with low implementation and maintenance costs, tend to create a source of competitive advantages. Alternatively, if a region or country is able to demonstrate that their safety system has more integrity than those from the competitors, the emergence of another source of competitive advantages can be expected, now linked to product differentiation. Food safety internationalization can also generate competitive advantages through the creation of vertical forms of coordination within the production system (SPRIGGS; ISAAC, 2000).

Therefore, the peculiarity of a certain region mobilizes heterogeneous resources such as tradition, tacit knowledge, relations of trust, natural territorial characteristics, etc. These resources, known as “strategic territorial assets” (STA), generate specific attributes to the product (quality), enabling the emergence of competitive advantages. They also form the foundations to justify the construction of conventions. For such reason, the definition of these attributes supposes the existence of coordination between a large number of agents, in which the negotiation of rules and norms define the social construction of competitive advantages.

Within the logic presented, the following research question emerges: does the SIAL coordination influence the exploration of strategic territorial assets for the development of sustainable competitive advantages? And how can this be evaluated in a beef cattle SIAL in Rio Grande do Sul, Brazil?

The article was divided into four parts: the framework for the Social Construction of Competitive Advantages in Localized Agro-alimentary Systems; the method used to undertake the research; an analysis of the social construction of competitive advantages through an empiric research; and a discussion about the mechanisms used by the SIAL to coordinate the STAs, followed by the limitations of the research.

2. Bibliographical Review

2.1. Framework for the Social Construction of Competitive Advantages in Localized Agro-alimentary Systems

This section presents the theoretical construction developed by Malafaia et al. (2007), which supports the analysis of the social construction of competitive advantages in localized agro-alimentary systems. The starting point is the comprehension of the peculiar way a certain region mobilizes its STA, generate specific attributes to the product (quality), enabling the appearance of competitive advantages and building the foundations for the justification of the construction of conventions.

In a second moment, in order to verify the necessary conditions for the creation of a Social Convention of Quality capable of generating sustainable competitive advantages for the SIAL agents through efficient coordination of their STA, it was decided to improve the framework developed by Barjolle and Sylvander (2002), more specifically the stage that refers to **collective actions** (figure 01).

The proposed framework seeks to analyze at first the agent's **motivation** for developing a project in cooperation, which can derive from an economic or social crisis or, in many times, from the anticipation of certain environmental crisis. Afterwards, an analysis of the **relevance** of the execution of the project is carried out, examining if the project has a defined demand and is economically viable. In case of positive answers for these two stages, it follows the stage of establishing **collective actions**.

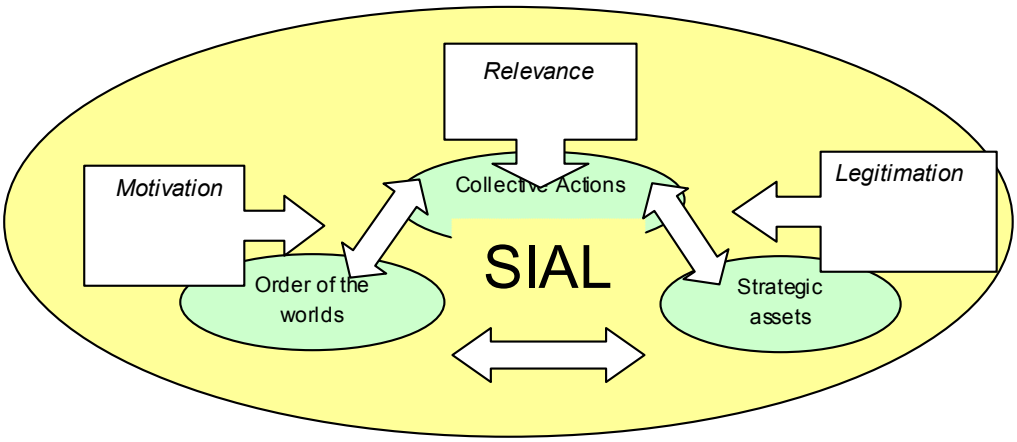

Figure 01: Social Construction of Competitive Advantages in Localized Agro-alimentary Systems
Source: Malafaia et al, 2007.

In this stage, we begin identifying the STA present in the SIAL. These assets are responsible for the establishment of relations between agents in the construction of the product's quality. The particularities concerning the categorization and attributes of the resources under a Resource Based View (RBV) perspective provide indicators to understand the creation of values capable of originating sustainable competitive advantages for the organizations. For this reason it is emphasized the need of identifying the STA involved in the operations, as well as the attributes that distinguish them.

RBV basic principle states that the firm is a set of resources, whose productive use depends on the strategic perspective of their managers, to be correctly mobilized to generate sustainable competitive advantages. However, when operationalizing this notion, it is common to identify the resources separately, in order to find factors of strategic sustentation.

The search heeds the need to analyze how the resources influence the firm's performance, but on the other hand restrains an integrated analysis of these factors. What can then be verified is the loss of the notion of interaction among the resources emphasized. For Black and Boal (1994), this loss corresponds to the challenge of understanding the role of the relations and the meaning of the configuration that depends on the trajectory of the firm for the construction of sustainable competitive advantages. Therefore, the issue of relations is fundamental, both in terms of structure and in terms of the social composition in different analytical scales of time and space (NOHRIA, 1992; POWEL; SMITH-DOER, 1994).

For that reason, collective action makes the emphasis of RBV that focuses on the individual firm relative, providing a bridge for the interaction between resources, their factors of strategic sustentation and social relations. It is then required to emphasize the importance of collectivity in certain regions to promote the complementarity of resources, the same being articulated in a practical way. In a broader view, the disposition, appropriation and collective use potentialize the interaction between resources in the direction of the original idea of Penrose (1959), *the unique packages*, these being put in practice to reach sustainable competitive advantages and the success desired for organizations. In this sense, the typology developed by Fensterseifer and Wilk (2003) for the categorization and evaluation of Cluster resources becomes pertinent in this stage of the framework. For the authors, in a territorial perspective, the same way that occurs with the competition between individual firms, the resources of a region can influence the performance and ability of competition among groups of firms that access these resources in a privileged way, and therefore the cluster's competitive capacity. In the typology developed by the same authors, the classification of Cluster strategic resources is based on three concepts: singular resources, systemic resources and restricted access resources.

Singular resources are those that belong to individual firms. They are strategically sustained by the firm's individual technological trajectory, family history, long term deals, co-specialization of assets, knowledge asymmetries or even by a base condition of immobility and non-negotiability. The singular resources induce to differences of performance between the firms and when these differences are acknowledged by managers and explored competitively, they allow the acquisition and defense of advantageous positions in the market.

Systemic resources are those that do not belong to individual firms, but are shared by a set of firms as a whole. The systemic resources do not influence the competition between firms inside a cluster, but do relate positively to the differentials of efficiency between firm clusters or between firms that belong or not to a cluster. The formation of systemic resources occurs through several processes that can occur in a complex and interconnected way, usually marked by path dependence.

Restricted access resources do not belong to an individual firm, but can be accessed in a privileged way by a certain subset of cluster firms. Restricted access occurs due to multiple factors, as the firms' initiative to access them, previous condition in terms of complementary resources and knowledge, geographic position advantages, participation in the agglomerate formation and capital of strategic relationships. These resources induce the formation of strategic groups of differentiated firms with high performance inside an industry.

After categorizing and evaluating the strategic territorial assets present in the SIAL, the next step consists on visualizing the way these assets are managed by the agents, or in other words, how the agents protect and explore the STAs so that they are capable of complementing each other and consequently aggregating value to the final products, generating a competitive differential.

Convention Economy (CE) suggests that price is the main management form of a SIAL if there is no uncertainty concerning the quality of what is being transacted. If this is the case, differences in price will be equated with quality. That is the characteristic that CE calls

market coordination. When price alone is not capable of valorizing quality, the agents create quality conventions, which lead to others forms of coordination. In **domestic coordination**, uncertainty concerning quality is solved through trust, or in other words, through the predominance of long term relationships between actors, which thus increases the products' reputation. In **industrial coordination**, uncertainties concerning quality are solved through external actions, like certifications, inspections, standards, norms, etc. In what concerns **opinion coordination**, quality is solved by the concept of reputation, that is, the objects are appreciated due to the establishment of brands and geographical appeal. In this case, a product's identity is guaranteed or institutionalized in the repetition of the history of the region or country or brand. **Inspired coordination** is responsible for providing organizational learning in the SIAL, because through this form of organization, knowledge can be increased, generating technological innovations and aggregating non-codifiable values. At last, there is the **civic coordination**, in which the product's identity is reported by its impact on society or the environment, exploring a collective agreement towards well being.

The last stage of the framework concerns the **legitimation** of the quality convention, which requires a legal and institutional apparatus: registration and protection of the product brand, negotiation of the conditions of production and geographic area, and legitimation of the collective actions developed by the operational system.

Therefore, the framework for the *Social Construction of Competitive Advantages in a SIAL* contributes for the comprehension that the efficiency of the SIAL occurs through the connection between product, territory and innovation, provided by processes of collective actions. A SIAL can be characterized by several forms of coordination in its different stages and even in a same segment. At the same time, the quality conventions would enable the combination of these forms of coordination into an integrated form of governance, which, by itself, can be contested and answer to changes, redefinitions and renegotiations (NÃO ENTENDI…). Thus, quality could explain or determine several forms of coordination in different links of a productive arrangement.

In a SIAL characterized by the dominance of industrial and market quality conventions, governance usually occurs through consumers, by the large retail brands that determine the way the strategic resources will be treated throughout the production chain. However, in a SIAL characterized by civic conventions, the consumer of "ethical" products and/or civil groups exercises an important role in the coordination of resources throughout the chain. Certifiers and auditors also play an important role in negotiating consumers' demand regarding the possibility of standardizing the production. Therefore, the process of certification and codification, as well as scale economy, facilitate the emergence of industrial-market conventions. This leads to the perception that this type of SIAL has recently become more and more conducted by the consumer. In a SIAL with domestic conventions, there is a low level of resource directors. In other words, there can be a small functional division of the resources, besides an immediate relation between suppliers and consumers. These SIALs (1) are local, or connected to the history of a place (local, regional, geographic indication systems, etc.) and/or (2) requires repeated interactions and the building of trust (PONTE; GIBBON, 2005).

A SIAL can be considered more or less articulate depending on which quality conventions - or combinations of conventions – are present throughout the chain. These dynamics can be connected to the legitimacy of the SIAL's forms of governance, or in other words, the acceptance of the firm's resource organization models and the coordination of inter-firm resources. In this sense, conventions theory could open the scope by identifying who coordinates, governs or conducts the SIAL, and configuring how it is being strategically conducted.

At last, the theoretical perspectives that compose this framework, when worked together, impose a dynamic aspect to the creation of social conventions of quality for an agro-alimentary product. Theoretical deepening of the social construction of the concept of coordination and its relation with competitive strategies allow a better comprehension concerning the sustainability of productive arrangements.

3. Methodological Aspects

The present work can be characterized as a qualitative research, able to describe the complexity of a certain problem and to understand individuals' particularities. In the case, participants can affect the direction of the research during their interactions with the researcher (MALHOTRA, 2001). The research can also be characterized as exploratory, defined by Lakatos and Marconi (2001) as an empiric investigation that aims to formulate questions or a problem, seeking to better understand the environment, fact or phenomenon for further analysis and improvement. Among the types of qualitative research, one could highlight the case study, a deep analysis of one object, considered adequate for the present research due to its exploratory character (TRIPODI et al., 1975).

The case chosen was **APROPAMPA – Association of Cattle Meat (beef?) Producers of the Pampa Gaúcho**, entity responsible for the management of the Southern Campanha Pampa Gaúcho Meat Source Indication (figure 02) located in the Campanha region of the State of Rio Grande do Sul (27ºS to 33º S 49º W to 57ºW). This choice is centered on the opportunity to investigate the development of a "common good", in this case the meat produced in the Pampa Gaúcho, through the rules that define an individual behavior that is a coherent with a given collective situation.

Figure 02: ***Map of the production area of the*** **"Southern Campanha Pampa Gaúcho"**
Source: APROPAMPA (2007).

Data collection was carried out in two stages: a) conference with experts of the beef cattle chain; b) in-depth interview with APROPAMPA agents. In the first stage, a group of experts was chosen in Rio Grande do Sul, composed of leaders of the sector, researchers, businessmen and experts, seeking to identify the strategic territorial assets present in the Localized Agro-alimentary System where the Pampa Gaúcho meat is produced. For such reason, they received a preliminary list of strategic assets based on bibliographical research. The specialists then classified the assets regarding their strategic attributes, which generated a new list, which was then resent to the group for validation. The second stage, an in-depth interview with the members that compose APROPAMPA, was carried out so they could judge the development stage of each asset. It was sought to assure that these interviewees could also report clearly and objectively all activities since the formation of the productive arrangement. From the elements of analysis established earlier, a script of topics was used, without obeying a formal structure (LAKATOS; MARCONI, 2001). Although it serves as a guide for the interview, this collection method enables the necessary freedom to develop each situation in the adequate direction, obtaining the necessary information to solve the problem initially proposed.

Eight interviews with members of APROPAMPA's Regulatory Board were carried out. The board was represented by producers, industry, retail, consumers, breed association and research institutions. The interviews were carried out in the city of Bagé/RS on the 23rd and 24th of July, 2007, during the 4th BEEF CATTLE SEMINAR – PRODUCE MORE CALVES. Each interview had an average duration of 60 minutes. After the transcription of the interviews, the results were described and analyzed in its content, considering the elements previously defined for investigation.

In regard to the number of interviewees, Minayo (2001) affirms that the criterion of representativity of the sample in qualitative research is not numeric like in quantitative research. This number should not be very big, but should be sufficient to give the researcher a good understanding of the study object. Good sampling is therefore the one that allows to comprise the totality of the problem investigated in its multiple definitions. Therefore, the interviewees selected in this research can be considered representative due to the fact that they present the same characteristics of the population from which they were extracted, besides having been indicated by specialists as strategic for the comprehension of the totality of the cases studies, given that they participated in the elaboration of the projects from the beginning.

The interviewees were asked about the aspects that motivated the creation of the social quality convention, as well as the economic and social relevance that the convention possesses. They were also questioned about the activities developed for the creation of specific attributes of the meat (quality), in which it was sought to identify how the agents coordinate their strategic territorial assets. At last, they were asked about how the legitimation process occurred.

The appreciation of the information obtained was carried out considering the concepts of Conventions Economy and Resource-Based View. The final stage of the research includes the analysis of the information and development of suggestions and considerations.

4. APROPAMPA Case Study

4.1. Brief contextualization of APROPAMPA

Several strategic territorial assets (STA) can be found in the Campanha Region of Rio Grande do Sul: genetic resources – trust – soil resources – recognized brands – energy resources – ability to develop technological innovations – differentiated production system – culture and tradition – support services – typical traditional products – information technologies – tourism. Figure 2 demonstrates the set of territorial strategic assets available in the SIAL of the Campanha Region of RS (MALAFAIA et al., 2007). These factors resulted in the "Southern Campanha Pampa Gaúcho Meat" Origin Indication (IP)" provided by INPI (National Institute of Intellectual Property) in December, 2006. It should be emphasized that Origin Indication can be understood as a product originated inside a territory or country where a certain quality, reputation or other good characteristic are essentially ascribable to its geographic origin (BARHAM, 2003). The elaboration of the Pampa Gaúcho Meat IP Project began in 2004 through a partnership joining SEBRAE (Brazilian Service for Managerial Learning), SENAR (National Service for Rural Learning), FARSUL (Rio Grande do Sul Agriculture Federation) - thanks to the program "Together to Compete", UFRGS (Federal University of Rio Grande do Sul State) and EMBRAPA (Brazilian Organization for Agricultural Research), besides rural leaderships in the Western Campanha Region. **APROPAMPA - Association of Cattle Meat Producers of the Pampa Gaúcho** was created in this occasion.

The association is a non-profit organization which does not have cultural, social and research purposes. It is formed by rural producers, local slaughterhouses, retail and other

agents directly or indirectly connected to the beef cattle chain. Its main purpose is to preserve and protect the geographic indication of the meat, leather and derivates of the "WESTERN CAMPANHA PAMPA GAÚCHO" region. Other goals of the institution are: a) make beef cattle products with origin and quality guarantees available to the consumer – origin certification; b) aggregate value to the products generated in the beef cattle production chain through the implementation of quality processes; c) stimulate research in beef cattle as well as the qualification of meet, leather and derivates; d) develop actions that promote the organization and preservation of the Western Campanha Pampa Gaúcho; e) stimulate and promote the region's touristic potential as well as the social-cultural improvement of members, their families and the community.

The association is composed of a board of directors, technical regulatory council, administration council, fiscal council, executive council and technical research council. APROPAMPA manages, plans and certifies the whole process of production and distribution of the meat produced with the Pampa Gaúcho Meat IP seal. It currently has 40 partners, and 22 are involved with slaughtering. The inclusion of new partners depends on the accomplishment of some demands such as delimitation of the area where the rural property is located, race standard and nutritional system of the animals. Therefore, an inspection is carried out by APROPAMPA technicians in the farms that wish to become partners, in order to verify if they satisfy the predetermined requisites.

4.2. Social Construction of Competitive Advantages in the Pampa Gaúcho SIAL

4.2.1. Motivations for the Creation of the Pampa Gaúcho Meat IP

As well known, the beef cattle industry in Rio Grande do Sul, especially in the Southern half of the State, has been passing through innumerous difficulties to remain economically viable (FÜRSTENAU, 2004). The reflexes of the chain's bottlenecks can be seen principally in agro-economic results, which have been negative most of the times, as well as in the elevated dependence of non-agricultural income (specially originated from leasing and retirements). Likewise, most of the times the production systems present a relatively low land value, low level of immobile capital, low use of labor and low or negative economic efficiency indicators. It can also be noticed that the globalization process has had a big impact on beef cattle production in Rio Grande do Sul, mainly due to the competition with countries from MERCOSUL, causing many producers to be excluded from the production process and many industries to go bankrupt. The State is having difficulties facing the competition of some more recent cattle breeding centers, such as the states of the Midwestern Region of Brazil, in what concerns the exportation of beef cattle that due to demands of the external market requires a greater qualification in the production process than the production directed towards the internal market (FÜRSTENAU, 2004). The participation of Rio Grande do Sul in beef exports in 1990 was 22%, and has fallen to less than 6% in 2002.

The scenery described above was the main motivator for the creation of the Pampa Gaúcho Meat IP project. Corroborating with this affirmation, one of the interviewees quotes: *"producers began to notice that they did not have a volume of production to compete with Central Brazil"*. This perception generated debates about *"how to aggregate value so that the beef cattle business could become more profitable without increase scale, given that the areas are restricted, the properties are getting smaller and the investments scarcer"*.

The idea for the project originated in 2002, after a group from SEBRAE participated of the SIAL fair in France and ANUGA in Germany. According to the interviewees *"in that occasion it was noted that Europe valued geographic indications a lot"*. Along with this, *"what also called out attention was the large movement of consumers that tasted meat from Uruguay and Argentina. The European consumer present in the SIAL fair was impressed with the quality of the Angus and Hereford meats"*. In their return to Brazil, the SEBRAE group

began to discuss these issues with the producers. The idea arose during a meeting: *"if we have the same fauna, we are in the same Biome where Uruguay and Argentina are located, why can't we differentiate ourselves using this?"* And moreover, *"the European consumer is willing to pay 10% or 20% more for a product with geographic indication because that involves origin control, production system control, a group of well related producers"*.

One of the interviewees used the example of other well succeeded experience of meat with geographic indication as a motivation for the project: *"something interesting occurred with a community in Spain in a meat project in Ávila, that was not doing well; the producers were not being well paid for their products and through geographic indication of the meat they were able to promote the meat using the local self-esteem of the whole community within a domestic commercial environment. This made the business viable and profitable and thus arose the idea for the Pampa Gaúcho Meat IP project"*.

As demonstrated, the IP project had a strong economic motivation for its creation. Problems of low competitivity in relation to Central Brazil were clearly evidenced when the interviewees externalized their motivations. This perspective is corroborated by the literature on the subject. In the framework used in this work, economic motivation is one of the forms used to ignite the creation of a quality convention.

4.2.2. Marketing Relevance of the Pampa Gaúcho Meat IP

The food crises that have occurred in the beef cattle market have made the consumers react in different ways. The most immediate reaction was to reduce the consumption of bovine meat. The other reaction, a bit slower but with more lasting effects, was to demand more safety and quality of the meats, as well as more information. These demands led to a need to guarantee the traceability and development of specialty brands (Origin Denominations, Geographic Indications, Racial Labels, among others) in which the trust in the process is the basic tool for competence (MALAFAI et al., 2007).

Several works have approached the marketing relevance of meat products with origin identification (OUREIRO; UMBERGER, 2007; SILVANDER et al., 2006; VERLEG et al., 2005; BRUNSO et al., 2005). These studies demonstrate that the international consumer, mainly in the European Union and the USA, are willing to pay a premium price for meat with origin certification.

Regarding the Pampa Gaúcho IP project, the internal market is currently being explored, more specifically the city of Porto Alegre – RS. The volume commercialized by the project is still small: *"the range of slaughters is about 50 animals per week and the meat is commercialized in a traditional and well-known 'meat house' in the capital"*. It should be emphasized that this *meat house* is well-positioned in the market due to the differentiation of its products, especially meats. According to the manager, "the consumer has great interest in the product and the demand has been spectacular". "The consumer that is acquiring this meat is demanding and pays a differentiated price for it".

Despite envisioning the external market, it is consensus among the participants that *"currently the project still needs to consolidate itself, grow roots"*. It becomes evident in the interviews that the process is being built slowly but in a very solid way. The option to provide to the internal market at first seems coherent, because *"this is making the wheel turn and in the future, when we are able to aggregate a good amount of value, we will think about exportation"*. Until now, 800 animals have been slaughtered in the program.

The interviewees agree that currently the project's performance control revolves around two indicators: number of members and number of members slaughtering. According to one of them, *"today our performance control has been about the externalization of the idea, seeking new partners. We were able of carrying out the first stage, which was obtaining*

the seal, now we have to increase the number of members, have more volume and scale of production. Today we have 40 members, and only 22 of them are slaughtering. Our goal for 2009 is reaching 200 members and a rate of 150 members slaughtering".

It is important to emphasize the long-term feeling present in the group. It became clear in the interviews that all of them share the idea that the gains will not be immediate. According to one of the interviewees, *"this is not for make gains in one or five years, it is the construction of a process that will benefit whoever continue our work"*. Even so, some economic gains can already be noticed, given that the producer receives the *top* price of the industry. One of the interviewees affirms that *"nowadays there isn't a differentiation of price. It is the same paid to other producers. What occurs is that the IP producer is earning a top price of the slaughterhouse table, the exportation price. This is due in part to the small number of cuts we currently place in the market. If we had more cuts, maybe we could get a bigger price"*.

Regarding the Pampa Gaúcho Meat IP developed in the SIAL, despite the fact that it is still in an initial stage, the existence of a marketing relevance can be noticed in the project. This affirmation is sustained by the good sales in retail, which demonstrates the acceptance of the product by the demanding market niche of the capital of Rio Grande do Sul. Moreover, an excellent alternative in the external market can be seen as was mentioned before. Despite facing problems regarding the volume of the scale, it is worth calling attention to the marketing appeal of these products, differentiated exactly due to the "traditional" breeding techniques carried out in small production units, industrialized in slaughterhouses with limited capacity and commercialized in small meat houses (MARESCOTTI, 2000).

4.2.3. Legitimation used in the Pampa Gaúcho Meat IP

Recognition of a geographic indication is originated from the effort of a group of producers or service workers that become organized to defend their products or services, motivated by collective profit. The product or service that has geographic indication has a personal and not confusable identity. Consequently, its substitution becomes rarer.

According to the president of APROPAMPA, *"the granting of the Geographic Origin Indication and the concession of the Southern Campanha Pampa Gaúcho Meat seal was delivered 12/27/2006 by the National Institute of Industrial Property (INPI), autarchy connected to the Ministry of Development, Industry and Foreign Commerce. The process went through all the stages demanded and took two years and a half to be concluded, the indication being the first of the Americas for bovine meat. This Origin Indication is founded on five pillars. The first is the history that goes from the introduction of the cattle by the Jesuits, the leather and* charque *cycles, cattle improvement and the modern slaughterhouse industry. Tradition and culture, preserved environment, product – quality cattle recognized and sustainable development with natural pastures improved with adequate handling. The marked and georeferenced area with technical criteria of soil quality and botanic composition has 1,293,500 hectares belonging to 13 municipalities of the southern campanha region.*

Therefore, it can be noticed that there is a strong legitimation of the project, meeting the postulates of the framework proposed, which emphasizes that the quality convention needs a legal and institutional apparatus to be legitimated, that is: registration and protection of the product brand, negotiation of the conditions of production and geographic area or legitimation of the collective actions developed by the operational system.

4.2.4. Strategic Territorial Assets of the Campanha Region of RS SIAL

From an initial list of the resources obtained through a bibliographical research, in-depth interviews were carried out with a group of experts aiming to identify and select the assets that had strategic attributes. The following assets considered strategic were present in the SIAL: genetic resources – trust – soil resources – recognized brand – energy resources – ability to develop technological innovations – differentiated production system – culture and tradition – support systems – typical traditional products – information technology – tourism.

After the assets were identified, they were then classified into previsously proposed categories – singular; restricted; systemic. The assets' strategic sustentation factors were then analyzed – valuable; scarce or rare; inimitable; irreplaceable; passive of causal ambiguity; path dependent; influenced by degrees of knowledge; conditioned by negotiability. At last, the evaluation made by the interviewees concerning the degree of development of each STA was presented as follows: developed; in development; undeveloped (chart 01).

The following categories of STA were identified while observing the elements classified: systemic – singular – restricted access. The **systemic** assets refer to the *edaphoclimatic conditions, social capital and trust, culture and tradition, typical traditional products, geographic identification*. The strategic sustentation factors found in these STA were: *inimitability, rarity, scarcity, rare, inimitable and path-dependence.* In regard to the degree of development, only *social capital* and *trust* were not considered as *developed*, given that the interviewees consider this a dynamic asset, also constantly needing to be in evolution. The **restricted** assets are composed by advantages of touristic localization, ability to develop technological innovations and the producers Association. Their strategic sustentation factors are: *path dependence, influenced by degree of knowledge, information asymmetry.*

Classifiable element	Type of STA	Strategic Sustentation Factor	Degree of development
Production system in practice	Singular	Knowledge codification, path dependence, co-specialization	Developed
Bovine genetics	Singular	Valuable	Developed
Edaphoclimatic conditions	Systemic	Inimitability, rarity, scarcity	Developed
Touristic localization advantages	Restricted	Path dependence	In development
Ability to develop technological innovations	Restricted	Influenced by degree of knowledge, path dependence	Developed
Social capital / trust	Systemic	Rare, inimitable, path dependence	In development
Recognized brand	Singular	Valuable, path dependence	Developed
Market knowledge	Singular	Path dependence, information asymmetry	Developed
Culture and tradition	Systemic	Rare, inimitable, path dependence	Developed
Traditional typical products	Systemic	Rare, path dependence	Developed
Information Technologies to assure quality	Singular	Valuable, co-specialization	In development
Geographic indication	Systemic	Inimitability, rarity, path dependence, valuable	Developed
APROPAMPA	Restricted	Path dependence, information asymmetry, inimitability	Developed

Chart 01: Classification of the strategic territorial assets identified in the Campanha Region SIAL

Source: Elaborated based on the research.

The **singular** STA found were: *production system, bovine genetics, water and soil resources, recognized brand, market knowledge* and *use of information technology to assure quality.* The strategic sustentation factors were: *knowledge codification, path dependence and*

co-specialization, valuable, inimitability, rarity and scarcity. All STAs of this category were considered developed.

The STA and strategic sustainability factors indicated depend largely on the actions that are being implemented. When analyzed separately, it can be verified that these assets lead to different competitive abilities. Among the STA highlighted the ones that present rarity and path dependence as attributes for strategic sustainability factors are the hardest to be replicated by competitors, especially in this sector, marked by individualism.

Correspondingly, when the STA and their factors are analyzed, one observes the importance of the influence of collective actions in the management of the STA and how these assets could lead to a differentiated use of the same. As mentioned by Fernsterseifer and Wilk (2004), the typology for classification of the STA used in this study refers to distinct managerial documents for each case. For *systemic resources*, given its collective importance, it is interesting to establish a structure of sectorial or governmental coordination in order to guarantee a satisfactory level of systemic performance. *Restricted resources* are generally coordinated by firms with more intense appropriation, many times organized through associations. In regard to *singular resources*, coordination presents itself through the managerial perception and the competitive strategies of each firm, which should reflect a certain degree of collective interest.

4.2.5. Quality Conventions and the Coordination of Strategic Territorial Assets

APROPAMPA agents have opted to establish a set of quality conventions in which the commitment of the *domestic-industrial coordination* is emphasized, given that it deals with a product of territorial origin that seeks to establish a geographical and cultural relation with the consumer and at the same time has a rigid productive protocol to be followed. According to Sylvander et al (2006), the evolution of the agro-alimentary system and its regulations, especially regarding health and hygiene, tend more and more to impose rigid control standards in the production processes. At the same time a domestic product arises the consumer's interest due to its connection with certain region, it also needs to follow standards and norms that certify its quality and origin. In the present case, the image imposed to the product refers to the guarantee of the quality characteristics of the meat (product of a differentiated biome, genetic quality, superior organoleptic characteristics of the meat, innocuousness) and simultaneously guarantees the characteristics of the production process (with special attention given to traceability and the control of technical standards).

Therefore, the *domestic – industrial* commitment results in an interaction between the STA present in each coordination mechanism. *Domestic coordination* mobilizes the SIAL's *systemic* resources such as *edaphoclimatic conditions, social capital, trust, culture, tradition, typical traditional products and producers Association*. However, in order for this STA to generate competitive advantages, it is necessary to unite them with other STA found in other forms of coordination. In the present case, the *industrial logic* sought to solve this problem, as uncertainties concerning quality are solved through traceability, animal standards, product standards inspections, etc. Thus, *singular* STA such as *information technologies to assure quality and the production system* were mobilized in order for this quality convention to occur.

This type of combination of coordination presents important strategic sustentation factors (*inimitability, rarity, scarcity, rare, inimitable and path dependence, valuable, co-specialization)* that could hardly be copied by other SIALs. This is mainly due to the *systemic* STA of the SIAL. As emphasized by Fernsterseifer and Wilk (2004), systemic resources do not influence the competition among firms inside a cluster, but do relate positively to the differentials of efficiency between clusters of firms, or between firms that belong or not to a cluster.

APROPAMPA also uses a *civic – opinion* combination, given that at the same time it establishes a concern with consumer safety and well-being through a rigid nutritional control of the animals, based on natural pasture (*civic coordination)*, it explores the strength of the brand the industry possesses and also links the production process of the Pampa Gaúcho Meat IP to only two main European races (*opinion coordination)*. Through this combination, the complementarity of the singular STA found in both "*worlds*", such as *production system, bovine genetics, water and soil resources, recognized brand and market coordination* becomes possible. Marescotti (2000) affirms that this composition of forms of coordination seeks mainly to meet the demands of the markets and groups of civil society for ethical products.

It can also be noted that this combination has a strong interrelation with *domestic – industrial* coordination, due to the fact that it remits its STA to a rigid control of the production processes, codifying the production systems and meat characteristics. It also remits its STA to a connection with the region of production, creating a relation of proximity and trust with the consumer. This sentence is corroborated by Ponte and Gibbon (2005), who affirm that this combination (*domestic – industrial / civic – opinion*) is the most adequate for typical products, given that it focuses on the construction of a relation of proximity between product, region and non-local consumer. Market coordination does not seem to be the most adequate alternative in this situation.

Civic – opinion coordination is sustained by the singular STA and presents strategic factors such as *knowledge codification, path dependence and co-specialization, valuable, inimitability, rarity and scarcity*. These STA lead to differences in performance among the agents of the SIAL, but when they are seen by the managers and explored coordinately, they can possibly generate positive externalities that allow the acquisition and defense of advantageous positions of the SIAL in the market.

A *market – domestic* coordination combination can also be observed due to the fact that the relations among agents occur via price, but within an environment of trust. This domestic environment allows full knowledge of the information concerning the quality of the cattle and meats being negotiated by the APROPAMPA agents, allied to the reputation acquired by them due to the repetition of transactions throughout time. In the final market, the consumer of the capital is stimulated to pay a plus price because of the meat's origin guarantee. This occurs due to the belief in higher quality of the region's product and the reputation of the agents involved, as well as the location's tradition and culture. Marescotti (2000) affirms that throughout the relations established in the SIAL, sustentation is created based on trust and reciprocal knowledge of that which is being negotiated, therefore not needing support elements (more or less institutionalized).

At last, it is worth emphasizing that nowadays maybe this connection can only be possible if there is complementary with the instruments that transmit trust to this non-local consumer. This leads to the belief that more and more the STA that aggregate value to the product tend to be materialized in rigid control standards and process certification. Renard (2003) mentions that in certain sectors industrial norms (such as ISO 9000, HACCP, EUREPGAP, USDA Process Verified, Traceability, Animal Welfare, Organic, Fair Trade) are currently becoming the management tools for quality control, directing the focus of quality more towards the processes than the products.

Final Considerations

With the increase of the internalization of production and consumption of food, concerns with food safety has provided the generation of competitive advantages through trustworthy food safety systems. Therefore, the peculiarity of a certain region mobilizes

heterogeneous resources known as "strategic territorial assets", which generate specific attributes to the product (quality). Thus the definition of these attributes supposes the existence of coordination between a large amount of agents, in which the negotiation of rules and norms define the social construction of competitive advantages. The present study examined the influence of the SIAL coordination in the exploration of strategic territorial assets for the development of sustainable competitive advantages. For such reason, a framework for the Social Construction of Competitive Advantages in Local Agro-alimentary Systems was applied.

Based on this framework, APROPAMPA – managing association for the Pampa Gaúcho Meat Origin Indication– was analyzed. The results demonstrated that the stages of the framework signalize favorable conditions, indicating a possible development of competitive advantages. In the specific case of the stage concerning the coherence of collective actions, in which the main contribution for this study occurred, several forms of coordination throughout the SIAL could be identified and, moreover, that these forms make combinations among each other consequently generating a complementarity of the STA.

Among the forms of coordination used in the SIAL studied, one could emphasize the predominance of a strong *industrial – domestic* coordination, which refers to the guarantee of the meat's quality characteristics, simultaneously guaranteeing to consumers the characteristics of the production process. This combination of coordination allows the interaction among the STA, thus building strategic sustentation factors that will hardly be possible to copy by other SIALs, given that they are systemic.

The competitive advantages identified in this SIAL through the specific form of the production system, characterized by the existence of a strong interaction among "products – actors – territory and innovation systems" are harder to be copied by other SIALs because they refer to unique territorial aspects, enabling the obtainment of sustainable competitive advantages throughout time.

Consequently, it could be concluded that a SIAL can be considered more or less articulate depending on which quality conventions – or combinations of conventions – are present. These dynamics would be connected to the legitimacy of the SIAL's forms of governance, in other words, the acceptance of the firm's resource organization models and the coordination of inter-firm resources. Each of these forms of coordination refers to different principles to determine the nature of the products (quality). The product's specificity derives therefore from the execution of the variety of forms of coordinating the STA.

The theoretical perspectives that compose the framework used in this study impress a dynamic aspect in the process of collective construction of the quality of an agro-alimentary product. Theoretical deepening of the social construction of the concept of coordination and its relation with sustainable competitive strategies allows a better comprehension of the sustainability of productive arrangements. Thus, the challenge of understanding the function of the relations between STA can be studied also under the perspective of Convention Economics.

The composite character of the forms of coordination present in CE becomes pertinent to understand the complementarity of the resources studied by RBV, which allows one to assert that the forms of coordination influence the exploration of the strategic territorial assets, thus answering the research's initial question.

In this sense, finding the chance to conjugate these two theories to better comprehend the SIAL's competitivity was the main contribution of this study. The main limitations of the research concern the development time of the initiative studied. The fact that the initiatives were still new makes them not yet in their ideal configuration. It becomes difficult in these initial stages to identify the conflicts and ways used to solve them. We suggest that in future studies be made an application of the framework for the Social Construction of Competitive

Advantages in other objects of analysis so that its theoretical-empirical adequation be tested in other fields o of study.

7. References

APROPAMPA. Associação dos Produtores da Carne do Pampa Gaúcho. **Dados**. 2007. Disponible: HTTP:/www.carnedopampagaucho.com.br. Acess in: 15 out. 2010.

BARHAM, Elizabeth. Translating terroir: the global challenge of French AOC labeling. **Journal of Rural Studies**, New York, v. 19, p. 127-138, 2003.

BARJOLLE, B.; SILVANDER, B. Some factors of success for origin labelled products in agro-food supply chain in europe: market, internal resource and institutions. In: ECONOMIES ET SOCIETE**.** Paris: La Délégation Générale à La Langue Française, 2002. (Série Dévelopment Agroalimetaire n. 25)

BLACK, Janice A.; BOAL, Kimberly B. Strategic resources: traits, configurations and paths to sustainable competitive advantage. **Strategic Management Journal**, Inglaterra, v. 15, n. special, p. 131-148, 1994.

FÜRSTENAU, Vivian. Pecuária de corte: baixos índices zootécnicos e eficiência no setor exportador. **Indicadores Econômicos FEE,** Porto Alegre, v. 32., n. 1, p. 1-15, 2004.

LAKATOS, E. M.; MARCONI, M. **Metodologia do trabalho científico**. São Paulo: Atlas, 2001.

LOUREIRO, Maria L.; UMBERGER, Wendy J. A choice experiment model for beef: what US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability. **Food Policy,** Inglaterra, v. 32, n. 4, p. 496-514, Aug. 2007.

MALAFAIA, Guilherme Cunha et al. Building competitive advantages for the livestock farming of Rio Grande do Sul: the case of the indication of origin of the "Meat of the Gaucho Pampas". In: WORLD FOOD & AGRIBUSINESS SYMPOSIUM, 17., 2007, Parma. **Anais...** Parma: IAMA, 2007. 1 CD-ROM.

MALHOTRA, N. K. **Pesquisa de marketing**: uma orientação aplicada. 3. ed. Porto Alegre: Bookman, 2001.

MINAYO, Maria Cecília de Souza (Org.). **Pesquisa social**: teoria, método e criatividade. Petrópolis: Vozes, 2001.

NOHRIA, N. Is a network perspective a useful way of studying organizations? In: NOHRIA, N.; ECCLES, R. G. (Ed.). **Networks and organizations**: structure, form, and action. Boston: Harvard Business School Press, 1992. p. 1-22.

PENROSE, E. T. (1959) **The theory of the growth of the firm**. New York: Wiley, 1959

PONTE, S.; GIBBON, P. Quality standards, conventions and the governance of global value chains. **Economy and Society**, London, v. 34, n. 1, p 1-31, 2005.

POWEEL, W. W.; SMITH-DOERR, L. Networks and economic life. In: SMELSER, N. J.; SWEDBERGER, R. (Org.). **The handbook of economic sociology**. Princeton: University Press, 1994. p. 368-402.

RENARD, Marie-Christine. Fair trade: quality, market and conventions. **Journal of Rural Studies,** New York, v. 19, n. 1, p. 87-96, 2003.

SYLVANDER, B. et al. Establishing a quality convention, certifying and promoting the quality of animal products: the case of beef. In: RUBINO, R. (Ed.). **Llivestock farming systems**: product quality based on local resource leading to improved sustainability. Italy: EAAP Publication, 2006. p. 118.

TRIPODI, T. et al. **A análise da pesquisa social**. Petrópolis: Alves, 1975.

COLLECTIVE ENTREPRENEURSHIP: THE EMERGENCE OF ALTERNATIVE COORDINATION MECHANSISMS TO ENHANCE COLLECTIVE ACTION

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Abstract
Existing research treats the cooperative structure as relatively homogeneous. We argue cooperatives are not created equal. Consideration of the cooperative strategy, economic justification, and relevant interdependencies is imperative when designing, restructuring or analyzing the cooperative enterprise. In recent empirical work, we observe cooperatives forming as single- or multi-purpose; adopting coordination mechanisms to manage pooled or sequential interdependencies; generating equity capital passively, quasi-passively, or proactively; vertically integrating in a centralized, federated, or hybrid fashion; governing through fixed or proportional control rights; and instituting open, closed or class-varying membership criteria. The emergence of multiple-level rent-seeking cooperatives challenges traditional rent dispersion models of collective action. We call these multi-level, patron, rent-seeking entities a form of collective entrepreneurship. This paper develops a set of criteria to distinguish between traditional forms of cooperation and collective entrepreneurship. We employ these criteria to analyze and contrast forms of collective action. We propose a continuum from single-level rent seeking, traditional, patron, user-driven cooperative forms; through forms of hybrids and macrohierarchies; to multiple-level rent-seeking, patron, user-investor-driven collective entrepreneurship.

Key words: agribusiness networks, collective action, new institutional economics

COLLECTIVE ENTREPRENEURSHIP: THE EMERGENCE OF ALTERNATIVE COORDINATION MECHANSISMS TO ENHANCE COLLECTIVE ACTION

In an increasing number of countries, producers are experimenting with alternative modes of collective ownership. Often, these new forms of cooperation challenge notions of what constitutes a cooperative and the role cooperatives play in the economy. The development of multiple organizational models for producer-ownership can lead to ideological debate regarding ideal principles and structural arrangements to govern cooperation.

We argue ideal cooperative structural form varies depending upon such factors as cooperative strategy, economic justification, nature of interdependence and assignment of uncertainty bearing (Gulati and Singh 1998). It is in understanding the nature of interdependence cooperators are able to develop appropriate coordination mechanisms to sustain collective action (Lazzarini, Chaddad and Cook 2001; Thompson 1967). Fundamental differences in the specific interdependencies relevant to collaboration ultimately determine the optimal architecture of a cooperative organization. In this context, there is no single set of ideal coordination mechanisms that define cooperation. But rather, distinct opportunities to create value may require distinct organizational forms to address a variety of interdependencies. Those interested in collective action examine which set of coordination mechanisms best aligns incentives and allows cooperators to capture or create value.

We find evidence producer groups have recognized these distinct interdependencies and have participated in the development of radically distinct cooperative organizations. We identify these ventures as forms of collective entrepreneurship and discuss how organizational design principles of collective entrepreneurial ventures differ from traditional cooperatives. The following sections outline the distinct coordination mechanisms each cooperative model utilizes and describe the benefit these mechanisms bring to each model. We focus our analysis on two contrasting organizational forms: traditional cooperatives and collective entrepreneurship. It is helpful to envision these forms of cooperation as nodes on a continuum. Spanning the space between these two nodes is a large variety of hybrids that have evolved. In some instances, hybrids are utilized as transitional governance forms during organizational restructuring. Intermediate models of cooperation incorporating coordination mechanisms from both models of cooperation are viewed as hybrids of the contrasting examples presented here.

1. Collective Entrepreneurship

The concept of collective entrepreneurship has been used by scholars in many disciplines and multiple sectors. Burress and Cook (2009) document a broad set of literature that covers academic and practitioner usage of the term. While some theorists argue all entrepreneurship may be fundamentally collective in nature (Johannisson 1998), other theorists consider collective entrepreneurship as a subset of entrepreneurship (Tardieu 2003). Thus, there is little agreement on a definition of collective entrepreneurship. For example, the term may refer to individuals or groups organizing to affect social change (Chouinard and Forgues 2002), public-private partnerships for technological development (Silva and Rodrigues 2005), entrepreneurship among collaborating firms (Mourdoukoutas 1999), or collective enterprise (Emelianoff 1942).

This article examines collective entrepreneurship as it relates to risk-bearing, multiple level rent-seeking, patron-owned firms in the agriculture and food sectors. We utilize the term collective to refer to individuals jointly involved in the entrepreneurial process. We describe the development of collective entrepreneurship among agricultural producers as path dependent (David 1985; Page 2006): due to their past involvement in agricultural cooperatives, producers familiar with advantages and disadvantages of traditional cooperative models utilize this knowledge and experience to inform the design of new cooperative structures. For the purposes of this paper, we define collective entrepreneurship as *the joint process by which patron-investors design, finance, and incorporate a path dependent form of collective action for multiple-level rent generation*. This is a modification of the Cook-Plunkett definition which did not include "patron" (Cook and Plunkett 2006). This definition is formulated specifically for agricultural producer cooperative action but may be expanded to other sectors. We analyze this process from a Knightian point of view which envisions the entrepreneur as the bearer of uncertainty (Knight 1921).

2. Strategy: Defensive vs. Offensive

Cooperation has evolved over the last one hundred and fifty years. Cooperative organizations are shifting from a defensive strategy which primarily seeks to avoid market power, toward an offensive strategy which primarily seeks to create a competitive advantage for producers' products through producer investment in vertical supply chain integration. As a result of this strategy shift, organizational architecture of producer-owned cooperatives is experiencing a parallel shift from the use of 1) mechanisms designed to coordinate pooled interdependencies to 2) mechanisms designed to capture value from sequential interdependencies.

2.1 Traditional Cooperation: a Defensive Strategy for Safeguarding On-farm Rent Generation Capacity

Since the mid-1800s, scholars and practitioners have been developing taxonomies and typologies of group-oriented, commercial collective action in attempts to heighten awareness of the existence of distinct models. In Europe and North America, the emergent schools were influenced by the French and German cooperative philosophers, as well as the British Rochdale Pioneers. In North America, three forms of agricultural cooperatives evolved: (1) Rochdale-Nourse consumer-driven, multipurpose, spatial or local cooperatives (2) Sapiro, producer-driven, single purpose, commodity-oriented marketing cooperatives and (3) Raiffeisen-inspired rural credit cooperatives.

Traditional Rochdale-Nourse, Sapiro and Raiffeisen cooperatives often employ a defensive strategy. Their primary objective is to defend members against market power or predatory practices. In the experience of North America, atomistic producers often banned together as a mechanism for coping with local monopsony power. When employing a defensive strategy, the purpose of cooperation is not to generate profits, per se, but rather to protect members' on-farm rent generation capacity. Generating a cooperative profit may be necessary for traditional cooperation to be sustainable. However, a profit at the cooperative level is not the primary objective. Cooperators may forego use of the term profit for terms such as net surplus, net margin, net operative gain, earnings or savings. We elaborate on distinct rent generation strategies in Section 3.

2.2 Collective Entrepreneurship: Patron-Driven, Offensive Mechanisms for the Joint Bearing of Uncertainty to Seek Opportunities for Multiple-level Rent Generation

During most of the twentieth century, successful European, Oceanic, and North American cooperatives created innovative selective incentives to maintain high degrees of homogeneity

in preferences among their memberships. Sometime in the late 20th century, producers began to shift their preferences toward more multiple rent-generation and multiple risk-bearing strategies. Producers began to utilize cooperative organizations to invest risk capital into vertically integrated, off-farm ventures. Fundamental to this offensive strategy is a dual profit motive: producers seek to generate rents at the farm-level and the cooperative level.

In North America, grain producers often adopted this strategy as a vehicle for investment in the biofuels sector. For example, corn growers jointly invested in cooperatives or limited liability companies to process corn into ethanol. From these ventures, producers seek to capture a competitive price for their corn deliveries as well as a profit from the processing of corn into ethanol. It is from observing the actions of groups of producers with similar dual profit motives that the concept of collective entrepreneurship emerges. The emergence of multiple rent-oriented, patron-oriented producer groups across many countries is well documented (Chaddad and Cook 2004; Cook and Iliopoulos 1999; Harris, Stefanson and Fulton 1996; Hendrikse and Bijman 2002; Merrett and Walzer 2001; Nilsson 1999).

Embedded in these collective entrepreneurial ventures are core attributes derived from the Sapiro school of agricultural collective action. These attributes include single commodity orientation; well-defined, long-term contracts obligating members to delivery; and a centralized membership structure. However, collective entrepreneurs have also adopted organizational attributes from other legal forms. Collective entrepreneurial organizations generally possess transferable delivery rights and obligations, appreciable equity shares/delivery shares, defined membership, and a minimum up-front capital investment requirement—attributes commonly found in limited liability joint stock companies.

These organizational design differences as explained in depth in the following sections and summarized in Table 1 have considerable risk and rent-generation implications. Collective entrepreneurial ventures incorporate a greater degree of incentive alignment, are offensive in design, seek to generate economic rents at multiple levels, and create options for exit and wealth. There appears to be a continuum along which this process and these organizational designs may locate. Table 1 gives concrete examples of the coordination mechanisms used in traditional cooperation, hybrids, and collective entrepreneurship.

3. Economic Justification

It is costly to coordinate independent actors. Therefore, successful cooperatives perform an economic function. Evaluating anticipated rents to be generated from cooperation may help to distinguish between traditional cooperation and collective entrepreneurship. Distinct cooperative strategies correspond to distinct economic justifications for collective action, expected methods of rent generation, and interdependencies. Defensive cooperatives, in an effort to ameliorate some form of market failure, are often attempting not to create rents, per se, but rather primarily attempt to disperse monopoly rents. Offensive cooperatives, in contrast, organize in response to a perceived opportunity in the market; they primarily attempt to generate Ricardian or entrepreneurial rents.

As an example of traditional cooperation, consider Rochdale cooperatives. The cooperative entity is constructed as a non-profit entity existing to pass the benefits of cooperation back to its members in proportion to patronage (Conover 1959). The cooperative is to retain only enough earnings to continue in its designated function. Under this philosophy, the cooperative primarily exists to protect its members from simple market power and ex post market power; reduce the risks of long-term contracting; ameliorate problems of asymmetric information including moral hazard, hold up, and costly strategic bargaining; credibly communicate patron preferences; compromise among diverse patron preferences; reduce alienation; and minimize credit or supply rationing (Centner 1988; Hansmann 1996; Williamson 1985).

The value of the traditional cooperative is not in its earning potential. Typical examples of a cooperative's value are its ability to attract sufficient members and volume to wield bargaining power when buying inputs or selling raw materials, to ensure quality products thus reducing moral hazard, or to ensure producers a market with reliable product grading. In the case of traditional cooperatives forming due to defensive reasons, the cooperative has the potential to dissipate monopoly rents by creating a bilateral monopoly. This strategy can be successful given the tendency for spatial monopolies to exist in agriculture. Lowering transaction costs arising due to moral hazard or hold up also allows the cooperative to pass additional savings back to their members. Patron-members are then able to maximize their returns at the farm-level. In well performing cooperatives, producers may have an incentive to reinvest these returns into their on-farm operations, increasing production.

Over time, successful cooperatives may ameliorate market failure issues or market contracting costs (Hansmann 1996). Future generations of producers no longer experience the same motivations that led their predecessors to organize for defensive purposes. Successful waves of defensive cooperation may, in fact, be one of the reasons we witness the development of new patron-driven strategies. Amelioration of market failure issues may allow producers to focus on market opportunities further up or down the value chain. If the market in which producers sell their raw inputs is relatively competitive, a defensive cooperative will operate on very low margins or cease to exist (Nourse 1942). Therefore, producers looking for opportunities to create value through cooperation are likely to seek opportunities further down (up) the supply chain.

It is in organizing to exploit these market opportunities that producers begin to engage in collective entrepreneurship. In doing so, they seek avenues to generate Ricardian and entrepreneurial rents at multiple levels: the farm level and the firm level. Producers are able to access Ricardian rents by investing in further processing or marketing activities because, as suppliers, they have extensive ability to improve the quality of inputs or produce according to exact timing, quantity and attribute specifications. Thus, Ricardian rents are generated by the producers' collective ability to influence consumer price through the provision of quality products or to minimize marketing margins through the provision of raw material produced to specification (Sexton and Iskow 1988). Producers seeking entrepreneurial rents contribute upfront risk capital to invest in new resource combinations, uncertain of the value of those new combinations (Alvarez 2007).

Thus, if we are to develop a continuum to explain collective action, we suggest the expected method of rent generation as one of the defining criteria. Traditional cooperation is dominated by the dispersion of monopoly rents. Hybrid forms may begin to shift their focus to Ricardian rent generation; while collective entrepreneurs are primarily focused on the generation of Ricardian and entrepreneurial rents.

Investment in the U.S. biofuels sector is the first step many producers made in shifting from employing traditional cooperatives structures to experimenting with collective entrepreneurial structures. Producers familiar with utilizing Rochdale-Nourse cooperatives for farm supply and grain marketing services saw an opportunity to generate entrepreneurial rents by investing risk capital in biofuel production. They often created new cooperative entities to capture Ricardian or entrepreneurial rents. In these new ventures producers sought to minimize marketing margins, in part by ensuring optimal, low-cost supply of raw inputs to ethanol processing plants. Producers also sought to advance processing technology and explore new by-products uses.

4. Interdependent Nature of Cooperation

Underlying each economic justification for collective action is the proposal that a specific form of interaction among members will create value (Borys and Jemison 1989; Gulati and Singh 1998). To a degree, members are dependent upon one another to accomplish the collective goal. The nature of interdependence, however, depends upon the economic justification for collective action. From a netchain perspective, interdependencies may be categorized as pooled, sequential, or reciprocal in nature (Lazzarini, Chaddad and Cook 2001; Thompson 1967). If we categorize cooperation based on the primary form of interdependence anticipated during formation, traditional cooperatives are generally founded to coordinate pooled interdependencies. By contrast, collective entrepreneurial ventures are primarily designed to coordinate sequential interdependencies.

4.1 Traditional Cooperatives Designed to Coordinate Pooled Interdependencies

In the traditional cooperative, members capture value primarily by combining their resources in a shared pool. This type of cooperation requires lower levels of patronage coordination. For example, in the case of a bargaining cooperative, members extract value by aggregating their farm products to achieve a collective degree of market power. A primary focus of resource pooling does not require sequential ordering of activities. In this example, the bargaining cooperative's primary objective is to extract value by defending the producer's market power. The cooperative accepts all of the member's raw material inputs and does not attempt to control the quantity or supply of product the member markets through the cooperative. Indeed, controlling a larger share of raw materials on the market may increase market power.

Alliances based on pooled interdependencies often exhibit positive network externalities (Lazzarini, Chaddad and Cook 2001). Therefore, a greater number of members joining the alliance may increase benefits to all members. Because the nature of interdependence is associated with increasing returns, traditional cooperation is best served by coordination mechanisms which attract the greatest number of cooperators and minimize entry costs.

4.2 Collective Entrepreneurship Designed to Coordinate Sequential Interdependencies

In the collective entrepreneurial venture, member raw materials are delivered to the cooperative as an input for further processing. This value creation strategy requires serial ordering of activities, associated with sequential interdependence. Cooperators primarily create value through supply chain optimization or niche product marketing. This sequential interdependence benefits from coordinating mechanisms that dictate specifics such as the exact timing, quality attributes, and quantities of member raw input deliveries.

In the collective entrepreneurial model, the cooperative organization plays the role of a central planner to ensure optimal utilization of collective assets. Because this vertically integrated approach depends upon optimizing production and operations to create value at the level of the cooperative as well, a closed membership strategy model specifying delivery requirements and obligations is often used as a coordinating mechanism.

It is by coordinating sequential interdependencies that producers expected to generate Ricardian rents in the biofuels sector. As producers, they have greater control over the supply of corn to ethanol plants. Therefore, when public companies may be driven to bankruptcy by contracting high corn prices, collective entrepreneurial ventures have an enhanced ability to survive due to their control over supply. In addition, as owners of the collective venture, farmers may elect to uphold delivery contracts, minimizing long-term contracting risks. Contracting with public companies has posed a high risk for some grain producers. For example, many corn delivery contracts were voided, rejected or renegotiated when Verasun, at the time one of the largest ethanol companies in the U.S., entered bankruptcy proceedings

(Steil 2008). Because of similar contracting risks, producers find value in the ability to retain greater control of sequential interdependencies. Of course, through vertical integration in the biofuels industry, producers are also electing to bear a greater share of market uncertainty.

5. The Bearing of Uncertainty

Knight (1921) holds that the act of bearing uncertainty is a distinct characteristic of the entrepreneur. Therefore, in attempting to distinguish between the traditional cooperative and emerging instances of collective entrepreneurship, we look to the bearing of uncertainty to identify additional distinguishing criteria and their resulting implications for cooperative design. We find the traditional cooperative is a mechanism used by producers to transfer the bearing of uncertainty primarily to the cooperative level. In contrast, joint bearing of uncertainty is a notable trait of collective entrepreneurship that results in significant changes to equity capitalization and membership requirements (Table 2).

5.1 Mitigating Farm-level Risk vs. Joint Bearing of Uncertainty

When considering a patron-driven cooperative endeavor, we must analyze at least two levels at which rents are generated: the farm and the cooperative. Traditional cooperation seeks to mitigate uncertainty at the level of the farm by transferring uncertainty-bearing to the cooperative, pooling interdependency at the cooperative level. Several traditional functions of the cooperative embody this transfer of uncertainty including the pooling of raw materials for commodity marketing, the use of a cooperative to ensure market access or service provision, and the Noursian ideal of the cooperative as a competitive yardstick. Thus, traditional cooperation is an important mechanism for producers to reduce farm-level exposure to uncertainty (Sexton and Iskow 1988). Valentinov characterizes this function of the traditional cooperative as "offering members a degree of revenue insurance" (Valentinov 2007).

In agreement with the Knight's (1921) assessment of large corporations, producers are able to mitigate the level of uncertainty they experience by pooling these uncertainties within a larger organization, the traditional cooperative (Casson 1982). Therefore, the traditional cooperative, although an efficient mechanism for mitigating uncertainty, would not be considered an entrepreneurial organization in the Knightian sense. Traditional cooperation was primarily designed as a means to mitigate farm-level uncertainty. The cooperative's goal was to minimize costs at the firm-level while supporting a producer's on-farm interests (LeVay 1983).

By contrast, ventures assuming attributes of collective entrepreneurship call upon a producer to bear a greater degree of uncertainty at the farm-level and the firm-level. Producers engaged in collective entrepreneurship often invest significant upfront risk capital in the organization. We explore this investment in the following section. In conjunction with their share purchase, they contract to provide the venture with raw inputs. Due to the contractual obligation of the supplier relationship, the producer now bears a greater share of the farm-level risk, ceteris paribus. While in the traditional cooperative, a producer may choose not to deliver, emerging collective entrepreneurial ventures such as new generation cooperatives and patron-owned limited liability companies often strictly enforce delivery obligations and specifications. Member-investors may incur sanctions for failure to deliver. These sanctions may include fines, the obligation to reimburse the venture for commodities bought on the open market to fulfill delivery obligations, and forfeiture of share investment.

In addition to the increase in farm-level risk borne by producers, producer-investors are exposed to firm-level uncertainty experienced by the new cooperative entity through their risk capital contribution. This assumption of cooperative-level risk acts as a coordinating mechanism to align producer interests with the economic viability of the cooperative entity. Producers essentially agree to bear this uncertainty jointly. Often, on-farm risk may be

amplified due to a closely-related or vertical investment strategy that lowers investment diversification. The advantage of investing in an organization that is dependent upon a producer's raw inputs is often touted as enabling producers to realize dual profits: profits at the farm-level through increased prices paid for raw materials and profits at the firm-level through rents generated in the processing of those inputs. However, if entrepreneurial profits are generated through the bearing of uncertainty as in the Knightian perspective, dual profit potential could manifest as dual jeopardy in times of economic hardship. Among collective entrepreneurial ventures that failed, we observe instances of producers losing not only their initial investment, but also forfeiting payments for their raw material inputs. This organizational structure, while allowing producers profit potential, is dramatically different from the traditional notion of cooperation with respect to its risk bearing attributes.

Joint bearing of uncertainty may afford producers a mechanism to diffuse the level of uncertainty that would have been borne by a single producer-investor in the entrepreneurial venture. In this manner, producers experience pooled interdependency in terms of their risk capital contributions. However, the combination of risk capital contribution and raw material delivery requirement transforms the nature of their interdependence to that of a sequential interdependency. Due to the assumption of production, processing and marketing uncertainty born by individual producers through supply contracts and risk capital investments, collective entrepreneurial cooperative entities deviate from their traditional cooperative counterparts.

5.2 Capital Generation

Traditional cooperatives utilize retained earnings as the primary mechanism for capital generation. This structural trait is a reflection of the transference of risk to the cooperative. Minimal capital contributions are made upfront by producers. The bulk of capital contributions are made in a *passive* or *quasi-passive* manner (Krumpelman-Farmer 2005). The cooperative collects passive capital contributions from members by allocating net income to equity capital on the basis of patronage. Thus, in theory, the member receives market price for raw materials delivered and does not personally take part in transferring their portion of equity capital to the cooperative. Quasi-passive capital contributions refer to member equity capital retained from individual member delivery checks. Capital contributions through delivery check deductions promote a relatively greater awareness of retained funds. In neither instance, passive or quasi-passive equity capital generation, does a member individually determine the specific amount of their capital contribution. These capital contributions are made by the cooperative on behalf of the producer. Low levels of personal control regarding risk capital investment decisions may contribute to low levels of psychological ownership (Pierce, O'Driscoll and Coghlan 2004).

Thus, the traditional cooperative primarily generates equity capital internally through savings or earnings. Contributed capital is often redeemable which serves to lower the financial commitment and, therefore, level of uncertainty borne by the producer. Traditionally, cooperatives were not focused on generating equity capital, or building strong asset bases. Limited equity capital has been a structural consequence for many traditional cooperatives (Chaddad, Cook and Heckelei 2005; Staatz 1987). Their primary function was, again, to support the producer's on-farm production. Therefore, savings earnings and investment were primarily intended to be passed back to the member, not to be utilized to capitalize the cooperative. This structural characteristic leads Cortopassi to refer to equity capital generated from retained earnings as "an accounting misnomer for junior, subordinated revolving debt' (qtd in Staatz, 1987).

Among collective entrepreneurial ventures, members often commit substantial, upfront equity capital. Members individually decide the exact amount of their contribution to equity capital by selecting a number of shares to purchase. Thus, *proactive* risk capital investment is utilized to capitalize the cooperative and provide working capital prior to the commencement

of the cooperative's business activities (Krumpelman-Farmer 2005). This structural characteristic sets collective entrepreneurial organizations apart from traditional cooperatives. In addition to the bearing of uncertainty through initial capital contributions, equity capital shares are often transferrable and appreciable, but not redeemable. Therefore, producer-shareholders are committing permanent equity capital to the cooperative, a characteristic "rarely" seen in the traditional cooperative setting (Staatz 1987). Examples of patron-driven organizations relying on upfront equity capital contributions include Southern Minnesota Beet Sugar Cooperative and the majority of producer-owned ethanol companies formed in United States in the last few decades.

5.3 Membership

Traditionally, cooperatives operate on the basis of open membership. Members are not required to perform specific duties nor are they obligated to deliver certain products. Thus, cooperative members choose when to do business with the cooperative and at what level, depending upon their individual preferences during the production season. In this way, uncertainty with respect to marketing is largely transferred to the cooperative. Pooled interdependence among producers in the traditional cooperative setting renders mechanisms more stringent than voluntary membership unnecessary. In addition, low entry costs associated with membership allow the traditional cooperative to capture the positive network externalities associated with a larger membership pool.

In collective entrepreneurial ventures, membership is often closed. Stringent production requirements or delivery obligations may be present to qualify for membership. These supply control and coordination mechanisms enable the collective entrepreneurial venture to optimize the supply chain. While this constitutes an increase in the complexity of coordination mechanisms when compared to traditional cooperation, mechanisms associated with closed membership are reflective of a governance structure better suited to manage sequential interdependencies. Supply contracts and marketing agreements are examples of member-related coordination mechanisms that may signal the transition of a traditional cooperative to a hybrid structure: as traditional cooperatives restructure to create value from sequential interdependencies, they begin to establish direct coordination mechanisms with producers.

5.4 Patron vs. Investor Focus

Traditional cooperatives primarily focus on cost minimization or returns to members per unit of raw input supplied (LeVay 1983). Thus, the cooperative exists to return benefits of membership to patrons on the basis of their patronage. This is commonly referred to as the user-benefit principle (Dunn 1988). Residual claim and control rights are distributed solely among patrons. In addition, patrons are not required to bear uncertainty individually. The cooperative entity is constructed to pool uncertainties arising from production or marketing of raw material inputs.

By contrast, collective entrepreneurial organizations demonstrate a greater reliance on distributing residual claims to investors contributing risk capital. Investors elect to proactively contribute risk capital without knowing the probability of residual claim outcomes associated with this decision. Although investors may enter into a supply relationship with the organization in proportion to their capital investment, additional raw materials potentially supplied outside the initial marketing contract would not be eligible for a benefits distribution at the same level of compensation as those supplied under the auspices of the marketing contract. Thus, the distribution of benefits is structured to primarily reward investors' capital contributions. This type of cooperation lies in stark contrast to more traditional cooperation organized under Rochdale principles which solely distribute benefits on the basis of patronage (Robotka 1947).

5.5 Cooperative Performance Measures

While multiple measures of cooperative performance are available, patrons of traditional cooperatives often rely on prices paid for raw material inputs to gauge the performance of the cooperative (Jesse 1978; Schrader, et al. 1985). Collective entrepreneurial organizations, however, are able to utilize share price or return on investment shares as an additional measure of cooperative performance. This additional level of performance evaluation may also represent another mechanism for the cooperative to influence a producer's loyalty in addition to raw input pricing and delivery rights.

Fluctuating share prices constitute a distinct deviation from many original cooperative structures. Early American cooperative organizers elected to fix share prices at the value at which they were issued in an attempt to reduce speculation and deter inflation (Conover 1959). No unusual risk was to be assumed by the cooperative. By contrast, fluctuating share prices or measures of return on share price are structural traits of collective entrepreneurial organizations allowing producers to attempt to value the level of entrepreneurial rents generated in the bearing of uncertainty at the level of the cooperative firm.

5.6 Collective Decision making

Traditional cooperative structures are governed under a one-member, one-vote principle. This governance structure enhances the democratic capacity of its producer-members. It is important to note, however, that the defensive cooperative structure may be more susceptible to collective decision making costs because of ill-defined property rights (Cook and Iliopoulos 1999). These costs arise from the misalignment of residual control and residual claimant rights. Therefore, the one-member, one-vote structure may exacerbate collective decision making costs. The resulting free rider, horizon, portfolio, influence, free cash flow, and control problems also act to limit producers' willingness to invest as individuals bearing uncertainty jointly.

As the popularity of new generation cooperatives grew in the early 1990's, one-member, one-vote governance structures continued to dominate these cooperative forms. However, new generation cooperatives often attempted to limit the number of shares any one member could purchase. This was an attempt to reduce heterogeneity of member preferences as producer-investors with substantially different risk capital contributions often exhibited distinct preferences when voting. Newly emerging collective entrepreneurial ventures increasingly adopt weighted voting schemes or voting proportional to investment in order to minimize ill-defined property right problems. Governance structures that distribute voting rights in proportion to capital investments minimize free riding and, therefore, may be a more efficient structure for the joint bearing of uncertainty.

6. Discussion and Conclusions

This paper discusses a dynamic occurring in patron-owned firms, the emergence of an entrepreneurial form of organization which attempts to capture benefits from both patron-oriented and investor-oriented models. We analyze these emerging organizational forms from the perspective of property rights, netchain science and entrepreneurship. We find the unique coordination mechanisms employed by collective entrepreneurial ventures are reflective of anticipated sequential interdependencies inherent in their strategic focus. Producers do not conform to a single model or ideology of collective action. Instead, they have designed alternative coordination mechanisms depending upon the underlying rent generation logic. Varying rent generation strategies create distinct interdependencies among collaborators which shift the optimal arrangements for risk and uncertainty bearing, capital acquisition techniques, residual claim and control rights, collective decision making costs, and performance measures.

While collective entrepreneurial structures present substantial opportunities for producer- and locally-owned organizations, the traditional cooperative simultaneously remains a viable organizational form for pooled interdependencies. We see the traditional patron-owned design maintaining its favor as a single- rent level, defensive form of producer cooperation employed for reducing the negative consequences of market failures. At the same time, producers interested in enhancing the vertical economic options of their agricultural production units will increasingly organize offensive ventures. Thus, we conclude all cooperatives are not created equal. Consideration of the economic purpose and relevant interdependencies of the cooperative is imperative when designing, restructuring or analyzing the cooperative enterprise. Adherence to a single model of cooperative governance may be to the detriment of producers.

Public policy makers may be interested in the economic growth externalities, decision making processes and qualities, democratic practice implications, collective decision making skills and leadership training that evolve from collective entrepreneurship initiatives – all considered to be public goods. Additionally, agricultural producers, rural development specialists, and local government leaders may be interested in understanding the differences between traditional collective action and patron-investor collective entrepreneurship activities. In numerous countries, we witness emerging changes to cooperative law that seek to foster the development of collective entrepreneurial ventures with the structural characteristics described in this piece. Lenders and other input suppliers would be well advised to understand the risks and rewards of patron-owned entrepreneurial ventures. Although often viewed as similar in organizational architecture, the economic and decision making differences between these emerging collective entrepreneurial ventures and traditional forms of collective action are important and merit scholarly exploration. This paper strives to foster further discussion of the variety of coordination mechanisms available to producers to enhance collective action.

Table 1. Comparison of Forms of Cooperation

Coordination Mechanism	Traditional Cooperation	Hybrid Example	Collective Entrepreneurship
Strategy	- Defensive origins, often supplementing primary goals through multiple services	- Defensive origins, evolving as a cooperative to incorporate multiple offensive characteristics including the introduction of non-member business	- Offensive strategy
Economic Justification	- Access rents by dissipating monopoly/ monopsony rents	- Shifted from monopoly rent dissipation to Ricardian rent generation primarily due to competitive pressure	- Founding purpose to generate Ricardian, and entrepreneurial rents, secondary goals could include the generation of temporary monopoly rents
Primary nature of interdependence anticipated at inception	- Pooled Interdependence	- As organization matures, the primary focus may shift from pooled interdependence to sequential interdependence for a designated portion of raw material inputs	- Sequential Interdependence
Expectations Regarding the Bearing of Uncertainty	- Farm-level uncertainty transferred to cooperative firm	- Cooperative develops contractual arrangements and proportional capital mechanisms in an attempt to redistribute the bearing of uncertainty over the life of the cooperative	- Patron-Investors bear a greater proportion of their farm-level risk by assuming contractual delivery obligations. Patron-Investors engaged in joint uncertainty bearing with respect to non-redeemable risk capital contributions.
Primary Source of Equity Capital	- Allocated Earnings (Rochdale-Nourse, Passive), Retains (Sapiro, Quasi-Passive)	- Allocated Earnings, Retains, and Non-member Business	- Upfront Risk Capital Contributions, Allocated Earning, Retains, and Non-member Business.
Membership	- Open membership, voluntary supply	- Open membership subject to minimal business volume membership requirements, incentives developed to reward members for entering into supply contracts	- Membership closed to shareholders, shareholders contract to assume the delivery obligations
Distribution of Residual Claims	- To patrons in proportion to use	- To patron-users subject to minimum volume or equity capital levels. Distribution of fixed dividends to patron-investors may be introduced through preferred equity stock programs.	- To patron-investors, often including contractual arrangements that govern supply. Patron-investors own transferrable, appreciable shares.
Cooperative Performance Measures	- Primary focus is on prices paid per unit of raw inputs or cost per unit of purchased input	- Primary focus on prices paid per unit of raw inputs, with secondary emphasis on equity revolvement period	- Dual focus on (1) share price or return to shares and (2) price paid for raw input materials
Collective Decision Making	- Most organizations rely on one-member, one-vote governance structure	- Weighted equity voting and multi-tiered systems in an attempt to align residual control rights with residual claimants rights	- Increasingly utilizing legal structures that allow for the alignment of residual control rights with residual claimant rights. However, organizations that continue to rely on one-member, one-vote often cap the number of shares that can be owned by each individual in an effort to align investors' interests.

Table 2. Degree of Uncertainty Borne by Cooperative Member

	Low	High
Structure	Traditional Cooperative, Rochdale-Nourse Example	Collective Entrepreneurship, Ethanol Processing Venture Example
Permanent Equity (Risk) Capital Contribution	Membership share ~$100 U$. Average start-up debt financing ~ 90%.	Minimum shares for membership ~$30,000 U$. Average start-up debt financing ~ 40%.
Entry	May join at any time. No penalty for adopting a wait-and-see strategy.	Can only join when shares are available for purchase: member sale or share offering
Delivery Obligation	None	Delivery contracted in proportion to equity capital contribution.
Sanction for Non-delivery	None	May include sanctions such as fines, charges for market purchase of non-delivered goods, or mandatory uncompensated surrender of shares.
Price paid for delivery	Publicly listed price, often known ex ante or based on market rates.	Based on cooperative residual; could be positive or negative. Often only a portion of delivery price is paid

		upfront. Full delivery price may not be known ex ante.
Return on Investment	No dividends or interest paid on initial investment	Could be positive or negative
Ability to Trade Shares	Shares are not tradable. Shares redeemable at the board's discretion.	Shares are tradable at a profit or loss. Often, the board retains discretion over trades to ensure buyer is able to meet delivery obligations.
Capital Call	Membership costs known ex ante; members are not required to make additional cooperative investments beyond membership share.	Membership costs uncertain ex ante; members may be subject to mandatory capital calls or voluntary capital contributions. Capital calls require additional risk capital investments to be made in proportion to equity holdings.

7. References

Alvarez, S. A. 2007. "Entrepreneurial Rents and the Theory of the Firm." *Journal of Business Venturing* 22(3): 427-442.

Borys, B., and D. B. Jemison. 1989. "Hybrid Arrangements as Strategic Alliances: Theoretical Issues in Organizational Combinations." *The Academy of Management Review* 14(2): 234-249.

Burress, M. J., and M. L. Cook. 2009. "A Primer on Collective Entrepreneurship: A Preliminary Taxonomy." Working Paper AEWP 2009-4, University of Missouri, Department of Agricultural Economics.

Casson, M. 1982. *The Entrepreneur: An Economic Theory*. Totowa, NJ: Barnes & Noble Books.

Centner, T. J. 1988. "The Role of Cooperatives in Agriculture: Historic Remnant or Viable Organization?" *Journal of Agricultural Cooperation* 3: 94-106.

Chaddad, F., and M. L. Cook. 2004. "Understanding New Cooperative Models: An Ownership-Control Rights Typology." *Review of Agricultural Economics* 26(3): 348-360.

Chaddad, F. R., M. L. Cook, and T. Heckelei. 2005. "Testing for the Presence of Financial Constraints in US Agricultural Cooperatives: An Investment Behaviour Approach." *Journal of Agricultural Economics* 56(3): 385-397.

Chouinard, O., and É. Forgues. 2002. "Collective Entrepreneurship and Regional Development: Case Study of a New Brunswick Cooperative." *Journal of Rural Cooperation* 30(2): 79-94.

Conover, M. 1959. "The Rochdale Principles in American Co-operative Associations." *The Western Political Quarterly* 12(1): 111-122.

Cook, M., and C. Iliopoulos. 1999. "Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative." *The Finnish Journal of Business Economics*: 525-535.

Cook, M. L., and B. Plunkett. 2006. "Collective Entrepreneurship: An Emerging Phenomenon in Producer-Owned Organizations." *Journal of Agricultural & Applied Economics* 38(2): 421-8.

David, P. A. 1985. "Clio and the Economics of Qwerty." *The American Economic Review* 75(2): 332-337.

Dunn, J. R. 1988. "Basic Cooperative Principles and Their Relationship to Selected Practices." *Journal of Agricultural Cooperation* 3: 83-93.

Emelianoff, I. V. 1942. *Economic Theory of Cooperation: Economic Structure of Cooperative Organizations*. Washington, DC: Reprinted, 1995 by the Center for Cooperatives University of California.

Gulati, R., and H. Singh. 1998. "The Architecture of Cooperation: Managing Coordination Costs and Appropriation Concerns in Strategic Alliances." *Administrative Science Quarterly* 43(4): 781-814.

Hansmann, H. 1996. *The Ownership of Enterprise*. Cambridge: Harvard University Press.

Harris, A., B. Stefanson, and M. Fulton. 1996. "New Generation Cooperatives and Cooperative Theory." *Journal of Cooperatives* 11: 15-29.

Hendrikse, G. W. J., and J. Bijman. 2002. "Ownership Structure in Agrifood Chains: The Marketing Cooperative." *American Journal of Agricultural Economics* 1(84): 104-119.

Jesse, E. V. 1978. "Measuring Market Performance: Quantifying the Non-Quantifiable." Working Paper 15, University of California, Davis.

Johannisson, B. 1998. "Entrepreneurship as a Collective Phenomenon." Paper presented at RENT XII Conference, Lyon, France, November 26-27.

Knight, F. H. 1921. *Risk, Uncertainty, and Profit*. Boston, MA: Hart, Schaffner & Marx; Houghton Mifflin Company.

Krumpelman-Farmer, E. 2005. "The Investment Horizon Issue in User-Owned Organizations." Dissertation, University of Missouri.

Lazzarini, S., F. Chaddad, and M. L. Cook. 2001. "Integrating Supply Chain and Network Analyses: The Study of Netchains." *Journal on Chain & Network Science* 1(1): 7-22.

LeVay, C. 1983. "Agricultural Co-operative Theory: A Review." *Journal of Agricultural Economics* 34(1): 1-44.

Merrett, C. D., and N. Walzer. 2001. *A Cooperative Approach to Local Economic Development*. Westport, CT: Quorum Books.

Mourdoukoutas, P. 1999. *Collective Entrepreneurship in a Globalizing Economy*. Westport, CT: Quorum Books.

Nilsson, J. 1999. "Co-operative Organisational Models as Reflections of the Business Environments." *Liiketaloudellinen Aikakauskirja: The Finnish Journal of Business Economics* 4: 449-470.

Nourse, E. G. 1942. "The Place of the Cooperative in Our National Economy." In *American Cooperation, 1942-1945*. Washington DC: American Institute of Cooperation, pp. 33-39.

Page, S. 2006. "Path Dependence." *Quarterly Journal of Political Science* 1(1): 87-115.

Pierce, J. L., M. P. O'Driscoll, and A.-M. Coghlan. 2004. "Work Environment Structure and Psychological Ownership: The Mediating Effects of Control." *The Journal of Social Psychology* 144(5): 507 - 534.

Robotka, F. 1947. "A Theory of Cooperation." *Journal of Farm Economics* 29(1): 94-114.

Schrader, L. F., et al. 1985. *Cooperative and Proprietary Agribusinesses: Comparison of Performance*. West Lafeyette, Indiana: Purdue University, Agr. Exp. Sta. Res. Bull. No. 982 April.

Sexton, R., and J. Iskow. 1988. *Factors Critical to the Success or Failure of Emerging Agricultural Cooperatives*. Department of Agricultural and Resource Economics, University of California, Davis, Giannini Foundation Information Series No. 88-3, June.

Silva, M. R., and H. Rodrigues. 2005. "Public Private Partnerships and the Promotion of Collective Entrepreneurship." Working Paper, University of Porto Economic Department, Working Paper no. 172.

Staatz, J. M. 1987. *The Structural Characteristics of Farmer Cooperatives and Their Behavioral Consequences*. U.S. Department of Agriculture, Agricultural Cooperative Service, Cooperative Theory: New Approaches, Service Report 18, July.

Steil, M. 2008. Verasun Bankruptcy Hitting Minnesota Farmers in the Wallet. St. Paul, MN, All Things Considered. National Public Radio. November 21.

Tardieu, L. 2003. *Knowledge and the Maintenance of Entrepreneurial Capability*. Research Document. Center for Economic Analysis, Université d'Aix-Marseille.

Thompson, J. D. 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. New York: McGraw-Hill.

Valentinov, V. 2007. "Why Are Cooperatives Important in Agriculture? An Organizational Economics Perspective." *Journal of Institutional Economics* 3: 55-69

Williamson, O. E. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.

COLLECTIVE ACTION IN THE ARGENTINA AGRIBUSINESS SECTOR: A CONTRAST WITH BRAZIL

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Abstract
Este trabajo gira en torno a la pregunta: ¿cómo está organizado colectivamente el sector de agroalimentos en la Argentina? Si se considera que un modo de organización colectiva puede ser la acción de representación por medio de entidades de clase entonces, para definir la noción de representación, se tomó como marco teórico a la perspectiva no formal descriptiva (o sociológica). Para esta corriente de pensamiento, la representación demanda un "reflejo" o una "semejanza" entre el cuerpo representativo y la sociedad representada. De modo que se indaga quiénes son las entidades representativas del sector y, siguiendo la perspectiva teórica de cadenas de agroalimentos, se identifica quiénes son los principales actores empresariales de las mayores cadenas productivas del país, es decir los representados. Se pone en evidencia que las transformaciones que tuvo el sector en las últimas décadas pusieron en el escenario a actores con una identidad organizacional muy diferente a la de las entidades que supuestamente los representan, quienes mantuvieron, en general, sus rasgos fundacionales. Asimismo en este trabajo se describe brevemente la organización del sector en Brasil y, con este contraste como fondo, se presenta una propuesta para la reflexión.

Key words: ACCIÓN COLECTIVA – REPRESENTATIVIDAD POLÍTICA – AGRONEGOCIOS

COLLECTIVE ACTION IN THE ARGENTINA AGRIBUSINESS SECTOR: A CONTRAST WITH BRAZIL

1. Introducción

La cuestión central de la VIII Conferencia Internacional en Agronegocios gira en torno a la pregunta cómo balancear la economía con el medioambiente y la sociedad y, cualquiera que sea la propuesta para contribuir con esta temática, estará relacionada directamente con la acción social colectiva.

En el balance *economía – medioambiente – sociedad*, el primer término, es decir la economía, tiende a inclinar la balanza a su favor. Es interesante observar cómo con los avances tecnológicos en las últimas décadas, en la medida que se acortaron las distancias y el mundo se hiper comunica, las personas paradójicamente se alejan, perdiendo capacidad de acción colectiva y ganando en individualismo. Este individualismo se traslada también a las organizaciones empresariales cuya única lógica parece ser la del mercado. López Rey incluye también en esta lógica a algunas organizaciones no gubernamentales para el desarrollo, (ONGD) que, en principio, tendrían que tener comportamientos altruistas y valores opuestos al utilitarismo económico[145].

Al mundo de los agronegocios, en particular, en el que los precios de los *commodities* es una variable importante para la definición de las estrategias, también se le agrega la complejidad de las decisiones globales entre las matrices *proteicas – energéticas*, en la que también impera la racionalidad económica.

Las teorías en organización en vigor coinciden en otorgar un rol fundamental a sus directivos o gobernantes, no solamente en lo que refiere a la definición de las estrategias corporativas, así como también sobre su comportamiento ético que contribuya al incremento del capital social. Sisón relaciona el liderazgo con el capital moral y sostiene que: "no hay capital humano, intelectual o social suficiente que sea capaz de suplir la carencia de capital moral de los empleados para el éxito a largo plazo de una empresa"[146]. Del mismo modo Debeljuh coloca a la ética empresarial en "el núcleo de la estrategia corporativa"[147].

Volviendo al ámbito empresarial de los agronegocios, visto desde la perspectiva de las cadenas agroalimentarias, y en función de sus peculiaridades, se puede sostener que diseñar una estrategia exitosa que le otorgue competitividad y sostenibilidad a la organización a largo plazo es una tarea que excede a la individualidad del directivo o del órgano de gobierno de la organización. Es necesaria la construcción y el mantenimiento de la cohesión de vínculos asociativos entre organizaciones en un accionar colectivo.

De modo que este trabajo se focaliza en la cuestión de la acción colectiva y parte de la pregunta: ¿cómo está organizado colectivamente el sector empresarial agroalimentario argentino? Un modo de organización colectiva es la representación por medio de entidades o asociaciones de clase. En estos casos la identificación, (sea ésta por rasgos de identidad o por intereses), entre representantes y representados es un indicador que se tomó para el análisis. Otro modo de aproximarse a una respuesta a la pregunta planteada es realizando un análisis por contraste, es decir, comparando la acción colectiva del sector empresarial agroalimentario argentino con otro; en este caso se comparó con Brasil.

La sección siguiente se destina a abordar la noción de representación y a describir los principales actores del sector empresarial agroalimentario argentino y las entidades gremiales que los representan. Luego, en la sección siguiente, se describe el caso brasilero. Finalmente

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[145] López Rey, José, *Solidaridad y Mercado,* Coruña, Netbiblo, 2001.

[146] Sisón, Alejo, *Liderazgo y capital moral*, Madrid, Mac-Graw Hill, 2004.

[147] Debeljuh, Patricia, *Ética Empresarial,* Buenos Aires, Cengage, 2009.

se concluye que existe una escasa identificación entre los principales actores del sector y las entidades que los representan y se presenta una propuesta para reflexionar.

2. El sector agroalimentario argentino y la representatividad

En el marco global mundial de los agronegocios puede sostenerse que, en los últimos 20 años, se produjeron una serie de cambios tecnológicos y bio-tecnológicos que afectaron el modelo de producción ocasionando, consecuentemente, cambios en las formas de organización empresarial y en la articulación de lo público y lo privado.

Algunos autores sostienen que para que exista desarrollo económico en una sociedad en su conjunto –o en un sector que impulse su economía– deben preexistir instituciones sólidas y confiables[148]. Si se pretenden reformar las grandes instituciones de un país, como por ejemplo el gobierno o la justicia, debe comenzarse la labor desde la primera institución, que es la familia, y luego continuar con las pequeñas instituciones, como las organizaciones sociales, en particular las organizaciones empresariales.

De manera que cuando se abordan temas en el ámbito empresarial no se puede desconectar la teoría de la práctica. El "modelo" del empresario "socialmente responsable" debe estar acompañado por la práctica de su accionar, sus hábitos, y no puede eludir su participación en las instituciones en las que está inmerso[149].

Es común, en la literatura sobre administración de negocios, encontrar discursos en los que se hace referencia a la necesidad de políticas de gobierno favorables para el desarrollo de la actividad económica, reglas de juego claras y otros requisitos para el eficaz desempeño de las organizaciones empresariales[150], como si se tratara de un petitorio a terceros que nada tienen que ver –sólo les corresponde gobernar, legislar o impartir justicia– con sus organizaciones.

El slogan "no nos metemos en política", que muchos empresarios e instituciones que agrupan empresarios esgrimen con un cierto orgullo, ha producido una crisis o, para algunos autores, una metamorfosis del concepto de la representación[151].

2.1 La noción de representación

El concepto de representación, restringido al ámbito político, tiene orígenes antiguos pero fue ampliamente desarrollado en la modernidad, como idea base del sistema político. Uno de los eminentes teóricos de la Revolución Francesa fue Emmanuel Joseph Sieyès. Las

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- [148] La corriente de pensamiento denominada Nueva Economía Institucional considera las transacciones como unidades de análisis en los sistemas económicos. Douglas North, por su parte, plantea las instituciones como un marco en el que se desarrollan las transacciones y analiza comparativamente el ambiente institucional y la vigencia de los derechos de propiedad en varios procesos de desarrollo económico. Encuentra una correlación entre el nivel de seguridad jurídica y los costos de transacción. Si los derechos de propiedad son débiles los costos de transacción aumentan y, consecuentemente, se retrasa el crecimiento del sistema económico. Véase North, Douglas, *Estructura y cambio en la historia económica*, Madrid, Alianza, 1994.
- [149] Llano, Carlos y Polo, Leonardo, *Antropología de la acción directiva,* Madrid, Unión Editorial, 1997.

[150] En países como la Argentina, en los que existe una cierta inestabilidad de las políticas públicas, es común encontrar críticas en el medio académico reclamando seguridad jurídica y políticas fiscales estables para lograr la competitividad en el medio empresario. Véase Alvarado Lesdesma, Manuel, *La Argentina Agrícola. Un país que niega su destino,* Buenos Aires, Temas, 2003.

[151] Véase Manin, Bernard, "Metamorfosis de la representación", en: Dos Santos, Mario, *¿Qué queda de la representación política?*, Caracas, CLACSO, 1992.

ideas de Sieyès, en el sentido de la creación de un gobierno representativo (no necesariamente democrático), coinciden con los autores del *Federalist* en el marco de la Revolución estadounidense, al encontrar en el sistema representativo una solución técnica para gobernar los Estados modernos, numerosos y diversos [152].

Hanna Pitkin, en su libro *El concepto de representación,* recorre la evolución histórica de las diferentes posiciones teóricas con respecto a su significado. Así, menciona dos grandes perspectivas contrarias entre sí: 1) la de la responsabilidad y 2) la de la autorización; Pitkin considera a ambas como perspectivas formalistas de la representación, porque se focalizan en la formalidad de la relación entre representante y representado [153].

La primera considera que el representante es alguien responsable que habrá de responder por sus actos, es decir, deberá rendir cuentas ante sus representados. La segunda perspectiva considera que el representante es libre de actuar y se constituye en representado porque ha sido autorizado para ello.

Pitkin considera que ambas perspectivas, si bien fundamentadas, son incompletas porque el criterio para definir la representación se restringe a lo que "hace" el representante (antes o después del acto de representar) y no a lo que "es" representar. Siguiendo el análisis de Pitkin, otras perspectivas teóricas no formales son la de la representación simbólica, según la cual el representante "suple" o "encarna" aquello que representa, y la de la representación descriptiva (o sociológica). Para esta última corriente teórica, la representación demanda un "reflejo" o una "semejanza" entre el cuerpo representativo y la sociedad representada. Para ser representativo, el representante debe ser como sus electores en algunos aspectos y, en otros, diferente; preferentemente "mejor" para poder representarlos de manera adecuada.

El fenómeno de la representatividad es un fenómeno complejo en el que pueden intervenir varias dimensiones, como la identificación organizacional, la comunicación y la dimensión psicosocial en la que se configuran los imaginarios colectivos, entre otras [154]. En este trabajo, al tener como propósito indagar sobre cómo se organiza colectivamente el sector empresarial agroalimentario argentino, se sigue la corriente de pensamiento sociológica. El análisis de los lazos de representatividad que se construyen en las principales organizaciones empresariales que conforman las distintas cadenas agroalimentarias, se concentró en los aspectos de identidad e identificación organizacional [155].

En este sentido de la identificación entre organizaciones, cabe señalar que el modelo agro-ganadero del siglo XIX –motor del desarrollo económico del país en ese momento– cambió y esta transformación fue algo más que cuantitativa; en la realidad se produjo un salto cualitativo que, en la última década del siglo XX transformó la fisonomía del sector. Esta cuestión será motivo de análisis en la sección siguiente.

2.2 Los principales actores

Los cambios en la organización de la producción que se iniciaron en la década de 1980 y se consolidaron en la década 1990 le otorgaron una nueva fisonomía al sector. Entre otros aspectos se verifica la expansión de las fronteras hacia tierras marginales, el aumento de la escala de las explotaciones, la disminución del peso relativo del factor tierra y la diferenciación del dueño de la tierra y del productor.

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[152] Véase Prelot, Marcel, *Historia de las ideas políticas,* Buenos Aires, La Ley, 1971.

[153] Pitkin, Hanna F., *El concepto de representación*, Madrid, Centro de Estudios Constitucionales, 1985.

[154] Algunas investigaciones en el ámbito organizacional se apoyan en teorías derivadas de la Psicología Social, como la Teoría de las Representaciones Sociales, que establece relaciones de interacción e interdependencia entre la estructura social, la cultura y los aspectos mentales.

[155] Ashforth, Blake E. y Mael, Fred, "Social Identity Theory and the Organization", *Academy of Management Review,* Vol. 14, 1989, 20-39.

Desde una perspectiva meramente instrumental, estos cambios podrían considerarse como tendientes a un modelo de explotación económica que maximice la *performance*. Sin embargo, una mirada más amplia indica que las innovaciones en el uso de la tecnología (fitosanitarios, fertilizantes y sistema de siembra directa sin labranza del suelo, entre otras), alcanzaron también aspectos de integración social más allá de la vinculación económica.

Las relaciones entre los integrantes del sector se vuelven más complejas. En algunos casos los capitales invertidos en la actividad provienen de otros sectores, como en el caso de los *pools* de siembra que administran fondos de inversión.

Los cambios en el sistema productivo, en el modelo actual de los agronegocios, hacen que el sector se asimile a una compleja red conformada por diferentes cadenas productivas. El concepto de cadenas de agronegocios fue definido por Davis y Goldberg como la suma total de operaciones involucradas en la manufactura y en la distribución de la producción agrícola, las operaciones de producción en el campo, el almacenaje, el procesamiento y la distribución de los *commodities* agrícolas y sus manufacturas derivadas[156].

En otras palabras, se sigue un *commodity* hasta el final y el seguimiento de la cadena se efectúa en forma vertical[157]. Con esta metodología y sobre la base de los datos que provee la Secretaría de Agricultura, Ganadería, Pesca y Alimentos, se identificaron en la Argentina las cinco mayores cadenas productivas, (en función de su producción en toneladas) que son: la **soja,** el **maíz,** el **trigo,** la **carne vacuna** y la **leche.**

De acuerdo con la noción sociológica de representación que sostiene que la identificación entre representado y representante es necesaria, a los efectos de verificar el grado de cohesión de los vínculos asociativos entre los principales actores del sector y las entidades que supuestamente los representan, previamente es necesario indagar, ¿quiénes son esos actores? En otras palabras identificar quiénes son las empresas que, al menos desde el aspecto económico, son los actores más relevantes del sector. Para ello en primer lugar se buscó en las estadísticas oficiales los cinco mayores productos producidos en el país, en términos de volúmenes, en los últimos años. Luego se identificaron las principales empresas, en términos de participación en el mercado, que actúan en cada uno de los eslabones que componen las cinco mayores cadenas productivas. En el **Cuadro 1** se exponen los hallazgos; en letra normal las empresas de capital argentino y en letra negrita las de capital extranjero.

En la cadena agrícola se puede observar que las principales empresas **productoras de insumos** y las empresas **exportadoras** son compañías que actúan en todo el mundo y tienen mayoría de capital extranjero. En el eslabón de los **proveedores de maquinarias** agrícolas las grandes compañías multinacionales no siempre son competitivas con sus productos en el mercado local. Las pequeñas y medianas empresas nacionales ofrecen productos fabricados con una tecnología más sencilla, que se adaptan a las exigencias del medio agrícola argentino, son más fáciles de operar y reparar, y se comercializan a precios más competitivos. Las cinco empresas **productoras primarias** más relevantes, y con mayoría de capital argentino, actúan también en los países vecinos, Uruguay, Paraguay y Brasil; cuatro de ellas buscaron socios en los fondos de capitales extranjeros para poder financiar su crecimiento y expansión. Los **clientes internos** de los tres principales productos agrícolas que se producen en la Argentina

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- [156] Davis, John y Goldberg, Ray, *A Concept in Agribusiness,* Cambridge, Harvard Business School, 1957.

[157] El sistema de agronegocios coasiano fue iniciado por Decio Zjlberstajn, director del PENSA, en 1996, quien unió la definición de agronegocios de Davis y Goldberg a los principios de la Nueva Economía Institucional. En la Argentina, en el ámbito de la Facultad de Agronomía de la Universidad de Buenos Aires, se sigue esta corriente de pensamiento y, en 1998 se fundó el Programa de Agronegocios y Alimentos, con el objetivo de generar capacidades en la materia, formando líderes que contribuyan a consolidar la competitividad de los alimentos argentines. Héctor Ordóñez, uno de los principales ideólogos del Programa,

están constituidos por las compañías aceiteras, cuya producción final, en su mayoría, se destina a la exportación, (como es el caso del aceite de soja) y las harineras, que en el caso del trigo, en su mayoría se destina al consumo interno.

Si bien se agruparon las empresas por la relevancia de su actuación en los diferentes eslabones, cabe señalar que muchas de ellas actúan simultáneamente en diferentes eslabones de la misma cadena productiva, así como también participan en otras cadenas.

En la pecuaria los **productores de insumos,** en general, son las mismas compañías –tanto en la cadena de carne bovina como en la de leche y sus derivados– para el caso del aprovisionamiento de productos veterinarios, el alimento balanceado y el forraje, con excepción de las cabañas, que se especializan por razas.

En el eslabón de los **proveedores de maquinarias** para el manejo del ganado bovino y lechero en los establecimientos, en general, actúan las mismas empresas que también aprovisionan al sector agrícola. Otra coincidencia en estas cadenas es la de los **clientes internos,** que en ambos casos están representados por las grandes cadenas de hipermercados.

En el eslabón de los **productores primarios** dos empresas, que ya despuntaban con su presencia en la cadena agrícola, nuevamente aparecen como importantes jugadores en ambas cadenas pecuarias; son Adecoagro y Cresud.

El eslabón que más se diferencia en la cadena pecuaria entre el sector de carne bovina y el lácteo y sus derivados es el de las empresas que **industrializan,** y que además son las que actúan en el mercado externo. Observando el **Cuadro 1** se puede verificar que en la cadena de la carne bovina los principales actores son empresas de capital extranjero: brasilero y estadounidense. La empresa brasilera JBS-Friboi tiene la mayor capacidad de faena del mundo: 47.000 cabezas por día aproximadamente. En la cadena láctea una gran parte de las empresas que industrializan tienen mayoría de capital nacional. Las dos mayores empresas nacionales, la cooperativa SanCor y Mastellone Hermanos, ante la caída de los precios internacionales de la leche en polvo colocan el 85% de su producción en el mercado interno.

En resumen, la descripción actual de la composición del sector –desde la perspectiva de cadenas agroalimentarias– como metodología de análisis, permite no solo evidenciar quiénes son los principales actores en cada uno de los eslabones de las principales cadenas productivas sino también mostrar sus interacciones y algunos rasgos de su identidad.

En la teoría de las organizaciones el concepto de "identidad organizacional" tiene varias definiciones. En general los autores coinciden en que los rasgos de identidad están contenidos en el concepto de cultura organizacional, y las corrientes que se apoyan en marcos teóricos oriundos del psicoanálisis consideran la identidad "como la base inconsciente de la cultura organizacional"[158].

Los rasgos de identidad organizacional son indicadores para determinar el nivel de identificación que puede darse entre diferentes organizaciones. En el caso de las principales organizaciones que constituyen el eslabón de los **productores primarios** se verifica una actuación de la mayoría de las empresas en una gran cantidad de las principales cadenas productivas, de modo que los principales actores se reducen a una decena de organizaciones empresariales.

Este cambiante entramado organizacional que le dio una nueva fisonomía al sector en el siglo XXI parece contrastar con la estática de las entidades representativas que, como se verá en la sección siguiente, mantuvieron sus principales rasgos de identidad fundacionales, permitiendo la apertura de una brecha en términos de identificación entre representantes y representados.

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[158] Diamond, Michael A., *The Unconscious Life of Organizations: Interpreting Organizational Identity,* Westport, Quorum, 1993.

CUADRO 1. PRINCIPALES ACTORES EN EL SECTOR AGROALIMENTARIO ARGENTINO

PRODUCTOR PRIMARIO	PROVEEDOR DE INSUMOS	PROVEEDOR DE MAQUINARIAS	CLIENTE EXTERNO (Exportador)	CLIENTE INTERNO		
				SOJA	**MAÍZ**	**TRIGO**
Monsanto (estadounidense) **Bayer (alemán)** **Nidera (holandés)** **AgroEvo (alemán)** **DuPont (estadounidense)** **Syngenta (suizo)** **Avanta (holandés)**	**Adecoagro** Cresud MSU Grupo La Redención Sofro Grupo Los Grobo El Tejar	Agrometal Marani Agrinar Vassalli Metalfort Bertini Pla **Otras maquinarias importadas**	**ADM (estadounidense)** **Noble (asiático)** **Nidera (holandés)** **Dreyfus (francés)** **Cargill (estadounidense)** Bunge	**Cargill** **Nidera** AGD-DEHESA Vicentin Bunge Molinos Río de la Plata	**Productos de Maíz (estadounidense)** Arcor Ledesma Glucon-L	**Cargill** Navilli Lagomarsino José Minetti Morixe Hermanos
Adecoagro (Cabaña Pilagá) Cabaña Don Panos **Productos veterinarios (diversos laboratorios multinacionales)** Alimento balanceado y forraje (diversos productores) Criadores de terneros (diversos productores) ProAgro (especialidades veterinarias)	**Adecoagro** Cresud Prinex Don Panos	Agrometal Crucianelli TracZa Zanello Metalfort Pauny	**JBS Friboi (brasilero)** **Marfrig (brasilero)** **Tyson Food (estadounidense)** **Finexcor - Cargill (estadounidense)** Prinex Mattievich	**Carrefour (francés)** **Disco-Ahold (holandés)** **Jumbo (chileno y alemán)** **Wall-Mart (estadounidense)** Coto	**CADENA PECUARIA** **CARNE BOVINA**	
Alta Genetics (canadiense) CIALE Biogénesis – Bagó Ídem carne	**Adecoagro** Cresud La Sibila Williner Producción pulverizada	**Delaval Bosio (sueco)** **Westfalia Surge** Industrias Rodeg Máximo Bauducco Tellmak Ordeñadoras	Sancor Mastellone Hnos. **Molfino Hnos. (canadiense)** Milkaut (participación chilena) **Nestlé (suizo)**	**Carrefour (francés)** **Disco-Ahold (holandés)** **Jumbo (chileno y alemán)** **Wall-Mart (estadounidense)** Coto	**CADENA PECUARIA** **LECHE Y DERIVADOS**	

2.3 Las entidades representativas

Las cuatro entidades que componen la llamada "Comisión de Enlace" o "Mesa de Enlace" se constituyen como las organizaciones que representan gremialmente al sector agropecuario argentino en su conjunto. Las organizaciones que la componen, ordenadas de acuerdo con el año de su fundación, son: la Sociedad Rural Argentina (SRA), la Federación Agraria Argentina (FAA), la Confederación Rural Argentina (CRA) y la Confederación Intercooperativa Agropecuaria (CONINAGRO).

La mesa de enlace tiene sus antecedentes en la década de 1970, cuando las cuatro entidades en conjunto se propusieron realizar jornadas sobre el tema "El agro y el desarrollo nacional", que tuvieron lugar el 26 y 27 de octubre de 1970 en la ciudad de Rosario, y el 17 de noviembre en Buenos Aires. En esa ocasión se dio a conocer un documento en el cual los presidentes de las cuatro entidades se proponían integrar una "Comisión de Enlace" con la presidencia ejercida por cada uno de ellos en forma rotativa y manteniendo la individualidad institucional de cada entidad.

Se fijó, entonces, el 1 de enero de 1971 para iniciar sus actividades, hecho que por diversas divergencias no ocurrió y recién en marzo de 2008, cuando el Poder Ejecutivo anunció la intención de aumentar las retenciones a las exportaciones por medio de la Resolución nº 125, la Comisión de Enlace se puso en funcionamiento para defender los intereses del sector en el diálogo con el gobierno.

En un análisis conjunto de la historia del sector agropecuario y el surgimiento de sus entidades representativas, es posible verificar la coincidencia de circunstancias adversas en el momento de la fundación de la mayoría de ellas. En algunos casos el nacimiento de la entidad se produjo como resultado de un proceso de escisión que contempla simultáneamente la carencia de representatividad de algunos actores y la presencia de luchas por su supervivencia para no quedar al margen de la actividad productiva.

En el caso de la Sociedad Rural Argentina (SRA), la primera entidad que se fundó en 1866, confluyeron como acontecimientos adversos: la guerra con Paraguay, la guerra civil, las sequías en el norte de la provincia de Buenos Aires y las inundaciones en el sur. Frente a estas circunstancias, los productores rurales se agruparon, para, entre otros objetivos, "velar por los intereses generales de la campaña".

El caso de la Federación Agraria Argentina (FAA), fundada en 1912, es consecuencia del enfrentamiento y la lucha contra los arrendadores de campos. El movimiento que le dio origen congregó a pequeños arrendatarios pobres, chacareros y algunos extranjeros; todos asesorados por personas militantes del sindicato de estibadores y anarquistas que tenían una tradición de lucha social.

La crisis ganadera de 1923 puso de manifiesto la divergencia de intereses entre los criadores y los invernadores, ambos asociados a la SRA. La falta de representatividad de una parte de los productores ganaderos que, ante la crisis internacional de 1930, no encontraron en la SRA espacio ni propuestas para superar las repercusiones que tuvo la crisis en sus actividades, aceleró la conformación de la Confederación de Asociaciones Rurales de Buenos Aires y La Pampa (**CARBAP)**, antecesora de la Confederación Rural Agropecuaria **(CRA)**.

El movimiento cooperativo que actualmente agrupa **CONINAGRO** tiene sus antecedentes en la Federación Entrerriana de Cooperativas (FEDECO), que se constituyó en 1919.

Todas las entidades que componen la Comisión de Enlace tienen una acción gremial y, en particular, la SRA mantiene una Dirección de Acción Gremial y una Dirección de

Acción Política, a diferencia de las llamadas "entidades ausentes"[159], que tienen voz pero no tienen voto porque no actúan en el ámbito político de la representación gremial.

Estas entidades ausentes en la representación gremial pueden agruparse como comunidades de interés o práctica. Se considera que las **comunidades de interés**[160]agrupan personas que comparten los mismos intereses y valores y que se encuentran en un espacio para debatir, intercambiar experiencias, conocimientos e inquietudes. Las **comunidades de práctica**[161] agrupan personas que tienen el dominio de una misma práctica y que se reúnen para interactuar y aprender cómo mejorar esa práctica.

La demanda de conocimientos que se evidenció al finalizar la década de 1950 fue el principal motivador para la fundación de los grupos CREA, de modo que se puede sostener que los grupos **CREA** (1957) y posteriormente la Asociación Argentina de Consorcios Regionales de Experimentación Agrícola (**AACREA)** en 1960, son comunidades de interés y de práctica.

La Asociación Argentina de Productores en Siembra Directa (**AAPRESID**) también puede ser considerada como una organización técnica integrada por una red de productores agropecuarios que adoptaron e impulsan la difusión de un nuevo paradigma agrícola: la siembra directa. Otras entidades presentes y relevantes en el sector son las agrupadas por cadena de valor, como la Asociación Maíz y Sorgo Argentino (**MAIZAR**) y la Asociación de la Cadena Soja de la Argentina (**ACSOJA).** La primera intenta generar valor en toda la cadena para generar un crecimiento general del cultivo; en otras palabras, su objetivo consiste en aumentar el área sembrada en el país, por la promoción de industrias de transformación del maíz en proteína animal. La segunda entidad tiene como misión mejorar la competitividad de todos los sectores involucrados en el cultivo de la soja, también por el incentivo del área de investigación y desarrollo en la producción y comercialización de subproductos de alta calidad.

El Instituto de Promoción de Carne Vacuna Argentina (**IPCVA**) es un organismo no estatal que funciona con fondos privados, obtenidos de los productores y la industria vinculada; fue creado por fuerza de la Ley 25507, promulgada el 11 de diciembre de 2001. Su principal compromiso es el de incrementar la competitividad de la cadena cárnica en su conjunto, si bien esta función está restringida por la política de "saldos exportables".

3. El caso de Brasil

Entretanto, en el mundo la demanda de alimentos continúa, así como las posibilidades de inserción de aquellos países que, como la Argentina, cuentan con alguna ventaja comparativa en lo que refiere a la riqueza y/o extensión de su suelo. En la nueva

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[159] Se consideran "entidades ausentes" a aquellas que tienen presencia en el sector agropecuario argentino pero que no integran la "Mesa de Enlace".

[160] Los autores que investigan en el área de la Psicología Social o la Psicología Comunitaria, entre otros, por ejemplo, Maritza Montero, entiende el concepto "comunidad" como un grupo social dinámico que, con sus frecuentes interacciones, genera un sentido de pertenencia e identidad social. Véase Montero, Maritza, *Teoría y práctica de la psicología comunitaria. La tensión entre comunidad y sociedad*, Paidós, Buenos Aires, 2003.

[161] Para Etienne Wenger, en el estudio de los procesos de aprendizaje, la unidad de análisis no debe ser el individuo sino las comunidades de práctica. Véase Wenger, Etienne, *Comunidades de práctica: aprendizaje, significado, identidad,* Buenos Aires, Paidós, 2001.

configuración mundial de los agronegocios no existe más espacio para las miradas restringidas al ámbito nacional.

La Argentina, junto con Brasil, se constituyen como los mayores productores de alimentos de Latinoamérica, de modo que la estrategia productiva de la Argentina no puede estar escindida de la de Brasil. Es por este motivo que en este trabajo se describe brevemente cuál es el camino por el que optó Brasil en términos de políticas públicas para el sector agropecuario y de organización para articular los mecanismos de representación empresarial.

La elaboración de políticas públicas para el desarrollo del sector agropecuario se remonta a la década de 1960, con la llamada "reforma agraria". Las principales medidas incluidas en la reforma tendían a: mejorar la productividad agrícola, establecer el libre comercio entre los países latinoamericanos, promover la modernización de la infraestructura de comunicaciones, entre otras reformas.

Desde 1974, Brasil se enfocó a la instrumentación de la estrategia de desarrollo para el sector agropecuario conocida como la "Modernización desde arriba y desde fuera", que se mantuvo vigente hasta el año 2000 con un pleno enfoque hacia el libre comercio, De esta forma, Brasil comenzó casi una década antes que el resto de los países de Latinoamérica una estrategia que promovía la especialización en el cultivo a gran escala de productos como la soja, el café, los cítricos y el azúcar, y la producción de cárnicos, entre otros.

Durante la década de 1980 se interrumpió la línea de crédito rural subvencionado, que fue relevante en la década anterior, como parte de los programas de ajuste estructural contraídos con organismos financieros internacionales. En la primera mitad de la década de 1990 esto dio lugar a las políticas de promoción de exportaciones, por medio de incentivos fiscales, y de competitividad internacional, a través de la libre flotación del tipo de cambio.

A partir de 1995 y hasta la salida de Fernando Henrique Cardoso de la presidencia, en 2002, la política agrícola brasileña se enfocó hacia la reestructuración agroindustrial, incluyendo el financiamiento de la industria agrícola y la definición de una política de fijación de cuotas para la exportación, así como políticas de sustitución de energía, que utilizaron fondos especiales para la inversión en la producción de alcohol y estímulo a los consumidores.

Con la llegada de Luis Ignacio da Silva a la presidencia de Brasil, en 2002, y luego de su sucesora Dilma Rousseff en el 2011 el compromiso económico y social se propone hacer converger la realidad económica de la globalización con una estrategia eficaz de combate a la pobreza, que incluye medidas como: una política de crédito y seguro agrícola, dar prioridad a la producción doméstica y local, junto con la propuesta de crear un mecanismo de compensación como renta ecológica por la preservación de suelos, entre otras medidas.

A diferencia de la Argentina, el sector agropecuario de Brasil evidencia una participación activa en el gobierno y una representación en la legislatura. Dentro del Congreso actúan sus propios representantes los cuales ejercen sus funciones a través del Frente Parlamentario de Apoyo al Agro y la Ganadería, más conocido como "Bancada Ruralista". En el Poder Ejecutivo cuenta con dos ministerios: el Ministerio de Agricultura, Ganadería y Abastecimiento y el Ministerio de Desarrollo Rural.

El Ministerio de Agricultura, Ganadería y Abastecimiento tiene como objetivo primordial promover e incentivar el desarrollo sustentable, y el aumento de la producción y de la competitividad de los agronegocios. Su política para lograrlo consiste en integrar los aspectos metodológicos, tecnológicos, científicos y ambientales.

La estructura de este Ministerio está integrada por las áreas de la Política Agropecuaria; Producción y Fomento Agropecuario; Comercialización y Abastecimiento Agropecuario; Defensa Sanitaria; Fiscalización de los Insumos Agropecuarios; Clasificación e Inspección de Productos de Origen Animal y Vegetal; Investigación Tecnológica y Agrometeorológica; Cooperativismo y Asociativismo Rural; Electrificación Rural y Asistencia y Extensión Rural.

El Ministerio de Desarrollo Rural, con la misión de promover el desarrollo sustentable del sector rural constituido por los agricultores familiares, se divide en dos secretarías: la Secretaría de Agricultura Familiar, que crea programas de apoyo a los agricultores familiares y por otro lado, la Secretaría de Desarrollo Territorial, que centra sus actividades en el desarrollo integral de las regiones donde predominan las familias agricultoras.

Otra empresa gubernamental, creada en la década de 1970, es la Empresa Nacional de Investigaciones Agropecuarias (EMBRAPA). Su área de actuación está orientada a la búsqueda de soluciones tecnológicas que aumenten la competitividad de los agronegocios y, al mismo tiempo, a disminuir los desequilibrios sociales para tornar posible la inserción del pequeño productor en el proceso de desarrollo económico y social.

En la última década se promulgaron más de 50 leyes específicas para el agro y la cadena agropecuaria, como por ejemplo: la Ley de Subsidio al Seguro Rural (aprobada en el año 2005), el Seguro Agrario, la Ley de Defensa Agropecuaria, la Ley de Política Agrícola y diversas leyes para regulación del crédito agrario y para la protección sanitaria.

De acuerdo con la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA)[162], Brasil tiene en vigencia diez programas generales –como el de Precios Mínimos, el de Adquisición del Gobierno Federal (AGF) y el de Préstamo del Gobierno Federal (PGF)– y siete específicos. Entre los programas específicos se encuentran el Programa de Fortalecimiento de la Agricultura Familiar (PRONAF) y Programa Nacional de Alimentación Escolar (PNAE).

¿Qué evidencia el caso brasilero? En primer lugar cabe destacar las diferencias histórico-culturales entre Brasil y Argentina que hacen que los lazos asociativos se construyan (y mantengan) de un modo diferente. Más allá de las diferencias culturales existen algunas cuestiones que se podrían tener en cuenta en el caso argentino.

Una cuestión se refiere al rol que el gobierno le adjudica al sector agropecuario. Como se vio en el caso brasilero, a lo largo de su historia se consideró al sector como estratégico, ya sea por el hecho de asegurar el aprovisionamiento de alimentos, como también en la producción de energía combustible, como fue el programa PróAlcool (Programa Brasileiro de Álcool), creado el 14 de noviembre de 1975 y, más recientemente, la promoción del Biodiésel, por medio del Programa Nacional de Produção e uso do Biodiésel.

Este rol preponderante del sector se refleja, entre otros factores, en la existencia de dos Ministerios, cuando en la Argentina hasta octubre del año 2009, existía solamente una Secretaría de Agricultura, Ganadería Pesca y Alimentos que dependía del Ministerio de

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[162] *La competitividad del sector agropecuario brasileño.* Buenos Aires: *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA),* septiembre de 2003 [ref. 06 de septiembre de 2008]. Disnible en Internet: <http://www.infoaserca.gob.mx/fichas/ficha17-CompetBrasil.PDF>.

Economía[163]. La representación del empresariado en una única entidad gremial creada hace más de un lustro, la ya mencionada CNA, también facilitó el mantenimiento de los vínculos asociativos. Esta entidad, a diferencia de sus pares argentinos, no está diseñada en función de la inserción social, actividad o tipo de organización a la que pertenecen sus afiliados. Ella agrupa a todos los productores, independientemente del producto que produzcan, de si son grandes o pequeños productores y de si están asociados a cooperativas o no.

Sumado a esta situación que facilita la representación, la existencia de una bancada ruralista en el Poder Legislativo le otorga una fuerza política al sector que le permite, entre otras cosas, hacer aprobar medidas que favorecen al sector, como por ejemplo, políticas crediticias.

4. Conclusiones y una propuesta para reflexionar

Como se mencionó en la Introducción, este trabajo está focalizado en torno a la cuestión de cómo está organizado colectivamente el sector empresarial agroalimentario argentino. Para ello se identificaron sus principales actores en términos económicos, las entidades que los representan y se presentó brevemente, para un análisis por contraste, el caso de Brasil. ¿Cuáles fueron los principales hallazgos?

En primer lugar se verificó que las empresas, y sus directivos, en los últimos años parecieron preocuparse más por los intereses económicos que por los sociales y políticos. Aprovechando una situación favorable, en lo que refiere a la demanda y a los precios de los *commodities* en el mundo, se produjeron una serie de fusiones, adquisiciones y otras formas de asociaciones entre empresas con el objetivo de maximizar la *performance* económica. Se mostraron, al menos en los últimos 25 años, más como un grupo de interés y de presión que como un actor social y político.

El sector, en las últimas décadas, creció en competencia y productividad. Expandió su frontera agrícola, erradicó la fiebre aftosa, aumentó la producción lechera y continúa redoblando la apuesta de inversión en el paquete tecnológico que se expandió en la década de 1990 y que cambió su fisonomía. Quedó en evidencia que se produjo un cambio de paradigmas en el sector, pasando de un modelo antiguo basado en la producción en el que se podía hacer una clara distinción entre el agricultor, el ganadero dedicado a la cría, o al engorde y terminación de los animales, a un nuevo modelo agro-pecuario-industrial con complejas actividades e interacciones.

Existen cinco cadenas que son las más representativas en términos de los volúmenes producidos en el país, que son: la soja, el maíz, el trigo, la carne y la leche. Los nuevos actores en las cinco mayores cadenas productivas del país están más concentrados e intervienen en la mayoría de los eslabones, tendiendo a la verticalización de las actividades y, simultáneamente, actúan en diferentes cadenas productivas.

Los rasgos de identidad de las principales organizaciones que actúan en los diferentes eslabones son diversos. Así, por ejemplo, en las cadenas agrícolas, en el eslabón de los proveedores de insumos agropecuarios y en el de los exportadores de granos predominan las empresas transnacionales. En la cadena pecuaria del ganado bovino, los mayores frigoríficos exportadores, son empresas familiares de capital brasilero. Los

[163] El gobierno anunció la creación del Ministerio de Agricultura, Ganadería y Pesca el 01 de octubre de 2009.

productores primarios, en cambio, con excepción de una gran empresa constituida por fondos de inversión externos, en su mayoría son empresas familiares argentinas.

Así como en el aspecto económico el empresariado argentino del sector se mostró eficaz, no logró una presencia significativa en el ámbito político. La mayoría de las empresas identificadas como los principales actores en el eslabón de los productores primarios, reconocen que sus principales vínculos asociativos con entidades de clase los mantienen con aquellas que les aportan conocimientos tecnológicos que pueden transformarse en beneficios productivos, como por ejemplo AACREA, MAIZAR y ACSOJA, entre otras.

¿A qué se le puede atribuir esta indiferencia asociativa en relación con las entidades gremiales que supuestamente las representan? Entre otras razones a la baja identificación que existe entre ellas. Las cuatro entidades que componen la llamada Comisión de Enlace y que se constituyen como entidades representativas del sector mantuvieron, en general, su identidad fundacional y no se adecuaron a los grandes cambios en la fisonomía del sector.

Otro factor identificado como impedimento para la acción colectiva es la falta de una entidad gremial que represente al sector de un modo integrado y congruente con su actual fisonomía. No existe en la Argentina una entidad como la Confereração Nacional de Agricultura e Pecuária do Brasil (CNA). En la Argentina los gobiernos, en las últimas décadas dialogan con personas, no con una única entidad representativa.

Las entidades que componen la Comisión o Mesa de Enlace continúan manteniendo rasgos de su cultura fundacional representando, consecuentemente, a diferentes sub-sectores dentro del gran sector de los agroalimentos. En consecuencia, la visión sobre el futuro deseado para el país en general y para el sector en particular, está condicionada por los intereses de los asociados que representan, y por lo tanto no siempre es coincidente.

Asimismo, aun si se encontrara una coincidencia sobre el "modelo de país" al que se aspira y se clarificara la visión de los propósitos a cumplir en el futuro del sector, el *qué queremos ser para hacer*, sería necesario superar otra cuestión. Es necesario subordinar la economía o *performance* a la política para elaborar la misión que el sector agropecuario se adjudica; en otras palabras: definir el *cómo y con quién* hacer.

Este razonamiento se puede ejemplificar utilizando una metáfora como figura del lenguaje. Suponiendo que queremos *ser un medio de transporte* para sacar al país del retraso en que lo coloca la pobreza y la exclusión social, debemos luego decidir qué tipo de medio queremos ser, por ejemplo, un *avión* o un *tractor*. La elección del medio definirá el tipo de combustible adecuado, ya que colocarle aero-nafta a un tractor no hará que funcione más rápido. En este caso el combustible está representado por los recursos de los que disponemos y la riqueza que con ellos pretendemos generar en un período de tiempo determinado.

Es en esta decisión en la que se abre un inmenso abanico de posibilidades para definir un "modelo de país" y es aquí donde se requiere coherencia entre el vehículo y el combustible, así como también prudencia en la definición de los plazos para alcanzar los objetivos propuestos. Entonces, el *qué queremos ser* estaría representado por el medio de transporte, el *para hacer* que sería sacar al país del atajo, y el *cómo y con quién* equivaldría al vehículo y al combustible.

El sector agroalimentario argentino, en general, se puede considerar como un adecuado vehículo colectivo para transportar al país a un nuevo lugar de destaque en el escenario de las relaciones internacionales, y el combustible fundamental lo constituyen las organizaciones empresarias que lo integran. Es aquí donde la figura del directivo-

empresario adquiere relevancia en la tarea de construir vínculos asociativos que aumenten el capital social. Es en este paso en el que se pone a prueba empíricamente la "responsabilidad social empresaria".

Como se mencionó en párrafos anteriores hay innúmeras posibilidades de definición de "modelo de país" pero, como enseña la historia, es necesario elegir una para darle sentido al rumbo que se sigue. Por supuesto, no es el sector agroalimentario argentino el único vehículo en un programa que contemple el desarrollo económico y social del país y además, si se lo considerara, existen varios sub-sectores o cadenas agrolimentarias que podrían actuar como el combustible que potencie el cambio.

Sin embargo, si se propusiera al sector agroalimentario, es a los directivos de las organizaciones que lo integran a quienes les cabe la responsabilidad de asumir el rol de agentes del cambio. En este sentido no pueden eludir su responsabilidad de participar e intervenir activamente en la vida social. Caso contrario, sin una actitud proactiva como ciudadanos, probablemente quedarán a la deriva de las decisiones que tomen los grupos de poder, que contemplan únicamente sus propios intereses.

De modo que se propone reflexionar sobre la posibilidad de formar algo similar a un *Think Tank* operativo. El tipo de organización que se propone es una asociación no gubernamental sin fines de lucro, que se podría denominar **COAALIAR**, un vocablo que evoca una imagen de alianza, o cooperación y que está conformado por las primeras letras de las palabras: **Comunidad Agro Alimentaria Argentina.** Sus socios o asociados serían los directivos de algunas de las cinco principales empresas que actúan en cada uno de los eslabones de las cinco principales cadenas productivas del país. La cantidad total de participantes debería ser un número impar, para evitar empates en los momentos de votación, y que no superasen las 35 personas por cuestiones de agilidad operativa.

La construcción de esta organización para la acción colectiva tendría que pasar por, al menos dos etapas. Primero una etapa previa al funcionamiento de la organización. En esta fase es necesario profundizar en el conocimiento que se tiene de las empresas identificadas como posibles asociados de la organización, para seleccionar las empresas que resulten más adecuadas para emprender la tarea propuesta. En este sentido es necesario contactar con las empresas, promover reuniones preliminares explicativas sobre la propuesta de conformación de una entidad para la acción colectiva del sector. El objetivo de esta etapa es construir lazos más profundos, que encuentre rasgos comunes y coincidencia en valores que conforme a la nueva organización como una verdadera comunidad empresaria.

Luego se propone una etapa de elaboración del plan de acción. En esta etapa se propone establecer el diálogo en el seno de COAALIAR, con el objetivo de diseñar un plan de largo plazo para el sector. Las entidades que componen la Mesa de Enlace, a fines de 2008, coincidieron en la necesidad de extender la unidad del campo a otros eslabones de la cadena agroindustrial, con el objetivo de aumentar su participación en el ámbito político y ésta sería una oportunidad de hacerlo.

En un sector tan complejo y heterogéneo como es el agropecuario argentino, no es sencillo conseguir el consenso al respecto del propósito futuro común. Es en esta cuestión donde se pondrán a prueba la responsabilidad social de los empresarios que integren COAALIAR y sus capacidades personales, en el sentido de renunciar a algunos intereses particulares en función del bien común. Por tratarse de una tarea compleja, es posible que

sea aconsejable, en esta etapa, la presencia de una entidad que actúe como "facilitadora"[164], para encontrar el camino que lleve a la construcción de una verdadera comunidad y no simplemente a una conciliación de intereses puntuales y momentáneos.

Es necesario algún ejercicio de reflexión previa, asistido por los "facilitadores", en el sentido de lograr elaborar un plan de acción, básico, simple, pero que contemple políticas de largo plazo. Es importante considerar que cada fase de esta etapa debe contar con un plazo cierto para su inicio y fin. La prioridad no es elaborar el "mejor" plan para el sector, sino elaborar un plan "posible" y, en este sentido, la oportunidad de su presentación es fundamental.

Una vez consensuada la visión sobre el futuro del sector agropecuario que se espera concretar y el plan de acciones que resulta como consecuencia, es necesario divulgar estas cuestiones. En esta fase se torna nuevamente necesaria la contratación de una organización especializada en comunicación y marketing institucional. El propósito del sector y su plan de acción futura debe presentarse de un modo muy claro y transparente ante la sociedad en su conjunto.

Es bastante probable que surjan innúmeras oposiciones a la propuesta que tenga el sector y, ciertamente, todas ellas resultarán constructivas en el sentido de tenerlas en cuenta. Pero también es cierto que existe un momento para la deliberación y otro para la acción. Continuar discutiendo al respecto de lo que se decidió luego de profundos análisis y reflexiones no aportaría grandes contribuciones para la sociedad en su conjunto.

En resumen, esta propuesta es un camino posible para coordinar la acción colectiva del sector empresarial agroalimentario argentino para contribuir con el aumento del capital social. Es curioso como este término "capital social" que es tan utilizado en la bibliografía organizacional en el siglo XXI, tiene casi cien años de existencia. Como recuerda el sociólogo Putnam, su creador fue Lyda Judson Hanifan, un educador y reformador social del partido progresista en Virginia Occidental quien utilizó la expresión "capital social" para referirse a: "esos elementos tangibles [que] cuentan sumamente en la vida diaria de las personas, a saber, la buena voluntad, la camaradería, la comprensión y el trato social entre individuos y familias, características constitutivas de la unidad social"[i], (Putnam, 2003).

Casi 100 años después podemos concluir que en el sector agroalimentario argentino un poco de los "ingredientes tangibles" que componen el capital social nos vendría muy bien, no sólo para mejorar la competitividad estratégica de las organizaciones, sino también para sentirnos más satisfechos como personas en la comunidad en la que participamos.

5. Referencias

[1] López Rey, José, *Solidaridad y Mercado,* Coruña, Netbiblo, 2001.
[1] Sisón, Alejo, *Liderazgo y capital moral*, Madrid, Mac-Graw Hill, 2004.
[1] Debeljuh, Patricia, *Ética Empresarial,* Buenos Aires, Cengage, 2009.
[1] La corriente de pensamiento denominada Nueva Economía Institucional considera las transacciones como unidades de análisis en los sistemas económicos. Douglas North, por su parte, plantea las instituciones como un marco en el que se desarrollan las transacciones y analiza

[164] Se entiende por "facilitador" a aquella persona o grupo de personas que, en función del objetivo del grupo y de la tarea que los convoca, observan e intervienen intentando modificar algo que entorpezca el trabajo del grupo, como podría ser un conflicto. La Psicología Social y el Socio Psicodrama, entre otras disciplinas, proveen herramientas teóricas para realizar este tipo de trabajos grupales.

comparativamente el ambiente institucional y la vigencia de los derechos de propiedad en varios procesos de desarrollo económico. Encuentra una correlación entre el nivel de seguridad jurídica y los costos de transacción. Si los derechos de propiedad son débiles los costos de transacción aumentan y, consecuentemente, se retrasa el crecimiento del sistema económico. Véase North, Douglas, *Estructura y cambio en la historia económica*, Madrid, Alianza, 1994.

[1] Llano, Carlos y Polo, Leonardo, *Antropología de la acción directiva,* Madrid, Unión Editorial, 1997.

[1] En países como la Argentina, en los que existe una cierta inestabilidad de las políticas públicas, es común encontrar críticas en el medio académico reclamando seguridad jurídica y políticas fiscales estables para lograr la competitividad en el medio empresario. Véase Alvarado Lesdesma, Manuel, *La Argentina Agrícola. Un país que niega su destino,* Buenos Aires, Temas, 2003.

[1] Véase Manin, Bernard, "Metamorfosis de la representación", en: Dos Santos, Mario, *¿Qué queda de la representación política?*, Caracas, CLACSO, 1992.

[1] Véase Prelot, Marcel, *Historia de las ideas políticas,* Buenos Aires, La Ley, 1971.

[1] Pitkin, Hanna F., *El concepto de representación*, Madrid, Centro de Estudios Constitucionales, 1985.

[1] Algunas investigaciones en el ámbito organizacional se apoyan en teorías derivadas de la Psicología Social, como la Teoría de las Representaciones Sociales, que establece relaciones de interacción e interdependencia entre la estructura social, la cultura y los aspectos mentales.

[1] Ashforth, Blake E. y Mael, Fred, "Social Identity Theory and the Organization", *Academy of Management Review,* Vol. 14, 1989, 20-39.

[1] Davis, John y Goldberg, Ray, *A Concept in Agribusiness,* Cambridge, Harvard Business School, 1957.

[1] El sistema de agronegocios coasiano fue iniciado por Decio Zjlberstajn, director del PENSA, en 1996, quien unió la definición de agronegocios de Davis y Goldberg a los principios de la Nueva Economía Institucional. En la Argentina, en el ámbito de la Facultad de Agronomía de la Universidad de Buenos Aires, se sigue esta corriente de pensamiento y, en 1998 se fundó el Programa de Agronegocios y Alimentos, con el objetivo de generar capacidades en la materia, formando líderes que contribuyan a consolidar la competitividad de los alimentos argentines. Héctor Ordóñez, uno de los principales ideólogos del Programa,

[1] Diamond, Michael A., *The Unconscious Life of Organizations: Interpreting Organizational Identity,* Westport, Quorum, 1993.

[1] Se consideran "entidades ausentes" a aquellas que tienen presencia en el sector agropecuario argentino pero que no integran la "Mesa de Enlace".

[1] Los autores que investigan en el área de la Psicología Social o la Psicología Comunitaria, entre otros, por ejemplo, Maritza Montero, entiende el concepto "comunidad" como un grupo social dinámico que, con sus frecuentes interacciones, genera un sentido de pertenencia e identidad social. Véase Montero, Maritza, *Teoría y práctica de la psicología comunitaria. La tensión entre comunidad y sociedad*, Paidós, Buenos Aires, 2003.

[1] Para Etienne Wenger, en el estudio de los procesos de aprendizaje, la unidad de análisis no debe ser el individuo sino las comunidades de práctica. Véase Wenger, Etienne, *Comunidades de práctica: aprendizaje, significado, identidad,* Buenos Aires, Paidós, 2001.

[1] *La competitividad del sector agropecuario brasileño*. Buenos Aires: *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA),* septiembre de 2003 [ref. 06 de septiembre de 2008]. Disponible en Internet: <http://www.infoaserca.gob.mx/fichas/ficha17-CompetBrasil.PDF>.

[1] El gobierno anunció la creación del Ministerio de Agricultura, Ganadería y Pesca el 01 de octubre de 2009.

[1] Se entiende por "facilitador" a aquella persona o grupo de personas que, en función del objetivo del grupo y de la tarea que los convoca, observan e intervienen intentando modificar algo que entorpezca el trabajo del grupo, como podría ser un conflicto. La Psicología Social y el Socio

Psicodrama, entre otras disciplinas, proveen herramientas teóricas para realizar este tipo de trabajos grupales.

[1] Putnam, Robert (ed.), *El declive del capital social,* Galaxia Gutemberg, Barcelona, 2003.

AVALIAÇÃO DE DESEMPENHO DAS PRINCIPAIS COOPERATIVAS DE CRÉDITO DO ESTADO DO PARANA BASEADA EM CRIAÇÃO DE VALOR ECONÔMICO: UM ESTUDO MULTICASO

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Abstract
Uma vez que as cooperativas de crédito apresentam-se como importante fonte de financiamento para os pequenos e médios agricultores do agronegócio paranaense e que boa parte dos relatórios que avaliam seu desempenho econômico são realizados a partir da utilização de índices baseados em dados contábeis, que não exigem uma rentabilidade mínima para o capital investido, houve interesse em verificar se estas cooperativas conseguiram criar ou destruir valor econômico aos seus associados no período compreendido entre os anos de 2005 e 2009. Aproveitaram-se os dados disponibilizados pelo BACEN - Banco Central do Brasil e pela OCEPAR – Organização das Cooperativas do Estado do Paraná para, após uma padronização dos demonstrativos, aplicar-se a metodologia do EVA – Economic Value Added. Os resultados obtidos revelam que a expressiva maioria das cooperativas de crédito da amostra pesquisada destruiu valor econômico dos associados no período analisado.

Key words: Cooperativismo; Cooperativismo de crédito; Valor econômico Adicionado. Análise de desempenho.

AVALIAÇÃO DE DESEMPENHO DAS PRINCIPAIS COOPERATIVAS DE CRÉDITO DO ESTADO DO PARANA BASEADA EM CRIAÇÃO DE VALOR ECONÔMICO: UM ESTUDO MULTICASO

1. Introdução

Cooperativas são organizações constituídas de pessoas, com objetivos comuns, sociais ou econômicos, que desempenham atividades em benefício de todos os seus cooperados tendo como objetivo principal não somente a busca pelo lucro mas também melhorar a qualidade de vida de seus cooperados, promovendo–os socialmente e, também, trabalhando de forma integrada com projetos socioambientais – voltados à educação, à prática de desenvolvimento sustentável por meio de recuperação de mata ciliar, tratamento de fluentes, coleta seletiva de lixo, reflorestamento etc.

O maior problema gerencial deste tipo de organização é a falta de equilíbrio entre o fator social e o econômico pelo fato de serem formadas, em sua maioria, por familiares, amigos e parentes com ações focalizadas nas atividades sociais. O equilíbrio destes assegura que todos os associados tenham direitos e deveres uma vez que em qualquer ramo do cooperativismo, o cooperado é ao mesmo tempo dono, usuário e fornecedor da cooperativa.

Segundo dados da OCEPAR, os investimentos com indicadores sociais das cooperativas paranaenses somam 3,21 bilhões de reais e representam 12,8% da receita bruta do ano de 2009 – percentual relacionado a todos os tipos de cooperativas independente do ramo de atuação. Atualmente, o cooperativismo agropecuário paranaense conta com 82 cooperativas difusoras de tecnologia, crédito rural e política desenvolvimentista; o cooperativismo de saúde conta com 33 cooperativas que atuam no atendimento médico hospitalar, odontológico, anestesiologista etc.; o cooperativismo de infraestrutura é composto por 8 cooperativas que fornecem serviços de energia elétrica às propriedades rurais de forma conjunta e solidária; as cooperativas educacionais somam um total de 15 cooperativas e são formadas por pais de alunos, professores e alunos que buscam uma forma de solucionar suas necessidades educacionais; as cooperativas de transporte contam com 21 cooperativas de transporte de carga e de pessoas como alternativa de valorização profissional e melhor remuneração dos profissionais; as cooperativas de turismo e lazer somam 3 cooperativas e contribuem na geração de empregos relacionados ao turismo; as cooperativas de crédito totalizam 63 cooperativas e prestam serviços financeiros aos associados, tais como, concessão de crédito para plantações ou outros fins, captação de depósitos à vista ou a prazo, cheques, prestação de serviços de cobranças, de custódia, de recebimentos e pagamentos além de outras operações específicas e atribuições estabelecidas na legislação em vigor – estas cooperativas se relacionam direta ou indiretamente com as outras cooperativas.

A literatura disponível sobre gestão de cooperativas de crédito foi insuficiente para responder à questão aqui proposta porque os trabalhos se restringem aos aspectos econômicos (custos, finanças e contabilidade) e as avaliações e análises se utilizam de índices, normalmente, baseados em dados contábeis, sem exigência alguma de rentabilidade sobre o capital. Portanto, este trabalho tem como objetivo avaliar, por meio de dados concretos, se as cooperativas de crédito paranaense criaram ou destruíram valor econômico para seus associados. Para atingir este objetivo, analisaram-se os dados

disponíveis para fazer a avaliação de desempenho das cooperativas pela utilização da metodologia do EVA – *Economic Value Added*.

2. Fundamentação Teórica

2.1 Cooperativismo de crédito no Brasil

Segundo Pinheiro (2006), cooperativa de crédito é uma sociedade de pessoas, constituída para prestar serviços financeiros aos associados (concessão de crédito, captação de depósitos à vista e a prazo, cheques, prestação de serviços de cobranças, de custódia, de recebimentos e pagamentos além de outras operações específicas e atribuições estabelecidas na legislação a vigor), cujo regime jurídico foi instituído pela Lei nº 5.764, de 16 de dezembro de 1971.

A OCB (2007) define cooperativa de crédito como uma associação autônoma de pessoas que se unem, voluntariamente, para satisfazer aspirações e necessidades econômicas, sociais e culturais comuns, por meio de uma empresa de propriedade coletiva e democraticamente gerida.

A primeira cooperativa de crédito brasileira foi constituída em 28 de dezembro de 1902, dois anos após a criação da primeira Cooperativa de Crédito das Américas, por Alphonse Desjardins, na localidade da Linha Imperial, município de Nova Petrópolis (RS), sendo denominada de Caixa de Economia e Empréstimos Amstad, que, posteriormente, foi batizada de Caixa Rural de Nova Petrópolis.

O Decreto nº 1.637, de 05 de Janeiro de 1907, foi a primeira norma disciplinadora do funcionamento das sociedades cooperativas: sociedade anônima, sociedade em nomes coletivos ou em comanditas, regidas pelas leis específicas. O decreto permitia que as cooperativas recebessem dinheiro a juros não só dos sócios, como de pessoas estranhas à sociedade (art. 25, § 3º).

Entre os anos 1902 a 1964, surgiram 66 cooperativas de crédito do tipo *Raiffeisen* no Rio Grande do Sul. A primeira cooperativa de crédito do tipo *Luzzatti*, surgiu no dia 1º de março de 1906 no município de Lajeado (RS), denominada de Caixa Econômica de Empréstimos de Lajeado, ainda em atividade com nome atualizado para Cooperativa de Crédito de Lajeado (PINHEIRO, 2006).

A primeira cooperativa de crédito da região sul foi fundada em Porto Alegre, em 19 de setembro de 1912, do tipo mista com seção de crédito – União das Cooperativas Riograndenses de Responsabilidade Ltda. – suas filiais eram cooperativas agrícolas.

Na década de 20 foi constituída, na cidade do Rio de Janeiro, uma Federação de Cooperativas de Crédito, organizadora de três congressos cooperativistas nesta mesma cidade nos anos de 1923, 1924 e 1925.

Em 8 de setembro de 1925, em Porto Alegre (RS), foi constituída, pela reunião de 18 cooperativas, a Central das Caixas Rurais da União Popular do Estado do Rio Grande do Sul, Sociedade Cooperativa de Responsabilidade Ltda. – a primeira cooperativa central unicamente de crédito, do Brasil, que congregava cooperativas do tipo *Raiffeisen* nos estados do Rio Grande do Sul e de Santa Catarina. No dia 19 de agosto de 1967, a assembléia geral deliberou sua transformação em cooperativa singular – Cooperativa de Crédito Sul Riograndense Ltda., do tipo *Luzzatti*, ainda em funcionamento. Nessa época, possuía 55 filiadas (BANRICOP).

Quanto à legislação, a Lei nº 4.984, de 31 de dezembro de 1925, atribuiu ao Ministério da Agricultura a incumbência da fiscalização, sem ônus algum do cumprimento

das prescrições do Decreto nº 1.637. O Decreto nº 17.339, de 2 de junho de 1926, aprovou o regulamento destinado a reger a fiscalização gratuita da organização e o funcionamento dos caixas rurais *Raiffeisen* e bancos *Luzzatti*. O Serviço de Inspeção e Fomento Agrícolas, órgão do Ministério da Agricultura, Indústria e Comércio, ficou responsável por fiscalizar as cooperativas de crédito (PINHEIRO, 2006). Após o Decreto nº 22.239 surgiram outros tipos de cooperativas de crédito:

a) cooperativas de crédito agrícola;
b) cooperativas de crédito mútuo;
c) cooperativas populares de crédito urbano; e
d) cooperativas de crédito profissionais, de classe ou de empresa.

As cooperativas de crédito agrícola são originadas do sistema *Raiffeisen*, como caixas rurais e se destinam a propagação de crédito entre os produtores rurais. A Portaria de 1.098, de 11 de dezembro de 1961, passou a exigir que as cooperativas de crédito agrícolas e as agrícolas mistas com seção de crédito, somente associassem agricultores e criadores, além de obrigatoriamente destinarem às operações de crédito agrícolas ou para aplicação de atividades agrícolas pelo menos 70% dos seus empréstimos.

As cooperativas de crédito mútuo se originaram do sistema Desjardins, que exige vínculo entre os associados. Pelo estatuto só podem ser associados pessoas de determinada profissão, classe ou corporação. A primeira cooperativa brasileira de crédito mútuo foi a Cooperativa de Crédito dos Funcionários da Matriz do Banrisul Ltda., constituída em 02 de março de 1946, ainda ativa sob a denominação de Cooperativa de Crédito Mútuo dos Empregados do Banrisul Ltda.

As cooperativas populares de crédito eram cooperativas tipicamente urbanas e necessitavam de autorização do governo para funcionar, diferentemente dos bancos populares tipo *Luzzatti*, por terem livre admissão de associados e por não adotarem todas as características previstas no Decreto 22.239 (SILVA).

As cooperativas de crédito profissionais, de classe ou de empresa, diferenciam–se das de crédito mútuo por não exigirem vínculo entre os associados, mas simples afinidade. As cooperativas de crédito profissionais ao contrário das cooperativas de crédito mútuo necessitam de autorização do governo para funcionar (CONFEDERAÇÃO NACIONAL DO COMÉRCIO).

Com o advento da Lei nº 4.595, de 31 de dezembro de 1964, as cooperativas de crédito se equipararam às demais instituições financeiras e passaram a receber fiscalização do Banco Central do Brasil.

2.2 Diferenças entre cooperativas de crédito e bancos

Existem algumas semelhanças jurídicas, econômicas e de constituição entre as cooperativas de crédito e os bancos. Uma delas é que ambas as instituições são autorizadas e fiscalizadas pelo Banco Central e possuem produtos e serviços em comum (FRAINER; SOUZA, 2007). Ao contrário das cooperativas de crédito o principal objetivo dos bancos é a geração de lucro, sendo este enviado pelas agências até suas matrizes, normalmente localizadas em áreas urbanas distantes de suas filiais. Assim, enquanto os bancos industrializam o crédito, as cooperativas socializam o crédito. Com a socialização do crédito as cooperativas promovem o corpo social e criam a possibilidade de expansão sem geração de lucro, pois a sociedade de pessoas que compõem a cooperativa não têm objetivos próprios de lucro, mas sim de desenvolvimento coletivo. “As cooperativas de crédito reaplicam a poupança dos associados na própria região, contribuindo para estimular

seu desenvolvimento e, ao mesmo tempo, corrigir desequilíbrios regionais" (PINHO, 2004, p. 128).

A comparação entre bancos e cooperativas de crédito pode ser evidenciada por Meinen (2002, apud FRAINER; SOUZA, 2007), cujo quadro apresenta-se a seguir.

Quadro Comparativo entre Bancos e Cooperativas de Crédito	
Bancos	**Cooperativas**
Sociedade de capital.	Sociedade de pessoas.
Poder de acordo com o número de ações.	Poder independente do capital investido.
Administrador ligado ao mercado financeiro.	Administrador associado ou cooperado.
Os usuários são clientes e não interferem na definição do preço do produto ou serviço prestado, havendo distinção de tratamento entre estes.	Os usuários são os donos, que, juntamente com os demais cooperados, decidem a política operacional com direitos e deveres comuns a todos.
Preferem grandes investidores e poupadores com foco na captação de correntistas e/ou parceiros nos grandes centros financeiros – finalidade mercantilista beneficiária aos banqueiros.	Se voltam aos pequenos poupadores e têm forte atuação nas pequenas cidades. Quando há lucro ele é partilhado entre todos e retorna em forma de sobras.
Não há limite de preço para suas cestas de produtos	Operações e serviços prestados com finalidade de cobrir custos (taxas administrativas).
Atendimento em massa e investimentos altos em automação para auto atendimento.	Atendimento personalizado e tecnologia utilizada como ferramenta para agilizar os procedimentos.
Sem vínculo com a comunidade porque suas ações estão voltadas para a competitividade e lucro.	Compromisso com a comunidade de seus cooperativos e cooperados.
O dinheiro se concentra nas mãos dos banqueiros.	O excedente (sobras) é distribuído entre todos de acordo com as operações realizadas individualmente.
Os rendimentos tanto públicos como privados são pautados em taxas de juros e cobrança de tarifas elevadas, além de serviços agregados adquiridos, forçadamente, pelos correntistas destas instituições.	O associado se subscreve e integraliza o capital numa conta chamada Conta de Capital para depois abrir uma conta corrente. A conta capital é movimentada somente nos casos de alteração nas quotas de capital subscritas, quando há exclusão, demissão ou eliminação do quadro societário da cooperativa ou na distribuição das sobras líquidas do exercício. Pela conta corrente o cooperativo registra a movimentação financeira diária na cooperativa.
Encerramento da conta concedido por pedido formal e retirada de todo o dinheiro.	Desligamento em qualquer tempo com formalização do pedido. Além da retirada dos valores da conta corrente o associado tem de volta o capital integralizado – após Assembléia Geral Ordinária de prestação de contas do exercício.

Quadro 01: Comparativo entre Bancos e Cooperativas de Crédito.
Fonte: Adaptado pelos autores.

2.3 Valor Econômico Adicionado – *Economic Value Added* (EVA)

De acordo com Santos e Stefano (2002), em uma economia de mercado, as decisões sobre investimentos e como a empresa irá financiá–los determinam o risco financeiro e o lucro do negócio, sendo o mais importante: se há criação de valor aos acionistas. A capacidade de sobrevivência da cooperativa no seu ambiente está diretamente ligada à criação de valor econômico.

Para Assaf Net (1999, apud GIMENES), o valor econômico, ou lucro residual, é criado ao acionista quando as receitas de vendas cobrem todos os gastos incorridos,

inclusive o custo de oportunidade do capital próprio investido no negócio. Tal custo é dado como o retorno da melhor alternativa de investimento disponível no mercado, abandonada em troca pelo investimento dos recursos na empresa, em um mesmo nível de risco. Portanto, mesmo tendo lucro contábil, uma companhia pode destruir valor, basta não conseguir cobrir o custo mínimo de oportunidade do capital investido.

Quando há autofinanciamento a destruição de valor não é tão evidente, o que exige controles financeiros mais complexos para sua apuração. Isto acontece porque o custo de oportunidade do capital próprio não é um desembolso monetário efetivo, ou seja, seu valor não sai do caixa da empresa e por isso não fica registrado como despesa no demonstrativo de resultado. Assim, os resultados não são afetados por estratégias que podem estar destruindo valor. Um caminho alternativo de gerenciamento seria o *Economic Value Added* (*EVA)* visando o lucro residual, pelo fato desta ferramenta de desempenho estar mais correlacionada com a criação de valor para os acionistas ou neste caso, os associados das cooperativas em estudo.

De acordo com Oliveira et. al. (2004, p. 184):

> *EVA: economic value added,* ou valor econômico adicionado é o mais "novo" instrumento de medida de valor. O objetivo principal de todas as empresas deve ser a maximização dos lucros dos detentores de capital, isto é, remunerar os donos do dinheiro. É a medida de desempenho financeiro que vê mais de perto, do que outro instrumento, o lucro econômico verdadeiro de uma empresa.

Segundo Marion (2001, p. 243 apud RIBEIRO, S. P; JORGE, C. R; HARANO, R. T.) "o Valor Adicionado ou Valor Agregado é muito comum nos países da Europa Ocidental, esses valores procuram evidenciar para quem a empresa está canalizando a renda obtida". De acordo com Ribeiro et. al. o *EVA (Economic Value Added*) " é uma ferramenta de gerência que permite à empresa medir o lucro líquido realmente obtido nas atividades". O EVA evidencia, de forma clara e precisa, as demais gerações de riquezas e valores agregados que pertencem aos associados, sócios ou acionistas não apresentados nas demonstrações contábeis. Ele permeia todos os níveis da empresa, ao incluir uma cobrança sobre o lucro pelos custos de todo o capital investido pelos acionistas.

A mensuração da criação ou destruição de valor pelo EVA facilita a comparação entre as cooperativas de crédito, porque as distorções contábeis são eliminadas pela sua transformação em informações econômicas já que a contabilidade tradicional mistura os dados contábeis com os dados econômicos. O EVA permite que o gestor tenha uma medida de desempenho que facilita a tomada de decisões e as estratégias entre os associados.

O cálculo do EVA exige o conhecimento do custo de capital da empresa, no caso das cooperativas que foram analisadas, este custo foi determinado para cada fonte de recursos (próprios e de terceiros) ponderada pela sua participação nos investimentos realizados.

A estrutura básica para o cálculo do EVA é dada pela seguinte fórmula:

$$EVA = (ROIC - WACC) \times C\,I$$

Sendo:

ROIC - Retorno sobre o Capital Investido.
WACC - Custo Médio Ponderado de Capital.
CI - Capital Investido (Ativo Econômico).

3. Metodologia

Segundo Strauss e Corbin (1998), o método de pesquisa é um conjunto de procedimentos e técnicas utilizados para se coletar e analisar os dados. O método fornece os meios para se alcançar o objetivo proposto, ou seja, são as "ferramentas" das quais se faz uso na pesquisa, a fim de responder a questão.

Quanto à forma de abordagem do problema, uma pesquisa pode ser quantitativa ou qualitativa. Esta pesquisa é quantitativa pelo fato de mensurar o valor econômico adicional a partir dos dados obtidos dos demonstrativos financeiros das cooperativas de crédito que fizeram parte da amostra selecionada para o estudo em questão.

Uma pesquisa quanto aos objetivos pode ser exploratória, descritiva ou explicativa. Esta pesquisa é descritiva porque, segundo Vergara (2000), descreve características de determinada população ou fenômeno ou estabelece relações entre variáveis envolvendo o uso de técnicas padronizadas de coleta de dados – observação sistemática, assumindo, em geral, a forma de levantamento. Também, foi adotado o procedimento de pesquisa multicaso, que, de acordo com YIN (2001), proporciona maior abrangência dos resultados, não se limitando às informações de uma só organização.

A partir da constatação de que as cooperativas de crédito localizadas no estado do Paraná estão classificadas pelo seu porte (pequena, média e de grande porte) e pela sua estrutura patrimonial (patrimônio líquido, depósito, capital etc.), selecionou-se uma amostra de 76 cooperativas que representassem o universo estudado.

Os balanços patrimoniais, bem com, as demonstrações de resultados foram obtidos junto ao BACEN – Banco Central do Brasil para o período de 2005 a 2009. Na sequência foi realizada uma padronização dos demonstrativos financeiros com o objetivo de mensurar pela utilização de índices do modelo proposto a criação ou destruição de valor econômico adicionado de cada uma das cooperativas participantes da pesquisa.

4. Apresentação e análise dos dados

A análise das cooperativas participantes da amostra iniciou-se pelo cálculo do *NOPAT – Net Operating Profit After Taxes*, ou seja, a Sobra Operacional excluindo-se os encargos financeiros, despesas e receitas não operacionais. As informações foram ajustadas para que se obtivesse mais claramente o resultado econômico, especificamente separando as despesas financeiras das operacionais, levando-se em conta a economia de impostos em razão do endividamento bancário das cooperativas.

Posteriormente foi identificado o valor do CI – Capital Investido pelas cooperativas para financiar seus processos de expansão no período estudado. Na sequência, foi

mensurado o ROIC – Retorno sobre o Capital Investido das cooperativas. O WACC foi determinado pela taxa média de remuneração de um CDI – Certificado de Depósito Interbancário como taxa mínima de atratividade exigida pelos associados para manter seu capital na cooperativa. Finalmente, apurou-se o *Economic Value Added* (*EVA*), cujo resultado, positivo ou negativo, determina se houve no período estudado criação ou destruição de valor econômico para os associados da cooperativa.

Para melhor organização dos dados e informações, as cooperativas da amostra foram divididas em Regiões do estado do Paraná, quais sejam, Região Noroeste, Região Centro Ocidental, Região Centro Oriental, Região Centro Sul, Região Metropolitana, Região Norte Central, Região Norte Pioneiro, Região Oeste, Região Sudeste e Região Sudoeste.

De acordo com a Tabela 1, na Região Noroeste há duas cooperativas de crédito, a Cooperativa Sicoob Paranavaí, situada em Paranavaí e a Cooperativa Sicoob Arenito, situada em Umuarama. O resultado apurado indica que a primeira cooperativa destruiu valor para seus associados em todo o período estudado devido ao baixo resultado operacional e ao aumento do passivo exigível à longo prazo. A segunda cooperativa, também destruiu valor em todo o período estudado devido ao aumento de despesas operacionais que ocasionaram redução do lucro.

Tabela 1 – Cooperativas da Região Norte Paranaense.

REGIÃO NOROESTE						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
SICOOB PARANAVAÍ	-389.135,34	-801.364,02	-613.082,06	-697.059,93	-634.455,49	-3.135.096,83
SICOOB ARENITO	-252.481,14	-180.097,23	-119.569,45	-141.478,70	-511.668,21	-1.205.294,74

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 2, na Região Centro Ocidental há uma cooperativa de crédito denominada Cooperativa Sicoob Credinoroeste, localizada em Campo Mourão. Esta cooperativa destruiu valor para seus associados em todo o período de estudo. Porém, no ano de 2006, destruiu menos que nos anos anteriores, devido seu resultado operacional ter sido melhor.

Tabela 2 – Cooperativas da Região Centro - Ocidental Paranaense.

REGIÃO CENTRO - OCIDENTAL						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
SICOOB CREDI NOROESTE	-405.858,90	-53.181,35	-155.888,57	-602.831,67	-492.392,39	-1.710.152,88

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 3, na Região Centro Oriental há três cooperativas de crédito, quais sejam, a Cooperativa CCRIS Castro, localizada em Castro, a Cooperativa Sicoob Centro Leste, localizada em Telêmaco Borba e a Cooperativa Unicred Campos Gerais, localizada em Ponta Grossa.

Todas as cooperativas desta região destruíram valor para seus associados no período analisado. A Cooperativa CCRIS Castro, no ano base de 2005, apresentou um índice menor de destruição de valor em relação aos outros anos pelo fato do resultado operacional ter sido bem superior ao das despesas operacionais. A Cooperativa Sicoob Centro Leste

também destruiu valor para seus associados em todo o período de estudo, porém no ano de 2009, teve uma destruição de valor maior do que nos demais anos pelo fato de apresentar um resultado operacional negativo. A Cooperativa Unicred Campos Gerais também destruiu valor para seus associados em todo o período de estudo devido aos altos índices de endividamento.

Tabelas 3 – Cooperativas da Região Centro - Oriental Paranaense.

REGIÃO CENTRO - ORIENTAL						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
CCRIS CASTRO	-13.700,14	-29.736,54	-35.484,74	-97.393,08	-17.872,08	-194.186,58
SICOOB CENTRO LESTE	-97.953,34	-253.533,45	-274.830,29	-313.528,08	-432.759,81	-1.372.604,97
UNICRED CAMPOS GERAIS	-999.311,19	-1.233.201,79	-1.135.035,10	-1.053.964,64	-995.761,40	-5.417.274,12

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 4, na Região Centro Sul há sete cooperativas de crédito. As cooperativas da região, no período estudado, apresentaram destruição de valor para seus associados. Destaca-se a cooperativa CRESERV de Pinhão, que a partir do ano de 2007 apresenta resultados positivos para o EVA, ou seja, está criando valor econômico para os seus associados.

Tabelas 4 – Cooperativas da Região Centro - Sul Paranaense.

REGIÃO CENTRO - SUL						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
CCRIS BOA VENTURA DE SÃO ROQUE	-46.722,29	-31.049,29	-16.776,02	-284.104,61	-235.238,58	-613.890,77
CRESOL DE PITANGA	-83.198,70	-120.881,23	-179.366,60	-414.571,67	-106.475,65	-904.493,85
CRESOL DE TURVO	-97.413,85	-171.569,56	-145.681,96	-339.750,17	-419.896,37	-1.174.311,90
CRESERV-PINHÃO	-73.487,57	-20.843,71	28.642,89	53.013,16	46.519,67	33.844,43
CRESOL DE CANDOI	-49.730,73	-65.884,74	-150.225,49	-193.110,14	-238.682,21	-697.633,31
CRESOL DE VIRMOND	-66.363,62	-75.747,97	-209.970,46	-473.419,70	-411.558,58	-1.237.060,33
CRESOL LARANJEIRAS DO SUL	-20.360,32	-130.476,48	-293.559,95	-338.260,58	-201.976,74	-984.634,07

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 5, na Região Metropolitana há sete cooperativas de crédito, tendo a maioria delas destruído valor aos associados no período analisado. Destaca-e no ano de 2005 a Cooperativa CCRIS Adrianópolis que apresentou o menor índice de destruição de valor, R$20.267,09 e a cooperativa da Grande Curitiba e Campos Gerais que apresentou o maior índice de criação de valor – R$ 954.049,70.

Tabelas 5 – Cooperativas da Região Metropolitana Paranaense.

REGIÃO METROPOLITANA						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
ESCRIV. NOTAR E REG. PR	-212.570,92	-251.142,22	-482.658,87	-339.799,74	-277.741,58	-1.563.913,33
CCRIS ADRIANÓPOLIS	-20.267,09	-77.900,30	-53.280,94	-15.544,47	-156.828,73	-323.821,52
EMP. GR. CTBA E C. GERAIS	-1.187.851,72	954.049,70	-1.326.215,70	-1.218.850,82	-2.325.451,95	-5.104.320,50
COOPESF	-49.616,52	-21.321,36	14.711,65	78.123,22	-11.281,89	10.615,11
CRESOL CERRO AZUL	-136.805,84	-131.541,04	-111.112,96	-459.466,05	-472.295,18	-1.311.221,07
CRESOL DE ITAPERUÇU	-50.607,96	-156.325,47	-143.393,21	-393.886,77	70.105,79	-674.107,62

SICREDI MEDICRED PR	-1.566.334,03	-1.333.419,68	-439.862,88	-1.165.775,05	273.471,67	-4.231.919,96

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 6, na Região Norte Central há nove cooperativas de crédito. No período analisado esta região não obteve bom desempenho porque nenhuma das cooperativas agregou valor. A Cooperativa Cresol Londrina, apesar do bom resultado operacional, apresentou alto índice de endividamento que afetou diretamente o resultado de destruição de valor aos seus cooperados. A cooperativa com o pior desempenho foi a UNICRED Norte do Paraná com índice de destruição de valor acumulado de R$ 49.682.218,08, resultado diretamente ligado ao alto valor das despesas operacionais que reduziram o resultado operacional líquido da cooperativa.

Tabelas 6 – Cooperativas da Região Norte - Central Paranaense.

REGIÃO NORTE – CENTRAL						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
REGIÃO DE MARINGÁ	-4.976.047,93	-4.829.174,21	-5.762.089,12	-5.444.636,40	-7.148.308,21	-28.160.255,87
CCRIS CÂNDIDO DE ABREU	-35.213,69	-13.439,89	-54.226,48	-165.522,90	-211.130,32	-479.533,29
UNICRED NORTE PR	-9.678.657,01	-8.940.865,52	-8.428.732,43	-12.463.977,73	-10.169.985,39	-49.682.218,08
CRESOL IVAIPORA	-122.631,44	-181.702,32	-88.423,68	-481.476,78	-434.472,71	-1.308.706,93
CRESOL LONDRINA	-9.081,41	-50.004,92	-80.681,99	-109.128,83	-94.642,69	-343.539,84
SICOOB Aliança	-289.667,16	-318.281,77	-268.848,23	-253.871,25	-684.763,68	-1.815.432,10
SICOOB NORTE DO PARANÁ	-2.406.322,48	-3.700.595,99	-4.688.976,83	-3.595.356,12	-5.649.731,37	-20.040.982,78
SICOOB CENTRAL PARANÁ	-11.913.339,87	-11.191.244,03	-14.797.466,03	-7.686.307,90	-13.477.117,91	-59.065.475,74
SICOOB ARAPONGAS	-738.616,62	-928.279,45	-385.184,31	-659.739,95	-956.390,69	-3.668.211,02

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 7, na Região Oeste há treze cooperativas de crédito que representam 17,10% do total das cooperativas de crédito do estado do Paraná. No período analisado destaca-se a cooperativa SICOOB Cascavel que sempre apresentou índices positivos acumulando um valor econômico de R$ 133.358.477,30.

Tabelas 7 – Cooperativas da Região Oeste Paranaense.

REGIÃO OESTE						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
MEDICOS D.P.S. TOLEDO REG	-1.009.837,16	-945.202,83	-984.170,55	-1.124.091,39	-1.096.557,38	-5.159.859,31
PROF AREA SAUDE OESTE PR	-1.724.214,98	-1.915.683,86	-1.923.248,34	-2.104.679,99	-1.692.118,15	-9.359.945,32
CECMF DA SANEPAR	-23.588,02	11.961,92	1.340,17	1.706,44	-2.091,48	-10.670,97
CRESOL DE CASCAVEL	-297.321,03	15.927,04	-465.098,61	-648.279,80	-1.566.667,24	-2.961.439,64
CRESOL DE GUARANIAÇU	-76.932,18	-42.694,04	-172.469,52	-377.832,35	-428.578,40	-1.098.506,49
CRESOL DE IBEMA	-48.648,63	-26.072,12	-172.752,66	-374.013,22	-332.721,68	-954.208,31
CRESOL DE LINDOESTE	-52.344,17	-25.408,62	-92.863,56	-301.217,66	-260.585,32	-732.419,33
CRESOL DE TRES BARRAS DO PARANA	-96.555,80	-150.685,58	-277.070,04	-610.451,57	-732.851,12	-1.867.614,10
CRESOL DE VERA CRUZ DO OESTE	-77.830,80	-7.741,46	-92.822,31	-226.483,09	-280.410,86	-685.288,52
SICOOB CASCAVEL	20.090.717,85	23.252.221,80	29.707.776,28	29.009.717,94	31.298.043,44	133.358.477,30
SICOOB MARECHAL	-235.350,20	-319.102,29	-208.662,27	-271.881,42	-366.398,01	-1.401.394,19

SICOOB MÉDIO OESTE	-253.251,94	-131.621,35	-231.656,39	-145.475,27	-176.837,35	-938.842,30
CRESOL SANTA LÚCIA	-68.147,93	-92.085,52	-232.609,76	-225.348,58	-349.564,75	-967.756,55

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 8, na Região Sudeste há duas cooperativas de crédito. A Cooperativa de Crédito Cresol Cruz Machado destruiu valor em todo o período estudado, já a Cooperativa de Crédito Cresol Prudentópolis agregou valor aos seus associados em todo o período estudado. Seu desempenho positivo está diretamente ligado ao bom gerenciamento e utilização do capital investido, isto permitiu manter baixo o seu índice de despesas e de endividamento.

Tabelas 8 – Cooperativas da Região Sudeste Paranaense.

REGIÃO SUDESTE						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
CRESOL CRUZ MACHADO	-75.133,95	-102.916,60	-922.916,87	-733.058,44	-902.451,79	-2.736.477,65
CRESOL PRUDENTÓPOLIS	45.803,07	74.166,86	87.515,90	119.981,62	213.057,02	540.524,46

Fonte: Desenvolvido pelos autores.

De acordo com a Tabela 9, na Região Sudoeste há vinte e sete cooperativas de crédito que representam 35,53% do total das cooperativas de crédito do estado do Paraná. Com nas regiões analisadas anteriormente, a maioria das cooperativas de crédito destruíram valor econômico no período analisado.

Tabelas 9 – Cooperativas da Região Sudoeste Paranaense.

REGIÃO SUDOESTE						
COOPERATIVA	**2005**	**2006**	**2007**	**2008**	**2009**	**SOMA**
CCM - SICOOB CRESUD	-602.785,78	-527.882,65	-511.494,04	-416.172,39	-592.165,70	-2.650.500,56
CCRIS BELA VISTA DA CAROBA	-58.833,20	-69.616,66	-57.876,63	-130.933,00	-74.063,47	-391.322,96
CECM PROF AREA SAUDE F BELTRAO	-398.998,06	-705.161,53	-344.857,14	-407.338,92	-687.495,12	-2.543.850,76
CRESOL CAPANEMA	-72.911,70	-111.650,39	-214.960,00	-421.414,48	-431.597,98	-1.252.534,55
CRESOL CHOPINZINHO	-200.529,73	-100.480,25	-329.780,48	-1.245.506,12	-880.610,87	-2.756.907,44
CRESOL DE AMPERE	-143.659,73	-165.527,01	-135.009,76	-378.118,26	-394.387,92	-1.216.702,68
CRESOL DE CORONEL VIVIDA	-144.359,80	-248.230,13	-387.011,83	-838.038,71	-763.229,42	-2.380.869,90
CRESOL DE DOIS VIZINHOS	-107.379,12	-90.724,49	-356.310,81	-1.018.164,09	-920.121,66	-2.492.700,17
CRESOL DE FRANCISCO BELTRÃO	-306.541,43	-266.746,63	-530.670,07	-1.566.393,76	-911.148,56	-3.581.500,45
CRESOL DE HONORIO SERPA	-107.283,81	-135.837,81	-370.794,78	-603.460,41	56.517,05	-1.160.859,76
CRESOL DE ITAPEJARA D`OESTE	-67.947,49	-195.412,65	-352.063,48	-1.411.362,25	-1.185.972,16	-3.212.758,03
CRESOL DE MANGUEIRINHA	-57.047,00	-123.959,93	-189.180,45	-404.518,73	-263.131,69	-1.037.837,80
CRESOL DE NOVA PRATA DO IGUAÇU	-67.976,92	-141.332,54	-252.958,74	-493.390,99	-572.842,69	-1.528.501,87
CRESOL DE PEROLA D`OESTE	-62.924,58	-94.592,41	-201.360,05	-352.158,01	-329.701,26	-1.040.736,31
CRESOL DE PRANCHITA	-140.386,29	-159.491,22	-223.778,90	-730.365,30	-626.800,41	-1.880.822,12
CRESOL DE RENASCENÇA	-58.197,82	-90.834,61	-250.850,39	-497.673,82	-151.555,14	-1.049.111,77
CRESOL DE SALGADO FILHO	-131.004,97	-186.376,65	-287.194,46	-480.227,55	-636.453,63	-1.721.257,26
CRESOL DE SALTO DO LONTRA	-157.675,33	-177.101,59	-229.706,80	-569.737,70	-510.201,10	-1.644.422,52
SANTO ANTONIO DO SUDOESTE	-80.619,72	1.601.735,50	-211.964,58	-524.423,49	-651.280,58	133.447,13

CRESOL DE SÃO JORGE D`OESTE	-90.047,96	-89.618,96	-278.709,53	-472.096,26	-475.156,74	-1.405.629,44
CRESOL DE VERE	34.711,16	77.554,96	-116.821,97	-570.509,89	-280.833,69	-855.899,43
CRESOL MARMELEIRO	-134.617,69	-248.800,16	-526.672,50	-1.392.888,08	-941.269,95	-3.244.248,38
CRESOL REALEZA	-9.770,98	-42.723,08	-104.919,74	-266.856,11	-619.782,25	-1.044.052,16
CRESOL SANTA IZABEL DO OESTE	-34.599,14	-154.975,64	-138.347,74	-457.900,03	-500.999,73	-1.286.822,27
CRESOL SÃO JOÃO	-9.092,08	-41.765,21	-75.107,63	-79.437,64	-43.460,97	-248.863,54
SICOOB INTEGRADO	-202.439,11	-151.177,04	-175.377,97	-240.193,90	-354.846,66	-1.124.034,70
CRESOL DE PLANALTO	-142.580,87	-178.940,53	-350.458,40	-535.752,78	-1.037.101,86	-2.244.834,44

Fonte: Desenvolvido pelos Autores.

A partir dos resultados apurados para as cooperativas de crédito da amostra selecionada para esta pesquisa, verificou-se para o ano de 2005 que 93,42% das cooperativas destruíram valor. No ano de 2006 este índice foi de 89,47%, apresentando uma melhora de 3,95% em relação ao ano de 2005. Para 2007, 92,11% das cooperativas destruíram valor e houve piora do índice em 2,64% em relação ao ano de 2006. No ano de 2008, 92,11% das cooperativas destruíram valor, tendo o índice no último ano (2009), constatado que 90,79% das cooperativas destruíram valor, apesar da melhora de 1,32% em relação ao ano de 2008.

As Cooperativas de Crédito CREDSERV – PINHÃO, CRESOL DE HONÓRIO SERPA, CRESOL DE ITAPERUÇU e SRICRED MEDICRED destruíram valor, só conseguindo, no último ano, apresentar um EVA positivo.

Apesar do destaque das Cooperativas de Crédito CRESOL PRUDENTÓPOLIS e SICOOB CASCAVEL de criarem valor aos seus acionistas, em relação ao capital investido o percentual de valor criado ficou abaixo da taxa mínima de atratividade exigida pelos associados das respectivas cooperativas.

5. Considerações finais

Agregar valor econômico ao associado significa compensar o risco assumido pelo mesmo ao manter seu capital na cooperativa. Ao utilizar-se o *EVA – Economic Value Added* – como medida do valor adicionado que deve superar a taxa mínima de atratividade dos associados, neste estudo admite-se de forma conservadora que ela deva ser igual a taxa média de remuneração de um CDB – Certificado de Depósito Interbancário, observa-se que apenas 9% das cooperativas de crédito paranaense da amostra conseguiram agregar valor econômico aos acionistas, percentual este, considerado muito baixo, em relação ao número de cooperativas que destruíram valor.

Estes resultados negativos demonstram que a riqueza dos associados está sendo destruída a cada ano, ou seja, o resultado operacional auferido pelos gestores destas cooperativas não é suficiente para cobrir o risco assumido pelos associados, mesmo considerando-se uma taxa mínima de atratividade bastante conservadora, haja vista, o risco do associado ao manter e aplicar seu capital na cooperativa ser bem maior do que ele o teria se aplicasse em um Certificado de Depósito Interbancário emitido por uma instituição financeira que atue no mercado financeiro.

Diante de tudo o que foi analisado, conclui–se que resultados contábeis, mesmo quando positivos, não significam um bom desempenho dos gestores, principalmente, no

segmento das cooperativas de crédito. Se os bancos pecam pelo excesso de zelo com relação as melhores práticas do setor na busca de margens operacionais que cubram os riscos do negócio, as cooperativas pecam pela falta de uma maior profissionalização da gestão. Torna–se, portanto, necessário um olhar mais crítico e empresarial para agregar valor aos investimentos realizados pelos associados.

Neste momento de transição da sociedade da informação para a sociedade do conhecimento é imperativo que as cooperativas de crédito se valham de pesquisa e conhecimentos científicos para melhor a performance de sua gestão ou acabarão sendo extintas do mercado – como toda e qualquer empresa.

6. Referencias

BANCO CENTRAL DO BRASIL. **Balancetes (Transferência de Arquivos)**. Disponível em: <http://www4.bcb.gov.br/?IFBALANCETES>. Acesso em: 30 set. 2010.

_____. **Dados coorporativos**. Disponível em: <www.bacen.gov.br>. Acesso em: 18 set. 2010.

BANRICOP. **História do Cooperativismo**. Disponível em: <http://www.banricoop.coop.br/site/historico_cooperativas_de_credito.php>. Acesso em: 10 out. 2010.

BIALOSKORSKI NETO, S. **Política Institucional de Monitoramento da Autogestão das**
Cooperativas do Estado de São Paulo. Uma Proposta Preliminar de Metodologia, Pesquisa e Implantação. São Paulo: Atlas, 2000.

CONFEDERAÇÃO NACIONAL DO COMÉRCIO. **Manual das Cooperativas de crédito**. Disponível em: <http://www.portaldocomercio.org.br/media/manualdascooperativasdecredito.pdf>. Acesso em: 03 out. 2010.

COODEFPRJ. **Regimento interno da cooperativa de crédito Mútuo dos integrantes da defensoria pública do estado do Rio de Janeiro – CCODEFPERJ**. Disponível em: <http://www.coodefperj.com.br/site/publicacoes/PUB_20100112142552.pdf>. Acesso em: 07 out. 2010.

FRAINER, R. G.; SOUZA, J. I. D. **Bancos comerciais X Cooperativas de crédito de Blumenau:** Uma Análise Comparativa das Vantagens Oferecidas a Partir das Valorações de Produtos e Serviços. Revista interdisciplinar científica aplicada, Blumenau, v. 1, n. 4, p. 1-22. 2007.

FRAZ, C. M.; AZAMBUJA, F. M. **A contribuição do cooperativismo de crédito para a eficiência econômica e eficácia social**. Disponível em: <http://www.pucrs.br/direito/graduacao/tc/tccII/trabalhos2006_2/cristiane.pdf>. Acesso em: 12 out. 2010.

OCB. **Site da Organização das Cooperativas Brasileiras - OCB**. Disponível em: <http://www.brasilcooperativo.com.br/>. Acesso em: 10 out. 2010.

OCEPAR. **Cooperativas do Paraná**. Disponível em: <http://www.ocepar.org.br/ocepar/>. Acesso em: 12 out. 2010.

OLIVEIRA, L. M.; PEREZ JR, J. H.; SILVA, C. A. S. **Controladoria Estratégica**. 2. ed. São Paulo: Atlas, 2004.

PINHEIRO, M. A. H. **Cooperativas de crédito:** história da evolução normativa do Brasil. 4. ed. Brasília BCB, 2006. 66 p. Disponível em: <http://www.bcb.gov.br/htms/public/microcredito/HccB4edicao.pdf>. Acesso em: 22 out. 2010.

PINHO, D. B. **O cooperativismo no Brasil – da vertente pioneira à vertente solidária**. São Paulo: Saraiva, 2004.

RIBEIRO, S. P; JORGE, C. R; HARANO, R. T. **Breve discussão sobre a importância da Demonstração do Valor Econômico Agregado (EVA)**. Disponível em: <http://www.ficms.com.br/web/revista/arquivos/ArtigoRevistaVisaon15BreveDiscussaodoValorEconomicoAgregado.doc>. Acesso em: 30 set. 2010.

SANTOS, E. L.; STEFANO, S. R. **Os princípios e a gestão do cooperativismo de crédito:** Caso Sistema Cresol. Disponível em: <http://web03.unicentro.br/especializacao/Revista_Pos/P%C3%A1ginas/6%20Edi%C3%A7%C3%A3o/Aplicadas/PDF/18-Ed6_CS-Princ.pdf>. Acesso em: 10 out. 2010.

SEBRAE. **Cooperativa de crédito**. Disponível em: <http://www.sebraemg.com.br/Geral/VisualizadorConteudo.aspx?cod_conteudo=4174&cod_areasuperior=31&cod_areaconteudo=317&cod_pasta=321&navegacao=PARA_SUA_EMPRESA/Servi%C3%A7os_Financeiros/Cooperativa_de_Cr%C3%A9dito>. Acesso em: 12 ago. 2010.

SILVA, A. R.. **Avaliação de desempenho das principais cooperativas de crédito baseada em criação de valor econômico. Um estudo de caso no DF1**. Disponível em: <http://www.contabeis.ucb.br/sites/000/96/00000174.pdf>. Acesso em: 20 out. 2010.

_____. **O cooperativismo em Face da Legislação Federal e Estadual**. Disponível em: <http://sicoobamazonia.coop.br/arquivos/63.pdf>. Acesso em: 05 out. 2010.

STRAUSS, A. & CORBIN, J. **Basics of qualitative research: Grounded theory, procedures and techniques**. Newbury Park, CA: Sage, 1998.

THENÓRIO FILHO, L. D. **Pelos caminhos do cooperativismo. Com destino ao crédito mútuo**. São Paulo: Central das Cooperativas de Crédito do Estado de São Paulo, 1999.

GIMENES, R. M. T. **Um ensaio sobre o desempenho econômico de cooperativas agropecuárias a partir do economic value added (EVA®)**. Disponível em: <http://www.revistas.unifacs.br/index.php/rde/article/view/1004>. Acesso em: 15 out. 2010.

VERGARA, S. C. **Projetos e Relatórios de Pesquisa em Administração**. 3. ed. São Paulo: Atlas, 2000.

YIN, R. K. **Estudo de caso – planejamento e métodos**. 2. ed. Porto Alegre: Bookman, 2001.

ZAPELONI, A. M. **Acordo da Basiléia nas cooperativas de crédito**. Monografia de conclusão do curso de Contabilidade. Ribeirão Preto: FEARP/U

IS SOCIAL CAPITAL A PRODUCTION FACTOR IN AGRIBUSINESS SYSTEMS? A COMPARATIVE ANALYSIS OF THE POULTRY, WINE AND BEEF SYSTEMS IN ARGENTINA

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Abstract
The different subsectors that make up the Argentine food network-industry present different degrees of competitiveness that make an impact on the level of investment of this sector. One of the causes of the low competitiveness observed is centered on the social structure of the different actors of the subsector; in other words the level of social capital the system has. The objective of the paper is to identify social capital as a factor of production for the development of the Argentine Agribusiness Systems, specifically within the Beef, Poultry and Wine Agribusiness Systems. The survey is presented as a research technique to compare and understand the different behaviors and opinions of the productive sectors analyzed. The questionnaire used includes both questions with predetermined answers and open questions, and makes it possible to compare different results from the different sectors, as well as to provide information about the performance of each sector. The variables studied were "trust," "collective action" and "cooperation and ethic." We can observe that the variables studied –Trust, Collective Action and Cooperation and Ethics– present different values based on the systems studied. The poultry system shows high levels of all three variables; the wine system shows medium levels, and the livestock and beef system shows low levels. This has a direct effect on the level of social capital in each system analyzed.

Key words: Trust, collective action, cooperation and ethic, enforcement.

IS SOCIAL CAPITAL A PRODUCTION FACTOR IN AGRIBUSINESS SYSTEMS? A COMPARATIVE ANALYSIS OF THE POULTRY, WINE AND BEEF SYSTEMS IN ARGENTINA

1. Introduction

1.1. Problem statement

The agrifood sector contributes 37% of the total employment in the country (Lach *et al.*, 2004). Regarding the GDP by sector in 2004, the incidence of the Primary Agricultural Sector constituted 6.2% of the total GDP of the country; the Food and Beverage Industry contributed 5.6%. Together they contributed approximately 12% of the total GDP. If we add to this datum the services and infrastructure generated by the primary agricultural sector and the food and drink industry, the ratios go from 30% to 42% of the total GDP total.

The country presents a great productive engine based on its Agribusiness, leveraged by its competitive advantages. However, this strong drive coming from "the fields" does not transfer to the rest of the food supply networks. The fast development of commercial interrelations that lead to the establishment of different types of food supply networks is a key phenomenon in modern agroindustrial economies. Therefore, the main actors of the agroindustrial chains must design the best options regarding the contents and architecture of their commercial relations (Ordóñez, 2005).

Network analysis is a broad field generally associated to sociology, although economists and strategists have recently analyzed network-based industries and applied the network concept to explain their performance and economic organization. Three basic value sources are examined in network analysis: the network's social structure, learning and externalities (Lazzarini *et al.*, 2001).

The different subsectors that make up the Argentine food network-industry present different degrees of competitiveness that make an impact on the level of investment of this sector. One of the causes of the low competitiveness observed is centered on the social structure of the different actors of the subsector. Diverse approaches to the social network coincide in highlighting the role of the social structure, that is, the interpersonal relations and individual positions of the agents in a network, relations and positions that influence performance and individual or collective conduct. Granovetter (1985) uses the term *embeddedness* to explain in what ways social relations affect the economic conduct of the agents and the transactions backed by institutional agreements. The literature on social capital deals with the role of the *"resources accumulated by an individual or a group based on the position he/it occupies in the chain of his/its more or less durable social relations"* (Adler & Kwon, 1999; p. 4).

The high economic interdependence among agents of an agrifood chain benefits not only from the individual stock of social capital contributed by each of those agents but also from

the formation of social capital generated by the relations among them. If individual economic gain depends to a great extent on the collective action of other agents, we can say that what we have before us is a relational network with strong cohesion. The salient characteristics that make possible a strong relational network are almost certainly trust and collective action among the participants in an Agrifood Chain (Gargiulo & Benassi, 2000).

1.2. Objectives

The main objective of the paper is to identify Social Capital as a factor of production for the development of the Argentine Agribusiness Systems. The specific objectives will be to identify the levels of social capital within the Beef, Poultry and Wine Agribusiness Systems.

2. Procedures

In relation to the objectives of this paper, the use of quantitative research techniques has been chosen. More specifically, a series of surveys have been conducted in order to advance towards the objectives proposed. Succinctly, Sautú *et al.* (2005) point out that a survey consists in the application of a standardized procedure to collect information –oral or written– from a sample of people about structural aspects, such as certain socio demographic characteristics or opinions about a specific topic.
The information is gathered in a structured fashion and the stimulus is the same for all participants. According to the authors, there are some advantages to the use of surveys in social research: surveys enable researchers to include a wide spectrum of questions in one study, facilitate the comparison of the results –which can be generalized– make it possible to obtain significant information and generate great volumes of information.

The survey is presented as an adequate research technique to compare and understand the different behaviors and opinions of the productive sectors analyzed. The questionnaire used includes both questions with predetermined answers and open questions, and makes it possible to compare different results from the different sectors, as well as to provide information about the performance of each sector. The variables studied were “trust,” “collective action” and “cooperation and ethic.”

Qualitative research techniques could hardly help obtain such a wide perspective on the behavior of the different sectors, although they may prove useful subsequently, in further research, to dig deeper into certain aspects revealed by the use of surveys. The material obtained through the surveys has been processed by means of SPSS statistical software.

3. Theoretical Framework

The development of social capital is directly linked to the development of social interaction, trust and a shared vision. In addition, this process promotes an exchange of resources and the creation of value (Ordóñez, 1999).
In reference to bounded rationality, information theory mentions that, due to this assumption, all complex contracts are inevitably incomplete. According to Milgrom &

Roberts (1992), a perfect contract would specify precisely what each of the parties must do when facing any circumstance, in such a way that each party would individually consider sticking to the terms of the contract as the optimal solution. Since man's rationality is limited, this contract does not exist. Therefore, bounded rationality contributes to the incompleteness of the information and of contracts, with the resulting increase in transaction costs.

Collective actions are part of another behavioral assumption. Alchian & Demsetz (1972) consider that, in many situations, the results obtained through team work or collective actions are better than the sum of the results obtained by individual actions. In the agrifood system, for instance, in which the agents conduct their business under peculiar characteristics –seasonality, food freshness, expiration dates, etc.– many producers and manufacturers have begun to cooperate with each other to exchange capacities and increase flexibility. The synergy between agents benefits each of the parties. This concept is closely linked to social capital.

Woolcock (2001) and Lynch et al. (2000) suggest that the concept of social capital is risky, since it tries to explain a lot based on very little and is being adopted indiscriminately, adapted without criticism and applied imprecisely. On the other hand, Putnam (2000) argues that social capital has quantifiable effects on many aspects of life. Among these are a decrease in crime rates (Halpern, 1999; Putnam, 2000), a better health system (Wilkinson, 1996), an increase in longevity rates (Putnam, op. cit.), better educational achievements (Coleman, 1988), higher levels of income equity (Wilkinson, op. cit.; Kawachi et al. 1997), lower child abuse rates (Cote & Healy, 2001), less corrupt and more effective governments (Putnam, 1995) and economic improvement based on trust and lower transaction costs (Fukuyama, 1995).

Coleman (1988) suggests that, like other forms of capital, social capital is productive but may be "depleted" if it is not renewed. Putnam (2000) adds that the more people work jointly, the more social capital is "produced" and the fewer people work jointly, the more that community shall deplete its social capital. Societies with a high stock of social capital have a greater capacity for exchange, for association; these societies develop with common objectives and generate positive gains.

Social capital also minimizes opportunism and therefore transaction costs. When there is a kind of mutualism, what is known as win-win (Pareto-superior) in game theory (see Milgrom & Roberts, 1995; Hart & Holmstrom, 1986; Hart, 1995; Aoki, 2001 in economics; and Weingast, 1996, Sened, 1997 in political science) and both parties are necessary to carry out the contract, the result is mutual benefit as long as the other party cooperates. Thus, systems are constructed or designed and implemented based on collective actions. The economic agents try to design as complete contracts as possible, contemplating safeguards for changes in the environment where the common business takes place.

According to Hansen & Morrow (2000), collective actions may help increase profit opportunities. Such a result is called "Pareto-superior" in memory of Vilfredo Pareto (1893). One result is Pareto-superior to another if at least one of the payers is better off and none of them is worse off. There is an economic problem when this leads to a non-

production or a below-the-ideal production of a public good, or when this problem happens due to excessive use of a public good.

In the case of collective actions and residual appropriation of property rights, faced with a scenario of little respect for these property rights –low institutional quality– and opportunism, what is known in the literature as the "Tragedy of the Commons" appears, hand in hand with rent seekers. In addition, collective actions may have a negative effect, such as the creation of mafias or lobbies that tend to develop policies that will benefit them in detriment of the rest of society.

Another problem of collective actions is rent seekers, who are more concerned about their own interests than about global objectives. Rent seekers dedicate their own resources to obtaining benefits that belong to others, instead of using those resources for the productive use of the society. The term is also used to refer to people who obtain profits that are not rightly theirs by means of lobbying, pressure or bribes offered to the authorities that control public resources. Rent-seeking imposes a net social cost similar to that of theft.

Hansen & Morrow (op. cit.) mention that the ideal cooperative structure allows its members to look for benefits from this cooperation without worrying about the risk of opportunism. The key to this ideal situation is trust. Trust may replace governance structures based on formal contractual agreements. Several economists have recognized the importance of trust in contractual relations.

According to Hardin (2003), the existence of a large number of collective actions in business and no free riders or rent-seeking actions may be due to three possibilities: 1) there are incentives for the members of the groups to be interested in contributing; 2) there are specific motivations; and 3) the agents fail to understand their own interests (Arrow, 1974; Frank, 1988; Gambetta, 1988; Macaulay, 1963), since in general trust is sustainable when it is impossible to establish a priori contracts that consider all contingencies (Macauly, op. cit.). The definition of trust in economic terms is an expectation that the other party will not violate or break any arrangement or contract.

Currently, we are witnessing a change in the way agribusiness is conducted. The food supply networks are increasingly abandoning the use of spot markets and starting to create alliances or use business contracts (Zylbersztajn, 1996). In this sense, it is important to mention that there exist specific characteristics in food supply chains that promote the formation of vertical structures and different governance structures.

Conflicts due to the incompleteness of contracts and their consequences are frequent in agribusiness. These contractual distortions may be overcome by means of positive agreements between the parties involved. Social capital and trust constitute two important values in the construction of such a positive, competitive situation between the parties involved in an agribusiness.

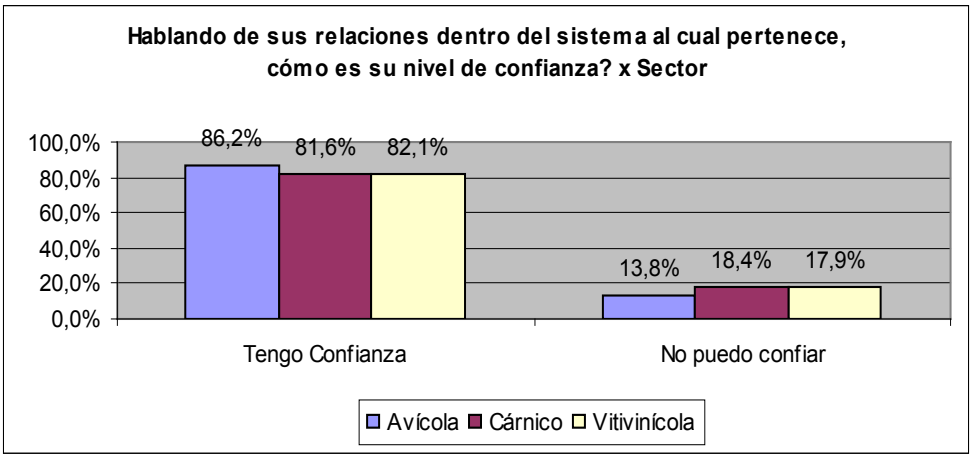
Cook & Chaddad (2004) consider that "agroindustrialization", whether analyzed in developing or developed economies, introduces discontinuous changes and economic chaos during periods of individual and collective unrest. Stiglitz (1988), Evans & Stephens (1988)

and Barry (1995) treat in depth the positive, negative and neutral implications of this often defamed agent or process of social and economic change.

4. Results

From an univariate analysis of the production by sector we shall establish some preliminary observations based on the crisscrossing of some key variables, in order to make a comparative evaluation of the performance of the poultry, beef and wine systems so as to determine the level of social capital in each of them.
As for the level of **trust**, we observe that, initially, the poultry (in Spanish "avícola", always in blue), beef (in Spanish "Cárnico" always in red) and wine (in Spanish "vitivinícola" always in yellow) sectors register very similar trust levels (Chart 1).

Chart 1. Speaking of your relations within the system to which you belong, what is your trust level? (divided by sector).[165]

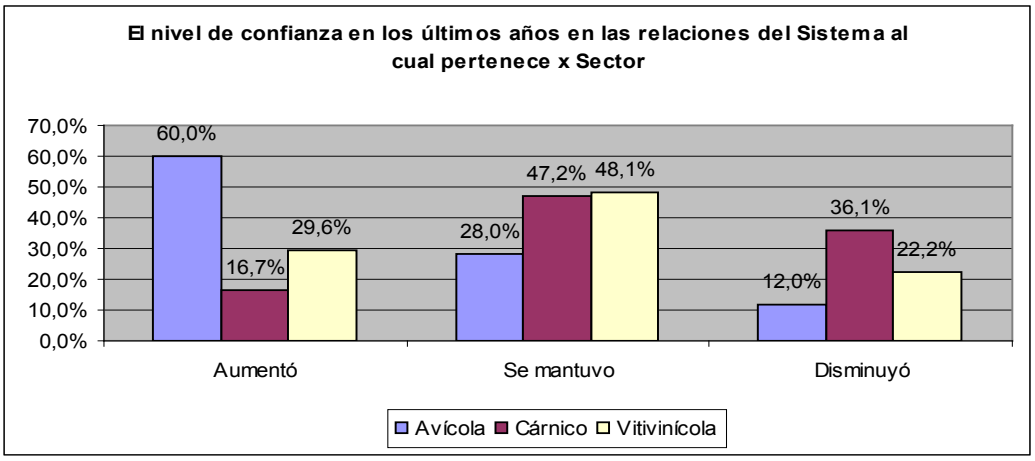


Source: the authors.

In this sense, the poultry subsector registers a strong perception that tends to recognize an increase in trust in the past few years (60% increase), a situation that is not mirrored in the other sectors (see Chart 2). In the case of the livestock and beef sector, in fact, trust seems to be decreasing (36.1% decrease), making the frequency distribution relative to a certain degree, as in the case of Chart 1, and suggesting the existence of systems of trust assignation by sector, differential in principle. In the case of the wine sector, records seem to be located half way between the other two.

Chart 2. Trust level in system relations the last few years (by sector).[166]

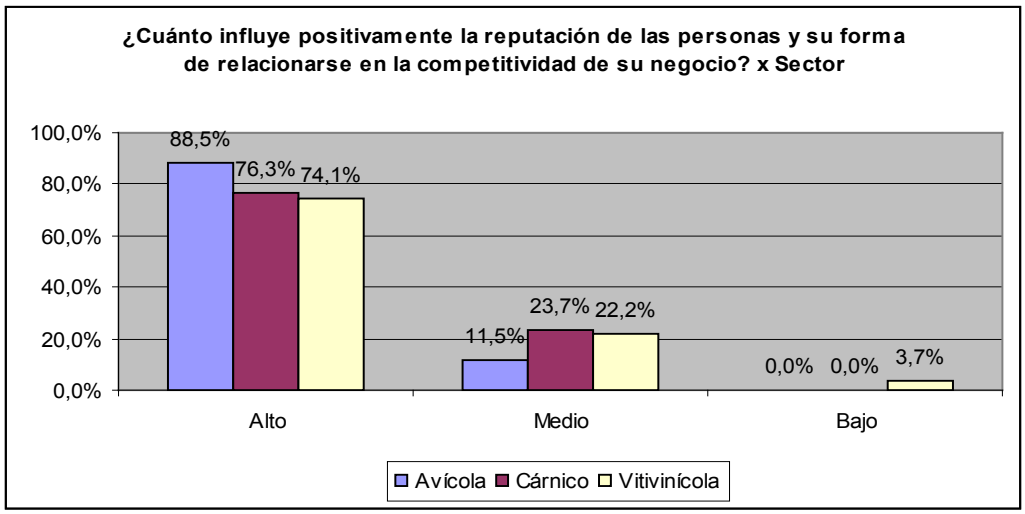
[165] "tengo confianza": I have trust; "no puedo confiar": I cannot trust.
[166] "Aumentó": increased; "se mantuvo": no changes; "disminuyó": decreased.



Source: the authors.

Likewise, it can be observed that, in all three sectors, reputation constitutes a valued and decisive factor at the time of generating links between the different areas that participate in the sector. Reputation may be understood as informally transmitted knowledge, based on personal relations through which the information is channeled, that accounts for the trust level of the sector. In the poultry production chain, reputation is ostensibly better valued (88.5% High).

Chart 3. To what extent do people's reputation and the way they relate influence the competitiveness of your business positively? (by sector)[167]



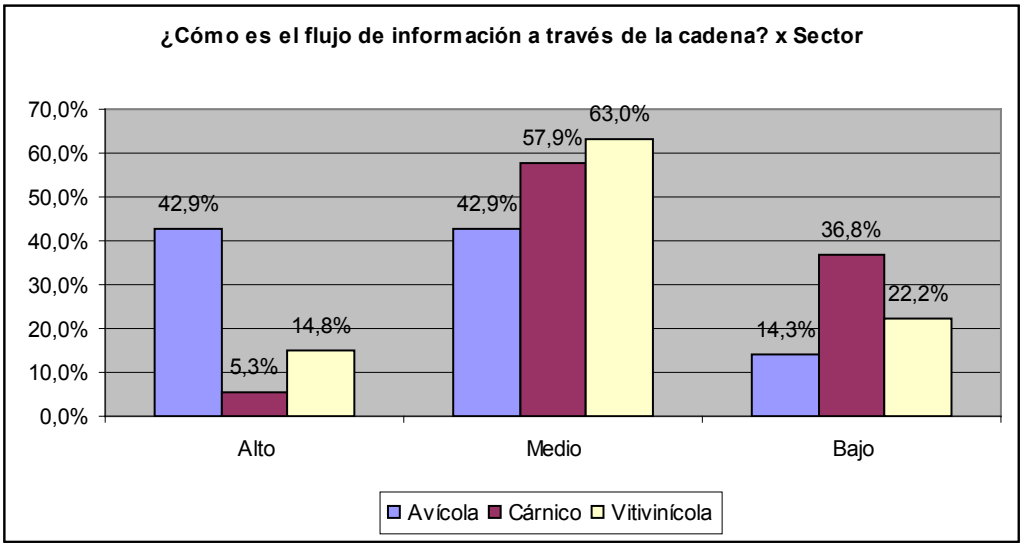
Source: the authors.

In terms of the flow of information through the chain, a fundamental variable at the time of becoming aware of productivity and the level of social capital of the sector, the poultry sector clearly registers higher frequencies (42.9% High), while the beef sector has the most negative perception of the information channels of its sector (36.8% Low). The wine sector

[167] "Alto": high; "medio": medium; "bajo": low.

is again in an intermediate position, though closer to the beef system than to the poultry system (63% Medium) (Chart 4).

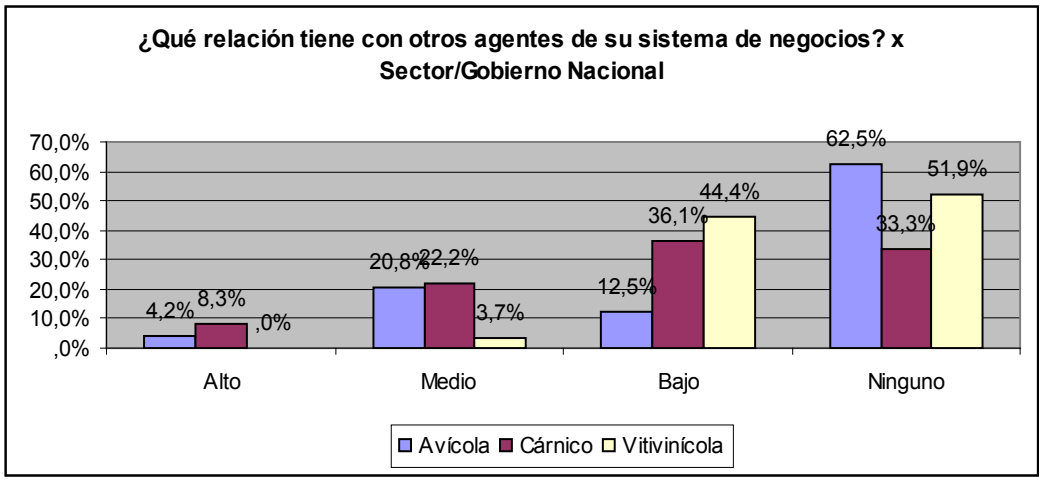
Chart 4. What is the flow of information through the chain like? (by sector)[4]



: Source: the authors.

In terms of **links with other agents** of the business system, the three sectors express a low level of relationship with the National Government; the poultry sector shows the greatest autonomy level (62.5% None). On the contrary, the beef sector registers higher levels of dependency on State decisions (8.3% High; 22.2% Medium). This last fact may probably be due to recent conflicts between the beef sector and the National Government (see Chart 5).

Chart 5. What is your relationship with other agents of your business system? National Government (by sector).[168]

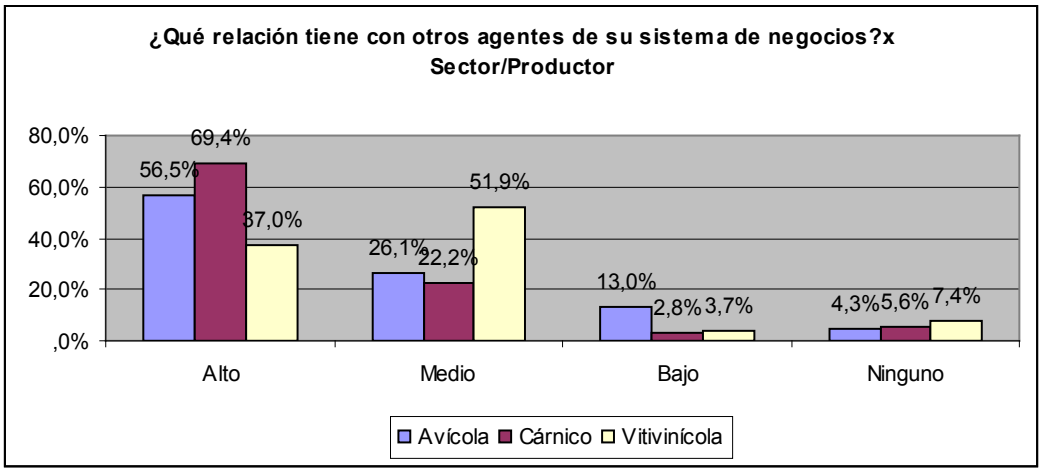


Source: the authors.

[168] "Alto": high; "medio": medium; "bajo": low; "ninguno": none.

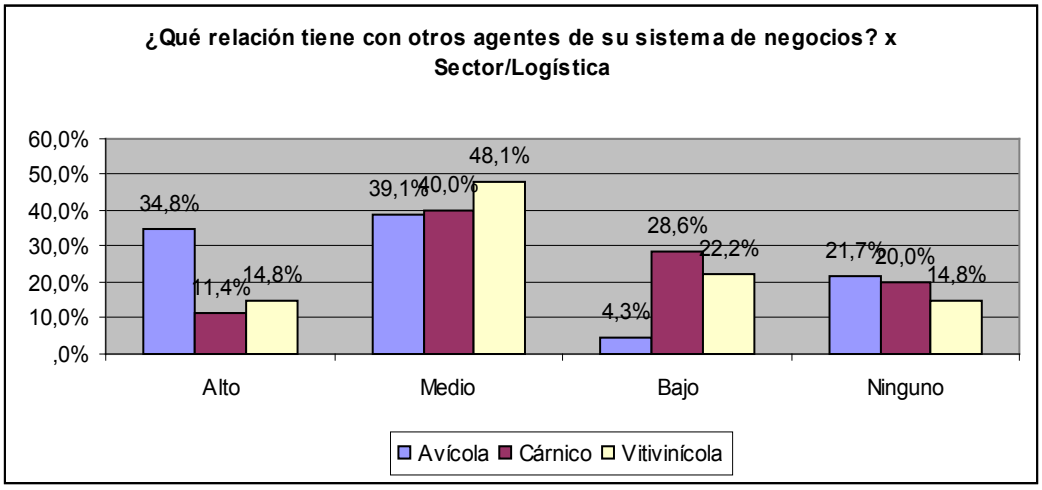
As for other agents that participate directly in the productive process, the livestock and beef system shows greater links with producers (69.4%), while the poultry sector is strongly related to the logistics (34.8%) and industrial (45.8%) sectors (see Charts 5, 6, 7, 8, & 9). In effect, the poultry sector would seem to demonstrate a higher level of complexity and autonomy, while primary production is perceived as the fundamental link in the livestock and beef system. In the case of the wine system, again it seems to take an intermediate position between the other two mentioned, usually registering a concentration of frequencies at medium values (51.9% for producers; 48.1% for logistics; 55.6% for industrial and 44.4% for intermediaries).

Chart 6. What is your relationship with other agents of your business system? Producers (by sector).[169]



Source: the authors.

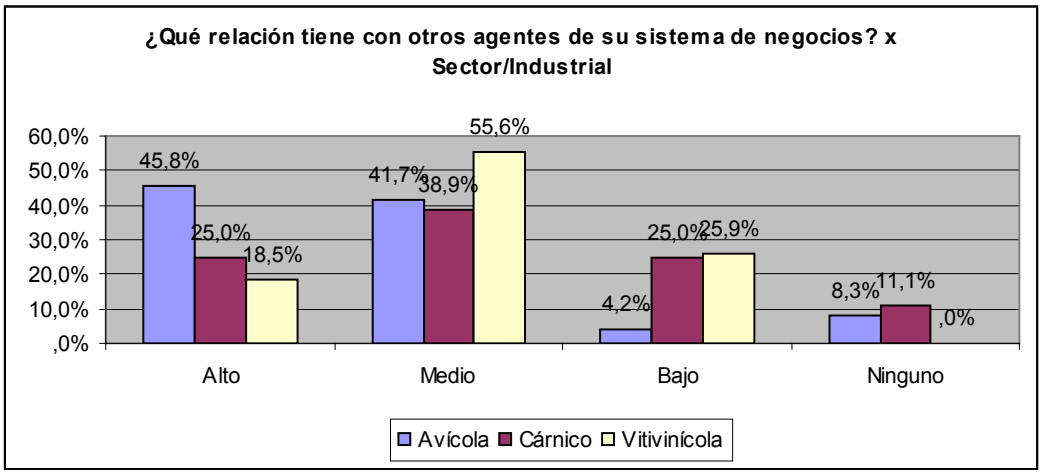
Chart 7. What is your relationship with other agents of your business system? Logistics (by sector).[5]



Source: the authors.

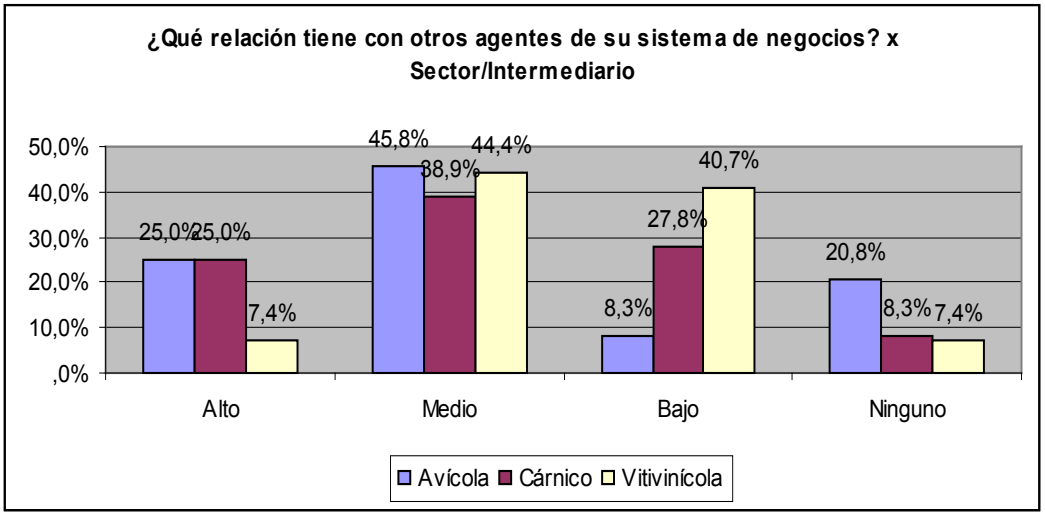
[169] "Alto": high; "medio": medium; "bajo": low; "ninguno": none.

hart 8. What is your relationship with other agents of your business system? Industrial (by sector).[6]



Source: the authors.

Chart 9. What is your relationship with other agents of your business system? Intermediaries (by sector).[170]

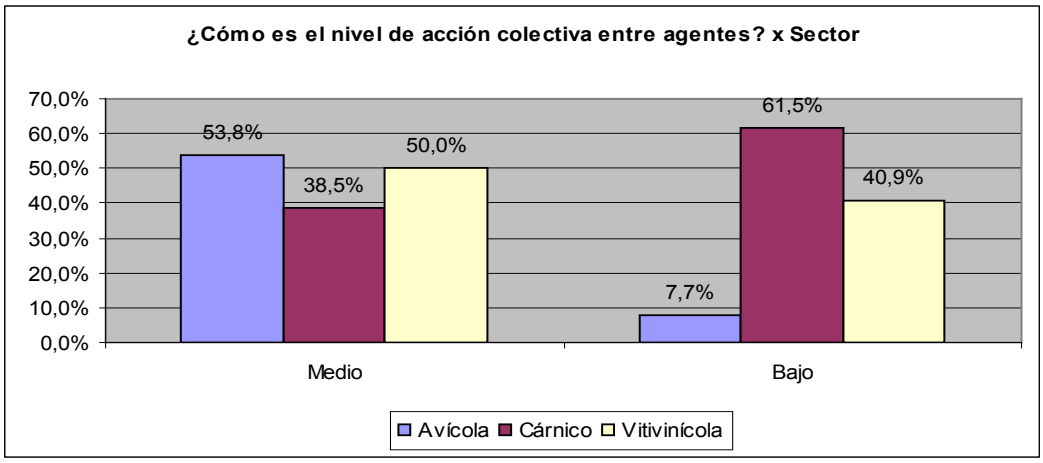


Source: the authors.

Regarding the levels of **collective action**, the poultry sector presents higher levels (38.5% High; 53.8% Medium). This indicates a higher level of coordination and independence among the agents that make up the business system. At the other end of the spectrum, the beef sector perceives the greatest difficulties to execute joint actions (61.5% Low), suggesting a high level of atomization that definitely goes against the organizational capacity of the sector. Wine production again seems to show an intermediate case; in fact, 50% of those surveyed tended to consider the level of coordination within the sector as "Medium" (see Chart 10).

Chart 10. What is the level of collective action among agents like? (by sector).[171]

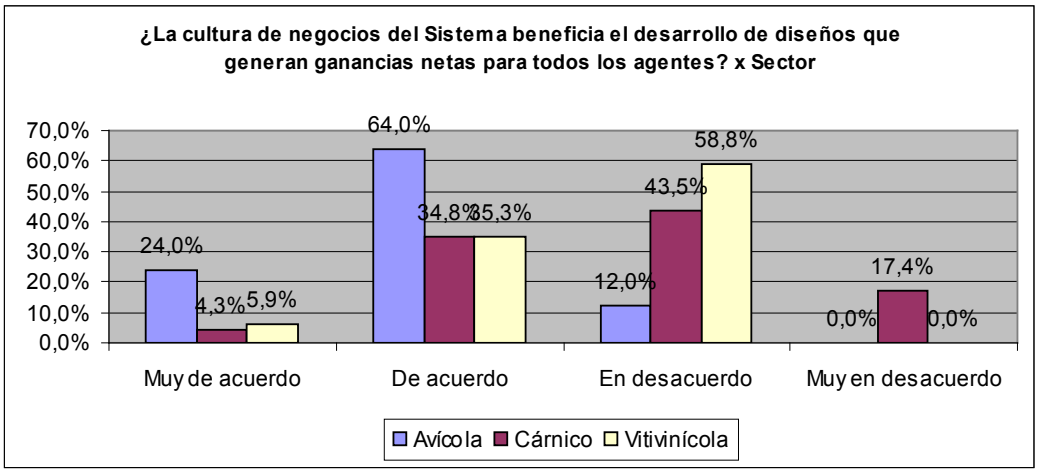
[170] "Alto": high; "medio": medium; "bajo": low; "ninguno": none.
[171] "Medio": medium; "bajo": low.



Source: the authors.

Regarding **business culture**, the poultry sector clearly shows a distribution of frequencies that expresses a balanced business structure and a healthy business culture that promotes a transparent, sustainable, high productivity design; in this sense, 88% of those surveyed answered "agree" or "strongly agree". On the other hand, the beef sector presented the most negative values; 43.5% of those surveyed answered "disagree" and 17.4% answered "strongly disagree". This evidences a strong systemic imbalance, of course directly related to the perceptions measured in the variables developed before: a deficient flow of information, relatively scarce sector autonomy, low levels of trust and little capacity for collective action. On the contrary, the poultry system has registered high trust levels, a solid flow of information, and a strong tendency towards technification and other areas capable of granting added value. Thus, it can be stated that the poultry and beef sectors crystallize opposite business, management and organization models. On the other hand, the wine system is located in an intermediate position (see Chart 11).

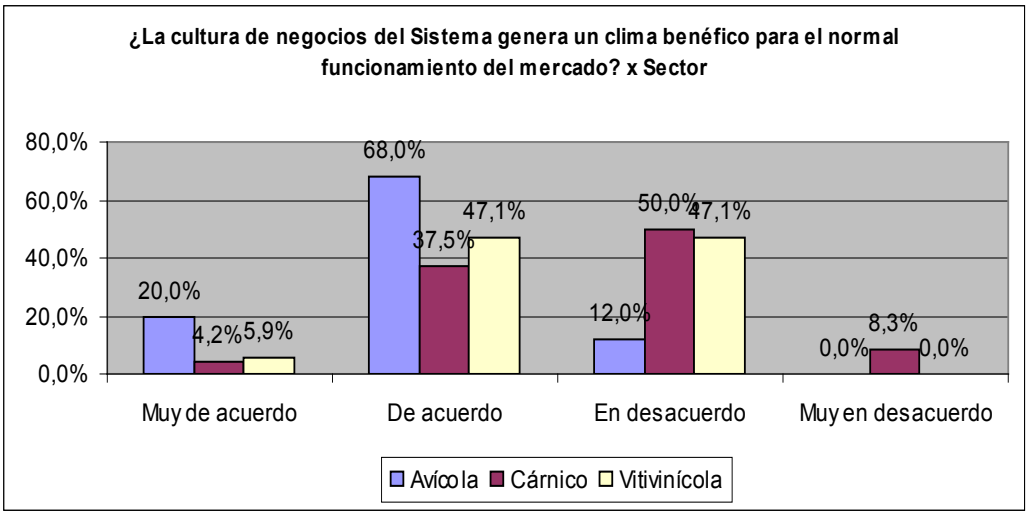
Chart 11. Does the system's business culture benefit the development of designs that generate net profits for all the agents? (by sector).[172]



Source: the authors.

Once again, as we continue with the business culture at sector level, we observe that the poultry sector shows good performance results –in this case in reference to a beneficial climate for the normal functioning of the market– in a very advantageous position with respect to the beef and wine sectors. 88% of those surveyed answered "agree" or "strongly agree" when asked whether the business culture benefits the normal functioning of the market. On the other hand, the beef production sector offers an opposite view: 58.3% of those surveyed "disagree" or "strongly disagree". Between them, the wine chain concentrates 94.2% of those surveyed between the "Agree" and "disagree" values in exactly the same proportion (47.1% each) (see Chart 12).

Chart 12. Does the system's business culture generate a beneficial climate for the normal functioning of the market? (by sector).[173]



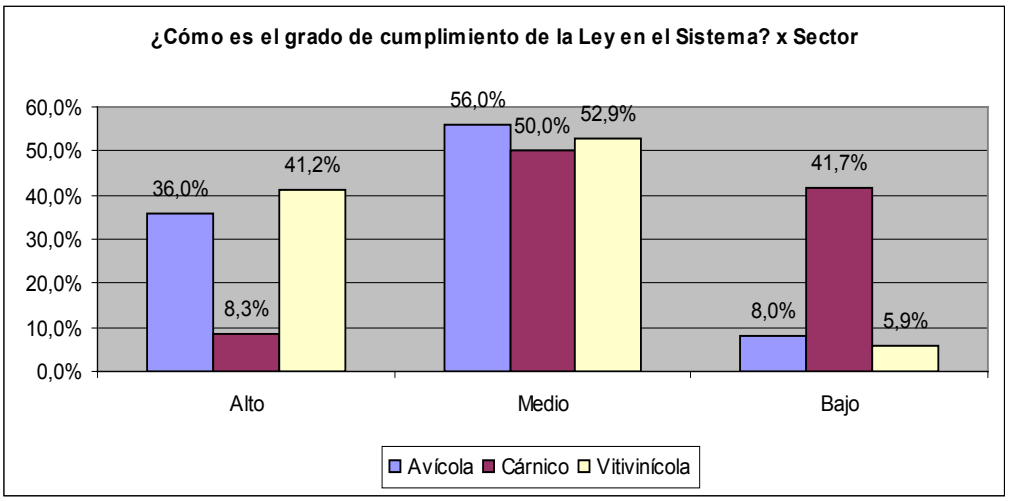
[172] "Muy de acuerdo": strongly agree; "de acuerdo": agree; "en desacuerdo": disagree; "muy en desacuerdo": strongly disagree

[173] "Muy de acuerdo": strongly agree; "de acuerdo": agree; "en desacuerdo": disagree; "muy en desacuerdo": strongly disagree

Source: the authors.

Enforcement of the law is a direct indicator of the normal, balanced functioning of any economic sector related to the formal production of goods and services, and, similarly, it alludes explicitly to the business culture of that sector. In the case of the beef sector, performance in this area is strongly regressive, with perception levels that indicate scarce observance of the law. In effect, 41.7% of those surveyed stated that the degree of institutional enforcement in the sector was "Low", a significant number if we take into consideration that only 8% and 5.9% of those surveyed answered the same for the poultry and wine sectors, respectively (see Chart 13).

Chart 13. What is the level of enforcement of the Law? (by sector).[174]



Source: the authors.

5. Analysis of results and conclusions

In principle, there is no doubt that the poultry business system shows the greatest social capital development throughout the sample. The trust level expressed by its members shows its capacity to solve the problems presented by collective action in the real business; this is the opposite of what happens with the beef system, while the wine system remains in the middle. This coincides with Putnam's statement (1993; p.171) that trust and reciprocity explain why certain communities reach higher levels of economic and democratic development than others. This level of trust, in turn, makes possible a higher level of coordination among the different areas of the productive process, flows of information that are perceived to be trustworthy and sufficient, and therefore a low level of breaches of contract. All this minimizes the problems of adverse selection and moral hazard, which constitute the axis of information asymmetry. The lack of information asymmetry, a determining factor of imperfect contracts, is directly related to low transaction costs.

[174] "Alto": high; "Medio": medium; "Bajo": low.

The poultry system registers a strong perception that tends to recognize an increase in trust in the last few years; such is not the situation in the other two cases. The speed and efficacy with which the poultry system managed to adapt to changes were largely due to the characteristics of the organizational group. In an agrifood system, the set of distortions generally appears characterized as of high consequence. In the reality of globalized agrifood businesses, a situation of strong changes in the environment is the only thing permanent (Ordóñez, 1999).

The poultry industry, through individual behavior based on the generation of trust within the system to which it belongs, was able to develop associations, companies, supply chains, networks or societies in their widest sense, capable of generating competitive keys for a better economic development of its business and of the subsector as a whole. The reputation of the members of the poultry subsector and the flow of information were two important variables to sustain a greater development of social capital and possibly a greater productivity of the poultry system as a whole. Reputation may be understood as informally transmitted knowledge, based on personal relations through which the information is channeled, which accounts for the level of trust in the sector. In the poultry production chain, reputation is ostensibly better valued (88.5% High) than in the beef sector (76.3% High) and in the wine sector (74.1% High), both a good ten points behind. The flow of information in the poultry sector registered clearly higher frequencies (42.9% High), while the beef sector perceives the information channels of the sector most negatively (36.8% Low).

Summarizing, when two parties create value jointly by doing business with each other and can continue to do so throughout the years, surely neither party will incur in ex post opportunistic conducts for fear of losing the benefits of the relationship or relational rent (Levin, 2003). When long-term profits are greater than those obtained by means of short-term opportunistic actions, it can be said that there exists a high level of enforcement of the relationship. Durlauf & Fafchamp (2005) describe trust as *"the expectation or optimistic belief in the behavior of the other agent."* It is for this reason that trust constitutes an indispensable value as an ingredient for the creation and sustainability of a relationship between parties or relational rent.

It is also clear that the livestock and beef system seems to embody the opposite scheme: low levels of trust and conflictive interrelation model between the agents of the productive chain.

Conflicts due to contract incompleteness and its consequences are frequent in the beef industry. Almost 60% of those surveyed has declared some medium to high degree of breaches of contract. Similar figures can be seen in the wine system. In the case of the poultry system, the opposite situation applies, since over 80% of the participants acknowledged a low degree of breaches of contract. Contractual distortions may be overcome by means of positive arrangements between the parties involved. The role of trust is important in the construction of that positive, competitive situation between the parties involved in a sector (Ordóñez, 1999). That is, the wine and beef industries not only present a high-medium breach of contract but are also probably deficient, due to lack of trust, in their capacity to solve conflicts with low transaction costs.

As for the level of collective action, the poultry sector presents the highest levels (38.5% High; 53.8% Medium). This indicates a higher level of union coordination and interdependency among the agents that are part of the business system. On the contrary, the beef sector perceives the greatest difficulties to carry out joint actions (61.5% Low); this fact suggests a high level of atomization of the associations that represent the sector's actors, a low level of participation in groups that definitely threatens the organizational capacity of the sector. The wine sector again shows an intermediate position. In fact, 50% of those surveyed saw the level of coordination within the sector as "Medium."

In reference to business culture, the poultry sector clearly creates business designs that generate net profits for all agents, since 88% of those surveyed answered "Agree" or "Strongly Agree". On the contrary, the beef sector presents a business culture in which business designs are beneficial only to part of the chain. It is for this reason that 43.5% of those surveyed answered "Disagree" and 17.4% answered "Strongly Disagree" when asked whether the business design culture generates net profits for all agents in the system. This evidences a strong systemic imbalance that is, of course, directly related to perceptions measured in the preceding variables: a deficient flow of information, low trust levels and little capacity for collective action. On the other hand, the poultry sector has developed high trust levels, a solid flow of information and a strong tendency towards technification and the development of areas capable of offering added value. 84% of those surveyed stated that the business culture of the Argentine poultry system promotes the development of designs that generate net profits for all agents. Thus, it can be said that the poultry and beef sectors represent opposing business, management and organization models, while the wine system rests in an intermediate position.

In other words, a business culture that generates designs that are beneficial to all agents of the system will allow a greater level of respect for contracts (formal and informal) and therefore lower levels of conflict and transaction costs. In the poultry sector there is complex coordination or transaction; greater added value was created; and the relationship under contractual forms ends up being more efficient that the spot market. Following Jensen & Meckling (1976), in the poultry example the agent enjoys more specific knowledge on the subject and therefore has access to more information. In an asymmetry situation, opportunistic behaviors in a broad sense may appear (Ordóñez, 1999). This concept may be related to the well known, erroneously called "Integrated" poultry business design, in which, according to Williamson (1999), the governance structure applied in the contract, not vertical integration.

In this sense, while most economists have generally paid great attention to the development of formal mechanisms or contracts, very few studies exist on the possibility of reducing conflicts or diseconomies based on informal arrangements or mechanisms. There is even a certain admission of the lack of adaptability and flexibility of formal contracts to offer solutions in an environment of strong turbulences. This reinforces the importance of trust as an instrument for effective coordination beyond the formality of the contract –or the lack of it.

However, and perhaps as a product of a weak institutional environment, the Argentine poultry system presents a higher number of formal contracts and, as we have seen, a greater

respect for their compliance, regardless of their incompleteness. There exists a low level of opportunism, and therefore a lower level of transaction costs. Different is the case of the beef and the wine sectors. There exists in both a larger number of informal contracts, which, according to some authors, would allow greater flexibility to change agreements between parties and even a better position in the face of changes in the system in general. Nevertheless, in these two sectors, a lax institutional environment and medium/low trust levels, in addition to a business culture not very beneficial for the group, generates higher breaches of contract and higher levels of conflict.

In the absence of a legal system to support informal contracts, enforcement of what is agreed by those involved is very important; it is here that social capital allows these coordination mechanisms to be more effective. Of course, there are special circumstances in both sectors in which functioning costs are low, respect for contracts is high and, consequently, there exists a greater creation of value in the final product at both ends of the system, that it, the producer and the consumer.

It must also be mentioned that the lack of formal contracts and of State control, to a greater extent in the beef sector than in the wine sector, favors the fiscal, commercial and health double standard (this is not the case for wine). In that sense, the low enforcement of the set of formal (laws, contracts, political systems, organizations, markets, etc.) and informal (norms, traditions, customs, value systems, religions, sociological tendencies, etc.) rules of conduct, i.e., the institutions, that facilitate coordination and rule the relations between individuals or groups (Kherallah & Kirsten, 2001), adds greater uncertainty to human interaction (North, 1990).

To sum up, we can observe that the variables studied –Trust, Collective Action and Cooperation and Ethics– present different values based on the systems studied. The poultry system shows high levels of all three variables; the wine system shows medium levels, and the livestock and beef system shows low levels. This has a direct effect on the level of social capital in each system analyzed.

6.References

Adler, P.S., & S. Kwon. 1999. Social capital: The good, the bad, and the ugly. Modified version of a paper presented at the 1999 Academy of Management Meeting, Chicago, IL.

Alchian, A.A. & H. Demsetz. 1972. Production, information and economic organization. American Economic Review. Vol. 62 (pp. 777-795).

Aoki, M. 2001. Modeling aggregate behavior and fluctuations in economics: Stochastic views of interacting agents. UCLA Economics Online Papers 142, UCLA Department of Economics.

Arrow, K.J. 1974. The limits of organization. Norton, New York. Bain.

Barry, P.J. 1995. Industrialization of U.S. Agriculture: Policy, research and education needs. Agriculture and Resource Economics Review 24(1), 128-135.

Coleman, J. 1988. Social capital in the creation of human capital. American Journal of Sociology 94 Supplement S95-S120. University of Chicago.

Cook M.L. & F.R. Chaddad. 2004. Redesigning cooperative boundaries: the emergence of new models. American Journal of Agricultural Economics 86 (N° 5): 1249-1253.
Cote, S. & T. Healy. 2001. The well-being of nations. The role of human and social capital. Organisation for Economic Co-operation and Development, Paris.
Durlauf, S. & M. Fafchamps. 2005. Social capital. Handbook of Economic Growth, en: Philippe
Evans, P. & J. Stephens. 1988. Development and the world economy. En: Smelser, N (Ed.), Handbook of Sociology. SASE Publications, Newbury Park, CA, pp. 739-773.
Frank, R.H. 1988. Passions within reason: The strategic role of emotions. New York: Norton.
Fukuyama, F. 1995. Social capital and the global economy. Foreign Affairs. 74(5):89-03. In Halpern, D. (1999). Social capital: The new golden goose. Faculty of Social and Political Sciences, Cambridge University. Unpublished review.
Gambetta, D. 1988. Can we trust trust? In D. Gambetta (Ed.), Trust: Making and breaking cooperative relations: 213-237. New York: Basil Blackwell.
Gargiulo, M. & M. Benassi. 2000. Trapped in your own net? Network cohesion, structural holes, and the adaptation of social capital. Organization Science, Vol. 11, No. 2, March-April, 183-196.
Granovetter, M. 1985. Economic action and social structure: the problem of embeddeness. American Journal of Sociology, 91:481-510.
Halpern, D. 1999. Social capital: The new golden goose. Faculty of Social and Political Sciences, Cambridge University. Unpublished review.
Hansen, M.H. & J.L. Morrow. 2000. The role of trust and governance in managing farmers cooperatives: Maximizing opportunities while minimizing opportunism.
Hardin, R. 2003. The free rider problem. Stanford Encyclopedia of Philosophy.
Hart, O.D. 1995. Firms, contracts and financial structure. Oxford: Clarendon Press.
Hart, O.D. & B. Holmstrom. 1986. The theory of contracts. En: T. Bewley, ed., Advances in Economic Theory. Cambridge: Cambridge University Press.
Jensen, M. C. & W.H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, vol. 3, núm. 4, octubre, pp. 305-360.
Kawachi, I.; B. Kennedy; K. Lochner & D. Prothrow-Stith. 1997. Social capital, income inequality, and mortality. American Journal of Public Health 87 (9) 1491-1498.
Kherallah, M. & J. Kirsten. 2001. The new institutional economics. Application for agricultural policy research in developing countries. Markets and Structural Studies Division. International Food Policy Research Institute (http://www.ifpri.org). USA.
Llach, J.; M. Harriague & E. O'Connor. 2004. La Generación de empleo en las cadenas agroindustriales. Study for the Fundation Producir Conservando. May.
Lazzarini, S.G.; F.R. Chaddad & M.L. Cook. 2001. Integrating supply chain and network analysis: The study of netchains. Journal on Chain and Network Science. 1 (1): 7-22.
Levin, J. 2003. Relational incentive contracts. American Economic Review. American Economic Association. Vol 93(3), pages 835-857.
Lynch, J.; P. Due; C. Muntaner & G. Davey Smith. 2000. Social capital: Is it a good investment strategy for public health? Journal Epidemiology Community Health 54: 404-408.
Macaulay, S. 1963. Non-contractual relations in business. American Sociological Review, 28: 55-70.

Milgrom, P. & J. Roberts. 1992. Economics, organization and management. New Jersey: Prentice Hall.

North, D.C. 1990. Institutions, institutional change and economic performance. Cambridge: Cambridge University Press.

Ordóñez, H.A. 1999. Nueva economía y negocios agroalimentarios. Programa de Agronegocios y Alimentos. Facultad de Agronomía. UBA.

Ordóñez, H.A.; S.I. Senesi & M.F. Daziano. 2005. Food processing and packaging machinery in Argentina. Programa de Agronegocios y Alimentos and Dutch Embassy. See www.agro.uba.ar/agronegocios.

Pareto, V. 1893. Considerazioni sui principi fondamentali dell'economía politica pura. En la revista Giornale degli Economisti.

Putnam, R. 1993. Making democracy work: Civic traditions in modern Italy. Princeton: Princeton U. Press.

_____1995. Bowling alone: America's declining social capital. Journal of Democracy 6 (1) 65-78.

_____2000. Bowling alone: The collapse and revival of American Community. New York: Simon & Schuster.

Sautú, R.; P. Boniolo; P. Dalle & R. Elbert. 2005. Manual de metodología: construcción del marco teórico, formulación de los objetivos y elección de la metodología. Buenos Aires: CLACSO.

Sened, I. 1997. The political institution of private property. Cambridge University Press.

Stiglitz, J.E. 1988. Economic organization, information, and development. In Handbook of Development Economics, Chenery, H. and Srinivasan, T. N. (eds.), Amsterdam: North Holland.

Weingast, B. An Endogenous Role for Sovereignty. Politics and Society.1996.

Wilkinson, R. 1996. Unhealthy societies: The afflictions of inequality. London: Routledge.

Williamson, O. 1999. Strategy research: Governance and competence perspectives. Strategic Management Journal, 20 (12), 1087-1108.

Woolcock, M. 2001. The place of social capital in understanding social and economic outcomes. ISUMA Canadian Journal of Policy Research 2 (1) 11-17.

Zylbersztajn, D. 1996. Governance structures and agribusiness coordination: A transaction costs economics based approach. Research in Domestic and International Agribusiness Management. Editor Ray Goldberg. Graduate School of Business Administration. Harvard University. Vol. 12.

CAMBIO DE PARADIGMA DEL SECTOR CITRÍCOLA EN LA PROVINCIA DE CORRIENTES: EL CASO DE COOSANFRA

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Abstract
El mercado internacional de cítricos se caracteriza por ser cada vez más competitivo, observándose que los países compradores son vez más exigentes en términos de calidad. Las ventajas comparativas de Argentina han permitido que el país se posicione como un proveedor mundial de cítricos en contraestación del hemisferio norte. Sin embargo, el Sistema de Agronegocios de citrus de naranja y mandarina se ha caracterizado tradicionalmente por poseer una baja capacidad de crear y capturar valor: hay una baja articulación de los agentes involucrados, un alto nivel de intermediación, oportunismo y costos de transacción y a su vez, coexiste un circuito informal de comercialización y distintos estándares sanitarios. Estos aspectos terminan por ser restricciones a la competitividad de la actividad. La "Cooperativa Colonia San Francisco Ltda" (COOSANFRA) en el Departamento de Monte Caseros, Provincia de Corrientes, emerge un modelo organizacional que representa un cambio de paradigma entre los citricultores de la zona. A través de la conformación de una Cooperativa, tomaron un rol más activo en la comercialización de su producción, adaptándola a la demanda del consumidor global cambiando el paradigma del tradicional sistema de agronegocios del citrus tradicional de Corrientes.

Key words: Nueva Economía Institucional - Citrus –Agronegocios – Cooperativa – Estudio de Caso

CAMBIO DE PARADIGMA DEL SECTOR CITRÍCOLA EN LA PROVINCIA DE CORRIENTES: EL CASO DE COOSANFRA

1. Planteo del problema

Los sistemas agroalimentarios están atravesando fuertes cambios producto de un escenario global turbulento. Zylbersztajn (1996), Ordóñez (1999) y Neves (2000) señalan como grandes perturbaciones al sistema agroalimentario a:

- La globalización
- Los cambios en la vida cotidiana, en los hábitos de los consumidores y las crecientes exigencias en seguridad, salud alimentaria, preocupación por la salud, generación de empleo, origen y etiquetado del producto,
- Las creciente concientización y entrada en vigencia de regulaciones para proteger el medio ambiente y el derecho de los consumidores.
- La creciente tendencia a la individualización del consumo masivo, el nuevo rol del consumidor, la reversión de la cadena; y finalmente el impacto del supermercadismo, con su doble rol de transmisor de las exigencias del consumidor; y a la vez, orientador de la cadena de valor. Presentación del producto.
- La revolución tecnológica en sentido amplio: la biotecnología, informática, comunicaciones, transporte, logística, los alimentos funcionales, trazabilidad, uniformidad etc.

La dinámica de estos cambios y la disponibilidad de recursos en relación a la demanda, ha determinado que países como los de la Unión Europea y economías emergentes asiáticas se conviertan en importantes importadores de materias primas y alimentos. Esto es una oportunidad para Argentina, donde las ventajas comparativas posicionan al país como un potencial proveedor de alimentos y materias primas a nivel mundial. El desarrollo rural y agroindustrial ofrece además la oportunidad de contribuir al desarrollo regional y a la disminución de la pobreza.

En la actualidad los consumidores exigen no sólo variedad, sino también calidad, uniformidad y valor. Gran parte de la agricultura debe, en consecuencia, pasar de una filosofía de "aquí está lo que producimos" a una situación en la que los productores deben tener en cuenta el deseo del consumidor. Hoy en día, las nuevas tecnologías hacen posible asegurar que los productos agrícolas y los alimentos tengan realmente las características que los consumidores demandan (Drabenstott, M.1995; Boehlje, M. 2000).

Sin embargo, los sistemas de agronegocios enfrentan el desafío de adaptarse y rediseñarse en pos de satisfacer a estos nuevos consumidores globales. Dada la velocidad del cambio tecnológico, la evolución de las tendencias del consumo y la creciente competencia en el mundo de los agronegocios, la innovación ya no depende de las firmas en forma individual sino de la red en que se encuentran insertan, como ser una cadena de abastecimiento (Nijhoff-Savvaki et al, 2009).

La estrategia competitiva más factible para los productores, la industria, los distribuidores, de hecho, para toda la comunidad de agronegocios, es desarrollar estrategias alternativas focalizadas en procesos colectivos, a fin de apalancarse en las iniciativas privadas para reorganizar la cadena de suministro alimentaria y de agronegocios. La acción colectiva debe estar basada en la construcción de sólidas redes de agronegocios y la búsqueda de economías de escala. Cabría considerar en algunos casos la búsqueda de economías de especialización, la promoción de productos de valor

agregado y la organización de redes de suministro (Ordóñez & Nichols, 2003) a fin de satisfacer al consumidor global.

En este escenario la "Cooperativa Colonia San Francisco Ltda" (COOSANFRA) en el Departamento de Monte Caseros, Provincia de Corrientes, presenta un modelo organizacional que representa un cambio de paradigma entre los citricultores de la zona. A través de la conformación de una Cooperativa, tomaron un rol más activo en la comercialización de su producción, adaptándola a la demanda del consumidor global cambiando el paradigma del tradicional sistema de agronegocios del citrus tradicional de Corrientes el cual posee gran cantidad de intermediarios entre la producción y la comercialización. El objetivo de este trabajo es la descripción del caso de la Cooperativa Colonia San Francisco Ltda. como ejemplo de cambio de paradigma institucional, organizacional, tecnológico y comercial en la Provincia de Corrientes.

2. Procedimientos

2.1. Marco Metodológico

La investigación es de carácter exploratorio, teniendo en cuenta que busca desarrollar, clarificar y/o modificar conceptos e ideas, con una visión de formular problemas más precisos o hipótesis que pueden ser formuladas en estudios posteriores. En este sentido, la investigación se basa en cuestiones cualitativas y a aplicaciones prácticas (Gil, 1994).

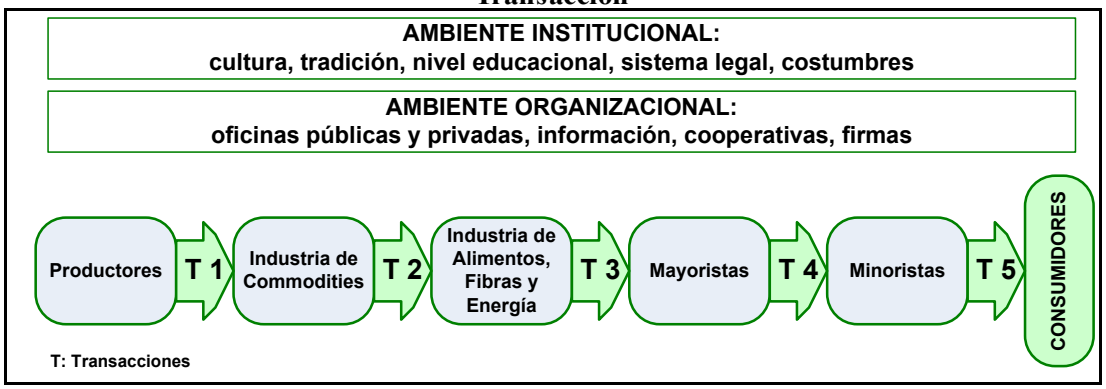
Se realiza un estudio de una Cooperativa Citrícola, en Monte Caseros Corrientes. Se utiliza el método del estudio de caso, ya que es un método adecuado para analizar situaciones donde una pequeña muestra permite obtener consideraciones más profundas sobre la complejidad en interdependencias de factores vinculados a una decisión (Yin, 1989). Según indican varios autores (Petersen, 1997; Sureshwaran & Hanks, 1998), el objeto de este tipo de estudio es desarrollar modelos teóricos no cuantitativos ajustados a un contexto a través de la inducción, para generar conocimiento empírico- práctico capaz de ser trasferido a circunstancias similares.

La principal fuente de información fueron las entrevistas a expertos y la realización de un viaje a campo. Esta información primaria relevada fue complementada con fuentes de información secundaria – datos estadísticos de SENASA; Ministerio de Agricultura Ganadería y Pesca y publicaciones científicas relacionadas – con el fin de lograr obtener datos cualitativos y cuantitativos de los sistema y el caso bajo estudio.

2.2. Marco Conceptual

El abordaje de los Sistemas de Agronegocios (SAG) tiene su origen en dos conceptualizaciones diferentes desarrolladas en diferentes lugares y épocas pero que muestran similitudes respecto de la estructura de los sistemas productivos (Neves, 2007; Zylbersztajn & Neves, 2000; Batalha, 2001; entre otros): el concepto de "Agronegocios" de Davis & Goldberg (1957) y Golberg (1968), y el concepto de "filiére" originado en la escuela francesa de Organización Industrial. Zylbersztajn (1996) se apoya en los aportes de estas dos corrientes en cuanto a la capacidad descriptiva y la definición de sistemas verticales en torno a un producto y plantea también como temas relevantes a la coordinación, las limitaciones del mecanismo de precios, la influencia del ambiente institucional, los aspectos distributivos y el ambiente competitivo (Teoría de la Moderna Organización Industrial). Por ello, el abordaje de Sistema Agroindustrial (SAG) se estudia como un conjunto de transacciones entre empresas especializadas con el objetivo de satisfacer a los consumidores. La Figura 1 presenta este modelo.

Figura 2: Sistema de Agronegocios desde la perspectiva de la Economía de los Costos de Transacción



Fuente: Zylbersztajn, 1996

Relacionado a ello, según Zylbersztajn y Neves (2000) los SAG contienen los siguientes elementos fundamentales para su análisis descriptivo: los agentes, las relaciones entre ellos, los sectores, las organizaciones de apoyo y el ambiente institucional. A partir de esto es que los autores definen el modelo teórico de ***red de la empresa*** (network de la empresa). En este sentido, el proceso es analizar una empresa y su conjunto de proveedores y distribuidores, las relaciones existentes entre ellos y la relación con el ambiente. En esencia es un ***abordaje de interacción y relaciones*** (Neves, 2007).

El abordaje de la Nueva Economia Institucional se adopta en dos niveles: macro y microanalítico. El nivel macro trata el ambiente institucional, las reglas de juego, que afectan el comportamiento y la performance de los actores y en el cual las organizaciones se desenvuelven. Williamson (1993) lo describe como el conjunto de reglas de juego de índole política, social y legal que se establecen como base para la producción, intercambio y distribución. A nivel microanalítico, el abordaje de la teoría de la Economía de los Costos de Transacción se utiliza para estudiar el ambiente organizacional. Esto se refiere a la dinámica de las transacciones entre los actores del sistema y la forma de llevar a cabo dichas transacciones (firma, formas híbridas o mercados) y los costos de transacción ex –ante o ex – post originados en las transacciones.

A nivel organizacional, la construcción de una red de negocios requiere de la innovación tecnológica y una sólida cultura para convocar y alinear los agentes en una acción colectiva. Por esta razón, también es importante encontrar una alineación entre el liderazgo, la estrategia y la cultura de la asociación (Ordóñez, 1999). En ese sentido, los conceptos de acción colectiva se utilizan con el fin de comprender las interacciones sociales entre los agentes en estudio, ya que están en la búsqueda de intereses comunes que requieren de acciones conjuntas que se pueden realizar a través colectivamente pero no por separado (Nassar, 2001). Olson (1999, en Neves, 2007) establece que los grupos pueden ofrecer bienes colectivos, pero argumenta que la presencia de polizones (free riders) es una amenaza. La creación de asociaciones implica dos tipos de costos para sus miembros: estructura y actividades de la asociación, los costos de mantenimiento y costos de transacción (gastos de personal y directores de los costes de seguimiento, negociación, comunicación, rendimiento de la organización y la prestación de los costes de los bienes colectivos). Cada miembro evalúa si esos costos son más altos o más bajos que el beneficio probable que la organización puede generar (Neves, 2007). El desarrollo de grupos de actores, tanto vertical como horizontal es clave para la mejora de la competitividad, ya que de esta forma se mejora la confianza, aumenta la información en el sistema y se promueven inversiones de activos más específicos.

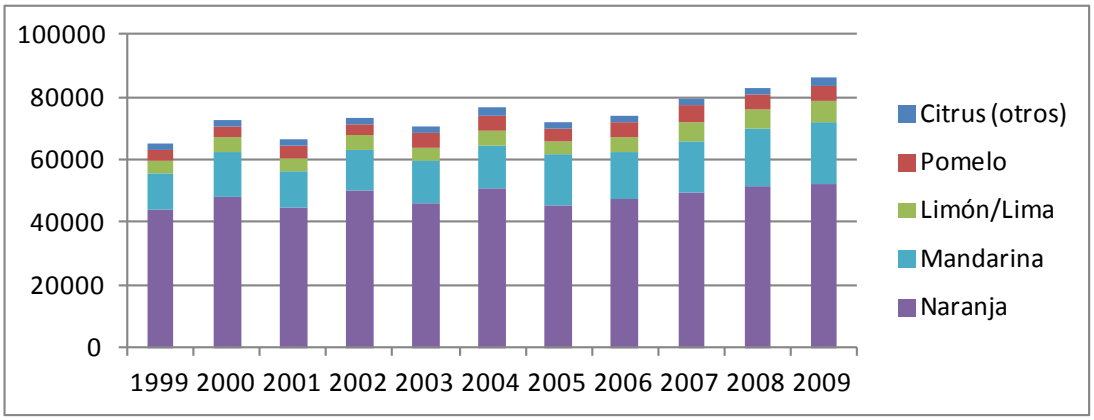
Junto con el estudio del ambiente tecnológico -el nivel tecnológico del sector, sus carencias tecnológicas, su capacidad de innovación, la inversión en capital tecnológico, el grado de alineación de los tres entornos institucionales, organizacionales y tecnológicos- y el nivel de costos de transacción generados determinará la performance del ambiente comercial y el nivel de competitividad del sistema (Ordóñez, 2000). El nivel de competitividad de una sociedad y su calidad de vida son una consecuencia directa de su capacidad para crear conocimiento colectivo y de co-innovación. Esto debe lograrse a través del consenso en los procesos de acción colectiva, orientada de una visión compartida, una misión colectiva y los metas comunes (Ordóñez, 2000).

3. El agronegocio del citrus argentino

3.1. Escenario internacional de la citricultura

En el periodo 1999-2009 la producción mundial de citrus se incrementó un 32%, alcanzando para ese último año las 86 millones de toneladas. El principal producto cítrico es la naranja, que representa el 64% de la producción mundial, seguida por la mandarina 24%, el pomelo (8%) y el limón (6%) (Figura 1).

Figura 1: Evolución de la producción mundial de cítricos 1999-2009.



Fuente: Elaboración PAA sobre datos de USDA

El 79% de la producción mundial de citrus se concentra en 7 países: China (25%), Brasil (21%), Estados Unidos (14%), Méjico (8%), España (6%), Italia (4%) y Argentina (3%)[175]. La producción mundial de cítricos continuará creciendo a tasas promedio anuales del 3% o menos. El crecimiento va a estar explicado no tanto por el incremento de la superficie plantada sino por la reconversión de la base productiva actual, hacia variedades de mayor productividad y adaptadas a las exigencias del consumidor. Las principales tendencias muestran que existe una mayor valoración por cítricos de variedades sin o con pocas semillas, cascaras oscura y lisa y fácil pelar, color de la pulpa rosada oscura, Brix alto (alto contenido de azúcares) y sabores intensos (Williams, 2009).

La producción de cítricos tiene dos destinos: como fruta fresca para consumo humano directo, y la industria procesadora que absorbe alrededor del 38% de la producción mundial, donde el principal producto es el jugo de naranja (Justo y Rivera, 2009). De las 2,2 millones de toneladas de jugo de naranja producidas en 2009, Brasil participó 61% de la misma, seguida por la EEUU, con el 28%. Brasil concentra el 86% del mercado de exportación de jugo de naranja, siendo el principal comprador mundial la UE con 57% de las compras, seguida por EEUU que participa con el 27%

[175] Fuente: Federcitrus sobre datos de USDA

En cuanto a la exportación de cítricos frescos Sudáfrica es el principal exportador de naranjas, y junto con Egipto y la UE participan del 68% del mercado. Por su parte, China lidera el mercado de exportación de mandarina con el 36%, seguida por Turquía y Marruecos (17% cada uno). En la exportación de limón, Méjico, Turquía y Argentina concentran el 67% de las exportaciones. Finalmente, en la exportación de pomelos, el liderazgo es de Sudáfrica, con 24% del mercado, seguida por EEUU (20%) y Turquía (17%).

Los principales países importadores de estas frutas se encuentran en el Hemisferio Norte, en donde se ubica la mayor parte de la población mundial y a su vez los mayores niveles de ingreso (Justo y Rivera, 2009), lo que a su vez se condice con la demanda de fruta fuera de estación. Los países de la Unión Europea representan alrededor de un tercio el mercado que en los cuatro principales cítricos. Rusia participa con 16% de la importación mundial de naranjas, 29% de mandarinas 14% de limones y 13% de pomelo. EEUU se perfila como un importante comprador de limón (27% del mercado). Los países de cercano oriente son también importadores relevantes, en particular en el mercado de naranja y mandarina. La Unión Europea se abastece principalmente de Sudáfrica, Argentina y Turquía, así como del comercio intracomunitario. Le sigue Rusia cuyos oferentes son Marruecos, Turquía y Argentina. Rusia en los últimos años ha aumentado el nivel de importación de cítricos, atribuible principalmente al incremento de la renta de sus consumidores. EE.UU. se abastece de Méjico y de la UE. Japón y Canadá tienen como principal proveedor a EE.UU (Justo y Rivera, 2009).

El mercado internacional de cítricos se caracteriza por ser cada vez más competitivo, observándose que los países comprados son vez más exigentes en términos de calidad, requiriendo la implementación de estándares y protocolos que permitan su aseguramiento, lo que representa un desafío para los países productores y exportadores (Justo y Rivera, 2009).

3.2. La citricultura en Argentina

La citricultura en ocupa un lugar importante en la economía Argentina como actividad generadora de empleo y riquezas: participa con alrededor de 100.000 puestos de trabajo y factura anualmente U$S 1300 millones. Anualmente entre la producción de limones, naranjas, mandarinas y pomelos se producen casi 3 millones de toneladas[176]. Salvo en el caso del limón y en algunas explotaciones de mandarina, la producción citrícola argentina se orientó a la demanda local. Esto significó que prácticamente no existan estándares de calidad como así tampoco recambio de variedades acordes a la demanda externa (Segovia, 2003).

Argentina es el principal productor de limones a nivel mundial, la producción de los mismos alcanza el 50% de la producción total de cítricos del país con casi 1,5 millones de toneladas producidas durante 2009. El 77% de la producción de limones tiene como destino la industria alimenticia principalmente la industria de bebidas. A su vez, Argentina es el 8º país productor de naranjas del mundo, con 840.000 tn en la campaña 2009/2010, y el 8º productor mundial de mandarinas con 370,000 tn en esa misma campaña. Las exportaciones en 2009 alcanzaron las 142.017 tn de naranja por valor de U$S 73,3 millones y 114.458 tn de mandarina por valor de U$S 80,9 millones[177]. En la tabla 1 se resumen los principales indicadores del sector citrícola en Argentina para el año 2009.

[176] Fuente: Federcitrus

[177] Fuente: SENASA

Tabla 1: Indicadores relevantes del sector citrícola año 2009

Indicador	
Principales productos	Limones, naranjas, mandarinas y pomelos.
Hectáreas implantadas (aprox.)	170.000
Posición de Argentina como productor mundial de citrus	6to
Principales provincias productores de citrus	Tucumán, Entre Ríos, Salta y Corrientes
Exportaciones totales de citrus (limón, mandarina, naranja y pomelo)	528.170 tn. u$s 358.559.000
Principales Destinos	Rusia, Holanda, España e Italia
Subproductos de la actividad citrícola	Jugos, Aceites Esenciales, Cáscaras Deshidratadas Alimentación Animal

Elaboración PAA en base a datos Federcitrus[178] y SENASA

El 99% de la producción argentina de cítricos se encuentra concentrada en las regiones del Noroeste (Tucumán, Salta, Jujuy y Catamarca) con el 62,7% y Noreste (Entre Ríos, Misiones, Corrientes y Buenos Aires) comprendiendo el 36,2% (Federcitrus, 2010). Dadas las condiciones agroecológicas y el rol de liderazgo que tuvieron las principales empresas productoras Tucumán se posicionó como la provincia más importante en cuanto a la producción de limones. Salta por la producción de Pomelos mientras que Entre Ríos es el principal productor de Naranjas y Mandarinas, seguido por la provincia de Corrientes.

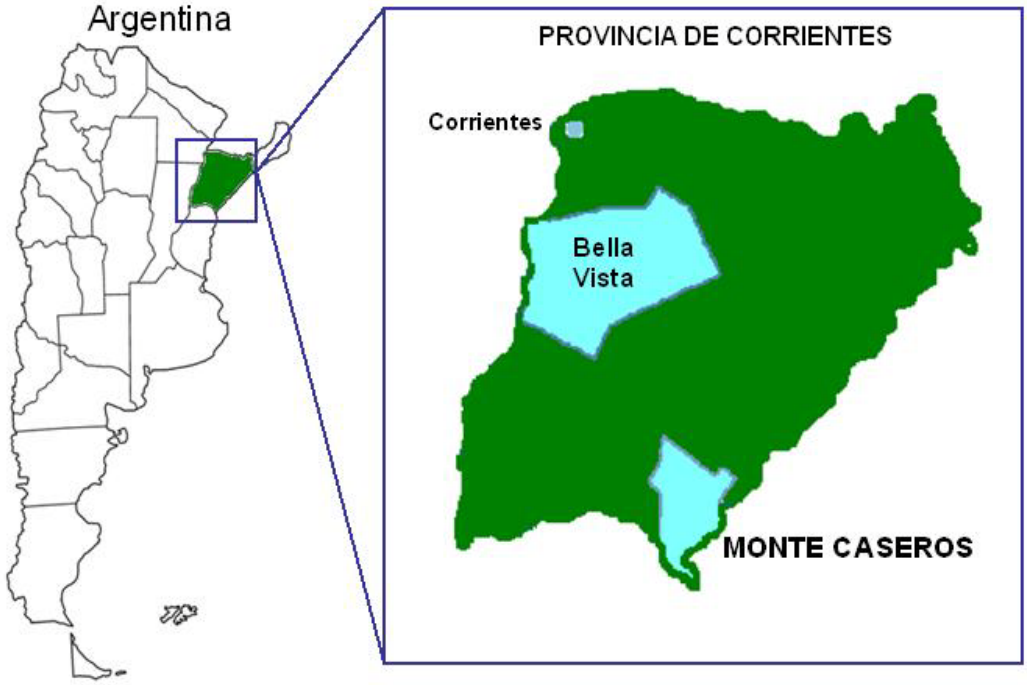
3.3. El Sistema de Agronegocios Citrus de Corrientes

La provincia de Corrientes posee 27.000 hectáreas plantadas de citrus que producen 220.000 toneladas anuales ocupando el 4º puesto como productor de citrus en Argentina (16% del total). Se posiciona como segundo productor de naranjas y el segundo productor de mandarinas, en ambos casos ubicándose por detrás de Entre Ríos. La producción de anual de naranjas es de 130.000 toneladas constituyendo el 60% de su producción de citrus nacional. La producción anual de mandarinas es de 50.000 toneladas. La producción de naranjas y mandarinas de la provincia representa el 25% y el 22% de la producción total nacional respectivamente.

Desde mediados de la década del 90 la producción promedio de citrus de la provincia se incrementó en un 30% pasando de 270 mil toneladas a 350 mil toneladas en esta década (Molina, 2010). La citricultura en Corrientes genera 4.700 puestos de trabajo equivalente. La mayor demanda se produce en el mes de agosto (8.700 puestos) y el menor nivel se produce en enero (2.500 puestos). La producción primaria demanda el 89.2 % de la mano de obra de la actividad, el empaque 7.8 % y la industria procesadora el 3.0 % (INTA, 2009).Se identifican dos regiones productivas en la provincia: una se extiende desde la costa del Río Paraná hacia el centro, el Departamento de Bella Vista, y la otra se encuentra sobre el Río Uruguay, el Departamento de Monte Caseros (ver mapa de la Figura 2).

[178] Fuente: Federcitrus

Figura 2: Ubicación del departamento de Monte Caseros, Provincia de Corrientes.



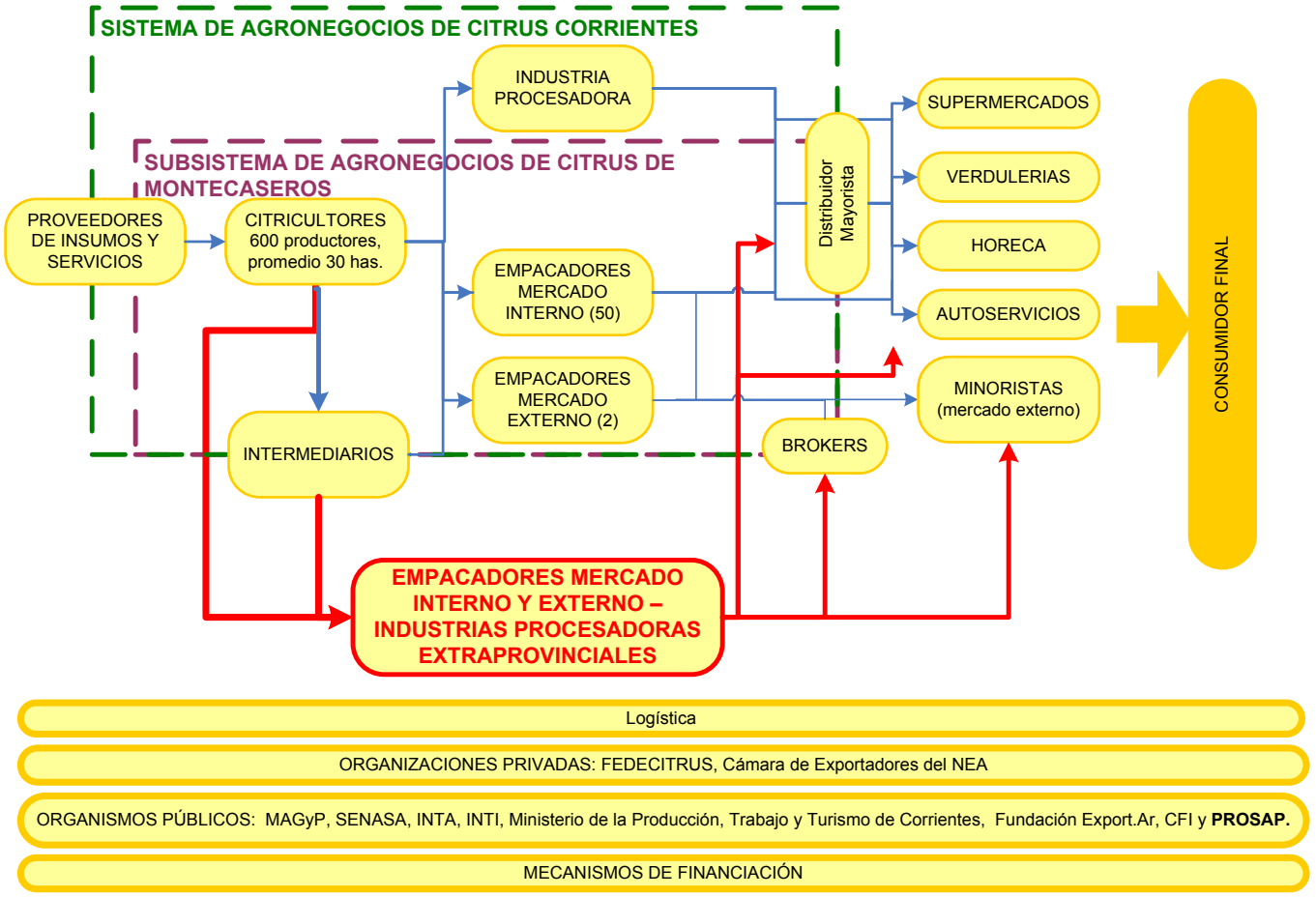
Fuente: elaboración PAA

El departamento de Monte Caseros – foco de estudio de este trabajo- participa en un 61% de la superficie implantada en la provincia, con 16,500 has plantadas. De este total, el 61% se destina a la producción de Naranja, el 36% a mandarina, 16% a pomelo y el restante 13% a limón. Anualmente se cosechan 300.000 bines de frutas cítricas, que representan 88.000 Toneladas. Por su parte el departamento de Bella Vista participa con el 36% de la superficie implantada en corrientes y se ubica como la segunda localidad en importancia de producción de citrus en Corrientes. Esta última se caracteriza por producir citrus para industria mientras que Monte Caseros para consumo fresco.

3.4. El subsistema de Citrus de Monte Caseros

El subsistema de Agronegocios de Citrus de Monte Caseros se compone de distintos agentes que se interrelacionan entre sí: proveedores de insumos y servicios, citricultores, empacadores, intermediarios locales y *brokers* internacionales y la distribución minorista (supermercados, verdulerías, canal HORECA, etc). Eso presenta en la Figura 3 a continuación, así como las interacciones de sus agentes hacia dentro y hacia fuera del mismo.

Figura 3: El Subsistema de Agronegocios de Citrus en Monte Caseros y su interacción con agentes provinciales y extraprovinciales en el Agronegocio Argentino de citrus



Fuente: elaboración PAA

El primer eslabón descrito del subsistema es el de los citricultores. Existen en Monte Caseros alrededor de 600 unidades productoras de cítricos, predominando los medianos y pequeños citricultores que poseen chacras baja a media escala: la superficie promedio ronda las 30 has. Alrededor de un 40% de las chacras tiene una escala de 10 a 25 hectáreas, y 25% de 25 a 50 hectáreas. Los productores citrícolas son típicamente empresas familiares, caracterizadas por una fuerte cultura hacia actividad, lo que tiene sus raíces en la colonización europea realizada a principios del siglo XX. Por lo general, los citricultores poseen una baja capacidad de gestión empresarial y un bajo acceso a información para la toma de decisiones.

La cosecha se realiza de forma manual, por lo que los citricultores contratan trabajadores para la realización de ese trabajo. Existen firmas que proveen ese servicio, y organizan la contratación de los trabajadores.

En la venta de cítricos a las plantas de empaque es frecuente que operen intermediarios, quienes compran en representación de los empacadores. Según su calidad, la producción de cítricos es destinada a empacadores o a la industria procesadora. Operan en el Departamento de Monte Caseros 50 establecimientos empacadores. Estos compran la fruta - 90% del procesado es propio (Pagliaricci, 2009) - y realizan un proceso de lavado, encerado y clasificación. Solo el 45% de la producción local se empaca en el Departamento de Monte Caseros. Por otro lado, sólo dos empacadores están habilitados para exportación de fruta fresca, por lo que esta etapa del proceso productivo se define el destino final de la fruta. En general lo empaques procesan fruta propia.

El principal destino de la producción de Monte Caseros es el mercado interno (80%)[179]. La fruta con destino a consumo en fresco por lo general comercializa a través de distribuidores mayoristas quienes operan en mercados concentradores de los principales centros urbanos del país, y/o abastecen a los distintos formatos de distribución minorista: supermercados, autoservicios, verdulerías, y el canal HORECA.

La industria procesadora se abastece de la fruta de descarte para la obtención de jugos y derivados (cáscara deshidratada, pectinas, aceites esenciales). No existen industrias procesadoras dentro de Monte Caseros, las tres existentes en Corrientes se encuentran en Bella Vista. Sin embargo, por cuestiones de cercanía y costos logísticos los cítricos con destino industrial se envían principalmente a Entre Ríos.

En la exportación de fruta fresca desde empaques habilitados a tal fin, suelen intervenir *brokers* entre el comprador final del producto, que es el punto de venta minorista.

A pesar de que el mercado de cítricos se encuentra en crecimiento, producto de una mayor demanda a nivel mundial, y de las características agroecológicas de Monte Caseros que determinan ventajas comparativas en la actividad, en el funcionamiento del subsistema de citrus de Monte Caseros se observa que existen restricciones y limitaciones a su competitividad, lo cual se analiza a continuación

3.5. Análisis Estructural Discreto

El Subsistema de Agronegocios de Citrus de Monte Caseros no escapa a la realidad de la citricultura de Corrientes en lo que respecta a las restricciones a la competitividad.

En el orden **institucional,** la principal restricción está relacionada a la cultura del negocio: tradicionalmente ha habido una fuerte informalidad en la actividad en la producción, empaque y comercialización de fruta para el mercado interno. Parte de esta problemática está asociada a la normativa vigente, que da lugar a la coexistencia de distintos estándares sanitarios y fiscales en el proceso de empaque, lo que lo que lleva a la competencia desleal entre empresas.

[179] Fuente: Entrevista a realizada Carlos Ramón Morilla - SENASA

A nivel **organizacional**, se observa que hay un fuerte individualismo y bajo nivel de acción colectiva entre los agentes del subsistema, lo que atenta la articulación de los mismos en pos de desarrollar una estrategia conjunta de crecimiento. A su vez existe una gran intermediación entre los productores y el consumidor final haciendo que, a lo largo de la cadena, exista un alto nivel de costos de transacción dada la existencia de oportunismo, información asimétrica, distorsión de precios e informalidad.

Los productores de cítricos poseen un bajo desarrollo de sus estrategias comerciales: las formas más comunes de venta son "en planta". Existe un alto nivel de intermediación en la comercialización (a granel como empacada), y la coordinación es predominantemente vía precio. La información asimétrica para la toma de decisiones, da lugar a un alto riesgo de oportunismo y costos de transacción: existe una alta incertidumbre sobre el precio al cual se venderá la producción y la cobranza efectiva de la venta. Existen diseños organizacionales alternativos tales como las Cooperativas donde se amortigua el impacto de la coordinación vía precio.

Si bien la opción de la venta directa permitiría sortear al intermediario no es una vía muy utilizada, debido a que las empresas les resulta dificultoso poder cumplir con algunas de las exigencias de los supermercados en cuanto a escala, calidad y fechas de entrega (Craviotti, et al 2010).

En el orden **tecnológico**, surgen como aspectos críticos la brecha tecnológica entre los productores en aspectos como (en base a Molina, 2010):

- tecnología de producción en chacra, especialmente en lo que respecta a la riego. El riego permite atenuar eventuales déficit hídricos, el efecto de heladas, contribuyendo a incrementar los rendimientos y calidad de la fruta.
- la producción de variedades no adaptadas a las preferencias del consumidor
- coexistencia de distintos estándares manejo fitosanitario: por un lado, citricultores que trabajan a fin de certificar lotes libres de "cancrosis de los cítricos"[180] y "mancha negra de los cítricos"[181].para exportación a la Unión Europea, y por otro, citricultores que con bajo nivel de manejo fitosanitario, cuyo impacto trasciende los límites de las chacras.
- prevalencia de plagas y enfermedades: entre las enfermedades cuarentenarias la cancrosis es la principal, seguida por el moteado negro, la sarna. La principal plaga es la mosca de la fruta, seguido por el minador de la hoja, ácaro del tostado, cochinilla roja y parlatoria. Estas no solo afectan los rendimientos y calidad de la fruta, sino que pueden representar una restricción para el acceso a mercados externos.
- baja capacidad instalada de infraestructura de empaque y almacenamiento, especialmente para fruta con destino al mercado externo. Actualmente se termina por enviar la mayor parte de la fruta a empacadores exportadores en Entre Ríos.
- escasez de mano de obra especializada para el manejo de las plantaciones, cosecha y procesamiento
- Importantes ineficiencias en el manejo de la producción (a modo de ejemplo según cifras estimadas por el Ministerio de la Producción de Corrientes arrojan que las pérdidas de poscosecha son del 10% en el caso de acondicionamiento y empaque, 20% en el transporte y 20% en el punto de venta. (Molina e Ivaldi, 2007).

En relación a ello, se observa que los citricultores Monte Caseros, a pesar de producir cítricos de calidad que se destinan al consumo en fresco y la exportación, no logran capturar buena parte del valor generado, lo cual es posible de ver en la performance **comercial** del subsistema.

El 80% de la producción local se destina al mercado interno para consumo en fresco o procesamiento. El precio recibido por el productor por mercadería destinada a industria es

[180] Causada por la bacteria *Xanthomonas campestris pathovar citri*
[181] Causada por el hongo *Guignardia citricarpa Kiely*

sensiblemente menor al que se paga por producto fresco, al punto que en muchos casos, no justifica la cosecha (ver Tabla 2).

Tabla 2: Precios pagados en la provincia durante la campaña 2009

Destino	Naranja	Mandarina	Limón	Pomelo
Consumo en fresco	$330	$380	$500	s/d
Industria	$200	$150	$180	$150

Fuente: Molina et al, 2010

Por otro lado, La estacionalidad de la producción genera fuertes variaciones en los precios. La mayor oferta ocurre en el período agosto – octubre. A modo de ejemplo se puede citar que durante la época de cosecha, la fruta con destino a industria llega a tener un valor del 10% de la fruta fresca con destino al mercado interno. Por otro lado, el consumo y los precios internos fluctúan fuertemente con los ciclos económicos del país.

La fruta para consumo en fresco con destino al mercado externo, cuyo valor luego del proceso de selección y empaque puede ser entre un 40% y un 50% superior solo representa el 20% de las ventas de Monte Caseros. Crecer en este segmento requiere no solamente del desarrollo de una estrategia de marketing y ventas adecuada, sino también de la adaptación del producto de forma de poder satisfacer al consumidor global.

Las restricciones y limitaciones planteadas anteriormente del SAG Citrus argentino no distan de las restricciones y limitaciones que poseen los citricultores de Monte Caseros. Existe una baja capacidad de crear y capturar valor, debido a sus dificultades para adaptarse a los estándares de calidad que los mercados globales demandan. Esta situación puede relacionarse a un insuficiente acceso a asistencia técnica y a recursos de capital para inversiones, así como una baja capacidad de coordinar acciones colectivas en pos de trabajar en estos aspectos. Teniendo en cuenta el ambiente de negocios en que se desenvuelve esta la actividad - alto nivel de intermediación, informalidad e incertidumbre que generan altos costos de transacción- muchos productores se han visto forzados a abandonar la actividad, especialmente aquellos con escalas de producción menores a 20 hectáreas.

4. Caso coosanfra, un cambio de paradigma

Como se presentó anteriormente, producto de una predominante orientación al mercado interno, la citricultura argentina está vinculada fuertemente a los ciclos económicos del país. Los productores de Monte Caseros no eran ajenos a esta realidad, donde los altibajos terminan por afectar el nivel de actividad derivando en quebrantos y salidas del negocio. Esta situación era crítica a finales de 2001 y principios de 2002: el cambio institucional apocalíptico rompió las reglas económicas vigentes. Se abrieron y profundizaron los conflictos de interés entre prácticamente todos los actores locales (Ordóñez & Nichols, 2003).

Este fue un punto de quiebre para los productores de cítricos de Monte Caseros: en el año 2002, un grupo de ellos que venía trabajando conjuntamente en la Cooperativa Agropecuaria y de Provisión de Energía Eléctrica Aguará Limitada decidieron reunirse para analizar cómo podían mejorar su situación. Esto dio lugar a la fundación, ese mismo año fundaron la Cooperativa de Transformación y Comercialización San Francisco Ltda. Realizaron las primeras ventas de mandarina y naranja a Paraguay, lo que fue una experiencia alentadora. En 2003, se dio inicio a la construcción un galpón de empaque en el cual se instaló una línea de procesado de frutas cítricas para venta a mercado interno y a países limítrofes. Paralelamente, se dio inicio a una nueva unidad de negocios: compra colectiva y venta de insumos, de forma de poder ofrecer precios más favorables para sus socios. Esto también fue un puntapié inicial para comenzar a trabajar en protocolos de manejo de plagas y enfermedades y aspectos vinculados al manejo de las plantaciones.

Las inversiones fueron realizadas con el aporte de los socios, que veían en esto una posibilidad de agregar y capturar valor. El proyecto capturó el interés del Ministerio de Desarrollo Social y

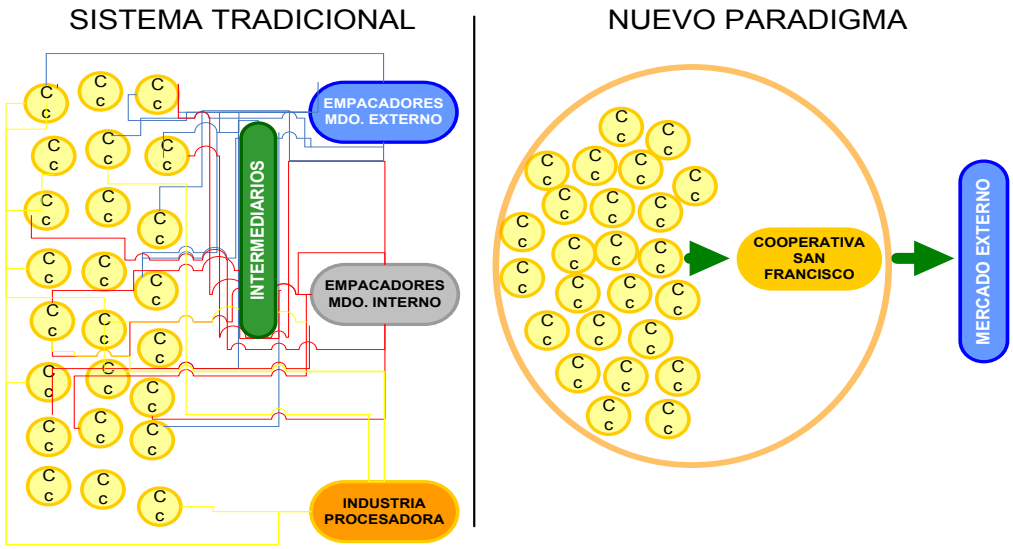
del Ministerio de la Producción de Corrientes, que facilitaron préstamos y subsidios (Altschuler, 2009). En enero de 2004 la planta de empaque propia comenzó a funcionar, empacando fruta para el mercado interno y el externo: por primera vez se exportó con marca propia. La cooperativa se insertó dentro de los programas existentes para el desarrollo de la actividad, como el "Programa de Reposicionamiento de la Citricultura Correntina", que involucra al Gobierno Provincial, al INTA, al SENASA, MCBA, y CFI. Esto permitió comenzar a abordar aspectos como el mejoramiento de la calidad de la fruta; los procesos de empaque; habilitación de galpones y maquinarias; buenas prácticas de manufactura; y los procesos necesarios para insertarse en el negocio exportador.

En relación a ello, la Cooperativa toma la decisión estratégica de reorientar y focalizar las ventas de la cooperativa hacia los mercados externos, ya que en el mercado interno cada vez se tornaba más difícil competir. Incrementar la oferta exportable y posicionar el producto internacionalmente implicaría fuertes inversiones en procesos y productos para sostener el crecimiento en el largo plazo, entre ellos:

- Inversión en infraestructura de empaque, para lo cual era necesario dar inicio a una la construcción segunda nave en el galpón de empaque e incorporar equipamiento.
- Reconversión de plantaciones a productos como mandarina (por ej. de las variedades Okitsu, Ellendale). Siendo Monte Caseros principalmente una zona productora de naranja, tiene como principal competidor Sudáfrica, que exporta a precios a los cuales la Cooperativa no puede igualar.
- Necesidad de invertir en infraestructura en riego, de forma de poder disminuir la alta incertidumbre en cuanto al volumen y calidad de la producción debido a inclemencias climáticas
- Articular acciones para el manejo fitosanitario de los lotes a fin de obtener las certificaciones necesarias para exportar (libre de cancrosis y de mancha negra) y de esta manera ampliar la producción exportable.

En la actualidad la cooperativa está conformada por 25 socios, que poseen de 35 a 50 has de citrus en promedio, representando un total de 1200 has en producción. Con el objeto de equilibrar las relaciones entre los asociados en términos de volúmenes de producción, han desarrollado un sistema de votos y cuotas que implica que cada miembro tiene el mismo poder de decisión en la Cooperativa. A su vez, los productores de cítricos asociados participan de un precio justo, ya que cobra un costo fijo para el proceso y los servicios de comercialización. El éxito de la Cooperativa San Francisco se basa en un diseño organizacional superior que permitió a los citricultores tomar control sobre la comercialización de su producción, a través del alquiler y luego construcción su propia planta de empaque. Esto se puede observar en la figura 3 donde se ven las diferencias del sistema tradicional de comercialización de Citrus en Corrientes versus el nuevo paradigma implementado por la cooperativa.

Figura 3: El Subsistema de Agronegocios de Citrus en Monte Caseros y su interacción con agentes provinciales y extraprovinciales en el Agronegocio Argentino de citrus



Fuente: elaboración PAA

El nuevo diseño organizacional representó una disminución importante de los costos de transacción entre las diferentes etapas de la cadena. Sin embargo también se debió trabajar sobre los costos fijos y variables y el aumento de la escala de producción. Es por ello que en mayo de 2006 se presenta un plan de negocios para solicitar un aporte no reembolsable (ANR) del PROSAP[182], proponía inversiones en infraestructura de empaque, de forma de poder ampliar la capacidad instalada y cumplir con los estándares de calidad exigidos por los mercados externos. Esto tendría un impacto directo en el ingreso de los citricultores, ya que en ese momento sólo podían procesar el 30% de la producción los asociados (alrededor de 600 toneladas). De hecho, por cada tonelada adicional procesada en la Cooperativa, los citricultores tendrían la oportunidad de incrementar el precio hasta un 50%. El proyecto incluyó la compra e instalación de la segunda nave del galpón de empaque, una cámara de frío, una línea procesadora de fruta, un autoelevador, una etiquetadora, entre otras maquinarias. La Cooperativa, como persona jurídica gestionó la solicitud ante PROSAP. Una vez aprobado el proyecto, cada socio aportó su cuota parte correspondiente para completar el 100% de las inversiones.

Luego se presentó un segundo plan de negocios que, a diferencia del primer proyecto, solicitarían el ANR los citricultores en forma individual. Las inversiones no se destinarían a "activos de uso colectivo", sino a mejoras en cada una de las chacras para la mejora de la calidad de la producción final de cada uno. Los productores de cítricos eran conscientes de que para continuar creciendo era necesario que todos en conjunto mejoraran su performance productiva ya que la incapacidad de cumplir con los estándares de calidad de los mercados externos era una amenaza a las relaciones comerciales de largo plazo con compradores de otros países: ***"…el incremento de los niveles de procesamiento y exportación va de la manos de los clientes y el mercado. Las relaciones tienen una evolución gradual: les vamos enviando, aprueban nuestro producto, nos pagan, y renuevan su pedido. Es un negocio de básicamente mucha confianza…"*** *(palabras de Miguel Rosbaco)*. Esto permite obtener un precio diferencial respecto de los obtenidos en el mercado interno (Ver Tabla 3)

Coosanfra resulto un cambio en el paradigma en el sistema del citrus correntino, el impacto se puede observar a nivel institucional, organizacional, tecnológico y comercial los cuales se presentan en la siguiente tabla:

Tabla 3: Principales logros de la Cooperativa Colonia San Francisco

Innovación y resultados del ambiente institucional
• Contribución a la incorporación de la citricultura de Monte Caseros al circuito formal: el hecho de operar en el mercado de exportación lleva al cumplimiento de estándares fiscales de los agentes vinculados a la actividad.

[182] Programa de Servicios Agrícolas Provinciales

• Fortalecimiento del cambio de paradigma entre los citricultores, pasando de una cultura individualista a la de trabajo en conjunto para lograr el bien común de su actividad y la región. Actualmente la Cooperativa y sus asociados han desarrollado una participación activa en la comunidad local a través de la colaboración con las escuelas de la zona y diferentes actividades de índole social.
Innovación y resultados del ambiente organizacional
• A través de la colaboración público-privada ANR PROSAP se incentivó a la unión y cooperación entre citricultores dado que es necesario, para poder acceder al mismo, pertenecer o crear a un grupo asociativo. • El formato de trabajo reforzó las relaciones en los productores, lo cual se observa cuando asumieron la responsabilidad de respaldar inversiones en chacras de otros productores. Es decir, se tomo conciencia de que para el bien común hacia falta compartir un proyecto común, pero también, un crecimiento individual de cada uno de sus miembros. • La experiencia con ANR PROSAP contribuyó al fortalecimiento del liderazgo de la Cooperativa en el proceso de profesionalización de los citricultores de Monte Caseros colaborando con la disminución de los costos de transacción del sistema a partir de nuevo diseño organizacional.
Innovación y resultados del ambiente tecnológico
• Las inversiones en la planta de empaque permitieron que esta cumpliera con las exigencias para acceder al mercado europeo. • Las inversiones a nivel de chacras contribuyeron a incrementar el volumen y calidad de la producción: desde su creación en 2002 a 2009 la Cooperativa San Francisco duplicó el volumen total empacado de cítricos 2009 (1750 tn a 3420 tn), y esperan que se duplique nuevamente para 2010 gracias a la nueva capacidad instalada y las ventas programadas. • El incremento de la capacidad instalada y las crecientes ventas, lleva a que Cooperativa incremente el procesamiento de fruta de productores no socios. Esto funciona como un incentivo a que más citricultores de la zona innoven a nivel de chacra certificando sus lotes para exportación (variedades, manejo fitosanitario).
Innovación y resultados del ambiente comercial
• En 2008 la Cooperativa discontinuó sus ventas en fresco en el mercado interno y las exportaciones alcanzaron el 70% de la producción procesada. El primer destino de exportación fue Paraguay, hoy es la Unión Europea. • En rediseño de la estrategia comercial permitió que las exportaciones representen el 70% del volumen total procesado (contra 28% en 2002), siendo la mandarina el producto principal (80%). El restante 30% se comercializa vía acuerdo preferencial de precios con la industria procesadora (10%) o se devuelve al productor (20%). Este diseño permite una mayor creación y captura de valor de los citricultores de Monte Caseros

Fuente: Elaboración PAA

El crecimiento del negocio en Monte Caseros tiene externalidades positivas: contribuye al incremento del producto bruto de la provincia, y genera empleo directo e indirecto: la planta de empaque emplea 50 personas, crea y sostiene puestos de trabajo en industrias y servicios conexos como la logística, la industria de la madera y la cosecha de fruta, entre otros y a su vez incorpora a agentes del sistema al mercado formal.

5. Consideraciones finales

Los sistemas agroalimentarios están atravesando fuertes cambios producto de un escenario global turbulento. La dinámica de estos cambios y la disponibilidad de recursos en relación a la demanda, ha determinado que países como los de la Unión Europea y economías emergentes asiáticas se conviertan en importantes importadores de materias primas y alimentos. Esto es una oportunidad para Argentina, donde las ventajas comparativas posicionan al país como un potencial proveedor de alimentos y materias primas a nivel mundial. En este escenario, la estrategia competitiva más factible para los productores, la industria, los distribuidores, de hecho, para toda la comunidad de agronegocios, es desarrollar estrategias alternativas focalizadas en procesos colectivos, a fin de aprovechar las iniciativas privadas para reorganizar la cadena de suministro alimentaria y de agronegocios (Ordóñez & Nichols, 2003) a fin de satisfacer al consumidor global.

El SAG Citrus de Monte Caseros, Corrientes, tiene una larga tradición en la actividad, que esta principalmente orientada a satisfacer al mercado interno. Los citricultores poseen chacras de baja a media escala, y el principal producto es la naranja. Según la calidad de la producción, esta puede ser destinada a consumo en fresco o a la industria procesadora, existiendo fuertes diferencias de precio entre ambos mercados. Los citricultores poseen una muy baja capacidad de crear y capturar valor por su incapacidad de cumplir con estándares de calidad, así como el alto nivel de intermediación existente en la actividad, incertidumbre, riesgo de oportunismo y costos de transacción, así como un fuerte individualismo de los agentes y la prevalencia de la comercialización informal. A presencia de estos puntos en la cadena (generadores de costos de transacción) mayor es la creación y captura de valor por parte del productor. El crecimiento del negocio en Monte Caseros tiene externalidades positivas: contribuye al incremento del producto bruto de la provincia, y genera empleo directo e indirecto: la planta de empaque emplea 50 personas, crea y sostiene puestos de trabajo en industrias y servicios conexos como la logística, la industria de la madera y la cosecha de fruta, entre otros y a su vez incorpora a agentes del sistema al mercado formal.

Desde una perspectiva global, la cooperativa ha atravesado un fuerte proceso de innovación. La creación de la cooperativa surge como un diseño de agronegocios superador al prevalente en el SAG Citrus de Monte Caseros, permitiendo a los citricultores crear y capturar mayor valor de su producción. El modelo es pionero en la provincia y está siendo replicado por otros citricultores: hay una iniciativa similar en la ciudad de Mocoretá, en el mismo Departamento de Monte Caseros. En miras al futuro, la Cooperativa se fijó como objetivo continuar fortaleciendo el sistema de coordinación implementado, desde el origen hasta la venta del producto a los clientes en otros países. Continuar operando en el mercado interno se tornaba cada vez menos inviable, ante la dificultad de competir con empresas operando con distintos niveles de estándares fiscales como sanitarios y una alta intermediación. Los puntos críticos a resolver estaban tanto a nivel de producción – manejo fitosanitario, calidad y cantidad de producción – y de infraestructura el de empaque.

Los beneficios de la iniciativa pueden resumirse en:

- Incremento de la producción de calidad exportable
- Creación y captura de valor por parte de los citricultores, a partir del foco en mercados de alto valor y la reducción de las ventas en el mercado interno (alta incertidumbre)
- Fortalecimiento del espíritu cooperativista entre los asociados
- Externalidades positivas: incorporación de agentes al circuito formal, creación de empleos a nivel local, incremento de los ingresos para la provincia.

El modelo es pionero en la provincia, y está siendo replicado por otros productores (en la localidad de Mocoretá): ***"…no nos damos cuenta del cambio que hemos generado; no sólo en nuestro caso, sino también en otros productores de cítricos de la región (…) que copian lo que su exitoso vecino hace…"*** *(Ángel A. Berta)*

Personas entrevistadas

Miguel Rosbaco- Presidente de la Cooperativa San Francisco.
Angel Berta - Productor y socio de la Cooperativa San Francisco.
Eduardo Dri - Productor y socio de la Cooperativa San Francisco.
Carlos Ramón Morilla – Ing. Agr. Responsable del Programa para el Control de la Mosca de la Fruta.

Referencias

Altschuler, B. (2009). El desarrollo regional en base a la economía social: el caso de La Cooperativa "San Francisco". X Seminario de la Red Muni. "Nuevo rol del Estado, nuevo rol de los municipios".
Arrow, K. (1963). The economics of moral hazard: Further comment. American Economic Review 58

Arrow, K. (1963). Uncertainty and the welfare economics of medical care. American Economic Review 53 (5): 941-73.
Barilatti, M. (2010). Public Programs Promoting Collective Actions and Innovation in Global Food Chains and Networks: Evidence From the Citrus Agribusiness in Argentina. Paper presented at 20th International Food and Agribusiness Management Assoiciation (IAMA) World Confrerence and Symposium. Boston, Massachusetts, USA.
Demzsetz, H. (1967). Toward a theory of property rights. American Economic Review 57, 347-59.
Jensen, M. C. & W.H. Meckling. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, vol. 3, number 4, October, pp. 305-360.
Kherallah, M. & J. Kirsten. (2001). The new institutional economics: Applications for agricultural policy research in developing countries. MSSD Discussion Paper No. 41. Washington, D.C.: International Food Policy Research Institute.
Lazzarini S.G. (1997). Estudos de caso para fins de pesquisa: aplicabilidade e limitaçoes do método. In: Farina, E. et al. (Coor). Estudos de Caso em Agribusiness. São Paulo: ed. Pionera, p. 9-23.
Molina, N. & J. Ivaldi. (2007). Economía del Sector Citrícola: Costos de Empaque en Tucumán Campaña 2006 – 2007. Serie Técnica N° 23. INTA EEA Bella Vista. 44 p.
http://www.inta.gov.ar/bellavista/info/documentos/economia/ST23_Empaque%20Limón%202007.pdf
Nijhoff-Savvaki, J.; J. Trienekens & O. Omta. (2009). Re-localizing pork production and supply:building bridges, not walls (based in: Gellynck, 2008, Pittaway et al, 2004, Omta, 2002, Powell, 1990). Paper presented at 19th International Food and Agribusiness Management Association (IAMA). World Conference and Symposium. Budapest, Hungary. September.
North D. (1990). Institutions, Institutional Change and Economic Performance. Cambridge University Press. Cambridge.
Olson, M. (1965). The Logic of Collective Action.
Ordóñez, H.A. (1999). El capital social clave competitiva: el desarrollo de capital social desafío crítico en la construcción de ventajas competitivas sostenibles. Programa de Agronegocios y Alimentos. Facultad de Agronomía. UBA.
Ordóñez, H.A. (2000). Nueva economía y negocios agroalimentarios. PAA – FAUBA
Ordóñez H.A. & J. Nichols. (2003). Los Grobo Case. Maple Leaf Conference. Noordwijk, The Netherlands. http://info.wlu.ca/~wwwsbe/MapleLeaf/conference_details.html. Published by University of Buenos Aires, Texas A & M. Buenos Aires.
Putnam, R. (1995). Bowling Alone: America's Declining Social Capital. Journal of Democracy 6(1).
Regmi, A. & M. Ghehlar. (2005). New directions in global food markets. Electronic report drom the Economic Research Archive. USDA. Agriculture Information Bulletin Number 794.
Sureshwaran, S. & G. Hanks. (1998). Un Marco para la Incorporación de Asignaturas de Escritura de Casos en los Cursos de Postgrado de Agronegocios. South Carolina State University. Journal IAMA Vol 1 N2, Jai Press, 1-FAUBA Translation.
Williamson, O. (1985). The economic institutions of capitalism. New York, Free Press.
Williamson, O. (1996). The Mechanisms of Governance. Oxford University Press.
Yin, R.K. (1989). Case study research: Design and methods. Newbery Park: SAGE Publications.
Zylbersztajn, D. (1999). Strictly Coordinated Food-Systems: Exploring the Limits of the Coasian Firm. Universidad de Sao Paulo.

Información Estadística

INTA: Instituto nacional de Tecnología Agropecuarias. Est. Exp. Monte Caseros-www.inta.gov.ar
Fedecitrus: Federación Argentina de Citrus. www. fedecitrus.org

ANEXO

Fotografía 1: Línea de empaque para exportación de la Cooperativa San Francisco

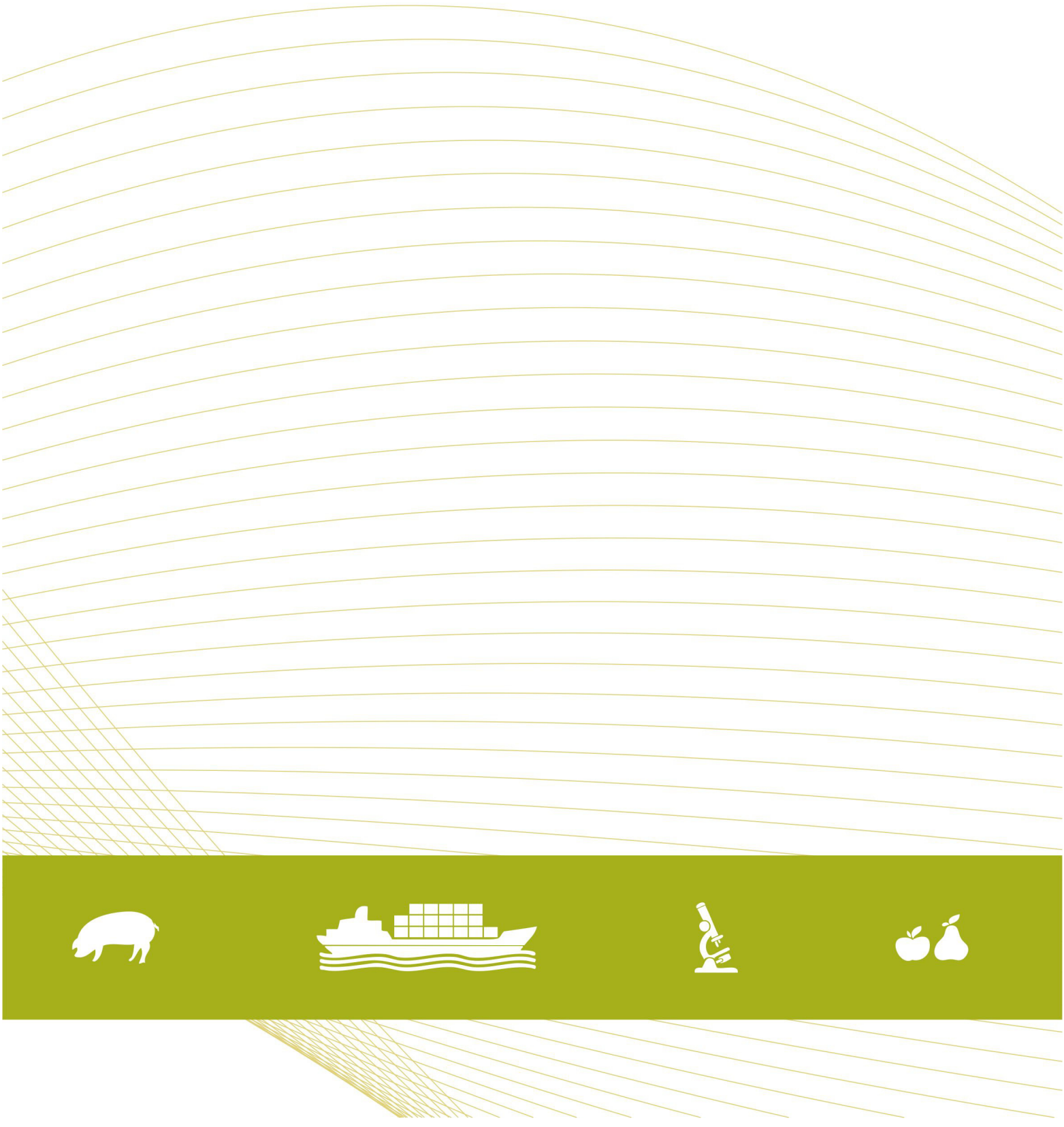
Fotografía 2: Línea de empaque para exportación de la Cooperativa San Francisco

Fotografía 3: Citrus empacado para mercado externo

Fotografía 4: La marca de Cooperativa San Francisco "COOPSANFRA"

Fotografía 5: La cooperativa empaca citrus para la marca de un comprador (Notar que la información de la cooperativa y el origen del producto está impreso en la caja)

Social Responsability



CORPORATE SOCIAL RESPONSIBILITY AND MARKET COMPETITIVENESS IN LOCAL FOOD SUPPLY CHAINS: CRAFTING INNOVATIVE STRATEGIES FOR VALUE CREATION IN AGRIBUSINESS INDUSTRY

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Abstract
Growing pressures to implement Corporate Social Responsibility, rising industry competition, changing consumer preferences, climate change, and volatility in financial markets, are some of the major issues currently facing food and agribusiness firms around the world. This paper presents a conceptual framework for analyzing value creation in local agribusiness supply chains through consideration of Corporate Social Responsibility, Information and Communication Technology, and the use of competitive market positioning strategies to gain competitive advantages over rivals. Crafting innovative strategies to promote the exchange of market information, technology innovations, market transparency, and strategic partnerships is crucial to the creation of value-added benefits that lead to sustainable competitive advantages in this dynamic global market. The paper also explains how Corporate Social Responsibility and the integration of information and communication technologies can lead to supply chain efficiencies and improved competitiveness of local agribusinesses.

Key words: Value creation, corporate social responsibility, information and communication technologies, local food supply chains, market competitiveness, United States.

CORPORATE SOCIAL RESPONSIBILITY AND MARKET COMPETITIVENESS IN LOCAL FOOD SUPPLY CHAINS: CRAFTING INNOVATIVE STRATEGIES FOR VALUE CREATION IN AGRIBUSINESS INDUSTRY

1. Introduction

Growing pressures to implement Corporate Social Responsibility, rising industry competition, climate change, and volatility in financial markets, are some of the major issues currently facing food and agribusiness firms around the world. A key development in the agribusiness sector has been the rise in the demand for food that is produced, marketed and consumed locally which has brought renewed interest and focus on local food markets (Matinez, 2010). As this interest in "food localization" grows, questions are now being asked about the "value creation" generated by local food supply chains (LFSCs) that is in turn derived by various stakeholders including small and medium scale agribusinesses, customers, and society. These LFSCs are expected to be equally competitive and sustainable just like the conventional food supply chains in order for them to deliver sustainable customer value. Understanding whether the LFSC are competitive and or sustainable is key for the generation of value creation beyond "localnesses" or perceived health and quality attributes that is commonly associated with food marketed locally.

The numerous problems consumers associate with global food supply chains (GFSCs) have helped spur the emergence of LFSCs. The globalization of food and agribusiness industry has led to a widening gap between producers and consumers, leading to concerns about greenhouse gas emissions, climate change, health and safety, nutrition, and the freshness of food. Due to the absence or lack of food tracking and traceability systems, consumers' trust in GFSCs has diminished, and their preferences have shifted towards local food systems. Instead, on-farm food processing and direct marketing of fresh food to consumers has increased market transparency, trust, social capital, and healthy eating habits. The reduction in food miles has introduced a more positive perception about LFSCs compared to conventional GFSCs. Further, the development and growth of LFSC has supported economic development through the generation of new employment opportunities that help uplift lagging rural areas struggling in this turbulent financial economy.

Clearly, in the United States and around the world, local food markets have been growing phenomenally. For instance, direct-to-consumer marketing in the US is estimated at $1.2 billion in 2007 compared to $551 million in 1997, an increase of over 100 percent (Matinez et al. 2010). In addition, government programs and policies supporting small farmers and local food markets have grown tremendously over the past decade. On the demand side, consumer preferences, for local foods due to their perceived quality, freshness, nutritional value, positive environmental externalities, and potential to reduce greenhouse gas emissions have helped stimulate the development and growth of LFSCs (Martinez et al. 2010, Clancy and Ruhf, 2010).

Attempts to create value in LFSCs have arisen from social constraints demanded by various constituents (e.g., environmental lobby groups, unions, consumers, and governments) forcing agribusinesses firms to respond accordingly. Although large corporations have been the target for such requirements, increasingly, LFSCs are being challenged to indicate their commitment to social responsibility and demonstrate an ability to survive the competitive pressures in the food industry (Ameshi et al. 2008). Therefore, a principal goal and key indicator of success in agribusiness firms is competitiveness (Mohammed, 2008). The previous concept of firm's competitiveness defined narrowly as "survival" and "profit maximization" has changed to include

environmental and social responsibility issues (Hayward, 1997; Grolleau, 2007). Firms have started to consider the "triple bottom line'' approach to include financial, social and environmental responsibilities (Catalyst Consortium and USAID, 2002). As firms become competitive, they develop core competence that are converted to distinct competence and eventually competitive advantages which gives a firm the capability or resources that is difficult to imitate and valuable in helping the firm outperform its competitors (Mooney, 2007). The level of competitiveness in a firm can be affected by different factors such as, market demand, the role of supporting industries, the role of government policy restrictions, the business environment, level of quality service and conditions which include human, financial and physical capital. To cope with these challenges, food and agribusiness industries are coming up with their own different ways to fit and stay in the marketing system to become competitive and deliver high customer value (Mohamed, 2008).

The aim of the paper is to present a conceptual framework for analyzing value creation in local food and agribusiness supply chains. The main research question is: What are the key drivers for value creation in LFSCs? To answer this question, the paper focuses on the adoption, implementation and management of CSR and sustainability practices, the role and significance of ICT integration in LFSCs, and competitive market positioning strategies that are being developed by local agribusiness firms. Based on this main question, the paper addresses the following specific objectives; 1) Identify and describe factors driving CSR and sustainability as a strategy for customer value creation in agribusiness industries. 2) Examine the role of ICT in market coordination and value creation in local agribusiness enterprises. 3) Determine strategies for value creation in agribusiness through market competitive positioning. 4) Recommend potential strategies to enhance value creation and sustainable competitive advantage in LFSCs in the United States.

The significance of this paper is four-fold. First, previous studies have focused attention on CSR and competitive strategies for large corporation. Second, LFSCs are becoming popular with consumers and their sustainability has become critical. Third, widespread availability of affordable ICT makes it easier for small and medium agribusiness enterprises to integrate these tools in decision making, communication with stakeholders, and penetrating new markets, thereby contributing to their competiveness and sustainability. Finally, the paper makes a contribution by proposing a conceptual framework that can be used to analyze competitiveness and sustainability of local agribusinesses.

The rest of the paper is organized as follows. The second section describes the conceptual framework that is used to deliver customer value and promote sustainable competitive advantage. The third section is divided into three sub-sections. The first deals with sustainability and CSR as a value creating strategy. The second sub-section examines the role of ICT integration in the provision of real-time market information and customer value creation. The third sub-section overviews strategies that contribute to market competitive positioning in LFSCs. This third sub-section is divided into four parts, marketing information, e-marketing, market transparency and strategic alliance consecutively. The fourth section covers challenges in implementation of value-creation in LFSC and this is followed in section five by conclusion and suggested recommendations.

2. Methodology

In order to develop effective marketing strategies that lead to a sustainable competitive advantage, firms first must identify value creating strategies that exploit not only gaps in productivity but also opprtunity (Gow, 2003). Value added stategies refer

to “firms’ expansion or improvement of its offering to maintain and advance its competitiveness”
(Moller, 2006). This paper hypothesizes that Corporate Social Responsibility (CSR), Information and Communication Technology (ICT) and competitive market positioning are key driving forces for customer value creation in agribusiness. Secondly, the generation of high customer value creation is expected to lead towards the attainment of a sustainable competitive advantage that can be benchmark with industry averages in order to measure relative performance. The three main elements for value creation and sustainbale competitve advantages in LFSC is explained in the conceptual framework as indicated in Figure 1.

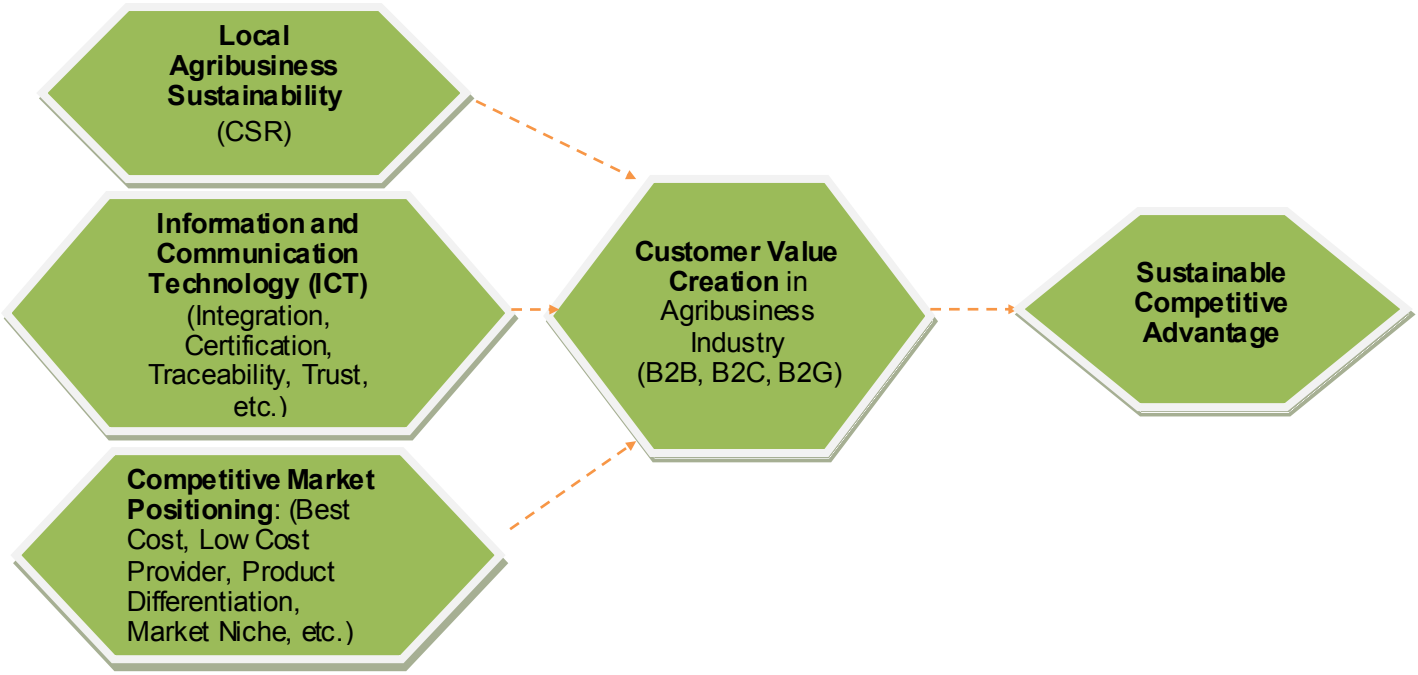

Fig 1: Conceptual framework: Key drivers for value creation and sustainable competitive advantage in local food supply chains.

Corporate Social Responsibility (CSR) plays a sustainability role in economic, social, and environmental aspects (Ameshi et al. 2008). The sustainability effort creates improved customer relations, quality of activities and production, and gives a better value proposition for business at both the local and international market which in turn results in sustainable competitive advantage. Royle (2005) noted that the CSR concept is based on the notion of “stakeholder democracy” and firms should address the various interests of the different stakeholders (or customers) who have influence over its business activities.

As stated by Andersen and Larsen (2009) and Ameshi et al (2008) multinational agribusiness are not only expected to behave socially responsibly within their own business but they are developing and implementing systems and procedures to ensure that their suppliers comply with social and environmental standards for sustainable global supply chain. In this process, investigate CSR guidelines, accounting and reporting in SMEs point of view is important since the practice is significantly different from those developed for large companies. Some of the distinctive characteristics identified are the fact that most of them are managed by owners, their linkage to business partners and local community, lack of resource and lack of CSR agreements or code of conduct (Ciliber et al, 2008; Spence, 2007; Jenkins, 2004; Pedersen, 2009). Moreover, even though there are some pressure from the supply chain and legislation on

environmental responsibility, majority of them justified moral and ethical arguments as to why CSR is important to them (Heyder and Theuvsen ;Jenkins,2004; Jenkins,2006).

From the analysis done by Pedersen (2009) and Nielsen and Thomsen (2009), it is also seen that CSR in SMEs is an incremental process where they expand their CSR activities gradually: from managing their employees and the environment internally to engaging in external relationships with supply chain partners. The other characteristics of SMEs that have engaged in what would be called CSR is that they are unaware or do not believe that they explicitly engaged in this type of practices. On this aspect, Nielsen and Thomsen (2009) stressed the importance of strengthening direct and indirect communication which helps to identify the potential for exposure in business networks, cross-sector partnerships and awards. Summary of differences in CSR perspectives among small and large business enterprises are shown below.

Table 1: Differences in CSR perspective among Small and Large Business Enterprises

Variables	*Large firms*	*Small firms*
Key CSR driver	External pressure	Internal pressure
CSR management	Business unit	Owner and entrepreneur
Business values	Firms' vision	Personal/family partner
Legal requirement	Requirement	Not a requirement
Value chain	Global	Local/Regional
Area of involvement	Environment and social	Mostly environment
CSR branding	Yes	No
Market power	High	Low
CSR process	Rapid	Gradual
CSR publicity	High	Low

As there are the differences mentioned above that might hinder or obstacle CSR implementation, there are also some core elements that SMEs have which facilitates the implementation. The fact that SMEs are more informal to manage a flexible working environment and easy adaptability are some of the many advantages. As Jenkins (2006) mentioned, this nature helps them to respond quickly to changing circumstances and to take advantage of new niche markets for products and services that incorporate social and environmental benefits. The other point is SMEs's creativity and innovative nature which can also be applied to the development of innovative approaches to CSR. Especially, the choice of certain initiatives seems to depend on the vision of the owner/entrepreneur and the socio-economic context in which the company operates (Ciliberi et al, 2008). Moreover, most SMEs are community and association dependent. As a result, the most useful source of influence comes from their local community, government, industry and commercial associations and large buyers. On top of these, associations can also support SME's effort towards CSR through their capacity building programs and by developing new tools in SMEs. As Perrini (2006) pointed out, SMEs's revealed ability to integrate their cultural factors, past experience and expectation about the behavior of people living in the local area in which they operate. This SMEs capability facilitates the exploitation of local engagement relatively easier than do big corporations, and this is a direct effect of SME's social capital. Lastly, even though many SMEs may not operate as profit maximizing firms, that doesn't mean that SMEs are not concerned with profits. According to Perrini (2006) research output, SMEs's which likely adopt CSR are those whose ownership is oriented towards increasing margins of profitability. The core elements for SMEs are shown in the following figure below.

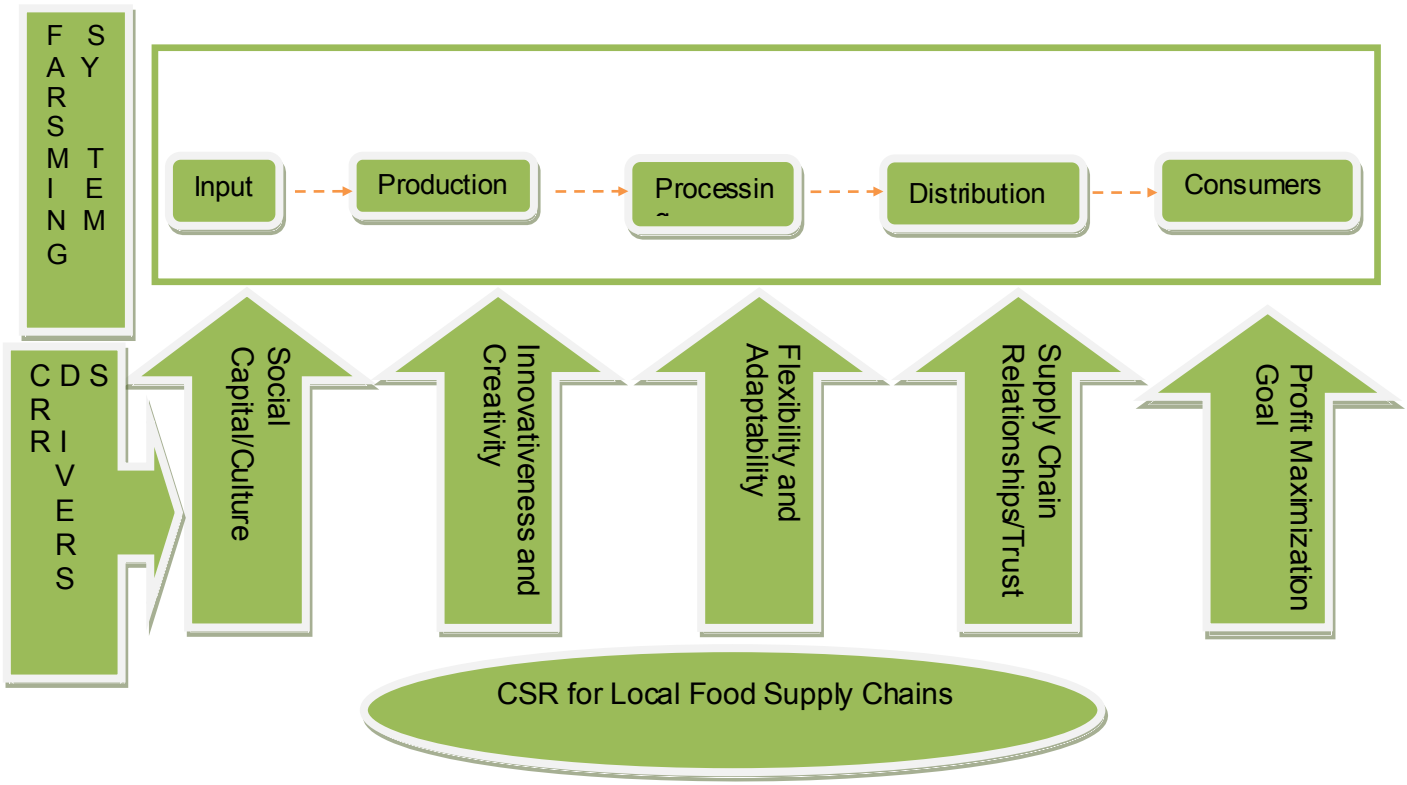

Figure 2: Core Elements for SME CSR Framework

For the above mentioned core elements to contribute in the facilitation of CSR in SMEs, SMEs need to know more about the potential advantage of socially responsible initiatives and practices. On top of that, policy makers should develop not only SMEs specific policies but also should understand the diversity of SMEs when developing CSR policies .The other important issue is in order for the entire supply chain to be socially and environmentally sustainable, the CSR requirements should pass through each supply tier.

Information and Communication Technology (ICT) is a principle vehicle that leads to customer value creation with in business to business (B2B), business to consumer (B2C) and business to government (B2G) in the supply chain management (Meyronin, 2004). Some of ICT implications are facilitation of market transparency so as to create trust, vertical and horizontal integration, coordination of resource and capability together, to achieve strategically significant goal which in turn results in transaction cost reduction (Auramo and Kauremaa, 2005).

Competitive Market Positioning also enables firms to create sustainable competitive advantage by finding new strategies or value-added activities to differentiate their products. Successful industries are those that are able to meet the increasing demand of customer standards. Porter's Five Forces has a power to show a clear image of the essential activities in a business to get competitive market positioning. It illustrates the major role of business in creating value by illustrating how businesses are

interdependent with their suppliers and customers by answering the following questions: Who captures the most value among rivals by competing for customer's lower price? Is it buyers with high bargaining power who force the firm to accept lower prices? Is it the supplier with high bargaining power that causes the firm to pay higher prices for their inputs? Is it attractive substitutes that limit the price consumers will pay for the firm's products? Or is it potential new entrants that force the firm to reduce its price to discourage their entry into the market? (Sheehan, 2005). Identifying who captures the most value in turn leads to value creating strategies that leads to sustainable competitive advantage.

As explained by Woodall (2003), customer value has the following two meanings; one is value for the customer (customer perceived value or customer received value) and the other is value for the firm. Boland (2009) also explained value-added in agriculture as to mean the process of increasing the economic value and consumer appeal of an agricultural commodity. Value creation in the food and agribusiness industry is conferred in numerous ways including product attributes (e.g., branding, freshness, health and safety, image, reputation, taste, aroma, nutrition, absence of food additives, etc.), support services (e.g., just-in-time deliveries, traceability, certification, etc.), and, animal and occupational welfare. Short food supply chains or LFSCs create value for business, consumers, and society through, transparency, revitalization of rural areas, and contribution to food strategy (Forsaan, et al. 2002). Local origin and low food miles have been widely identified as a key driver of value creation in LFSCs (Seyfang, 2003). This paper is based on the premise that value creation occurs in three interrelated dimensions, business to business (B2B), business to customer (B2C), and business to government (B2G) context. Value creation is derived from actions and decisions of both individual agribusiness firms and collaborative strategic relationships of various actors across a specific value chain. The framework also assumes that positive value creation in LFSCs contributes significantly to the development of sustainable competitive advantages and long –term profitability of the agribusiness firms. Based on this conceptual frame work, this paper will try to address the four objectives mentioned earlier in the next section and discuss key factors contributing to value creation in local agribusinesses.

3. Discussion: Value Creation in Local Agribusiness Enterprises

3.1. Corporate Social Responsibility and Environmental Sustainability in Food and Agribusiness Industry

The historic responsibility of corporate has been making money and increasing shareholder value. However, in the last decades, a broader aspect of responsibility called Corporate Social Responsibility (CSR) has become a central issue encompassing responsibility for the environment, for the community, for working environment, and for ethical practices (Catalyst Consortium and USAID, 2002). CSR advances goals of sustainable development. The 1992 Rio Earth Summit focused on environmental management followed by the 2002 World Summit on Sustainable Development (WSSD) which contributed further consideration of CSR agenda. Corporate industry committed itself to CRS endeavors to minimize negative impact of its process while maximizing positive impacts as their major principle (Maignan and Ralston, 2002). By doing so, businesses improve the quality of the life of the workforce and their families as well as the local community and society at large (Mohammed et al, 2008). Today, most companies are not the primary initiators of their CSR efforts. Rather, they are pressured by internal and external actors to engage in CSR actions partially due to rapidly changing expectations of business and its social responsibility (Serban and Kaufmann, 2011). Some reactive companies see CSR issue as challenging for the future

whereas, proactive companies search for competitive advantage by differentiating themselves from competitors (Loikkanen and Hyytinen,2011).

As explained by Uddin et.al (2008), CSR plays a sustainability role in economic, social and environmental and ecological aspects. The economic dimension includes the direct and indirect impacts of a firm on the surrounding community and on the company's stakeholder. The social aspect is the newest issue than the two whereby, many firms try to act accountably by handling the direct and indirect social effect of the company on the community. While environmental concern is also a key pillar of CSR which tries to handle the negative effects occurring in the surrounding natural ecosystem due to firms' activity.

Specific to the food supply chain, Maloni and Brown (2006) classified CSR based on eight different categories in the food supply chain; animal welfare, community, environment, financial practices, health and safety, biotechnology, labor and procurement. Some of these categories can be generalized to all industry types while some are specific aspects of CRS that applies only to food industries.

For years, politics follow traditional paradigm in which interested parties lobby government for a certain policy. However, the economic globalization created new political arena where by non-governmental organizations have played a significant role in regulatory quality, enforcing standards, and providing public goods (Chatterji and Richman, 2008). As indicated by Lyon and Maxwell (2008), the traditional public cycle generally consists of four stages which are: development stage whereby awareness about a problem is raised among the society, the second stage is politicization, whereby government leaders start to talk about the issue and some interested groups also take the role in mobilization. After these, the third stage will be legislation which includes the establishment of new laws regarding the issue and at last implementation will be enforced by government entities like, police, court and regulators. However, the change in responsibility from government to private interfered with the legislation and the implementation stage. Instead, NGOs are taking over the social and environment responsibility to work directly with corporations.

As identified by Winston (2001), there are two views by which human right NGO's try to achieve the "triple bottom line"- the combined performance considering corporation's financial, social, and environmental aspect. The first view is *engagement* whereby NGOs try to convince and persuade corporate to implement voluntary code of conduct while the second view is *confrontational* view which argues as corporate are incapable of implementing voluntary code of conduct than act when their financial interests are threatened. With the above views in mind, corporate industry started taking CRS in to consideration to protect their reputation and brand name (Catalyst Consortium and USAID, 2002). Even though, there are no international legal standards concerning CRS up to now, the interest of developed nation is also affecting the practice of developing countries. For instance, as noted by Lyon and Maxwell (2008), Colombia, being known as a major exporter of cut flower to Europe and US has started to adopt environmentally friendly practice since EU began to choose suppliers based upon their pesticide practices. On the reverse side, Multi-National Corporations (MNCs) have also been seen moving their capital and production facilities to developing countries where there exist no enforced standards and where countries compete to get foreign investment and hard currencies (Chatterji and Richman, 2008).

Specifically to agriculture and LFSCs, there are generally two ways through which food companies try to create sustainability in agricultural production. One way is by setting standard and code of conduct that is used throughout the food supply chain. Incentives are given for those who adopt the specific management practice (e.g., price premium) while others who don't comply with the standards will be excluded. The other approach is strategic partnership whereby both benefits and costs shared related to the sustainable initiatives (Ross et.al, 2010).

An example for this kind of partnership can be the alliance of the Inter America Development Bank and PepsiCo in 2009 in their initiative for small scale farmers in Mexico to engage in High-Oleic Sunflower Oilseed (HOSO). The aim of this initiative was for PepsiCo to replace its palm oil consumption with healthier HOSO. Inter America Development Bank provided the financial support for technical assistance and PepsiCo provided market guarantee for the local growers. At the end, local growers increased their income while PepsiCo improves the nutritional quality of its product (Acharya et.als, 2010). Another example is by Nestle Company in a district called, Moga in India. This company got a permission to build a dairy in the area. However, the impoverishment in the area due to failure in crops led to a high death rate of calves and also lack of refrigerator was another problem for these farmers not to ship milk as fresh. With the financial and technical support of Nestle, improvement in the irrigation scheme and construction of refrigerated dairies in each town decreased 75% of calves' death rate and increased milk supply by 50-fold. As a result of these investments, "value" was generated through increased household income and guaranteed milk supply for the company was achieved in a short period of time and that contributed towards sustainable competitive advantages (Porter and Kramer, 2007). As reported by APEC (2007), through the integration of Clean Product Agreement (GAP) and the increasing interest in consuming fruits that are ethically and responsibly produced, the Chilean fruit market is enjoying continuous success. This highlights the advantage of going beyond the merely business consideration and arriving at the win-win scenario in achieving sustainable competitive advantages.

Different private regulatory initiatives also use certification as a reward to ensure sustainable production. As found out by Raynolds et.al (2007), to ensure "sustainable coffee" production, these initiatives try to address concerns such as environmental degradation through mono-cropping, health issues regarding chemical usage, social issues in international coffee trade and uncertainties. Proper packaging has also been seen as one way of achieving environmental sustainability due to its environmental impact during transportation and disposal stage. Considering these in mind, different companies have committed themselves to ensure the recyclability of their packaging system

Empirical analysis conducted by Loikkanen and Hyytinen (2011), revealed that CSR has improved competitiveness with respect to new or improved products and services, by creating permanence of customer relations or attracting new employees. According to one third of the respondents, CSR has had an impact on competitiveness by improving mental well being and motivation of employees, international market position and newer improved production process. Moreover, one third of the respondents indicated that CSR has had an impact on competitiveness by improving the quality of activities and products. However, the issue of cost and low awareness among customers remains a challenge to maintain competitive advantage (Dangelio and Pujari, 2010). Chatterji and Richman (2008) in their research also highlighted the inescapable tension between CRS and profit maximization as "win win'' scenario may be less common as expected.

3.2 The Role of ICT in Value Creation in Food and Agribusiness Industry

Effective use of ICT has become a substantial factor in determining business success and attaining competitive advantage. Market volatility is identified as one of the significant influence of market information use (Richey and Matthew, 2001). The ability of a firm to observe and learn from the key players in their industry worldwide, to recognize how firms utilize new technologies and to understand product trends, process and marketing strategies are necessary approaches that will enable firms to attain significant advantage over competitors (Mohammed, 2008). So, firm's ability to identify changes in the market radically and respond to those changes quickly through ICT use is an important characteristic of successful companies. As noted by Johns and

Doren (2010), understanding the nature of the competition, its strategies and way of functioning, positions any company at a greater advantage for revolutionizing itself and quick adaptation for changes in the market. Competitive intelligence is the acquisition of comprehensive and updated information by a firm or company. Once a firm has this intelligence, it can then place it to action so that a company attains a competitive advantage by creating distinct point of differentiation (Johns and Doren, 2010).

According to Bringelen et.al (2000), trust level of decision makers in the available information is highly affected by the completeness of the information. Moreover, the completeness also enhances the utilization of the information in decision making. Johns and Doren (2010) also stated that the incorporation of corporate intelligence in a firm is evidence of firm's preparedness to make informed decisions whenever necessary which in turn builds credibility among customers. Acquisition of real-time information using ICT leads managers to arrive at sound decisions and strategies to gain competitive advantage. Especially in export marketing, according to Richey and Matthew (2001), firms that desire to hold a successful market position tend to utilize real-time market related information heavily. They also found out venture planning as a significant influencing process of information gathering that helps to identify relevant marketing research area and opportunities which guarantee quality information (Vyas and Souchon, 2001). Heimeriks and Duysters (2007) also pointed out as good working relationships with information providers is an essential means to warrant pertinent and up to date information.

Vyas and Souchon (2001) found two kinds of export information that decision makers should avoid. These are haphazard and distorted information. Haphazard use is "lack of care for systematic export information acquisition and use". This includes missing out uncollected information, wrong information or using available export information without considering the urgency and importance of the decision. On the other hand, distorted information occurs when "export decision makers have placed their faith in less reputable information sources or their own intuition to make decisions". Therefore, firms should be careful about the source and completeness of information before decision making. However, changing knowledge to capability and capability to competitive advantage is a progressive process essentially ingrained in the intangible assets of a firm. Particularly, in human and intellectual capital **(**Collins et al, 2002)

3.2. 1 E-Marketing in Food and Agribusiness industry

Information exchange and knowledge sharing are a key means to attain competitive advantage and enhance productivity of workers in today's economy (Annuaziata and Isabella, 2008). Among the different factors that contribute to a firm's competitiveness in today's globalized marketing system, the level of investment in ICT is a crucial component as other factors such as infrastructure, achieving economies of scale, service or product innovation, and offering distinctive services (Hamilton and Asundi, 2008). This use of ICT is even getting significant attention with farmers across rural areas all over the world (Jonsson and Gunnarsson, 2005). In the near future, it is expected that most labor intensive systems will be replaced by technology intensive systems and competitiveness will depend on the level of sophisticated technology invested (Hamilton and Asundi, 2008).

The internet has opened new opportunities for supply chain management. Many new business initiatives are emerging to take advantage of the internet by substituting the traditional channel of distribution (Chiang and Feng, 2010). However, it is important that managers possess relevant skill and knowledge to be able to recognize the internet marketing potential and build on it (Martin and Matlay, 2003). As revealed by Sultan and Rohm (2004), the major driving factors for internet initiatives are shift of channel power-dependence, increased internet adoption, customer empowerment and expectations. The study done by Fang and Lie (2006) shows that compared to traditional

marketing strategies, internet marketing has additional benefits such as customer relationship management (CRM), direct marketing, and electronic transaction, which are expected to reduce operational and social cost. At the same token, Sultan and Rohm (2004) also found out that nowadays, on top of revenue generating, firms view the internet as a primary mechanism to create value chain efficiencies. According to Frank and Bunte (2009), implications of ICT in food supply chain are generalized in to three categories as follows; *Market structures*: ICT usage contributes towards the performance level of a firm and the performance level in turn influence market structure since the level of performance determines whether firms enter or exit, grow or decline. One example mentioned by the researchers was Wal-Mart's rise in US general merchandising implications of ICT induced firm performance for market structure in food retailing. *Transaction cost*: ICT opens new way of doing business transactions. This holds true especially for e-commerce. Even though e-commerce is just getting popular, in particular in food retailing, ICT has the potential to widen the scope of potential trade partners in the international market. *Market transparency*: ICT in business allows markets to be transparent in a way that information is accessible, understandable, reliable and comparable. Transparent market enables consumers to buy products depending on the quality and price they want. E-commerce also at the same time creates the opportunity for suppliers to target specific customers based on their consumption preference.

Taking into consideration poor internet coverage in rural areas and the less enthusiastic trend of farmers in using computer and Electronic Data Inter-change, Lu et.al (2005) found out that mobile-commerce has the potential to solve such related problems and improves efficiency in supply chain. In order for primary producers to use mobile-commerce, mobile companies are coming up with their Short Message Service (SMS) targeting rural areas with timely information such as the provision of weather forecasts, harvest time, and pest management practices (Jonsson and Gunnarsson, 2005). Meanwhile, the researchers also found out that farmers are willing to pay for mobile based information but they emphasized the need for quality service for a paid service.

As the increase in the interest in e-commerce continues, there are also some barriers for its adoption which includes management resistance, technology concerns, resource issues, lack of awareness and lack of information (Hamilton and Asundi, 2008). Crespo and Bosque (2010) also pointed out risk perception related to online marketing as a major factor affecting e-commerce acceptance and adoption. As a result, they emphasized the role of companies in building trust among customers in e-transaction by establishing a secure commercial process.

3.2.2 Market Transparency in Food and Agribusiness Supply Chain

Until recently, customers had a limited view and interest of supply chains. Even firms themselves have often been content not to ask detailed information about the traceability of the inputs they source (New, 2010). Now everything has changed as consumers in many countries are concerned about the safety, quality, nutritional content, production process and origin of their food. One of the reason for these dramatic change is improvement of living standard (Henneberry and Mutondo, 2007; Dickinson and Bailey, 2003). In addition, an increasing number of consumers have started to show concern about the environmental impact of their purchase (Bounds, 2009).

Concerns over environmental and social impact are also linked to health in the day to day food choices and decision of consumers across the developed countries. As a result, food safety and quality standards are seen as key factors to improve reputation as well as against legal liabilities, additional standards such as labor, environmental and animal welfare are also gaining ground as strategies for customer loyalty and market shares (Fulponi, 2006**).** Significance of certification and labeling systems are escalating

rapidly in the food processing sectors (Dangelio and Pujari, 2010). Agricultural firms have been increasingly required to implement Quality Assurance System (QAS) in order to get market advantage and to build their reputation with asserted quality (Carriqiry and Babcock, 2007). This QAS ensures consumers and firms get the necessary market chain information. Types of QASs include certification marks, traceability programs, third party auditing programs and producer signed affidavits (Carriqiry and Babcock, 2007).

Both voluntary and mandatory labels have been also used to disseminate information, including nutrition content, country of origin, production process, health claim, and warning about the product (Henneberry, 2003). Rapid raise in voluntary certification and labeling initiatives are addressing environmental and social standards in a variety of product areas. (Dangelio and Pujari, 2010). The National Organic Program under the US Department of Agriculture has set acceptable labeling and certification standards, this came up after a long challenging effort by state level and numerous private interested parties (Bounds, 2009).

The development of technology in food science also plays a significant role for producers and food processors to provide the necessary information about the various attribute of their food product (Henneberry and Mutondo, 2007). Some of these scientific advances could lead to quantitative analysis as in nutritional composition whereas other aspects could be qualitative which are not easily measured (Dickinson and Bailey, 2003). Frequency Identification (FID) smart tag is also another ICT approach whereby primary livestock producers are able to track and trace the market chain of their product if broad band internet coverage is available (Lu et.al, 2005).These RFID readers allow customers to link to data on the product's origin, certifications and path throughout the food chain by simply swiping the phone over the tag (New, 2010). For example, a wine company called Blankiet Estate in California uses a code system which ensures authenticity when entered to the website (New, 2010).

The contribution of ICT in the process of traceability is extremely important. ICT assures the recording and transmission of production data through the supply chain. Some of the technologies used for the identification and registration are bar coded tags, RFID devices, ear tags and DNA tracing. Enterprise Resource Planning system (ERP) and Warehouse Management System (WMS) helps in management of traceability in agri-food firms while EDI (Electronic Data Interchange) is used in communicating traceability of data (Galliano and Orozco, 2008). On top of providing quantitative and qualitative information about food, food labels also lead to an increase in product demand (Henneberry, 2003). As justified by (Henneberry and Mutondo, 2007; Dickinson and Bailey, 2003), this increase in demand and producer surplus is because labels are also used as a non-price advertizing tool and also help producers to differentiate their product from competitors. A study revealed that Italian consumer make wide use of meat label in their purchasing decision. In fact, since the BSE crisis, the meat label appears to be a tool that reinforces consumer trust toward meat safety (Fritz et.ls, 2009). Dickinson and Bailey (2003) also measured the WTP for meat traceability, transparency and extra assurance (TTA) and the results show that consumers are willing to pay about 33% premium above the average price for a TTA beef and pork. They also identified factors contributing towards consumers WTP in purchasing food product as food availability, nutritional intake, trust in governance, positive perception of science and media.

Successful exporters are those able to meet increasing demand of food standards by important import markets. OMAF (2004) reported that dairy farmers of the area have recorded Geospatial Information System (GIS) of the dairy farms shipping milk. The primary purpose of this system is to use GIS technology to efficiently route milk trucks and optimize resource allocation. This helped in effective planning and control strategies to take place using factual and accurate information. One beef processor

admitted that they will do whatever the importer wants to "keep them happy", unless it means losing money (Vieira and Traill, 2007). Firms can create sustainable competitive advantage by finding new strategies, or value added activities to differentiate their product from their respective rivals and consumers are willing to pay for the value added (Shanah et al, 2008).

3.2.3 Competitive Positioning Strategies for Value Creation in Agribusiness Enterprises

Working independently and be able to sustain competitive advantage is becoming a challenge in this globalized economic environment. Even LFSCs are increasing being challenges to develop value-added collaborative relationships with customers and suppliers. Consequently, this has led to a surge in demand of collaboration between independent firms (Das, 2006). Strategic alliance is a formal relationship where firms combine resource and capability together to achieve strategically significant objectives that are mutually beneficial (Gall and Schroder 2006; Dyer and Singh, 1998; Elmut and Tathawala, 2001). Strategic alliances are increasingly being used as a tool to take advantage of this dynamic marketing system (Sambasivan and Yen, 2010). The pressure to form alliance is even greater when it comes especially to small agribusiness firms. The only way they can survive and stay competitive in today's dynamic business is in the form of an alliance with other companies.

Increasingly, firms are using strategic alliances as a means to enter new markets, share development costs, increase their marketing reach, and provide complete solutions to the customer (Heimeriks and Duysters, 2007). Therefore, managers should start looking outside their own companies and cooperate with others to reap the benefits. As noted by Westgern (2000), alliance is strategic when only two or more firms join resources. These days, firms are able to surpass national boundaries and many companies, across continent to form strategic alliance through globalization (Sambasivan and Yen, 2010). However, this also applies to farmers who have relatively very little power as compared to large food companies and agro-processors as, working in cooperative give them greater market power (Warman and Kennedy, 1998). In addition, the ability of firms to form a unique combination of resource brings competitive advantage over firms who are unwilling to do so (Elmut and Tathawala, 2001). These joint assortments can be of human capital, physical capital, organizational capital, financial capital and can also include intellectual properties including patents, specialized knowledge, information, and intangible assets like brand names (Westgern, 2000). The potential of strategic alliance is enormous. The motive and goal to form alliance can be different from firms and also according to the firm's position within the business (Das, 2006). Elmut and Tathawala, (2001) stated some major alliance motives including;1) growth strategies and entering new market 2) obtaining new technology/best quality/cheapest cost, 3) reducing financial risk and share cost of research and development and 4) ensuring competitive advantage. Whipple and Frankel (1999) also tried to come up with top five goals that motivated alliance formation as can be seen from the table below.

Table 2: Top Five Goals that Motivated Alliance Formation

Buying Firm Goals	***Supplying Firm Goals***
Reduce cost	Increased Customer Satisfaction
Improve Quality	Increase Sale Volume
Increase Customer Satisfaction	Enhanced Market Position
Improve Profit	Improve Profit
Increase Speed to Market/Leverage Capital*	Defend Current Market Position

*Two responses were tied for fifth Source: (Whipple and Frankel, 1999)

Strategic alliance hasn't brought the result expected for many business alliances due to many factors. Das, 2006; Elmut and Tathawala (2001) recognized clash of culture, lack of trust, lack of clear goal and objective and relational and performance risk as the major reasons for failure in alliance. Sambasivan and Yen (2010) also found that cultural similarity of partnering firms is a focal factor in the formation of strategic alliance. Ingredient branding has been identified as an initial step towards creating competitive advantage in agribusiness (Pinar and Trapp, 2008). The authors argue that innovating brands represent promises kept, and loyalty through trust that in turn results in increased demand and profitability. Additional innovative strategies include the deployment of ICT to deliver competitive advantages in terms of environmental sustainability through energy management, less material intensive economy and positive externalities in transportation (Hilty, et al. 2006). Therefore, for agri-food firms to grow successfully, they must give priority attention to developing appropriate advantage-generating capabilities in critical marketing areas including product-related innovations, branding, and customer relationship management (Ibeh et al., 2006).

4. Implementation Challenges and Future Prospects

There are many difficulties associated with implementing value creation using sustainability, ICT and competitive positioning. One of the challenges is partially related to the need to comply with the increasing and complex food standards that have become mandatory in the market system as part of value creation process. Some of the difficulties arise due to the existence of gap between practices adopted for the export market and practices adopted locally (Vieira and Traill, 2007). Specifically, SMEs and also newly emerging agribusiness firms find it hard to abide with the quality and safety standards for so many reasons. Some of the reasons stated by Trienekens and Zuurbier (2008), are lack of awareness and adequate information about specific demand of the global standards, multitude of standards, cost of certification, lack of harmonization of national norms and lack of enabling environment. For example, as noted by Bounds (2009), firms are expected to pay a minimum of $1,200 up to $1,500 for initial inspection and green claim to be certified by a program called ecology. This could be nothing for large firms but will definitely be a central issue for small firms. Some of the reasons for the cost as explained by Tegene et. al, (2003) are identity preservation especially related to biotech foods and cost of verification. Capacity constraints for local small farms, weak food distribution systems, and limitation in knowledge about local food marketing have been muted in the literature (Martimze, et al. 2010). Moreover, developing countries and LFSC in industrialized countries specifically suffers from insufficient financial and human resources to effectively comply with the standards. For example, as stated by Vieira and Traill (2007), due to their difficulties in adhering to a complete traceability (40 days prior to slaughter), the Brazilian beef chain is in danger of having their beef banned from the EU market. On top of that direct cost of certification is generally higher especially for small agribusinesses (Durstet.al, 2006).

5. Conclusion and Recommendations

As explained in the paper, pressure to implement CSR and sustainability practices, competition from national and international market, climate change, limitations on financial investment capital in food and agribusiness industry are some of the current issues that are affecting firms' success and performance of LFSCs. Success of any firm highly depends on how well it adapts to the changing market demand, social and environmental expectation. As illustrated by the conceptual framework**,** competitive market positioning, Information and Communication Technology (ICT) and the

integration of the six CSR components are key drivers for sustainable competitive advantage through effective promotion of value creation across the entire LFSC. This value addition enables firms to differentiate their products and gain competitive advantages over their rivals. Moreover, constant changes in the external environment and adaptation to the changing consumer desire are the key determinants for gaining sustainable competitive advantage. As the paper clearly showed, diffusion of real-time market information, e-commerce, market transparency, use of strategic alliance and innovative branding are some of the key strategies through which firms can survive in the market to achieve competitive advantages. Along with these changing expectations, sustainability implementation by different stakeholders in LFSCs, ICT uptake provides avenues that firms can make use of to create and maintain their competitive advantage.

However, to make use of these opportunities, it is important that firms should stay alert to acquire the relevant skills and knowledge necessary to make informed decisions. In other words, LFSCs need to become "learning supply chains" in order to move up in their competiveness and sustainability performance. Since successful agribusiness firms are able to meet food standards demanded by consumers it is imperative that managers gain better control over production, and distribution of their agricultural products in order to guarantee traceability of their products and to operate in a cost-effective way so as to become competitive and profitable. Moreover, government and NGOs should increase the capacity of small firms and farms to meet these high food quality standards. One way of support can be through good agricultural practice including integrated pest management training which helps to improve the quality and safety of their product in a cost-effective way. The need to have harmonized standard system at the local, national and international level would also facilitate coordination of balanced standard levels and at the same time lower total certification costs since suppliers don't have to pass through a separate certification for each retailer.

Finally, this paper has attempted to show that LFSCs are central to the development of modern food system and are being challenged to provide high value to their customers. The paper argues that LFSCs are not immune to CSR and the growing pressures to implement sustainability practices. Therefore, LFSCs should identify innovative ways to not only integrate modern ICT but pursue sustainability initiatives in order to survive the highly competitive marketplace. Although LFSCs face immense challenges, including capacity problems and skills limitations, it is vital to craft innovative strategies that exceed traditional consumer expectations for healthy, safe, fresh, and nutritious food by actively pursuing product differentiation that deliver additional customer value through CSR and sustainability. On top of that policy makers should also develop not only LFSCs specific policies but also should understand the diversity of LFSCs when developing CSR policies. In addition, the effective integration of ICT in LFSCs to minimize transactions costs and enhance industry collaboration and communication should further stimulate value creation opportunities that are necessary for the achievement of sustainable competitive advantages.

6. References

Acharya, T., Bena, D., Sauerhaft,B. and Yach, D. 2010. The Role of the Food Industry in Strengthening Links between Agriculture, Nutrition and Environment Sustainability. *Global Policy* 1(3): 327-329.

Adams, C.,and Goldsmith,P. 1999. Conditions for Successful Strategic Alliance in the Food Industry**.** *International Food and Agribusiness Management Review* 2(02):221-248.

Asian Pacific Economic Cooperation (APEC) 2007. Corporate Social Responsibility in the Global Supply Chain. Case Book, Human Resource Development Group. Capacity Building

Amayeshi, K.M., Osuji, O.K., and Nnodim, P. 2008. Corporate Social Responsibility in Supply Chains of Global Brands: A Bounderless Responsibility? Clarifications, Exceptions and Implications. *Journal of Business Ethics*, 81:223-234.

Andersen,M. and Larsen,T. 2009.Corporate Social Responsibility in global supply chains. *Supply Chain Management*. 14(2):75-86.

Annuaziata, D.,and Isabella,M. 2008. The SMEs Performance by the New Technologies Application: The case of Olive-Oil in Puglia. *Agricultural Economics Review* 9:70-80.

Auramo, J., Kauremaa, J. and Tanskanen, K.2005. Benefits of IT in Supply Chain Management: An Explorative Study of Progressive Companies. *International Journal of Physical Distribution and Logistics Management* 35 (2): 82-100.

Bounds, J. 2009. What do really tell you-As Eco-Seals Proliferate, So Do Doubts? *Wall Street Journal* D.1:1-3.

Bringelen, V., Ruyter, D., Wetzels, M. 2000. The Impact of Incomplete Information on The Use of Marketing Research Intelligence in International Service Settings. *Journal of Service Research* 2(4): 372-387.

Carriqiry, M., and Babcock, B. 2007. Reputations, Market Structure, and the Choice of Quality Assurance Systems in the Food Industry. *American Journal of Agricultural Economics*. 89(9):12-23.

Catalyst Consortium and U.S. Agency for International Development, USAID 2002. What is Corporate Social Responsibility? Washington D.C.

Crespo, A., and Bosque, I. 2010. The Influence of the Commercial Features of the Internet on The Adoption of E-commerce by Consumers. *Electronic Commerce Research and Applications* 9(6):562-575.

Chatterji, A. and Richman, B. 2008. Understanding the Corporate in Corporate Social Responsibility. *Harvard Law and Policy Review* 2:33-52.

Chiang, W., Feng, Y. 2010. Retailer or E-tailer? Strategic Pricing and Economic-lot-size Decisions in a Competitive Supply Chain with Drop-Shipping. *Journal of the Operational Research Society* 61(11):1645-1653.

Ciliberi,F, Pontrandolfo,P. and Scozzi,B.2008. Investigating Corporate Social Responsibility in supply chains: a SME perspective. *Journal of Cleaner Production*. 16(2008):1579-1588.

Collins,R., Dunne,T., and O'Keeffe, M. 2002. The Locus of Value: A Hallmark of Chains that Learn Supply Chain Management. *An International Journal* 7(5):318-321.

Das, T. 2006. Strategic Alliance Temporalities and Partner Opportunism. *British Journal of Management* 17(1): 1-21.

Dangelio, R., and Pujari, D. 2010. Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability. *Journal of Business Ethics* 95(3):471-486.

Dickinson, D., and Bailey, D. 2002."Meat Traceability: Are U.S Consumers Willing to Pay for it." *Journal of Agriculture and Resource Economics* 27(2):348-36.

Durst, P.,P.J Mckensie, P., and Brown, C. 2006. Challenges Facing Certified and Eco-labeling of Forest Products in Developing Countries. *International Forestry Review* 8(2):193-200.

Elmuti, D,and Tathawala, Y. 2001. An Overview of Strategic Alliance Management Decision. *Journal of Management History* 39(3):205-217.

Fang, C. , and Lie, T. 2006. Assessment of Internet Marketing and Competitive Strategies for Leisure Farming Industry in Taiwan. *Journal of American Academy of Business* 8(2): 296-300.

Forsman, S., Paananen, J., Trienekens, J.H., and Omta, S.W.F. 2002. Customer Value Creation in the Short Food Supply Chain: Theoretical Aspects and Explorative Findings.

Proceedings of the Fifth International Conference on Chain and Network Management in Agribusiness and the Food Industry, 6-8 June, Wageningen Academic Publishers, Wageningen, Netherlands.

Frank, H.and Bunte, L. 2009. Thought for Food: The Impact of ICT on Agribusiness. Wageningen University and Research, the Netherlands. *Proceedings of the 113th EAAE Seminar:* China, Crete and Greece.

Fritz, M, Rickert, U. and Schiefer, G. 2009. Fresh Meat and Traceability Labeling: Who Cares? *Proceedings of the 3rd International European Forum on System Dynamic and Innovation in Food Networks*, Organized by the International Center for Food Chain and Network Research, University of Bonn, Germany.

Fulponi, L. 2006. Private Voluntary Standards in the Food System: The Perspective of Major Food Retailers in OECD Countries. *Food Policy* 31(1): 1-13.

Gall, R., and Schroder, B. 2006. Agricultural Producer Cooperatives as Strategic Alliance. *International Food and Agribusiness Management Review* 9(4):26-44.

Galliano, D. and Orozco, L. 2008. Intra and Inter Organizational Determinants of Electronic Based Traceability Adoption: Evidence from the French agri-food industry. *Proceedings of the 12th Congress of the European Association of Agriculture Economics*. Toulouse, France.

Gow, H., Oliver, L .and Gow, N. 2003. Value Creation in Farmer-Driven Marketing Channels: The Case of Murrellen Pork. *Journal of Food Distribution Research* 34(1):86-91.

Hamlton, L., and Asundi, R. 2008. Technology Usage and Innovation its Effect on the Profitability of SMEs. *Management Research News* 31 (11): 830 – 845.

Heyder,M and Theuvsen,L. 2009.Corporate Social Responsibility in Agribusiness: Empirical Findings from Germany. Paper prepared for presentation at the 113th EAAE Seminar "A resilient European food industry and food chain in a challenging world", Chaina, Crete, Greece, date as in: September 3 – 6.

Hayward, A. 1997. Competition and Evolution. *Competitiveness Review* 7(2): 1-4.

Heimeriks, K.and Duysters, G (Year). Alliance Capability as a Mediator Between Experience and Alliance Performance: An Empirical Investigation into the Alliance Capability Development Process. *Journal of Management Studies* 44 (1):25-49.

Henneberry, S., and Armbruster, W. 2003. Emerging Role of for Food Labels: Inform**,** Protect, Persuade. *Journal of Food Distribution Research* 34(3):62-69**.**

Henneberry, S., and Mutondo, J. 2007. Food Labels: Implications for U.S. Agricultural Imports. *Journal of Agribusiness* 25(2): 197-217.

Hilty, L.M., Arnfalk, P., Erdmann, L., Goodman, J., Lehmann, M., and Wager, P.A. 2006. The Relevance of Information and Communication Technologies for Environmental Sustainability: A Prospective Simulation Study. *Environmental Modelling and Software* 21:1618-1629.

Ibeh, K., Ibrahim, E., Panayides, P.2006. International market success among smaller agri-food companies. International Journal of Entrepreneurial Behavior and Research 12(20):85-104.

Jenkins,H. 2004. Corporate Social Responsibility engaging SMEs in the debate: Initial Research findings.Research Associate,ESRC Center for Businesses Relationships, Accountability, Sustainability and Society. Initial research finding.

Jenkins,H.2006. Small Business Champions for Corporate Social Responsibility. *Journal of Business Ethics* 67(3): 241-256.

Johns, P., and Doris, C., and Doren,V. 2010. Competitive Intelligence in Service Marketing: A New Approach with Practical Application . *Marketing Intelligence and Planning* 28(5): 551 – 570.

Jonsson, S., and Gunnarsson, C.2005. Internet Technology to Achieve Supply Chain Performance. *Business Process Management Journal* 11(4):403-417.

Loikkanen, T. and Hyytinen, K. 2011. Environmental Management Accounting and Supply Chain Management. *Eco-Efficiency in Industry and Science*. Springer, Doldretch Hidelberg, London, New York.

Lu, N., Swatman, C. and Perreau, S. 2005. Sustainable Mobile Commerce (SamCom) – Extending the Rural Grocery Supply Chain through M-commerce. TENCON 2005 IEEE Region 10:1-6.

Lyon,T., and Maxwell, J. 2007. Corporate Social Responsibility and the Environment: A Theoretical Perspective. *Review of Environmental Economics and Policy* 1(0): 1-22.

Maignan, I., and Ralston, D. 2002. Corporate Social Responsibility in Europe and the U.S: Insights from Businesses' Self-presentations. *Journal of International Business Studies* 33(3): 497–514.

Martinez S., Hand, M., Pra, M.D., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S., and Newman, C. 2010. Local Food Systems: Concepts, Impacts, and Issues. United States Department of Agriculture, Economic Research Service, Economic Research Report Number 97

Martin, L., and Matlay, H. 2003. Innovative use of the Internet in Established Small Firms: The Impact of Knowledge Management and Organizational Learning in Accessing New Opportunity. *Qualitative Market Research. An International Journal* 6(1):1-26.

Meyronin, B. 2004. ICT: The Creation of Value and Differentiation in Services. *Managing Service Quality* 14(2-3): 216 – 225.

Mohammed, D. 2008. Size and Competitiveness: An Examination of the CARICOM Single Market and Economy. *The Round Table* 97(395): 287-303.

Moller, K. 2006. Role of Competences in Creating Customer Value: A` Value Creation Logic Approach. *Industrial Marketing Management* 35(8):913-924.

Moloni, J. and Brown, E. 2006. Corporate Social Responsibility in the Supply Chain: An Application in the Food Industry. *Journal of Business Ethics* 68:35-52.

Mooney, A. 2007. Core Competence, Distinctive Competence, and Competitive Advantage: What is the Difference. Stevens Institute of Technology Hoboken. *Journal of Education for Business* 83(2): 110-115.

New, S. 2010. Get The Best from Your People: The Transparent Supply Chain. *Harvard Business Review.* 88(10), 76-80.

Nielsen,A. and Thomsen,C.2009. CSR communication in small and medium-sized enterprises. A study of the attitude and beliefs of middle managers.ABS Center for Corporate Communication, Aarhus School of Business,Aarhus University, Aarhus, Denmark.*Corporate Communications. An International Journal* 14 (2):176-189.

Ontario Ministry of Agriculture and Food (OMAF) 2004. On-farm Food Safety Strategy for Ontario The Ministry of Agriculture and Food. Ontario, Canada.

Pedersen, E. 2009. The many and the few: Rounding up the SMEs that manage CSR in the supply chain. *Supply chain management: An International Journal* 14(2):109-116.

Pinar, M., and Trapp, P. 2008. Creating competitive Advantage through Ingredient Branding and brand Ecosystem: The Case of Turkish Cotton and textiles. *Journal of International Food and Agribusiness Marketing*, 20(1):29-56.

Porter, M. 2008. The Five Competitive Forces That Shapes Strategy. *Harvard Business Review* 86(1) :80-86.

Porter, M., and Kramer, M. 2007. The Link Between Competitive Advantage and Corporate Social Responsibility Strategy and Society. *Harvard Business Review*. 84(12):78-92.

Perrini, F.2006. SMEs and CSR Theory: Evidence and Implications from an Italian Perspective. *Journal of Business Ethics* 67(3):305-316.

Raynolds, L, and Murray, D. and Heller, A. 2007. Regulating Sustainability in the Coffee Sector: A Comparative Analysis of Third-Party Environmental and Social Certification Initiatives. *Agriculture and Human Values* 24(2):147-163.

Richey, R. and Matthew, M. 2001. An Investigation of Market Information Use in Export Channel Decisions: Antecedents and Outcomes. *International Journal of Physical Distribution and Logistics Management* 39(1): 334-353.

Ross, R., Amanor-Boadu, V., and Ross, K. 2010. On the Distribution of Net Benefits from Sustainability Initiatives in Agri-food Supply Chain. Agricultural and Applied Economics Association 2010 Annual Meeting Denver, Colorado.

Sambasivan, M., and Yen, C. 2010. Strategic Alliance in a Manufacturer's Supply Chain: Influence of Organizational Culture from the Manufacturer's Perspective. *International Journal of Physical Distribution and Logistics Management* 40(6):456-474.

Serban, V and Kaufmann, M. 2011. Corporate Social Responsibility: The Challenge for Medium Sized Enterprises in the Bamberg-forchim Region, Germany. *The AMFITEATRU Economic Journal* 13(29):180-194.

Seyfang, G. 2003. Sustainable Consumption and Greenhouse Gas Mitigation. *Climate Policy* 3(1): 135-146.

Shanah, C. Hooker, N. and Sporleder, T. 2008. The Diffusion of Organic Food Products: Toward A Theory of Adoption. *Agribusiness* 24(3):369-387.

Sheen, N. 2005. Why Old Tools Won't Work in the "New" Knowledge Economy. *Journal of Business Strategy* 26(4): 53-60.

Spence, L.2007. CSR and small Business in a European Policy Context:The fie "C"s of CSR and small Business Research Agenda 2007.*Business and Social Review* 112(4):533-552

Sultan, F., and Rohm, A. 2004. The Evolving Role of the Internet in Marketing Strategy: An Exploratory Study. *Journal of Interactive Marketing* 18(12): 6-19.

Tegene, A. Huffman,W., Rousu, M. and Shogren, J. 2003. The Effects of Information on Consumer Demand for Biotech Foods: Evidence from Experimental Auctions. USDA, Economic Research Service.

Trienekens, J and Zuurbier, P. 2008. Quality and Safety Standards in the Food Industry, Developments and Challenges. *International Journal of Production Economics* 113(1):107-122.

Uddin. M., Hassan. R, and Tarique. K. 2008. The Three Dimensional Aspect of Corporate Social Responsibility. *Journal of Business and Economics* 3(1):200-212.

Vieira, M. and Traill, W. 2007. The Role of Food Standards in International Trade: Evidence from Brazilian Beef Exports to the EU Market. *Journal of International Development* 19(6):755-764.

Vyas, R. and Souchon, A. 2001. Symbolic Use of Export Information: A Multidisciplinary Approach to Conceptual Development and Key Consequences. *International Marketing Review* 20(1): 67-94.

Warman, M., and Kennedy, T. 1998. Understanding Cooperatives. Rural Business Cooperative Service. USDA Education and Member Relations Program Area. Washington D.C.

Westgern, R. 2000. The 3Rs of Strategic Alliance Formation: Resource, Rent and (Property) Rights. Annual Research Conference of the Food and Agricultural Marketing Policy Section of the American Economic Association. Orlando, Florida.

Whipple, J. and Frankel, R. 1999. Strategic Alliance: Creating Long Term Success. Michigan State University, Department of Agricultural, Food, and Resource Economics, Staff Paper 11611, East Lansing, Michigan.

Winston, M. 2001. NGO Strategies for Promoting Corporate Social Responsibility. *Ethics and International Affairs* 16(12): 71-87.

Woodall, T. 2003. Conceptualization Value for the Customer: An Attributional, Structural and Dispositional Analysis. *Academy of Marketing Science Review,* 12.