

Factors for the success of agricultural cooperatives in Brazil

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Abstract

The Brazilian cooperative agribusiness is in a transitional phase. This moment is marked by the advancement of market globalisation, which has exerted great competitive pressure on national agribusiness. To survive and thrive in a globalised and fiercely competitive environment, cooperatives must face new challenges in the pursuit of competitiveness. This study aimed to identify and describe the main success or failure factors affecting agricultural cooperatives. To this end, bibliographic research was used as a research method, and 108 relevant works from the national and international literature were selected for analysis. The results pointed to the existence of 10 main success factors for agro-industrial cooperatives: conciliation of the dual agenda: social and economic goals; professionalisation of management; meeting the interests of multiple stakeholders; transaction cost management; risk and volatility management; improved commercialisation; competitiveness against traditional companies; technology adoption; sustainable development; and social responsibility. However, there is a gap regarding the existence of studies analysing, in an integrated manner, the prevalence and benefits of the success factors identified for agricultural cooperatives, especially those based in Brazil.

Keywords: Cooperatives, competitiveness, agribusiness, management

1 Introduction

According to data from the Cooperative Yearbook (OCB, 2019), in 2018, Brazil had 6,828 active cooperatives, 1,613 of which belong to the agro-industrial branch, which represents the most numerous segments in enterprises. It is estimated that approximately 50 % of all that is produced and marketed by Brazilian agribusiness passes, at some stage, through a cooperative (OCB, 2019). Also, according to the Organization of Brazilian Cooperatives (OCB) (2019), in the same year, agro-industrial cooperatives directly employed 209,778 people, bringing together 1.2 million members.

The Brazilian cooperative agribusinesses are undergoing a transition phase. This moment is marked by the advancement of market globalisation, which has generated great competitive pressures on national agribusiness. The cooperative agro-industrial business, in a short time, has been forced to compete with the efficiency of production systems of several other countries (Bialoskorski Neto, 1999). To this end, they have had to face the challenge of modernizing their

structure and management, reviewing doctrinal principles in the pursuit of economic efficiency, without, however, deteriorating relations with members or compromising social efficiency.

The strategies that can be adopted by agro-industrial cooperatives are delimited by the principles of cooperatives. This creates a contrast with the non-coop organisations with which they compete (Zylbersztajn, 2002). However, agro-industrial cooperatives will only establish themselves in the markets if they can achieve such or higher efficiency from the perspective of the organisation and coordination of agro-industrial system activities (Bialoskorsky Neto, 1999). Thus, given the greater complexity of the cooperative business, achieving success for these endeavours is an equally more complex process and requires managing a wide range of variables, objectives and interests, which is only possible through sophisticated management and interaction with markets (Zylbersztajn, 1996).

Agro-industrial cooperative organisations have been recognised as important actors for economic development given their ability to increase the gains of local economies, promote regional development and the well-being of pop-

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ulations (Castilla-Polo *et al.*, 2017). It can also be said that cooperatives play an important role in agribusiness development. They can contribute to increased bargaining power, production scales, crop diversification and stabilisation, adding value to agricultural products, expanding markets and capitalizing producers. In Brazil, agro-industrial cooperatives are important agents of rural development, often acting in areas where the state has failed (Moreira *et al.*, 2016). Thus, studies that can contribute to improving the competitiveness of agro-industrial cooperatives are important and necessary. Moreover, research in the field of cooperatives is still scarce and, for this reason, cooperatives should be taken more seriously, both by science and by governments (Puusa *et al.*, 2013).

In this context, this study aims to identify and describe the probable main factors of success or failure that affect the agro-industrial cooperatives. We hope to contribute to the development of management tools that are more in line with the specific needs of agribusiness cooperatives. As well as to provide the theoretical basis for future research which may contribute to the development not only of science but also of cooperative activity.

2 Methodological procedures

For this study, a bibliographical research method was used. Initially, prospective searches were conducted in the main academic content portals: CAPES Journal Portal, Scientific Electronic Library Online-SciELO, Scopus and Web of Science. In these, we tried to identify papers that contained in the title, abstract, or keywords, at least one of the terms: cooperative, competitiveness, success factors, agriculture, agro-industrial, coordination, management and performance. Some terms were varied for the plural, using them in the Portuguese, English and Spanish languages. The searches were configured so that the papers were found to appear in order of relevance and date of publication, according to the internal criteria of each portal.

Initially, based on the search criteria and after excluding repeated results, approximately 350 papers within the established profile were identified. Thus, the selection of literature was made. For that, abstracts were read. After their analysis, the following questions were answered:

- is there an alignment with the theme of the study being developed?
- does it offer contributions towards achieving the objective?
- are there elements in common with at least one other bibliography analysed?

The papers that received a “yes” answer to the three questions, 108 in total, were read in full and included in the bibliographic review materialised in this study. It is assumed that, given the settings implemented in the search tools, the chosen papers represent relevant studies, regarding the topics addressed here.

After selecting the literature, investigative procedures were initiated. For that, we opted for the use of a non-statistical technique called meta-synthesis, through which it is possible to identify, analyse, integrate and systematize key elements common to several studies, producing new concepts and interpretations (Priest, 2006; Cronin *et al.*, 2008). Thus, from the analysis of the 108 papers, key elements were identified which pointed to the existence of 10 probable main success factors for agricultural cooperatives. Table 1 shows the factors and the number of papers in which these appear.

Henceforth, each of the 10 probable success factors identified will be discussed from a theoretical perspective. It is noteworthy that the order of appearance of the factors in the text does not indicate their weight, level of importance, or the number of appearances, having been chosen arbitrarily by the authors. Additionally, it should be noted that some papers cover more than one success factor.

3 Probable main success factors for agricultural cooperatives

The study of success and competitiveness factors is an emerging need for all agents operating in agricultural markets. Agro-industrial cooperatives, due to their different ownership and management structures, should be the object of specific analyses, which may elucidate the scope and repercussion of such particularities in their business performance (Camilleri & Izquierdo, 2016). Further, studies of this nature can contribute to promoting the competitiveness of agro-industrial cooperative business, developing and improving aspects related to structure and management, which may strengthen their market positions.

Research has been conducted over time to identify success factors for agro-industrial cooperatives. Examples are the works of Sexton & Iskow (1988), who studied success or failure factors for emerging cooperatives in the United States; Zylbersztajn (1996) who was concerned with identifying crucial aspects for the management of Brazilian agro-industrial cooperatives; Mari-Vidal *et al.* (2013) who sought to establish competitive factors for Spanish cooperative agro-industrial business; and Abdolmaleky (2015) who described success factors for nut cooperatives in Iran.

The above studies have provided important scientific and empirical contributions to the development of agro-industrial

Table 1: Ten probable main success factors for agricultural cooperatives × number of appearances in the selected literature.

<i>Factor</i>	<i>Number of appearances</i>
Combining duality: the social and the economic agenda	10
Management professionalisation	18
Meeting the interests of multiple stakeholders	11
Transaction cost management	16
Risk management and volatility	10
Improved marketing	08
Competitiveness against traditional companies	12
Technology adoption	20
Sustainable development	24
Social responsibility	10

Source: Research results.

cooperatives. However, these are restricted to phases of the business cycle, internal management aspects, competitive environment, geographical area, or specific production chain. Thus, there are few comprehensive studies on the performance of agro-industrial cooperatives, and most of the existing models do not address the issue in a complete manner and in line with the particularities and decision-making process typical of this type of organisation (Marcis *et al.*, 2019). That is, there is a lack of research that tries to establish a broad and general framework about the success factors and/or, of course, failure for the agro-industrial cooperative business. So, there is a lack of integrative research on these factors.

3.1 Combining duality: the social and the economic agenda

Probably the biggest challenge facing agro-industrial cooperatives today is to become competitive firms in globalised and highly competitive markets without, however, neglecting the core values and principles of cooperatives (Battaglia *et al.*, 2015; Castilla-Polo *et al.*, 2017). Cooperative enterprises, by their very nature, represent the only sector of the economy whose basic objective is to strike a balance between the economic and social dimensions (Rodrigues, 1997). In this way, the cooperative's purpose of generating and distributing income and, consequently, improving the well-being of its members will only be achieved if economic performance is efficient (Bialoskorski Neto, 2004b). Thus, it can be said that the future of agro-industrial cooperatives is closely linked to their ability to reconcile this dual agenda (Castilla-Polo *et al.*, 2017).

By investing their resources, agro-industrial cooperatives, considering the principles of cooperatives, seek to balance economic and social objectives (Royer, 2014; Moreira *et al.*,

2016). Thus, one of the main bottlenecks to be overcome for the success of cooperative organisations is the conciliation between the economic, social and political interests of their members (Gimenes & Gimenes, 2007). The economic perspective involves operational efficiency and financial returns for the cooperative and its members. Social interests refer to services and benefits that members expect to receive in return for their dedication to the venture. The political dimension, in turn, is linked to the existence of diffuse interests, resulting from the heterogeneity of the formation of the cooperative framework, which can often lead to conflicts over power and representativeness (Antoniali & Souki, 2005). The cooperative's inability to balance all these interests can negatively affect its competitiveness, as well as create complex management situations (Moreira *et al.*, 2016).

The logic that governs the current global economic system is individual and uncooperative. The pressures exerted by the markets impose on the cooperatives the dilemma of remaining competitive organisations, without giving up their cooperative nature (Pascuci *et al.*, 2017). Given that the enterprise exists because of the cooperative members, it must remain attractive to them. At the same time, it must be competitive against non-coop organisations, growing and generating surpluses, which will be a source of attraction and permanence of the members. Overcoming the challenges of acting like private companies in a competitive environment, while preserving the best possible relationships with their partners, are fundamental conditions for the survival and prosperity of agro-industrial cooperatives (Dornelas, 1998).

There is a conflict between the principles of cooperatives and the demands of behaviour imposed by market forces. Both cooperatives and their partners are exposed to this dilemma. Thus, reconciling organisational objectives with personal interests has required cooperative enterprise managers

to become true “political leaders” (Pascuci *et al.*, 2017). To do so, they need to rebuild open and participatory dialogue with employees and associates based on more democratic forms of communication and engagement (Battaglia *et al.*, 2015).

3.2 Management professionalisation

It is known that cooperatives follow specific legislation, which gives them some advantages, especially concerning taxation. However, this simple legal differentiation is no longer capable of guaranteeing the competitiveness or even the survival of a cooperative organisation (Oliveira, 2012). To be able to compete in globalised markets, where they will certainly face competition from non-coop companies, cooperatives must seek to implement management models capable of promoting organisational efficiency and effectiveness, to consolidate sustainable competitive advantages.

Although they have clear social functions, cooperative businesses operate in a competitive environment and should be managed as professionally as any other company (Benato, 1992; Antonialli & Souki, 2005). Despite their strong social appeal, cooperatives are not configured as charitable businesses. On the contrary, they need to compete with quality and efficiency against competitors, intending to generate income and leftovers to be shared with their associates (Domingues, 2002). Thus, the management of the cooperative must be professionalised and focused on the conception and implementation of strategic and management models guided by the search for a competitive position vis-à-vis market companies (Miles *et al.*, 1997). Thus, it is possible to meet the indispensable conditions for the consolidation of cooperative ventures, considering that business success is a source of attraction and retention of members.

Given this scenario, it can be suggested that the professionalisation of cooperative management is an urgent need and an indispensable condition for the sustainability of firms operating in this sector (Zylbersztajn, 1994; Antonialli & Souki, 2005; Pelegrini *et al.*, 2015; Moreira *et al.*, 2016; Pascuci *et al.*, 2017). Professionalisation of management has been a reality for American and European cooperatives since the 1990s (Cook, 1995). In Brazil, on the other hand, the adaptation of cooperatives, despite increasing market pressures, is slow and complex (Bernardo-Rocha, 1999).

The professionalisation of the management of Brazilian cooperatives is imminently linked to the need to review some of the principles of cooperatives, such as democratic management, which makes the decision-making process slow and subject to the influence of political interests (Santos & Rodríguez, 2005). Thus, there is a conflict between the original principles of cooperatives and the demands and pres-

ures exerted by the markets (Pascuci *et al.*, 2017). Brazilian cooperatives are based on principles and ideals of a socialist nature and, precisely for this reason, have faced difficulties in adapting to capitalism, which governs the actual national and global economy (Antonialli & Souki, 2005).

It is also important to note that, in general, in Brazilian cooperatives, there is no separation between control and property. In most cases, the cooperative members also perform the management of cooperatives. This makes the management and decision process more difficult and complex, given the diffusion of objectives and interests to be considered (Machado Filho, 2004; Barreiros *et al.*, 2008). Also, the conflict of interest resulting from the heterogeneity of membership, as well as its dual status as members (at the corporate level) and competitors (at the individual level), can lead to personal and political aspirations influencing the cooperative management processes. Thus, with the professionalisation of administration, agents (professional managers), due to the fear of changes in the management body, would receive much more incentives to work for the collective interests of the main cooperative members (Zylbersztajn, 1994).

Other managerial difficulties faced by Brazilian cooperatives are linked to the loosely defined property rights structure and the small amount of contractual incentives for participation (Bialoskorski Neto, 2004a). National co-operatives generally encourage the situation of loosely defined property rights, as they usually have an objective function of distributing results through service delivery and better immediate prices. Also, in Brazil, there are no contractual obligations regarding transactions between cooperative members and cooperatives, and there is no obligation to participate (Bialoskorski Neto, 2007). Thus, it can be inferred that the Brazilian institutional environment, in a way, encourages members to act opportunistically, which may have serious implications for the management of the cooperative enterprise.

It is known that the business model of agro-industrial cooperatives is more complex than that presented by traditional firms, especially due to the existence of broad and diffuse objectives and interests (Iliopoulos *et al.*, 2016). Thus, it is observed that the singularities presented by the agro-industrial cooperatives demand the creation of strategies and management tools adapted to the reality of this segment, which can guarantee an adequate orientation for both the domestic and foreign markets, enabling the generation of value to all stakeholders.

Finally, it is believed that developing an entrepreneurial, market-oriented organisational culture is more crucial to the performance of agro-industrial cooperatives than the way they are structured (Kyriakopoulos *et al.*, 2004). Thus, agro-

industrial cooperative ventures have gradually increased their efforts to professionalise management and redirect their decision-making processes to a more rational and efficiency-focused standard (Moreira *et al.*, 2016). Through the professionalisation of management, accompanied by the separation of control and ownership and the review of the applicability of the doctrinal principles of cooperative agribusiness this will meet the conditions to play their role efficiently and effectively as coordinating agents within the systems of agribusinesses.

3.3 Meeting the interests of multiple stakeholders

The business model represented by agro-industrial cooperatives is indeed quite complex. The particularities and interactions inherent in such cooperatives result in equally unique managerial problems (Moreira *et al.*, 2016). Typically, cooperative endeavours need to pursue multiple goals while performing different functions. Thus, it can be suggested that the cooperative needs to direct its efforts and resources towards meeting the interests of widely diversified audiences, internally and externally (members, employees, suppliers, customers, financial institutions, civil society, among others). So, it is necessary to establish governance structures capable of efficiently coordinating interactions among multiple stakeholders (Miles *et al.*, 1997; Birchal, 2014; Iliopoulos *et al.*, 2016). Given this scenario, it can be stated that agro-industrial cooperatives should focus on the formation and management of collaborative networks and value chains, which, through the generation of synergies, can meet the interests of multiple stakeholders.

It should be noted that the main interested audience of the cooperative are the cooperative members themselves. After all, these are both owners and customers of the venture. Consequently, considering that the members differ due to the size, technological level and type of individual business (Barreiros *et al.*, 2008), the larger the membership, the greater the difficulty in reconciling the various interests. Larger cooperatives, therefore, require more sophisticated communication and management structures so that future vision, strategies, new investment plans, procedures and actions can be implemented (Barreiros *et al.*, 2008; Battaglia *et al.*, 2015).

Firms, including cooperatives, operating in the agro-industrial segment do not operate in isolation. They are part of a broad chain whose main objective is to generate value for the end consumer (Ferreira, 2009). Thus, it is possible to notice the emergence of concepts such as Supply Chain Management (Batalha & Silva, 2014) and Netchains (Lazarini *et al.*, 2001; Iliopoulos *et al.*, 2016; Perdomo *et al.*, 2016), among others. These practices represent the pursuit

of collective action, which can and should be coordinated by agro-industrial cooperatives, among several agents in the same production chain, getting closer to the consumer markets. This approximation with the consumers can ultimately generate the necessary synergies, to make the system globally more competitive.

Given the above, agro-industrial cooperative business should work to promote two-way relationships between cooperative members and other stakeholders, while at the same time interactions enable joint efficiency gains and ultimately better economic outcomes for all involved. They can contribute to collective learning and development, which would ensure the systems' capacity for innovation and sustainability. The ability to build relationships based on mutual gains in efficiency and learning is called "ambidexterity" (Turner *et al.*, 2012; Iliopoulos *et al.*, 2016; Perdomo *et al.*, 2016).

3.4 Transaction cost management

In the scope of agro-industrial activities, cooperatives represent an important and viable coordination way (Bialoskorski Neto, 1999; Iliopoulos *et al.*, 2016). They can promote joint efficiency among the various agents involved in a production chain. Given that they can be involved at various stages of the production process, cooperatives bring together the attributes needed to approximate the various links involved, facilitating transactions and ultimately lowering transaction costs (Bialoskorski Neto, 1999; Delarmelina & Sales 2016). Also, it can be said that cooperative businesses can coordinate both horizontally, when organising cooperative efforts around common objectives, and vertically, when, by facilitating relations between various agents, they contribute to the overall efficiency gain of the system.

It is important to remember that transaction costs can set up barriers for some producers, especially small and resource-poor, to participate in markets (Holloway *et al.*, 2000). In general, such costs in the agricultural segment are associated with the collection of market information, search and selection of trading partners, negotiation, logistics, monitoring and compliance with contracts entered (Holloway *et al.*, 2000; Lijia & Xuexi, 2014; Delarmelina & Sales, 2016).

Cooperative ventures can be characterised as hybrid business organisations, which are designed to combine market forces with internal organisational aspects to minimize transaction costs (Iliopoulos & Cook, 1999). This reduction is mainly due to the internalisation of transactions considered crucial in a single firm, collectively owned by the owners of specific resources, who wish to protect themselves from opportunistic behaviour and/or to guarantee market access. Thus, by joining forces with other cooperatives, the producers gain in marketing scale, allowing them to enter

new markets and potentially achieve better prices and, consequently, maintain their market position (Delarmelina & Sales, 2016). All of this is made possible by the coordinated capacity of the cooperative venture, which keeps transaction costs accessible to a wider range of producers (Holloway *et al.*, 2000; Lijia & Xuexi, 2014).

The cooperative, in turn, by keeping transaction costs at efficient levels, receives in return the loyalty of members who, while realizing that their costs are lower than those who would have negotiated individually, feel discouraged from being disloyal (Delarmelina & Sales, 2016). On the other hand, the loyalty of the members guarantees the stability of the cooperative offer (Levin, 1984) which, thus, can carry out transactions more frequently. This allows the cooperative venture to build a good reputation with its trading partners, thereby inhibiting the manifestation of opportunistic behaviour, which ultimately leads to lower transaction costs.

It should be noted, however, that the cooperative is not only interesting for producers who would not be able to access the market individually. For those wishing to expand their production and earnings, becoming cooperative means access to cheaper inputs, market guarantees for production, and increased frequency of transactions (Angeloska *et al.*, 2017).

The coordination exercised by the cooperative reduces the uncertainties of the members, especially regarding market guarantee and protection against price fluctuations (Holloway *et al.*, 2000; Lijia & Xuexi, 2014; Angeloska *et al.*, 2017). Similarly, the frequency of transactions is more intense and predictable (Delarmelina & Sales, 2016). This decrease in uncertainty contributes significantly to the permanence of the cooperative members, especially for the agro-industrial follow-up, which is known to be more complex, given that the uncertainties arising from market failures and opportunism add to those generated by uncontrollable natural factors (Batalha & Silva, 2014; Araújo, 2018).

Finally, there are two major challenges to be overcome by coordinating agro-industrial cooperatives. The first of these is related to the specificity of the assets. Products resulting from an agro-industrial activity are generally classified as specific assets (Delarmelina & Sales 2016). Temporal specificity is important given the seasonality of some genera as well as their perishability. On the other hand, the location specificity is present, given that certain productions are concentrated in certain geographic areas and the distance between product and consumer is determinant for the generation of logistic costs and losses. It is also important to highlight that some activities employ highly specific assets in the production process, such as mechanised sugarcane har-

vesting. Physical specificity is also observed, as consumer markets value certain qualities of products. The second challenge is linked to the possibility of opportunism being exercised by the members themselves. Property rights within the cooperative framework are loosely defined and there are few contractual incentives for participation (Bialoskorski Neto, 2004a). Thus, members can act opportunistically without suffering major sanctions. They will do so whenever they perceive individual conditions that are more advantageous in transacting with other firms. This is partly due to the income of the member coming mainly from the sale of its products to the cooperative and not from any operational surplus (Zylbersztajn, 2002; Machado Filho *et al.*, 2004; Bialoskorski Neto, 2007; Gimenes, 2007; Simioni *et al.*, 2009).

3.5 Risk management and volatility

Risk management, although it may be included as one of the transaction cost management activities, deserves to be mentioned separately, given its great relevance for maintaining cooperative and cooperative relations. When associated with a cooperative, the rural producer reduces the risks associated with its activity, especially those related to marketing and price fluctuations of its products (Delarmelina & Sales, 2016). Thus, while realizing that the risks incurred within the cooperative are lower than those associated with individual behavior, the producer will be discouraged from leaving the coop. In this context, the ability of cooperatives to manage and mitigate risks becomes a highlight within their value proposition to members (Briggeman *et al.*, 2013; Iliopoulos *et al.*, 2016).

It is notorious that agribusiness operates in a higher risk environment when compared to other economic segments. This greater complexity is attributed to factors such as strong influence of international markets in the case of commodities, the incidence of uncontrollable natural factors (e.g., climate), state interventions via public policies, seasonality, heterogeneity of agents and price volatility (Briggeman *et al.*, 2013; Moreira *et al.*, 2016). Faced with this scenario, agro-industrial cooperatives need to consider and operationalise a range of economic, administrative and risk management options (Lomott & Łyskawa, 2014).

Farmers associated with cooperatives, in turn, are doubly exposed to the risk of economic losses resulting from catastrophic effects (Zeuli, 1999). For example, an extreme weather event is supposed to cause a break in the production of a commodity. In this case, the cooperative producer loses with the decrease in individual performance and, again, loses due to the operational surpluses that will cease to be received (Moreira *et al.*, 2016). There is a point to be addressed, as agro-industrial cooperatives typically devote

much of their attention to the risks associated with trading and price volatility, but leave aside those related to production (Ligon, 2009).

The most used risk management tools used by agro-industrial cooperatives are crop insurance, input purchase and commodity hedging and forward contracts (Briggeman *et al.*, 2013; Moreira *et al.*, 2016). The problem with these tools is that they are generally inaccessible to small cooperatives, which end up with even greater problems in managing their risks, often caused by the very nature of the products they market (usually fruits and vegetables (Mafredo & Richards, 2007; Moreira *et al.*, 2012). Other risk management strategies that can be adopted by cooperatives to ensure supply stability are the geographic expansion of members and diversification of production (Zeuli, 1999). The first strategy favours diversification and increased availability of raw materials, however, will result in higher logistics costs. The second implies a reduction in risks, but it requires greater productive investments and may lead to higher production costs (Moreira *et al.*, 2016). Also, cooperatives have internal risks, usually caused by power struggles. In this case, geographic expansion can aggravate internal governance problems. Product diversification can lead to loss of focus and conflicts with more conservative members (Moreira *et al.*, 2012).

It is also noteworthy that, in the Brazilian context, the complexity of the risk management of the agro-industrial cooperative business is aggravated by certain local particularities, namely: risks resulting from logistical precariousness, high tax burden and high-interest rates. It is also noteworthy that, in Brazil, an agro-industrial cooperative can operate in several areas, and can simultaneously be a purchase, sale, production and credit cooperative. With this variety of activities, the risks that occur also vary in various sources and natures (Moreira *et al.*, 2012).

Finally, two issues stand out. First, the more loyal the members, the more efficient the risk management performed by the cooperative. Thus, the cooperative enterprise must outline strategies and policies directed to the attraction and retention of members (Iliopoulos *et al.*, 2016). When risk management is done collectively, there is a tendency for the results achieved to be more satisfactory (Cornaggia, 2013). Secondly, it is worth noting that the elimination of risks is impossible, or even undesirable since if it did, it would deprive firms of the potential to gain from market fluctuations. Thus, risk management serves precisely to work within the best possible risk-return ratio (Zeuli, 1999).

3.6 Improved marketing

Agro-industrial cooperatives have been identified as suitable organisations for enabling rural producers to act competitively both in the purchase of inputs and in the sale of products (Liu *et al.*, 2019). The farmer, by joining a cooperative, acquires conditions to access new markets and distribution channels, without, however, the need to make major changes in their property (Pinto *et al.*, 2012). In this sense, there is a double benefit in this relationship, given that there is an improvement in the conditions of production flow, without the need for significant investments. Thus, the role of the agro-industrial cooperative, as a multichannel distribution and rural development agent becomes somewhat relevant (Estevam *et al.*, 2015).

By expanding its possibilities of access to distribution channels, the cooperative also has options to diversify its production (Estevam *et al.*, 2015). This process is beneficial because, by expanding its product portfolio, producers can eliminate the effects of seasonality on their cash flow and/or work with higher value products, which generally makes rural properties that use cooperatives more profitable (Pinto *et al.*, 2012; Liu *et al.*, 2019).

Agro-industrial cooperatives are also especially important for the removal of barriers to farmers entering markets. They are fundamental for overcoming legal and sanitary barriers and enable minimum production and logistics scales (Estevam *et al.*, 2011). Equally, it is thanks to agro-industrial cooperatives that many small producers obtain certifications such as organic production and an indication of origin, increasing the added value of their products and gaining access to advantageous market niches (Bruce, 2016).

When designing their distribution networks, agro-industrial cooperatives can choose from two different configurations: short commercialisation circuits, usually adopted by smaller and more diversified cooperatives, which prefer to market their products in proximity markets, with some degree of dependence on institutional markets; or long commercialisation circuits, usually employed by larger and more specialised cooperatives, which seek to serve geographically distant markets (Rover & Riepe, 2016).

As distribution channels, agro-industrial cooperatives should also put themselves in the position of brand managers (Kontogeorgos, 2012). They are known to play a relevant role in the positioning of products in consumer markets, being associated with benefits provided by the goods, or values of the companies that produced them, and may represent a differential at the moment of the purchasing decisions. Some studies even suggest that cooperatives adopt a common quality and brand management standard to create in the minds of

consumers the concept of a “cooperative product” (Benos *et al.*, 2007; Kontogeorgos, 2012).

The challenge for agro-industrial cooperatives is to improve communication and satisfaction levels among their members, ensuring the stability and growth of their membership (Deimiling *et al.*, 2015). Thus, it will also be possible to guarantee the flow stability through the different commercialisation channels, strengthening and expanding the relations with the trading partners and consolidating the brands of its portfolio.

3.7 Competitiveness against traditional companies

The phenomenon of globalisation is making global competition increasingly fierce. Thus, domestic economic agents have been increasingly exposed to external competitors (Gimenes & Gimenes, 2007). In this context, firms need to strengthen and consolidate their competitive positions in order not only to survive but also to prosper (Camilleri & Izquierdo, 2016). Agro-industrial cooperatives are strongly exposed to this competition, given that commodity markets are extremely volatile (Briggeman *et al.*, 2013). In this context, cooperative firms face the challenge of being competitive without, however, losing their values of solidarity and democracy (Battaglia *et al.*, 2015).

Nowadays, agro-industrial cooperatives have been under double competitive pressure: externally, from their competitors, which impose on the firm the need for constant search for operational efficiency; and, internally, by the members themselves, who demand an increasingly high social and economic performance so that they can remain close to the cooperative (Birchall, 2014). Thus, the agro-industrial cooperative venture will only succeed if its members realise more advantageous economic benefits from interacting with the cooperative to the detriment of those who would have if they chose to act individually in the market (Bialoskorski Neto, 2007).

For cooperative ventures to thrive in this new competitive environment, efficiency must be established at both the industrial plant and each of its associated production units (Bialoskorski Neto, 1999; Gimenes & Gimenes, 2007). The capture, storage and marketing of products have become less profitable activities. Thus, the solution for the agro-industrial cooperative venture is to increase its performance along the production chain (Birchall, 2014). Thus, it can be said that the ability of the cooperative to exert coordination among agents, to generate consumer value, becomes a prime factor for its competitiveness since to compete in globalised markets, efficiency must be reached systemically along a production chain (Bialoskorski Neto, 1999; Gimenes & Gimenes, 2007; Azevedo & Gitahy, 2010). Agro-industrial

cooperatives wishing to remain in the international market must quickly become major transnational food processors (Birchall, 2014) because to survive they must be more efficient than traditional companies in terms of organisational and coordination aspects (Bialoskorski Neto, 1999).

The cooperative must become market-oriented shifting its focus from marketing everything that the cooperative produces to producing and delivering everything the market needs (Gimenes & Gimenes, 2007). To ensure its survival, it must be able to strengthen its competitive position by developing structural and management aspects that help strengthen its position in the market (Camilleri & Izquierdo, 2016). Thus, it is imperative to work to develop the factors that contribute to the competitiveness of agro-industrial cooperatives, namely: innovation, internationalisation, size, training, diversification and market orientation (Marí-Vidal *et al.*, 2013).

The volatility inherent in commodity markets has been constant (Briggeman *et al.*, 2013), as has experienced growth in world demand for food (Saath & Fachinello, 2018) and the production of renewable fuels (Leite & Batalha, 2016). As a result, the pressures on agro-industrial systems will become increasingly demanding, requiring progressively higher levels of competitiveness. These can only be achieved by the ability of firms to achieve effectiveness and efficiency collectively, generating synergies and gains in scale. In this scenario, agro-industrial cooperatives emerge as promoters of competitiveness, through the coordinating role that they must assume along the production chains.

3.8 Technology adoption

The role of technology in agricultural production has become more complex in recent times. There are pressures and expectations from markets and society that new resources will be applied, not only for economic and yield gains but also for more sustainable production (Hart & Milstein, 2004; Milk & Battle, 2016). Recent studies have shown that the participation of producers in cooperatives or associations results in positive impacts on the knowledge, acceptance and adoption of new technologies (Mcguire *et al.*, 2013; Leite *et al.*, 2014; Leite & Batalha, 2016).

When it comes to innovation, especially communication between producers plays an important role because when communicating, they can converge on specific variables, accepted by all or at least most of them (Geroski, 2000). The emergence of such variables would cause a kind of ripple effect, which would lead to a significant number of producers adopting the new practice. Thus, the diffusion of innovations among farmers is a process of communication and cooperation between farmers, governments/extension services

and other stakeholders (Wu & Zhang, 2013). In this context, cooperatives represent an important promoter of technology popularisation and adoption, given the communication structure that they maintain among their members (Leite & Batalha, 2016).

It is also noteworthy that there are studies that indicate that producers linked to cooperatives have easier access to technical assistance and a greater propensity to adopt new technologies (Domit *et al.*, 2008; Abebaw & Haile, 2013; Ma, 2016). The interaction environment provided by the cooperative also promotes communication between producers, which thus could share successful experiences, which may trigger the previously mentioned ripple effect.

In addition to the communication structure, agro-industrial cooperatives can employ several other tools to speed up the process of adopting new technologies by their producers, such as the articulation of public policies, advice for obtaining financing, offering differentiated credit lines, the establishment of targeted pricing policies, organisation of technical events, production of teaching materials, specialised technical assistance, among others (Lamine, 2011; Powson *et al.*, 2011; Kienzler *et al.*, 2012; Reimer *et al.*, 2012; Rabbinge & Bindraban, 2012; Wu & Zhang, 2013; Leite & Batalha, 2016). Thus, it is observed that cooperatives have a range of resources at their disposal, and their role is comprehensive and fundamental for the technological diffusion in the field, especially for small and medium-sized producers.

It is a fact that by promoting the adoption of new technologies by producers, agro-industrial cooperatives should generate mutual gains. Given that increased productivity (and probably earnings) should increase the level of satisfaction of members. These, in turn, will be more inclined to remain loyal to the cooperative, which will enjoy the gains generated from its operations. That is, for the cooperative to thrive, the process must begin with its members since the consolidation and growth of the enterprise are consequences of the positive results generated by its members.

However, there are still major challenges and obstacles that need to be faced by Brazilian agro-industrial cooperatives before the full development of their activities can be achieved. The first is the lack of mechanisms for measuring the adoption and effect of new technologies (Santos *et al.*, 2012), which makes the planning process for the introduction of innovations more complex. Further challenges related to new technologies are the high cost of implementation (ERTHAL *et al.*, 2018), the difficulty of operationalisation (Rains *et al.*, 2011; Erthal *et al.*, 2018), difficulties of access to financing (Rodrigues, 2017; Erthal *et al.*, 2018), lack of own resources (Kienzler *et al.*, 2012; Erthal *et al.*,

2018), associated risks (Powson *et al.*, 2011), low level of education of the members, and poor technical assistance to producers (Reimer *et al.*, 2012; Leite *et al.*, 2014).

3.9 Sustainable development

World demand for food has been expanding rapidly and is expected to double between 2005 and 2050 (Tilman *et al.*, 2002). Equally, the environmental impacts resulting from the expansion of agricultural activities have become increasingly significant, implying important and complex challenges to the promotion of sustainability, both in the production of green food and fuels, and the conservation of ecosystems (Tilman *et al.*, 2011; Ajanovic, 2011; Hochman *et al.*, 2013).

In this context, in addition to the imminent need to ensure the necessary conditions for agricultural activities to continue to develop over time, society and governments have exerted pressure on producers to direct them to adopt more aligned production practices with sustainability (Hart & Milstein, 2004; Tilman *et al.*, 2011; Leite & Batalha, 2016). Thus, any new practices and/or technologies that may be implemented in rural activities should take into consideration the criteria related to sustainability, without, however, leaving aside economic and productive aspects (Matson *et al.*, 1997). Equally, the creation of new incentives and public policies aimed at guaranteeing the sustainability of agricultural activity, as well as ecosystems, will be crucial for achieving the necessary productivity gains without compromising on the integrity of the environment or public health (Tilman *et al.*, 2002).

It is noteworthy that, due to competition with forests, environmental protection areas and urbanisation, the possibilities for expansion of arable areas have been reduced in recent years. It is estimated that by 2050 only 5% of the increase in grain yield will result from the increase in cultivated area (Hochman *et al.*, 2013). Thus, given that expansion is not a viable option, at least not from the point of view of sustainability, greater intensification of farming is the most appropriate solution (Matson *et al.*, 1997; Tilman *et al.*, 2011; Hochman *et al.*, 2013; Vorlaufer *et al.*, 2017; Kubitzka *et al.*, 2018).

Intensifying farming means producing more food per unit of resource employed while minimizing the environmental impacts of the activity (Hochman *et al.*, 2013). Thus, more intensive agriculture can contribute to the promotion of sustainable development, as it provides an important contribution to reducing deforestation and greenhouse gas emissions, as well as ensuring the most efficient use of productive resources (Hochman *et al.*, 2013; Vorlaufer *et al.*, 2017; Kubitzka *et al.*, 2018). The set of practices that aim to meet hu-

manity's current and future needs for food and fiber, ecosystem services and quality of life through practices that maximize net social benefit when considering all costs involved, is called "sustainable agriculture" (Tilman *et al.*, 2002).

Examples of practices related to sustainable agriculture include (Leite & Batalha, 2016):

- Conservation agriculture: based on three basic principles: minimum soil tillage, crop rotation and permanent cover (Hobbs *et al.*, 2008; Lalani *et al.*, 2017; Tambo & Mockshell, 2018);
- Precision agriculture: uses tools and technologies to identify soil and field crop variability to improve agricultural practices and optimise agronomic inputs (Hedley, 2014; Srbinovska *et al.*, 2015);
- Organic agriculture: aims at the production of healthy food through the use of natural inputs and with concern for the integrity of plants, soil and climate, as well as consumer welfare and health (Oelofse *et al.*, 2010; Santos *et al.*, 2012; Wollni & Andersson, 2014);
- Water use management: adoption of efficient irrigation technologies and systems to eliminate waste and more efficient use of water (Houshyar *et al.*, 2012; Romero *et al.*, 2012); and
- Integrated pest management: a control approach that seeks to reduce the pest population sustainably and cost-effectively (Akman *et al.*, 2018; Despotovic *et al.*, 2019).

Studies indicate that rural producers linked to cooperatives have better rates of intensification and adoption of agroecological and/or sustainable practices, and cooperation is considered a key factor for sustainable development (McCune *et al.*, 2011; Araújo & Silva, 2013; Verhofstadt & Maertens, 2014). In this context, the cooperative emerges as an important agent for promoting sustainability in agricultural activities. At the same time, sustainable practices become key factors for the cooperative's long-term survival. In other words, there is a relationship between the capacity of the cooperative enterprise to promote the intensification of its members' operations and its chances of survival and prosperity over time, while operating in a competitive environment.

3.10 Social responsibility

In recent years, Corporate Social Responsibility (CSR) has become one of the key factors in the strategic agenda of agro-industrial cooperatives (Castilla-Polo *et al.*, 2017). CSR's new ideals position social actions as sources of competitive advantage. Thus, they should be analysed as

products, since their importance goes far beyond simple philanthropy (Orlitzky *et al.*, 2011). CSR practice is today associated with strategies aimed at credibility and competitiveness at regional, national and international levels. Thus, ethical actions, focused on the environment and society, have been positively reflected by the market, in favour of those who practice them (Verdolin & Alves, 2005).

Given its importance, CSR should be managed to build a good reputation with the cooperative's key stakeholders. Such a reputation can allow the cooperative venture to differentiate itself in the market by retaining existing customers, attracting new ones, and even convincing them to pay higher prices due to the unique character of the products (Lee & Roh, 2012). Thus, reputation can be said to be one of the most valuable intangible assets for a firm (Hirsch & Meyer, 2010; Castilla-Polo *et al.*, 2017). For this reason, social responsibility management has been considered one of the most relevant strategic tasks for managers of agro-industrial cooperatives today (Gürel, 2014; Hall Jr. & Lee, 2014). Due to their nature, given their social importance, cooperatives are especially charged regarding their positions on CSR (Castilla-Polo *et al.*, 2017). Likewise, while social responsibility is implicitly integrated with the principles and values of cooperatives, cooperative business also needs to create benefits for members. Therefore, as regards CSR, the cooperative is charged by internal and external audiences (Jussila *et al.*, 2007). Given this scenario, it can be inferred that the management of social responsibility is somewhat more complex for agro-industrial cooperatives compared to other firms. However, it can be cited as one of the member retention sources.

In Brazil, currently, given the importance and representativeness of agribusiness, there are good opportunities for the development of actions of CSR (Pona *et al.*, 2015). The practice of CSR can provide the agro-industrial cooperative venture with several strategic advantages, including the elimination of non-tariff barriers imposed by international trading partners; improvement of relations with the internal public of the organisation; improved perception of product quality by the domestic market; increased efficiency and productivity; and improving the firm's image in front of its stakeholders (Verdolin & Alves, 2005).

Studies conducted in recent years show that firms' performance is positively correlated with their reputation (Lee & Roh, 2012; Hall Jr. & Lee, 2014; Castilla-Polo *et al.*, 2017). However, CSR management has not been a strength of Brazilian agro-industrial cooperatives (Ferraz & Motta, 2002; Castilla-Polo *et al.*, 2017). Thus, the managers of such ventures face the challenge of developing CSR management initiatives capable of effectively strengthening the

cooperative's market positioning, generating consistent differentiation and, consequently, sustainable competitive advantage.

4 Final considerations

Brazilian agro-industrial cooperatives are currently undergoing a key moment in their history. The literature points out that the cooperatives have sought to modernise and professionalise management and activity, seeking to occupy prominently their important social and economic roles. Thus, assuming a leading role as promoters of the organisation and coordination of agro-industrial systems. To do so, they need to develop specific administrative solutions that are adaptable to the unique needs resulting from the special nature of cooperative business. Therefore, knowledge of the factors for the success of this type of organisation is an indispensable condition for the formulation of effective strategies. This study aimed to identify and describe the main success or failure factors affecting agro-industrial cooperatives. It can be said that it was successful in achieving the proposal. The bibliographic survey and the organisation of observations through meta-synthesis allowed the identification of patterns in research in agro-industrial cooperatives, which allowed the identification and description of 10 success factors for the segment.

When analysing the 10 success factors described, it is possible to infer that these are, in some way, interrelated and mostly linked to aspects of the management of agro-industrial cooperatives. Thus, there are signs of the existence of a business model (Teece, 2010) common to successful agro-industrial cooperatives. It is possible to organise the 10 identified success factors in a business management model with factors in human resources (management professionalisation), corporate governance (combining duality, meeting the interests of stakeholders), strategy (risk management and volatility, technology adoption, competitiveness), corporate social responsibility (sustainable development, social responsibility), operations management (transaction cost management) and marketing.

Thus, if the prevalence of success factors is confirmed, it will also be possible to admit the existence of the presumed business model. Consequently, the study of such a model may help managers and scientists to better understand the mechanisms through which successful agro-industrial cooperatives create and deliver value to members and customers, as well as the means employed in retaining part of that value as a way of profits (Teece, 2018).

Despite the advances achieved, this study has limitations. Among them, the impossibility of finding empirical studies in sufficient quantity and quality to validate the identified factors. Likewise, the limitation of the methodological procedures adopted in establishing correlations between factors is mentioned. Finally, due to time, budget and especially Covid-19 limitations, it was not possible to conduct field studies to confirm, with the agro-industrial cooperatives, the prevalence of the identified success factors. The limitations described here should serve as a starting point for future research. So, as a research agenda, it is suggested that exploratory, descriptive and case studies be conducted to evaluate the effects of success factors management on the real performance of agro-industrial cooperatives operating in various branches and geographic regions.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Abdolmaleky, M. (2015). Preventive Factors to Found Walnut Production Cooperatives in Tuysarkan Township, Iran. *International Journal of Agricultural Management and Development (IJAMAD)*, 5(1), 9–17. doi:10.5455/ijam.178096.
- Abebaw, D., & Haile, M. G. (2013). The impact of cooperatives on agricultural technology adoption: Empirical evidence from Ethiopia. *Food Policy*, 38, 82–91. doi:10.1016/j.foodpol.2012.10.003.
- Ajanovic, A. (2011). Biofuels versus food production: does biofuels production increase food prices? *Energy*, 36(4), 2070–2076. doi:10.1016/j.energy.2010.05.019.
- Akman, O., Comar, T. D., & Hrozencik, D. (2018). Model selection for integrated pest management with stochasticity. *Journal of Theoretical Biology*, 442, 110–122. doi:10.1016/j.jtbi.2017.12.005.
- Angeloska, A., Trendov, N. M., & Stratan, D. (2017). Transaction costs within the individual and cooperative apple producers in Prespa region, the Republic of Macedonia. *Theoretical and Scientific Journal*, 3, 45–54.
- Antoniali, L. M., & Souki, G. C. (2005). *Princípios cooperativistas e modelo de gestão: um estudo sobre conflitos de interesses entre grupos de produtores rurais*. In: Anais do XLIII CONGRESSO DA SOBER: Instituições, Eficiência, Gestão e Contratos no Sistema Agroindustrial. Brasília: SOBER.

- Araújo, G. J. F., & Silva, M. M. (2013). *Crescimento econômico no semiárido brasileiro: o caso do polo frutícola Petrolina/Juazeiro*. *Caminhos de Geografia*, 14(46), 246–264.
- Araújo, M. J. (2018). *Fundamentos de Agronegócios*. 5 ed. São Paulo: Atlas.
- Azevedo, A., & Gitahy, L. (2010). The cooperative movement, self-management, and competitiveness: the case of Mondragón Corporación cooperativa. *WorkingUSA: The Journal of Labor and Society*, 13, 5–29. doi:10.1111/j.1743-4580.2010.00270.x.
- Barreiros, R. F., Prottil, R. M., & Moreira, V. R. (2008). Processo decisório nas cooperativas agroindustriais do Paraná: uma análise comparativa utilizando o modelo racional e o modelo político de decisão. *Revista de Contabilidade e Organizações – FEARP/USP*, 2(4), 3–22. doi:10.11606/rco.v2i4.34718.
- Batalha, M. O., & Silva, A. L. (2014). Gerenciamento de sistemas agroindustriais: definições e correntes metodológicas. In: Batalha, M. O. (Org.). *Gestão Agroindustrial*. Vol. 1. 3rd ed. São Paulo: Atlas, pp. 1–62.
- Battaglia, M., Bianchi, L., Frey, M., & Passetti, E. (2015). Sustainability reporting and corporate identity: action research evidence in an Italian retailing cooperative. *Business Ethics: A European Review*, 24(1), 52–72. doi:10.1111/beer.12067.
- Benato, J. V. A. (1992). *Cooperativas e Sua Administração*. São Paulo: OCESP.
- Benos, T., Kalogeras, N., & Verhees, F.J.H.M. (2007). The influence of cooperative organizational characteristics on market orientation and performance: the case of agri-food cooperatives in Greece. In: Papageorgiou, K. (Ed.). *Cooperative Reflections*. Athens: Stamoulis Publications, pp. 31–52.
- Bernardo-Rocha, E. E. R. (1999). *O Cooperativismo Agrícola em Transição: dilemas e perspectivas*. PhD Thesis. Universidade de Campinas (UNICAMP), Campinas, Brazil.
- Bialoskorski Neto, S. (1999). A nova geração de cooperativas e a coordenação dos sistemas agroindustriais. II Workshop Brasileiro de Gestão de Sistemas Agroindustriais. Ribeirão Preto: FEA/USP.
- Bialoskorski Neto, S. (2004a). *Economia das organizações cooperativas: uma análise da influência da cultura e das instituições*. Habilitation Thesis. Universidade de São Paulo, Ribeirão Preto, Brazil.
- Bialoskorski Neto, S. (2004b). *Cooperativismo é Economia Social: Um Ensaio para o caso brasileiro*. Seminário Tendências do Cooperativismo Contemporâneo, Cuiabá.
- Bialoskorski Neto, S. (2007). Um ensaio sobre desempenho econômico e participação em cooperativas agropecuárias. *Revista de Economia e Sociologia Rural*, 45(1), 119–138. doi:10.1590/s0103-20032007000100006.
- Birchall, J. (2014). *The Governance of Large Co-operative Businesses*. Bruxelas: Aliança Cooperativa Internacional.
- Briggeman, B., Shanoyan, A., Harmon, B., Harris, K., Haverkamp, J., Heier, R., Holder, J., Kniebel, C., Jackson, K., Lutz, T., Warta, T., & Wendelburg, A. (2013). Cooperative Innovation: The Case of Team Marketing Alliance. Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013.
- Bruce, A. (2016). The Legacy of agrarian reform in Latin America: foundations of the fair trade cooperative system. *Geography Compass*, 10/12, 485–498. doi:10.1111/gec3.12298.
- Camilleri, N. R., & Izquierdo, R. J. S. (2016). Orientación al mercado y tipología de las cooperativas agroalimentarias en base a la competitividad: caso-estudio de las cítricas españolas. *REVESCO*, 121, 145–172. doi:10.5209/rev_reve.2016.v121.51305.
- Castilla-Polo, F., Sánchez-Hernández, M. I., & Gallardo-Vázquez, D. (2017). Assessing the Influence of Social Responsibility on Reputation: An Empirical Case-Study in Agricultural Cooperatives in Spain. *Journal of Agricultural Environmental Ethics*, 30(1), 99–120. doi:10.1007/s10806-017-9656-9.
- Cornaggia, J. (2013). Does risk management matter? Evidence from the U.S. agricultural industry. *Journal of Financial Economics*, 109(2), 419–440. doi:10.2139/ssrn.1314439.
- Cronin, P., Ryan, F., & Coughlan, M. (2008). Undertaking a literature review: a step-by-step approach. *British Journal of Nursing*, 17(1), 38–43. doi:10.12968/bjon.2008.17.1.28059.
- Delarmelina, N., & Salles, A. O. T. (2016). Um estudo sobre a comercialização da produção de cooperativas agropecuárias sob a ótica da Teoria dos Custos de Transação. *Custos e @gronegocio online*, 12(4), 34–71.
- Despotovic, J., Rodic, V., & Caracciolo, F. (2019). Factors affecting farmers' adoption of integrated pest management in Serbia: an application of the theory of planned behavior. *Journal of Cleaner Production*, 228, 1196–1205. doi:10.1016/j.jclepro.2019.04.149.

- Domingues, J. A. S. (2002). *Aspectos jurídicos do cooperativismo*. Série cooperativismo. v.1. Porto Alegre: Editora Sagra Luzzatto.
- Domit, L. A., Dalbosco, M., Santos R. M. De S., & Guimarães, M. D. F. (2008). Transferência de tecnologia para a cultura da soja: a experiência da COPACOL. *Semina: Ciências Agrárias*, 29(2), 255–264. doi:10.5433/1679-0359.2008v29n2p255.
- Dornelas, S. (1998). dois pesos e uma medida: nascido sob a égide da solidariedade, o cooperativismo enfrenta hoje o desafio de conciliar seus princípios com a competitividade. *Agroanalysis*, 18(12), 28–29.
- Erthal, G. M. S., Russini, A., Sebem, E., Erthal, E. S., & Galafassi, C. (2018). Diagnóstico da Adoção da Viticultura de Precisão no Vale dos Vinhedos - Rio Grande do Sul. *Tecno-lógica*, 22(2), 174–186. doi:10.17058/tecnolog.v22i2.12059.
- Estevam, D. O., Marcolino, J., Lanzarini, J. J. S., & Madeira, K. (2011). Cooperativismo virtual: o caso da cooperativa de produção agroindustrial familiar de Nova Veneza (COOFANOVE), em Santa Catarina. *Cadernos de Ciência & Tecnologia*, 28(2), 485–507.
- Estevam, D. O., Salvaro, G. I. J., & Busarello, C. S. (2015). Espaços de produção e comercialização da agricultura familiar: as cooperativas descentralizadas do Sul Catarinense. *INTERAÇÕES*, 16(2), 289–299. doi:10.1590/151870122015205.
- Ferreira, J. M. (2009). Gestão do agronegócio cooperativo. *Revista do Núcleo Interdisciplinar de Pesquisa e Extensão do UNIPAM*, 6, 163–172.
- Geroski, P. A. (2000). Models of technology diffusion. *Research Policy*, 29, 603–625.
- Gimenes, R. M. T., & Gimenes, F. M. P. (2007). Agronegócio cooperativo: a transição e os desafios da competitividade. *Redes*, 12(2), 92–108.
- Gürel, P. A. (2014). A strategic approach to reputation management and its reflections on sustainable competitiveness. *International Journal of Research in Business and Social Sciences*, 3(2), 31–55. doi:10.20525/ijrbs.v3i2.97.
- Hall Jr., E. H., & Lee, J. (2014). Assessing the impact of firm reputation on performance: an international point of view. *International Business Research*, 7(12), 1–13. doi:10.5539/ibr.v7n12p1.
- Hart, S. L., & Milstein, M. B. (2004). Criando Valor Sustentável. *GV-executivo*, 3(2), 65–79. doi:10.12660/gvexec.v3n2.2004.34820.
- Hedley, C. (2014). The role of precision agriculture for improved nutrient management on farms. *Journal of the Science of Food and Agriculture*, 95(1), 12–19. doi:10.1002/jsfa.6734.
- Hirsch, B., & Meyer, M. (2010). Integrating soft factors into the assessment of cooperative relationships between firms: accounting for reputation and ethical values. *Business Ethics: A European Review*, 19(1), 81–94. doi:10.1111/j.1467-8608.2009.01580.x.
- Hobbs, P. R., Sayre, K., & Gupta, R. (2008). The role of conservation agriculture in sustainable agriculture. *Philosophical Transactions of the Royal Society B*, 363, 543–555.
- Hochman, Z., Carberry, P. S., Robertson, M. J., Gaydon, D. S., Bell, L. W., & Mcintosh, P. C. (2013). Prospects for ecological intensification of Australian agriculture. *European Journal of Agronomy*, 44, 109–123. doi:10.1016/j.eja.2011.11.003.
- Holloway, G., Nicholson, C., Delgado, C., Staal, S., & Ehui, S. (2000). Agroindustrialization through institutional innovation: transaction costs, cooperatives and milk-market development in the east-African highlands. *Agricultural Economics*, 23(3), 279–288. doi:10.1016/s0169-5150(00)00089-x.
- Houshyar, E., Azadi, H., Almassi, M., Davoodi, M. J. S., & Witlox, F. (2012). Sustainable and efficient energy consumption of corn production in Southwest Iran: combination of multi-fuzzy and DEA modeling. *Energy*, 44(1), 672–681. doi:10.1016/j.energy.2012.05.025.
- Iliopoulos, C., & Cook, M. L. (1999). The internal organization of the cooperative firm: an extension of a new institutional digest. *Journal of Cooperatives*, 14, 77–85.
- Iliopoulos, C., Cook, M., & Chaddad, F. (2016). Agricultural cooperatives in netchains. *Journal on Chain and Network Science*, 16(1), 1-6. doi:10.3920/jcns2016.x003.
- Jussila, I., Kotonen, U., & Tuominen, P. (2007). Customer owned firms and the concept of regional responsibility: qualitative evidence from finish cooperatives. *Social Responsibility Journal*, 3(3), 35-43. doi:10.1108/17471110710835563.
- Kienzler, K. M., Lamers, J. P. A., McDonald, A., Mirza-baev, A., Ibragimov, N., Egamberdiev, O., Ruzibaev, E., & Akramkhanov, A. (2012). Conservation agriculture in Central Asia -What do we know and where do we go from here? *Field Crops Research*, 132, 95–105.
- Kontogeorgos, A. (2012). Brands, quality badges and agricultural cooperatives: how can they co-exist? *The TQM Journal*, 24(1), 72-82. doi:10.1108/17542731211191230.

- Kubitza, C., Krishna, V. V., Urbanc, K., Alamsyahd, Z., & Qaima, M. (2018). Land Property Rights, Agricultural Intensification, and Deforestation in Indonesia. *Ecological Economics*, 147, 312–321. doi:10.1016/j.ecolecon.2018.01.021.
- Kyriakopoulos, K., Meulenbergh, M., & Nilsson, J. (2004). The impact of cooperative structure and firm culture on market orientation and performance. *Agribusiness*, 20(4), 379–396. doi:10.1002/agr.20021.
- Lalani, B., Dorward, P., & Holloway, G. (2017). Farm-level Economic Analysis - Is Conservation Agriculture Helping the Poor? *Ecological Economics*, 141, 144–153. doi:10.1016/j.ecolecon.2017.05.033.
- Lamine, C. (2011). Transition pathways towards a robust ecologization of agriculture and the need for system redesign. Cases from organic farming and IPM. *Journal of Rural Studies*, 27, 209–219. doi:10.1016/j.jrurstud.2011.02.001.
- Lazzarini, S., Chaddad, F., & Cook, M. (2001). Integrating supply chain and network analyses: The study of net-chains. *Journal on Chain and Network Science*, 1(1), 7–22. doi:10.3920/jcns2001.x002.
- Lee, J., & Roh, J. J. (2012). Revisiting corporate reputation and firm performance link. *Benchmarking: An International Journal*, 19(4/5), 649–664. doi:10.1108/14635771211258061.
- Leite, A. E., Castro, R., Jabbour, C. J. C., Batalha, M.O., & Govindan, K. (2014). Agricultural production and sustainable development in a Brazilian region (Southwest, São Paulo State): motivations and barriers to adopting sustainable and ecologically friendly practices. *International Journal of Sustainable Development & World Ecology*, 21, 422–429. doi:10.1080/13504509.2014.956677.
- Leite, A. E., & Batalha, M. O. (2016). Agricultura Sustentável e Cooperativismo: Quais Ligações Possíveis? *Interciencia*, 41(10), 660–667.
- Levin, H. M. (1984). Employment and Productivity of Producer Cooperatives. In: Jackall, R., & Levin, H. M. (Org.). *Worker Cooperatives in America*. Berkley: University of California Press. pp. 16–29.
- Ligon, E. (2009). Risk management in the cooperative contract. *American Journal of Agricultural Economics*, 91(5), 1211–1217. doi:10.2139/ssrn.1774021.
- Lijia, W., & Xuexi, H. (2014). Transaction costs comparison between cooperatives and conventional apple producers: a case study of northwestern China. *Annals of Public and Cooperative Economics*, 85(2), 233–255. doi:10.1111/apce.12039.
- Liu, Y., Ma, W., Renwick, A., & Fu, X. (2019). The role of agricultural cooperatives in serving as a marketing channel: evidence from low-income regions of Sichuan Province in China. *International Food and Agribusiness Management Review*, 22(2), 265–282. doi:10.22434/ifamr2018.0058.
- Lomott, M. J., & Łyskawa, K. (2014). The new instruments of risk management in agriculture in the European Union. *Procedia Economics and Finance*, 9, 321–330. doi:10.1016/s2212-5671(14)00033-1.
- Ma, W. (2018). *The Impact of Agricultural Cooperatives on the Adoption of Technologies and Farm Performance of Apple Farmers in China*. PhD Thesis. Christian-Albrechts-Universität zu Kiel, Kiel, Germany.
- Machado Filho, C. A. P., Marino, M. K., & Conejero, M. A. (2004). Gestão estratégica em cooperativas agroindustriais. *Caderno de Pesquisas em Administração*, 11(2), 61–69.
- Manfredo, M. R., & Richards, T. J. (2007). Cooperative risk management, rationale, and effectiveness: the case of dairy cooperatives. *Agricultural Finance Review*, 67(2), 311–340. doi:10.1108/00214660780001211.
- Marcis, J., Bortoluzzi, S. C., de Lima, E. P., & da Costa, S. E. G. (2019). Sustainability performance evaluation of agricultural cooperatives' operations: a systemic review of the literature. *Environment, Development and Sustainability*, 21(3), 1111–1126. doi:10.1007/s10668-018-0095-1.
- Marí-Vidal, S., Lajara-Camilleri, N., & Izquierdo, R. S. (2013). La formación em las sociedades cooperativas agrarias como factor clave de competitividad en un contexto de concentración e internacionalización de los mercados. *Interciencia*, 38(2), 112–120.
- Matson, P. A., Parton, W. J., Power, A. G., & Swift, M. J. (1997). Agricultural intensification and ecosystem properties. *Science*, 277, 504–509. doi:10.1126/science.277.5325.504.
- Mccune, N. M., González, Y. R., Alcántara, E. A., Martínez, O. F., Fundora, C. O., Arzola, N. C., Cairo, P. C., D'haese, M., Deneve, S., & Hernández, F. G. (2011). Global Questions, Local Answers: Soil Management and Sustainable Intensification in Diverse Socioeconomic Contexts of Cuba. *Journal of Sustainable Agriculture*, 35(6), 650–670. doi:10.1080/10440046.2011.586595.
- Mcguire, J., Morton, L. W., & Cast, A. D. (2013). Reconstructing the good farmer identity: shifts in farmer identities and farm management practices to improve water quality. *Agriculture and Human Values*, 30(1), 57–69. doi:10.1007/s10460-012-9381-y.

- Miles, M. P., White, J. B., & Munilla, L. S. (1997). Strategic planning and agribusiness: an exploratory study of the adoption of strategic planning techniques by cooperatives. *British Food Journal*, 99(11), 401–408. doi:10.1108/00070709710196481.
- Moreira, V. R., Freier, A., & Veiga, C. P. (2016). A review of concepts, strategies and techniques management of market risks in agriculture and cooperatives. *International Business Management*, 10(6), 739–750.
- Moreira, V. R., Silva, C. L. D., Moraes, E. A. D., & Protil, R. M. (2012). O cooperativismo e a gestão dos riscos de mercado: análise da fronteira de eficiência do agronegócio paranaense. *Revista de Economia e Sociologia Rural*, 50(1), 51–68. doi:10.1590/s0103-20032012000100003.
- OCB. (2019). *Anuário do Cooperativismo*. Brasília: OCB.
- Oelofse, M., Hogh-Jensen, H., Abreu L. S., Almeida, G. F., Hui, Q. Y., Sultan, T., & Neergaard, A. (2010). Certified organic agriculture in China and Brazil: market accessibility and outcomes following adoption. *Ecological Economics*, 69(9), 1785–1793. doi:10.1016/j.ecolecon.2010.04.016.
- Oliveira, D. P. R. (2012). *Manual de gestão das cooperativas: uma abordagem prática*. 5th ed. São Paulo: Atlas.
- Orlitzky, M., Siegel, D. S., & Waldman, D. A. (2011). Strategic Corporate Social Responsibility and Environmental Sustainability. *Business & Society*, 50(1), 6–27.
- Pascuci, L., Lorenzi, G. A., & Castro, S. C. (2017). Princípios Cooperativistas e Conflitos de Interesses: Um Estudo Comparativo. *Revista Eletrônica Estácio Papirus*, 1(1), 1–13.
- Pelegri, D. F., Shiki, S., & Shiki, S. F. N. (2015). Uma Abordagem Teórica Sobre Cooperativismo e Associativismo no Brasil. *Revista Eletrônica de Extensão*, 12(19), 70–85. doi:10.5007/1807-0221.2015v12n19p70.
- Perdomo, S. A. P., Farrow, A., Trienekens, J. H., & Omta, S. W. F. (2016). Stakeholder roles for fostering ambidexterity in Sub-Saharan African agricultural networks for the emergence of multi-stakeholder cooperatives. *Journal on Chain and Network Science*, 16(1), 59–82. doi:10.3920/jcns2014.0007.
- Pinto, L. B., Lourenzani, A. E. B. S., Lourenzani, W. L., & Mochiuti, J. C. (2012). Aspectos históricos e organizacionais da agricultura familiar no desenvolvimento da região Nova Alta Paulista. *Revista Brasileira de Gestão e Desenvolvimento Regional*, 8(2), 130–150.
- Pona, J. A. G., Goes, T. H. M., Gimenes, R. M. T., & Shikida, P. F. A. (2015). Responsabilidade social empresarial (RSE) nas cooperativas agropecuárias paranaenses. *Redes*, 20(1), 151–178. doi:10.17058/redes.v20i1.2985.
- Powson, D. S., Gregory, P. J., Whalley, W. R., Quinton, J. N., Hopkins, D. W., Whitmore, A. P., Hirsch, P. R., & Goulding, K. W. T. (2011). Soil management in relation to sustainable agriculture and ecosystem services. *Food Policy*, 36, 572–587. doi:10.1016/j.foodpol.2010.11.025.
- Priest, H. M. (2006). Essentials of Nursing Research: Methods, Appraisal and Utilization. *Nurse Researcher*, 13(4), 91–92. doi:10.7748/nr.13.4.91.s11.
- Puusa, A., Mönkkönen, K., & Varis, A. (2013). Mission lost? Dilemmatic dual nature of co-operatives. *Journal of Co-Operative Organization and Management*, 1(1), 6–14. doi:10.1016/j.jcom.2013.06.002.
- Rabbinge, R., & Bindraban, P. S. (2012). Making more food available: Promoting sustainable agricultural production. *Journal of Integrative Agriculture*, 11, 1–8. doi:10.1016/s1671-2927(12)60777-9.
- Rains, G. C., Olson, D. M., & Lewis, W. J. (2011). Redirecting technology to support sustainable farm management practices. *Agricultural Systems*, 104, 365–370. doi:10.1016/j.agsy.2010.12.008.
- Reimer, E. M., Weinkauff, D. K., & Prokopy, L. S. (2012). The influence of perceptions of practice characteristics: An examination of agricultural best management practice adoption in two Indiana watersheds. *Journal of Rural Studies*, 28, 118–128. doi:10.1016/j.jrurstud.2011.09.005.
- Rodrigues, R. (1997). O cooperativismo na globalização. *Agroanalysis*, 17(8), 10–12.
- Romero, R., Muriel, J. L., García, I., & Muñoz De La Peña, D. (2012). Research on automatic irrigation control: state of the art and recent results. *Agricultural Water Management*, 114, 59–66.
- Rover, O. J., & Riepe, A. J. (2016). A relação entre comercialização de alimentos e princípios agroecológicos na rede de cooperativas de reforma agrária do Paraná/Brasil. *Desenvolvimento e Meio Ambiente*, 38, 663–682. doi:10.5380/dma.v38i0.41984.
- Royer, J. S. (2012). Implications of the Cooperative Organizational Form for Vertical Expansion. *Journal of Rural Cooperation*, 40(2), 162–180.
- Saath, K. C. O., & Fachinello, A. L. (2018). Crescimento da demanda mundial de alimentos e restrições do fator terra no Brasil. *Revista de Economia e Sociologia Rural*, 56(2), 195–212. doi:10.1590/1234-56781806-94790560201.

- Santos, B. S., & Rodríguez, C. (2005). Introdução: para ampliar o cânone da produção. In: Santos, B. S. (org.). *Produzir para viver: os caminhos da produção não capitalista*. Rio de Janeiro, Civilização Brasileira, pp 1-60.
- Santos, J. A. M., Tavares, M. C., Vasconcelos, M. C. R. L., & Afonso, T. (2012). O processo de inovação tecnológica na Embrapa e na Embrapa Agrobiologia: desafios e perspectivas. *Ciência da Informação*, 17(4), 175-194. doi:10.1590/s1413-99362012000400011.
- Santos, J. O., Santos R. M. S., Andrade M. E. L., Sousa, D. F. M. A., & Coelho, D. C. (2012). Agricultura orgânica e a sustentabilidade. *Revista Verde*, 7(5), 59-65.
- Sexton, R. J., & Iskow, J. (1988). Factors Critical to the Success or Failure of Emerging Agricultural Cooperatives. Department of Agricultural and Resource Economics, University of California, Davis.
- Simioni, F. J., Siqueira, E. S., Binotto, E., Spers, E. E., & Araújo Z. A. S. (2009). Lealdade e oportunismo nas cooperativas: desafios e mudanças na gestão. *Revista de Economia e Sociologia Rural*, 47(3), 739-765. doi: 10.1590/s0103-20032009000300010.
- Srbínovska, M., Gavrovski, C., Dimcev, V., Krkoleva A., & Borozan, V. (2015). Environmental parameters monitoring in precision agriculture using wireless sensor networks. *Journal of Cleaner Production*, 88, 297-307. doi: 10.1016/j.jclepro.2014.04.036.
- Tambo, J. A., & Mockshell, J. (2018). Differential Impacts of Conservation Agriculture Technology Options on Household Income in Sub-Saharan Africa. *Ecological Economics*, 151, 95-105. doi:10.1016/j.ecolecon.2018.05.005.
- Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43, 172-194. doi:10.1016/j.lrp.2009.07.003.
- Teece, D. J. (2018). Business Models and Dynamic Capabilities. *Long Range Planning*, 51, 40-49. doi:10.1016/j.lrp.2017.06.007.
- Tilman, D., Balzer, C., Hill, J., & Befort, M. L. (2011). Global food demand and the sustainable intensification of agriculture. *Proceedings of the National Academy of Sciences of the United States of America*, 108(50), 20260-20264.
- Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polasky, S. (2002). Agricultural sustainability and intensive production practices. *Nature*, 418, 671-677. doi: 10.1038/nature01014.
- Turner, N., Swart, J., & Maylor, H. (2012). Mechanisms for managing ambidexterity: a review and research agenda. *International Journal of Management Reviews*, 15(3), 317-332. doi:10.1111/j.1468-2370.2012.00343.x.
- Verdolin, D. R., & Alves, A. F. (2005). Responsabilidade social: perspectivas para o agronegócio. *Organizações Rurais e Agroindustriais*, 7(1), 103-113.
- Verhofstadt, E., & Maertens, M. (2014). Smallholder cooperatives and agricultural performance in Rwanda: do organizational differences matter? *Agricultural Economics*, 45(S1), 39-52. doi:10.1111/agec.12128.
- Vorlauffer, T., Falkb, T., Dufhues, T., & Kirk, M. (2017). Payments for ecosystem services and agricultural intensification: evidence from a choice experiment on deforestation in Zambia. *Ecological Economics*, 141, 95-105. doi:10.1016/j.ecolecon.2017.05.024.
- Wollni, M., & Andersson, C. (2014). Spatial patterns of organic agriculture adoption: Evidence from Honduras. *Ecological Economics*, 97, 120-128. doi:10.1016/j.ecolecon.2013.11.010.
- Zeuli, K. A. (1999). New risk-management strategies for agricultural cooperatives. *American Journal Agricultural Economics*, 81(5), 1234-1239. doi:10.2307/1244113.
- Zylbersztajn, D. (2002). *Quatro estratégias fundamentais para cooperativas agrícolas*. Estudo preparado para o XIV Seminário de Política Econômica: Cooperativismo e Agronegócio. Universidade Federal de Viçosa.
- Zylbersztajn, D. (1996). *Surge uma nova geração de cooperativas agrícolas*. Handout. São Paulo: FEA/USP/PENSA.
- Zylberztajn, D. (1994). *Organização de Cooperativas: desafios e tendências*. *Revista de Administração*, 29(3), 23-32.