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Innovation Performance: What Is Happening In Agricultural Cooperatives?

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ABSTRACT

Studies have pointed to gaps in the understanding of innovation performance in the industrialization of cooperatives. This paper has addressed the innovation performance of Brazilian agricultural cooperatives in economic-financial and social dimensions. For our research, we conducted a semi-structured interview with managers of cooperatives that adopted the industrialization of products. In the economic-financial dimension, cooperatives increased the offer/variety of products and gained new markets, while, in the social dimension, the industrialization of new products for the cooperative, or for the market. These may affect the sense of pride in belonging to the cooperative due to the availability of a manufactured product for purchase that resulted from the *commodity* produced by the cooperative members. This study improves the understanding about the innovation performance model, and shows how cooperatives have addressed this topic. Such an understanding can assist in the development of strategies for innovation in cooperatives. The findings contribute to the understanding of innovation in industrialization, and add efforts in research on innovation in emerging economies.

KEYWORDS

Innovation, Innovation performance, Agricultural Cooperatives

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1. INTRODUCTION

Some cooperatives have adopted industrialization, due to changes in the Brazilian agricultural sector, with the purpose of adding value to the members' production (Lauermann et al., 2017). Consonance with changes in the economic and structural scenarios, constant adaptation, and new standards of efficiency in activities are essential for the survival of cooperatives (Bialoskorski, 2015). In this sense, agricultural cooperatives have been achieving success, because they are among the largest and best organizations in Brazil (Revista Exame, 2019), and the most of them from Paraná state, which also has the innovation program for cooperatives. We developed this study in four of the cooperatives involved in this program.

Agricultural cooperatives compete for market share with large non-cooperative organizations. They are pressured in the business environment for gains in scale and scope, forcing the adoption of new organizational structures, such as diversification of the production chain, verticalization, and expansion of geographical operations (Simão et al., 2017). Such dynamism in the environment forces cooperatives to apply advanced administrative models, requiring professional management and the implementation of organizational tools (Casagrande & Mundo, 2008).

In a competitive scenario, cooperatives need to consider their capacities, resources, and processes (Furlan et al., 2017). They have sought to innovate operational processes and agricultural production and to achieve industrialization; that is, innovation of processes and products. Cooperatives are similar to capital organizations but follow cooperative doctrinal principles and, in addition to the economic-financial dimension, they consider the firm's social dimension, or even serve the consumer market and members with products and services (Bialoskorski, 2015). Cook and Plunkett (2006) argued for the adoption of "entrepreneurial" attitudes by agricultural cooperatives through collective entrepreneurship, while Kormelinck et al. (2019) mentioned the role of social and sustainability goals in the relationship between members. These aspects may highlight the social perspective in promoting innovation of new products and markets with collective actions.

Luo et al. (2017) highlighted innovation performance in a complex construct with different dimensions. The authors studied agricultural innovations in the relationships between dynamics of innovation methods and innovation performance of cooperatives. They suggested further research focused on agricultural cooperatives.

Here, we analyzed Brazilian agricultural cooperatives and brought new variables to the model proposed by Luo et al. (2017). Therefore, it is important to mention state socialism in China and the emergence of the New Rural Reconstruction movements that historically affect the efficiency and the growth of agricultural cooperative organizations (Huang, 2011; Hale, 2013). Nearly half of all Chinese farmers are members of cooperatives and generally, cooperatives have low number of members based on villages (Yu & Nilsson, 2021). Modern Chinese agricultural cooperatives are at early stages of development (Huang, 2011; Hale, 2013).

Silva (2019) identified the components of innovation performance in Brazilian agricultural cooperatives, and developed an analysis construct with the components of innovation performance in the economic-financial and social dimensions. In this study, we used this construct to improve the empirical understanding of innovation performance in agricultural cooperatives that industrialize their raw material. Innovation performance in cooperatives approached considering components in the economic-financial and social dimensions is relevant. The economic-financial dimension addressed to market share, sale of new products, increases in the product portfolio, and budget

surplus. These elements are impacted by technological innovation introduced by the cooperative. On the other hand, the social dimension refers to the repercussions of technological innovation on participation in assemblies and on the communication channels between cooperatives and active members.

The limited number of studies on innovation in emerging economies (Resende et al., 2014), whose conditions for innovation are different from those reported in studies on developed economies (Frank et al., 2016), were some motivations of this study. We also highlighted the importance of research conducted in countries such as Brazil.

Our paper is organized in the following sections. We begin with "Cooperatives: an overview" which presents information about Brazilian cooperatives and Paraná state specifically as focus of our analyses. We then move to "Cooperatives and innovation" and "Innovation performance in cooperatives", which address to the importance of the adoption of innovation and the lack of theoretical construct analysis for innovation performance with social, and economic-financial perspective in cooperatives, mainly in Brazil. In the "Methodological Procedure" section we described details about the study area, the sample of cooperatives, and the data collected and analyzed. In "Findings and Discussion" we highlight the most important findings in the social and economic-financial dimensions of innovation performance. We conclude with "Final consideration" which holds main conclusions, remarks, limitations, and suggestions for future studies.

2. COOPERATIVES: AN OVERVIEW

Brazilian cooperatives are classified into seven different branches based on different areas of activity: agriculture and livestock, consumption, credit, infrastructure, labor, production of goods and services, health, and transportation (OCEMG, 2019). Regarding representativeness, Brazilian cooperatives are represented by the Organization of Brazilian Cooperatives (OCB), with headquarters in Brasília and units in various states. It promotes cooperativism in the Executive, Legislative, and Judiciary branches of government and represents cooperativism inside and outside Brazil.

The 300 largest cooperatives account for a worldwide turnover of US$ 2.1 trillion per year, and the agricultural sector has 1.2 million cooperatives (OCB, 2019). In Brazil, cooperatives amount to more than 6,700 thousand enterprises, with more than 14,590 million members, creating more than 425 thousand formal jobs and, specifically in the agricultural sector, figures indicate that there are 1,590 cooperatives, 1,018,864 members, and 209,529 employees (OCEMG, 2019). Not considering the different areas of operation of cooperatives, the southeastern region of Brazil has the largest number of cooperative enterprises, and the southern region has the largest number of members (Figure 1).

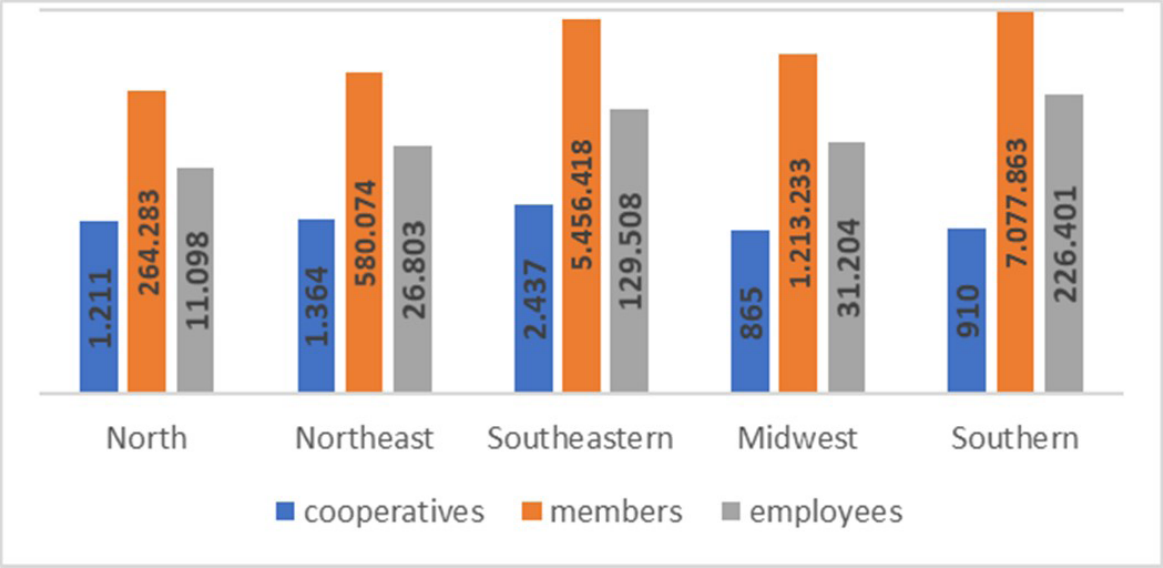

Figure 1. Cooperatives in Brazil.
Source: Yearbook of economic and social information of Minas Gerais cooperatives (OCEMG, 2020).

Our study area was in the state of Paraná, in the south of Brazil. The agricultural sector has 62 cooperatives with 151,367 members and 70,171 employees, accounting for 60% of all the state agricultural production and industrializing 48% of their production (OCEPAR, 2019). Cooperatives also drive foreign trade in states: Paraná has 20 internationalized cooperatives and ranks as the second largest number in the country, while the state of Rio Grande do Sul ranks the first with 22 internationalized cooperatives (OCB, 2019).

This paper focuses on agricultural cooperatives. Industrialization adds value to production, which generates financial benefits to the organization and its members (Deboçã et al., 2010). Agricultural cooperatives are among the most important organizations in Brazil in terms of higher net revenue and higher net capital. They are among the 50 largest exporters by export revenue and rank among the 100 largest organizations in terms of investments (Revista Exame, 2017).

Agricultural cooperatives are equivalent in competitiveness to private companies in a same sector (Simão et al., 2017). The state of Paraná holds a large share of cooperatives among the organizations with the highest net revenues in Brazil. There, cooperativism is considered an economic success model (Chechin, 2014) and the cooperatives are adopting innovation programs to maintain the competitiveness.

3. COOPERATIVES AND INNOVATION

The complexity of innovation in Brazilian agribusiness is a challenge (Gelinski et al., 2014). For these authors, understanding the complex and diverse relationships and interrelationships of innovation in agribusiness is a task that demands effort in developed countries, despite the more balanced growth of their economic sectors than that of developing countries such as Brazil. Constant changes in the economic scenario pose new challenges to the agricultural system and to cooperativism (Bialoskorski, 2015). Brazilian agribusiness has become increasingly competitive because of supportive investments in science and technology, and the innovative and entrepreneurial perspective of all agents linked to this sector (Melo, 2014).

In a competitive scenario, cooperatives have to adopt appropriate infrastructure to meet their members, who modernize their activities and start to demand other services, such as storage, processing, and industrialization capacity (Lauermann et al., 2017). The cooperative, as with any other enterprise, needs economic efficiency to survive and meet such growing demands (Bialoskorski, 2015). Industrialization makes cooperatives add value to their production and structure themselves as modern capitalist organizations, thus competing with large non-cooperatives in the same sector in which they operate (Serra, 2008).

Cooperatives pursue efficiency and, in order to survive amongst large competitors, have sought to innovate. Previous studies on innovation in cooperatives have adopted several approaches, such as institutional marketing innovation (Getnet et al., 2018), cooperative model innovation (Grashuis, 2018), horizontal and vertical communication (Peng et al., 2018), innovation in agriculture (Hata, 2017; Souza Filho et al., 2011), partnerships between the cooperative and ecological research centers (Berthet et al., 2016), creation and propagation of innovation within the formal structures of cooperatives focused on their members (Reed & Hickey, 2016), risks of technological innovation (Luo & Hu, 2015), organizational innovation (Lopes et al., 2015; Bijman et al. 2014; Casagrande & Mundo, 2008), intermediate innovation (Yang et al., 2014), entrepreneurship (Alves, 2010), characterization of technological innovations (Santini et al., 2006; Bassi et al., 2013), and the impact of innovation activities on the well-being of cooperative members (Giannakas & Fulton, 2005). Only the study of Luo et al. (2017) addressed innovation performance in cooperatives, focusing on the Chinese context.

Despite facing difficulties related to the lack of qualified labor, high costs and risks, and few possibilities for cooperation with other industries/institutions that affect innovation, the Brazilian manufacturing industry, part of which is made up of agricultural cooperatives, has managed to innovate in both national and international markets (Jacoski et al., 2014). Cássia and Zilber (2016) highlighted the impact of costs, the lack of qualified labor, and economic risks related to obtaining credit for the development of innovative activities.

Immersed in a scenario that requires constant adaptations, entities representing cooperatives have been concerned with the topic of innovation, for which they develop training programs, an example being the Paraná state study area. The innovation program for cooperativism in Paraná is a free-membership program aiming at training agents with the ability to lead innovation teams and foster a culture of innovation within cooperatives. The implementation of an innovative culture encourages creative behavior, a basic element in the management of innovation programs (Silva et al., 2014).

The methodology of the innovation program consists of stages of diagnosis, choice of agents, training of agents, application, and multiplication. These stages range from the identification of the behavioral and technical skills of the cooperative team, the selection of employees with the capacity to foster ideas, and those that make them a reality, as well as training on innovation and issues related to the application of the knowledge acquired in the program.

In the innovation program for cooperativism in Paraná, agents are expected to foster a culture of innovation in cooperatives as well as the creation of a favorable environment for interdisciplinary and multigenerational teams in order to produce innovative solutions through collaborative methodologies. The program aims at training agents with the ability to lead innovation teams within cooperatives in Paraná (OCEPAR, 2019).

3.1. INNOVATION PERFORMANCE IN COOPERATIVES

As in other types of organizations, organizational performance can be measured considering economic-financial and social aspects. When measuring outcome in cooperatives, we can consider the social (Ferreira, 2002) or socioeconomic aspects (Menegario, 2000), since cooperative enterprises have a double dimension, economic and social (Pinho, 1986; Oliveira, 1996). In the economic-financial and social analyses of a cooperative, there are unique aspects to this type of organization (Santos, 1986; Ferreira, 2002).

In studies specifically focused on innovation performance, there is a prevalence of economic measures (Reichert et al., 2016). Innovation performance refers to outcomes and effects of innovation with the efficacy of the construct, which can be in products and increases in sales (Sun et al., 2021). However, the social aspect needs to be incorporated (Luo et al., 2017) when considering the study of innovation performance in cooperatives in order to verify the impacts of innovations made on organizational performance.

Few studies have addressed innovation performance in cooperatives (Luo et al., 2017). Silva (2019) developed a construct due to identify which aspects, economic and social, are particular to cooperatives and should be considered in the study of innovation performance. The authors conducted a study with representatives of agricultural cooperatives, researchers who study cooperatives and who have links with university institutions, and representatives of entities representing cooperatives. Such a study has advanced the understanding of the specificities of the Brazilian cooperative enterprise.

Thus, innovation performance in cooperatives can be approached from the analysis of the components (Figure 2) of the economic-financial dimension: market share, sale of new products, increase in the product portfolio, and budget surplus. In the social dimension, the components are active members, participation in assemblies, and communication channels between the cooperative and members. This study improved the empirical understanding of these components.

The elements in Figure 2 differ from those of the study by Luo et al. (2017), which addresses innovation performance in Chinese cooperatives. For Luo et al. (2017), innovation performance in the economic dimension includes the number of members, income growth, technical and brand standards, or publications developed by a cooperative. The social dimension includes the number of farmers supported by cooperatives, and the level of knowledge transferred from cooperatives to local farmers. The difference stems from the particularities of the objectives for the study, the focus adopted for innovation in industrialized products, and the context in which cooperatives operate in each country.

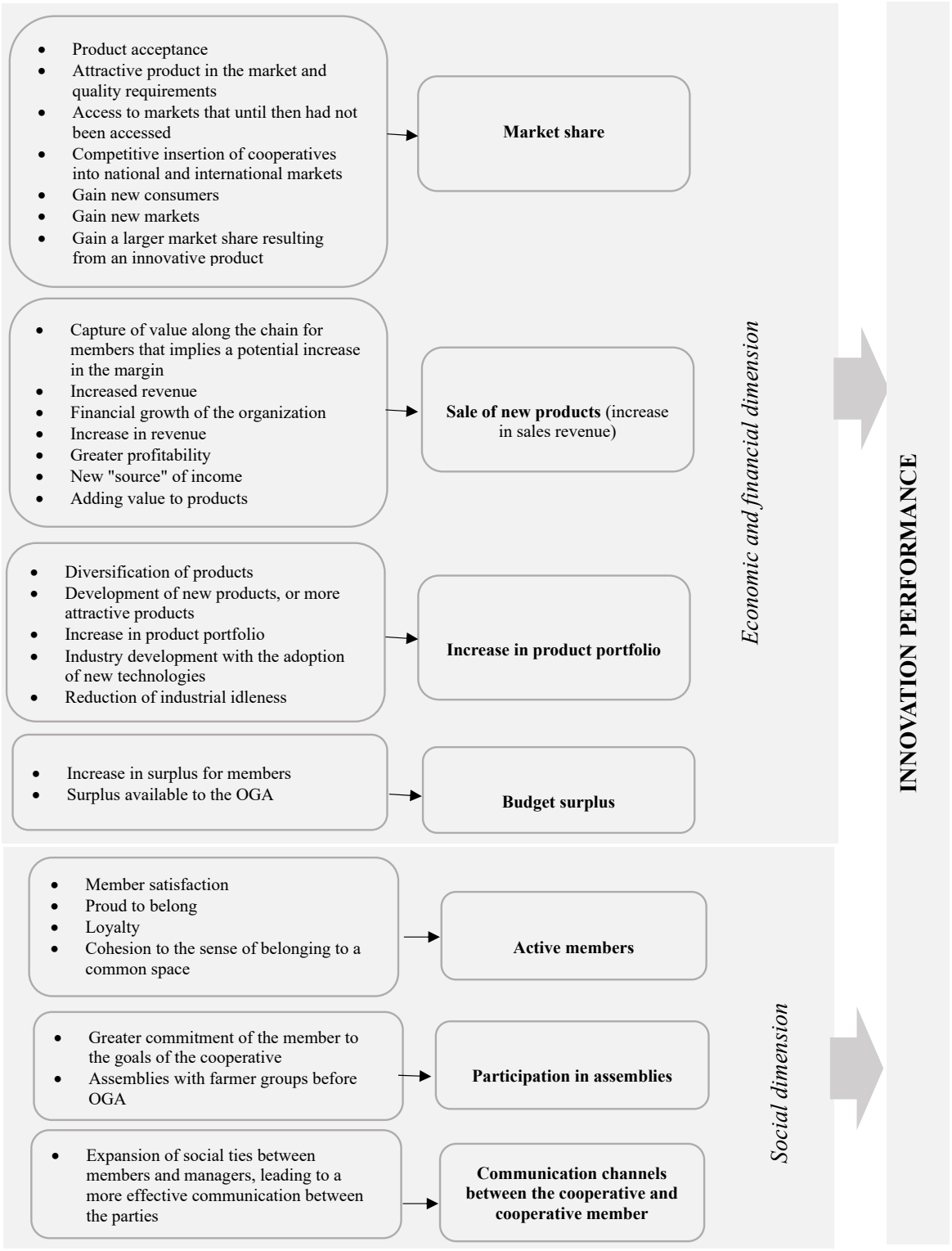

Figure 2. Construct of the components of innovation performance in the economic-financial and social dimensions
Source: Silva (2019)

4. METHODOLOGICAL PROCEDURE

Paraná state has 217 cooperatives (Sistema OCB, 2020), 62 agricultural cooperatives (OCEPAR, 2019). In this state, there is the innovation program for cooperatives with 70 participants from different branches. The purpose is the professional qualification addressing to improve the management of cooperative besides of disseminate innovation culture (SistemaOCB & ISAE, 2020). Cooperatives are free to take part in program, but they consider that cooperatives involved in it denote attention and action to innovation development and it can affect in improvements.

The innovation program for Paraná cooperativism is the result of a partnership between the Federation of Cooperatives of the State of Paraná, the Organization of Paraná Cooperatives (OCEPAR), the National Service for Learning Cooperatives, Arbache Innovations, and the Higher Institute of Administration and Economics of the Fundação Getúlio Vargas (ISAE). The ISAE promotes training, development, and updating of executives guided by global principles of policies and practices implemented by the largest and most respected organizations in the world (Arbache, 2019).

Singular agricultural cooperatives of the state of Paran**á** comprise the intentional sample of this study: the nine agricultural cooperatives that joined the innovation program for the cooperativism of Paraná. These cooperatives are among the 500 Best and Largest companies in Brazil, and among the 400 largest agribusiness organizations in Brazil. Both rankings are based on net sales (in millions of reais) and take into account data extracted from financial statements (Revista Exame, 2017).

Singular cooperatives are created by members like farmers, with the exception of the admission of legal entities, whose objective is the same, or correlated economic activities, or non-profit entities characterized by the direct provision of services to members (Brasil, 1971).

We contacted nine cooperatives by phone and email. After several attempts, four companies (44%) agreed to participate in the study. The names of cooperatives are not disclosed due to a confidentiality agreement. All cooperatives participating in the survey are from the food manufacturing sector (Table 1). Two cooperatives can be considered as having a primary focus on industrialization, since a large part of their revenues is from the commercialization of industrialized products. Two others cooperatives carry out the industrialization of products, but this is neither their focus nor their main revenue, which is the sale of *commodities.*

Regarding cooperative size, we used the classification of the National Bank for Economic and Social Development (BNDES) and the data contained in the cooperative reports. All cooperatives participating in the study are of a size equivalent to that of a large company (annual gross operating revenue higher than R$ 300 million).

Table 1
Profile of cooperatives participating in the semi-structured interview.

Participating cooperatives (fictitious name)	No. of members	Production/industrialization
E1	Up to 1,000	Maize, soy, barley, wheat**
E2	Up to 15,000	Corn, soybeans, wheat, poultry, eggs, milk, pigs, cassava
E3	Up to 10,000	Soy, corn, wheat, poultry, pigs
E4	Up to 10,000	Soy, corn, wheat, coffee, oat

Source: Annual reports, magazines of cooperatives, and their electronic addresses.
**Members also develop other activities, but the production is sell to other cooperatives.

We assigned fictitious names for the cooperatives (E1, E2, E3, E4), whose respondents' positions within the organization were: Strategy area manager, Innovation manager, R&D Manager, as well as Human Resources Manager and Planning manager, respectively. One cooperative did not answer all the questions (E4), and we point out which ones.

We prepared the semi-structured interview script following the elements presented in Figure 2. The authors elaborated some questions and others were based on the Industrial Survey of Technological Innovation developed by the Brazilian Institute of Geography and Statistics. These questions refer to impact of innovation in cooperatives with increases of offer/variety, participation in markets, and new markets.

We carried out a script pre-test electronically from February 28 to March 4, 2019, with two cooperative managers and one researcher. We applied the interview by phone or virtually, according to the respondent's availability, from March to July 2019. We also conducted a documentary analysis of the materials collected from the participating cooperatives' websites. The analyzed period covers three years (2016, 2017, and 2018).

For data analysis, we used interpretative analysis, as the questions addressed the characteristics and the presence of predefined operational elements in the main thematic categories and subcategories. We conducted the analytical process using the deductive method. When analyzing answers, secondary elements emerged and helped in the interpretation of operational elements, enabling the emergence of new categories (inductive method).

5. FINDINGS AND DISCUSSION

5.1. Innovation performance: economic-financial dimension

First, we analyzed the economic-financial dimension of innovation performance. Considering the latest innovations implemented/developed by cooperatives, all cooperatives answered that they gained new markets with the launch of new products in markets where they previously did not operate. The cooperative E3 highlighted the few markets due to limitations/deficiencies in fundamental sectors, such as marketing and the commercial area.

The offer/variety of products increased in all cooperatives. These innovations include new packaging and new products for the domestic and foreign markets (E2). The members put pressure on the expansion of the range of products in domestic retail, showing a desire to find a particular product, labeled with the cooperative brand, available for purchase (E1), even when that is not the focus or the expertise of the cooperative. The expansion and variety of production may reinforce market positioning and allow the organization to minimize vulnerabilities resulting from fluctuations in demand and from actions of competitors (Furquim, 2017).

Regarding the variety of products, E4 pointed out that it is related to meeting the demand for a particular product that originates from a part of the other activities of members, for example the production of fish feed using raw material produced by members. This respondent also highlighted that there is pressure for the cooperative to offer for members a product with a lower cost or higher quality than what the market is offering. In addition, "we begin by the issues of the member, but once this is covered, we open it up to sell to everyone" (E4). It is clear that initiatives to innovate (new products for the cooperative) may be created to meet the needs of members.

Market share increased for one of the respondents (E4) considering the latest implemented/developed innovations. Another respondent reported that it obtained about 30% market share with innovation (E1). It is noteworthy that one cooperative does not work with this indicator

(E2), and for another cooperative the percentage of market share was extremely low, as sales of the new product did not leverage (E3).

The latest innovations implemented/developed by the cooperatives increased sales revenue in three cooperatives (E1, E2, E4). Industrialization was not the main focus of one of the cooperatives surveyed. It managed to exceed expectations with the sales of a given new product, which reached a high volume of sales. This will influence the launch of a new line of that product, with a greater added value (E4). The cooperative that did not obtain increases in sales revenue highlighted the discontinuation of the product because the sales did not leverage the outcome (E3). This is part of the risk of withdrawing technological innovation (Luo & Hu, 2015). For one respondent, the larger the portfolio, the greater the opportunity to gain new markets. Consequently, the increase in the portfolio increases sales without losing margin for other new products (E4).

We asked about the percentage of sales in 2018 related to the implantation or development of new products for the cooperative or for the market in the previous three years. For one of the cooperatives (E3), the percentage for both innovations was 0%, resulting in the product being discontinued from the market. For E2, the percentage of sales of new products to the cooperative was 4%, while sales of new products to the market were non-existent. For one of the managers (E1), the percentage was similar (10%). The cooperative E4 was unable to inform percentages, but signaled increases of sales revenue and market share, which may reflect in the percentage of sales (although the precise figure was not informed). These changes resulted from the economic scenario and challenge the performance system of cooperatives (Bialoskorski, 2015).

In the analyzed period, the surplus available to the annual Ordinary General Assembly was the same or similar for two cooperatives (E1, E2), decreased for E3, and increased for E4. The cooperative that showed decreases is the same one that discontinued a new product for not having been successful in its sales. In contrast, the cooperative that recorded increased surplus is the same one that performed above average in launching a new product (E4). Still, regarding the increased surplus, a cooperative identified that "[it is] increasing over time; but there was a record harvest in 2017, a historic year for the cooperative, and there was a decline in 2018; but 2018 was better than 2016, so it is on the rise" (E4).

The distribution of surplus over the past three years has prioritized the members in the four cooperatives. The E3 cooperative also presented an application in investments. According to one interviewee, it would be interesting for a part of the surplus to compose "a fund" for innovation (E4). This interviewee pointed out that the annual budget plan already incorporates capital for investment, acquisition of new units, investment in technology, among others, but nothing specific for innovation. These actions are justified because the cooperative, as any firm, needs economic efficiency to meet the demands for survival (Bialoskorski, 2015).

5.2. Innovation performance: social dimension

The analysis of documents showed increases in the number of members of three cooperatives in 2018 compared to that of the previous year, ranging from 2.6%, 4.4% to 6% and representing 220, 280, to 550 members. In one of the cooperatives, the number remained similar.

Regarding the average number of active members analyzed in three years, the cooperative E4 did not provide this information, although its report of activities shows increased number of members. However, it was not possible to state whether this increase referred to active members. The cooperative E1 kept the same or a similar average, confirming the records of the total number of members. The cooperative E2 also recorded an increase in the total number of members, while the cooperative E3 recorded a decrease in the number of members, although this cooperative had increased in the overall number of members.

The average participation in Ordinary General Assemblies (OGA), in the time analyzed, remained the same or similar in E1 and E3 and it increased in E2, which is consistent with the number of active members. One cooperative recorded an increased number of members and increased number of active members, which reflected an increase in participation in OGAs. The E4 cooperative did not provide information.

Assemblies with producer groups (pre-assemblies) before Ordinary General Assemblies were always carried out by two cooperatives (E1, E4), while one carries it out frequently (E2) and the other rarely (E3). One of the respondents emphasized that each region served by the cooperative carries out its own pre-assembly and that there are also group assemblies with the representatives of members in each region (E4).

The cooperative that rarely holds assemblies with producer groups (E3) showed decreased number of active members and these facts may be related. However, to certify the relationship between these factors, it would be necessary to conduct interviews with former cooperative members. The average attendance at assemblies remained similar, which may indicate that the number of members who actually attended assemblies is somewhat constant, while the decreased number of active members indicates that they no longer participated in OGAs. Such facts require further studies on other variables that may affect this situation, but which are not the object and focus of this study.

The analysis of documents showed that cooperatives provide several communication channels, such as radio programs that are broadcast from Monday to Saturday. Each cooperative has its own magazine, social networks, and websites to disseminate relevant and pertinent information and events. In the electronic address, a member reads about the projects developed by the cooperative. The member can also find the annual activity report, magazines published by cooperatives, the weather forecast, financial indicators, agricultural quotations, associate portals, files of radio programs, and a channel for sending praises, criticism, or suggestions. These actions may affect innovation activities and the well-being of cooperative members (Giannakas & Fulton, 2005).

We identified other initiatives aiming at communication, such as conducting a member satisfaction survey, which resulted in the adequacy of operational procedures, and making available mobile applications in which the member has access to its account and other information on the cooperatives' website. Training courses at cooperatives' universities, field days aiming at spreading technical and scientific knowledge, a specific day dedicated to the multiplication of good practices in rural management and sustainability, and other rural management programs and seminars. Such aspects are related to the creation and propagation of innovation inside the formal structure of a cooperative focused on members (Reed & Hickey, 2016). In addition, assemblies were held to expose matters relevant to the cooperative with space for questions and suggestions on the part of the member.

Peng et al. (2018) associate communication with innovation and mention the importance of developing and implementing communication policies among members and between cooperative (managers) and members. The authors also describe several examples in their study, such as holding general assemblies, or those assemblies to discuss product prices, quality and competition, weekly newsletter of the cooperative, and phone calls and visits of the general manager/president to farms. These observations are based on small cooperatives with few members. Therefore, each action must be thought out according to its feasibility for other cooperative sizes.

Tidd and Bessant (2009) stated that, for an organization to be innovative, it needs more than a structure that encourages innovation. It is necessary to have a set of components that together will create and reinforce the conditions that favor the emergence of innovation. For the authors, the components that affect innovation performance are: sharing the organizational purpose;

leadership and willingness to innovate; an appropriate structure that facilitates creativity, learning, and interaction; key individuals with roles that facilitate innovation; investment in selecting and forming multifunctional teams to solve problems; involvement of the entire organization with improvements/innovation; creating and maintaining a creative environment with incentive to ideas supported by motivation systems; and customer-oriented external focus maintaining a wide network of contacts.

The findings were summarized in Table 2, which describes the reach of cooperatives for each element surveyed in the economic-financial and social dimensions of innovation performance.

Table 2
Summary findings of the elements economic-financial and social dimensions.

Economic-financial dimension	Participating cooperatives (fictitious name)
Gained new markets	E1, E2, E3, E4
Increased in offer / product variety	E1, E2, E3, E4
Increased in market share	E1, E4
Increased in sales revenue	E1, E2, E4
Low percentage of new product sales	E1, E2, E4
Social dimension	
Increased Surplus available to the OGA	E4
Increased in the number of members	E1, E2, E3, E4
Increased number of active members	E2
Increased participation in OGA	E2
Realization of assemblies with farmer groups before OGA	E1, E2, E4
Diversity of communication channels	E1, E2, E3, E4

Source: Research data.

For the survival of cooperatives in the market, diversification and differentiation are required combined with consideration to technological innovation, management and performance aspects, qualification, and implementation of new processes (Batalini et al., 2014). According to the authors, the diversification of products/services aiming at serving broad markets and consumers. In addition, differentiation requires actions by cooperatives to develop a trusted brand, to serve the consumer with agility, and to periodically transform and renew products/services. These perspectives can be regarded as collective entrepreneurship (Cook & Plunkett, 2006) and as social and sustainability goals (Kormelinck et al., 2019).

6. FINAL CONSIDERATIONS

This study considered the limited literature on innovation performance in industrialization for cooperatives, and the complexity of the construct. It also explored the empirical gap in the understanding of the economic-financial and social dimensions adapted to the particularities of the Brazilian cooperative entrepreneurship environment. The findings of this paper improve the understanding of elements that make up innovation performance in cooperatives in the proposed dimensions and the contributions are highlighted in each one.

In the economic-financial dimension, cooperatives increased the offer/variety of products and gained new markets. They did not always obtain increase in market share, since one of the cooperatives discontinued a given product from the market, and had non-increase in sales revenues. In other cooperatives, sales revenues increased. The percentage of sales in new products

developed in the last three years is low, ranging from zero to 15%. The positive outcome achieved by the cooperatives may be the result of innovations carried out prior to the period considered here and resulting from the gain of new markets with existing products. The surplus available to OGAs behaved in different ways: they remained similar, decreased, or increased. These findings allow the cooperative manager to make decisions regarding each component.

Regarding the social dimension, the industrialization of new products for the cooperative, or for the market, may affect social aspects, such as pride in belonging to a cooperative when a product which was manufactured from a *commodity* produced by members is available for purchase. This may affect the number of active members and their participation in assemblies.

The theoretical implications of this study work to improve the understanding in the innovation performance model and shows how cooperatives have dealt with this topic. For practical implications, this understanding may assist cooperatives in the development of strategies aiming at innovation. Industrialized food manufacturing allows for the insertion of cooperatives in marketsas "forces" to adopt more dynamic practices, for example, innovation incentives (in various dimensions).

The limitations of this study are related to the low participation of respondents in the sample, even with several attempts at contact. Another limitation is not including members of cooperatives as a data source while choosing the sample.

A further research opportunity is the innovation program for Paraná cooperativism that is currently under implementation. It would be opportune to research *a posteriori* what are the outcome of the program for cooperatives. Was there an increase in initiatives aiming at creativity and innovation? Did it foster a culture of innovation? How much did the program add in terms of innovation performance?

This study could also have adopted a quantitative approach. Quantitative research that addresses non-financial elements of innovation performance using control variables could help to understand the construct, which is difficult to measure. Future research could consider the inclusion of members' perceptions on innovation performance, especially in the social dimension, as well as the environmental dimension, which may contribute to a broader understanding of the construct. We also suggest studies focused in the innovation performance in agricultural cooperatives in developed countries, to compare with these findings.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest in the publication of this article.