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# GOVERNANCE STRUCTURE AND INNOVATION TO CREATE AND REMUNERATE VALUE IN THE SPECIALTY BEEF CHAIN<sup>1</sup>

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## Abstract

**Objective:** To understand how the governance structure between producers and slaughter cooperatives of specialty beef chain in Paraná, Brazil, influence innovation and the remuneration of the value generated.

**Methodology:** Semi-structured interviews were performed with 17 agents from two cooperatives and producers in the specialty beef chain in Paraná, Brazil.

**Originality:** This study seeks to fill a gap in the literature by combining innovation and efficiency theories to assess how agents organize themselves enable them to create and remunerate the value generated.

**Main results:** This study shows that producers and cooperatives organize themselves in a hybrid form involving verbal agreements which enable innovations due to information exchanges between producers. However, possible failures in value distribution stem from the non-remuneration of quality attributes, which may discourage innovations and the performance of the chain.

**Managerial contributions:** Despite failures, cooperatives promote innovation and are a viable alternative for producers to compete in the market. Incentives can mitigate the risks associated with the observed failures. This study provides insights for private and public actions to encourage the formation of these arrangements and to improve the coordination of innovation subsystems.

**Theoretical contributions:** Since efficiency theories underestimate innovation, our analysis employed efficiency and innovation theories, contributing to the better understanding of subsystems which depend on innovation to produce specialty products.

**Keywords:** Cooperative. Quality. Value distribution.

## ESTRUTURA DE GOVERNANÇA E INOVAÇÃO PARA CRIAÇÃO E REMUNERAÇÃO DO VALOR NA CADEIA DE CARNES ESPECIAIS

### Resumo

**Objetivo:** Compreender como a estrutura de governança entre produtores e cooperativas de abate nas cadeias de carnes especiais no Paraná, Brasil, influencia a inovação e a remuneração pelo valor gerado.

**Metodologia:** Foram conduzidas entrevistas semiestruturadas com 17 agentes que envolveram duas cooperativas e produtores da cadeia de carnes especiais no Paraná, Brasil.

**Originalidade:** O estudo busca preencher uma lacuna na literatura por meio da combinação de teorias de inovação e de eficiência para que a maneira com que os agentes são organizados possibilite a criação de valor e a remuneração pelo valor gerado.

**Principais resultados:** O estudo mostra que produtores e cooperativas são organizados de forma híbrida, envolvendo acordos verbais que possibilitam inovações pela troca de informações entre produtores. Porém, há margem para falhas na distribuição do valor decorrente da não remuneração de atributos de qualidade, o que pode desencorajar inovações e o desempenho da cadeia.

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**Contribuições gerenciais:** Apesar das falhas, a organização em cooperativas promove a inovação e é uma alternativa viável para os produtores competirem no mercado. Os mecanismos de incentivo em cooperativas podem mitigar os riscos associados às falhas observadas. Também fornecemos subsídios para ações privadas e públicas para estimular a formação desses arranjos e melhorar a coordenação de subsistemas voltados para inovação.

**Contribuições teóricas:** A análise utilizando uma abordagem de inovação com teorias de eficiência contribui para melhor compreender esses subsistemas, que dependem de esforços em prol da produção de produtos diferenciados nos quais as teorias de eficiência sozinhas são insuficientes por não considerarem a inovação.

**Palavras-chave:** Cooperativa. Qualidade. Distribuição de valor.

## ESTRUCTURA DE GOBERNANZA E INNOVACIÓN PARA LA CREACIÓN Y REMUNERACIÓN DE VALOR EN LA CADENA DE CARNES ESPECIALES

### Resumen

**Objetivo:** Comprender como la estructura de gobernanza entre productores y cooperativas de sacrificio en las cadenas de carnes especiales del Paraná, Brasil, influye en la innovación y la remuneración por el valor generado.

**Metodología:** Se realizaron entrevistas semiestructuradas con 17 agentes que involucraron a dos cooperativas y productores de la cadena de carnes especiales en Paraná, Brasil.

**Originalidad:** El estudio busca llenar un vacío en la literatura, combinando teorías de innovación y eficiencia para que la forma en que se organizan los agentes permita crear valor y pagar por el valor generado.

**Principales resultados:** El estudio muestra que productores y cooperativas se organizan de manera híbrida, involucrando acuerdos verbales, lo que posibilitó innovaciones a través del intercambio de informaciones entre productores. Sin embargo, hay margen para fallas en la distribución del valor derivadas de la no remuneración de los atributos de calidad, que pueden desalentar las innovaciones y el desempeño de la cadena.

**Aportes gerenciales:** A pesar de las fallas, la organización en cooperativas promueve la innovación y es una alternativa viable para que los productores compitan en el mercado. Los mecanismos de incentivos pueden mitigar los riesgos asociados con las fallas observadas. Proporciona subsidios para acciones públicas y privadas para estimular la formación de estos arreglos y mejorar la coordinación de subsistemas orientados a la innovación.

**Aportes teóricos:** El análisis desde un enfoque de innovación con teorías de eficiencia contribuye a una mejor comprensión de aquellos subsistemas que dependen de esfuerzos para producir productos diferenciados, en los que las teorías de eficiencia son insuficientes para responder por no considerar la innovación.

**Palabras clave:** Cooperativa. Calidad. Distribución de valor.

<sup>1</sup> Beneficiary of financial support from CAPES - Brazil.

## Introduction

Brazilian agribusiness has a great importance to the national and international scene in several sectors. In 2020, the gross domestic product (GDP) of agribusiness corresponded to 24.31% of the Brazilian GDP, with livestock being responsible for 26.2% of the agribusiness result (Cepea, 2021). Specifically, Brazil was the largest beef exporter in 2020 and the second largest producer in the world (Usda, 2020), which shows its relevance in the global context.

Despite the good performance of Brazilian livestock, studies show coordination problems in this agroindustrial system, such as information asymmetry (Oliveira et al., 2019), incentive problems (Shanoyan et al., 2019), and lack of trust between agents (Pereira et al., 2019). In addition to coordination failures, rural producers tend to face barriers in production scale, standardization, and costs, affecting their continuity in this market (Farina, 2002; Hooks et al., 2017).

As an alternative so rural producers remain in these activities, especially in developing countries, some studies suggest their insertion into value chains, based on production with greater added value (Gereffi et al., 2005; Giuliani et al., 2005; Samper et al., 2017; Trienekens, 2011). While insertion into these chains enables the improvement of producer positioning (upgrading), it requires the achievement of innovations regarding product quality, production forms, operation stages, and destined markets (Gereffi & Lee, 2012; Gereffi, 2013; Tóth, 2015).

In the specialty beef production chain, these innovations may be linked to improvements in the organoleptic characteristics of the final product (color, flavor, softness, and texture) and production by breeding schemes, ways of handling, precocity, traceability, and socio-environmental and health standards (Caleman & Zylbersztajn, 2012; Hooks et al., 2017; Saab et al., 2009). Value creation begins with access to information about what is demanded which, in turn, depends on how transactions in the chain are organized in terms of governance structure (Gereffi et al., 2005; Samper et al., 2017; Trienekens, 2011).

According to Transaction Cost Economics (TCE) (Williamson, 1985) and Measurement Cost Economics (MCE) (Barzel, 2005), in view of the differentiation efforts made, transactions may involve specific investments and attributes which may be difficult to measure. Therefore, based on Williamson (1985) and Barzel (2005), these transactions require more complex contractual arrangements than the market mechanism.

Considering the need for innovations to insert producers in high-value markets, the literature assumes that the way transactions are organized matters *ex-ante* — as they are mechanisms for creating value by carrying out innovations and accessing the knowledge and information necessary for achieving these innovations (Gereffi et al., 2005; Trienekens, 2011) — and *ex-post*, as they enable agents to remunerate the value generated by innovations, encouraging the continuity of innovations in this chain.

While contractual arrangements are necessary for the remuneration of the created value, Kühne et al. (2015) found that such arrangements, both horizontal and vertical, are sources of innovations. The

promotion of innovation in horizontal arrangements occurs due to cooperation, the possibility of reducing opportunistic behavior, and the greater flow of knowledge among agents (Lambrecht et. al., 2015; Nijhoff-Savakki et al., 2012). In vertical arrangements, fostering innovation occurs by reducing the uncertainty involved in transactions (Garbade et. al., 2015; Ho et. al., 2018).

Although the way the chain is organized is relevant to fostering innovation, efficiency theories dealing with governance structure, such as TCE and MCE, ignore value creation, dealing with mechanisms which allow the guarantee of asset ownership rights, including the value generated. We propose to fill this gap in the literature on upgrading these chains with innovation. Therefore, this study expands the view of efficiency theories to assess how arrangements simultaneously enable the distribution of property rights, the remuneration of value, and the achievement of innovations.

In Paraná, Brazil, we identified innovative organizational arrangements between producers and slaughterhouses to promote value creation via innovations in organizational arrangements and the consequent survival of producers in the sector, considering the competitiveness problems in Paraná. The development of this kind of arrangement is absent in other Brazilian states, justifying this study. However, it is unclear how these arrangements enable the creation of value, on one hand, and the remuneration of the value generated, on the other. So, we aim to answer this theoretical gap at the same time we contribute to the empirical sector in Paraná. We seek to understand how the governance structure between producers and slaughter cooperatives of specialty beef chain in Paraná, Brazil, influence innovation and the remuneration of the value generated.

This paper is organized into five sections. In addition to this introduction, the second section shows the theoretical foundation supporting this study. The third one describes the adopted methodological procedures. The fourth one shows and discuss our research results. Finally, the last section deals with our conclusions.

## **Governance structure and innovation to create and remunerate value**

The efficiency and long-term survival of quality-driven agri-food systems depend on governance structures that encourage innovation, and value distribution from the value created. According to Schumpeter (1997), innovation consists in a new combination of materials and efforts which are within the individual's reach or in combining the same things with different methods. Innovations, which can be radical or incremental, may take place in products, processing, marketing, and organization (Oecd, 1997).

Innovations, whether through incremental or radical ones (Tóth, 2015), are essential to seek differentiation in companies and production with added value. When it comes to chains involving high added value, how the chain is organized can leverage or hinder the achievement of innovations (Gereffi et al., 2005; Nain et al., 2019; Trienekens, 2011). This way of organizing a chain can be analyzed from

the governance structures adopted among agents (Williamson, 1985; Barzel, 2005; Mancini et al., 2019; Trienekens, 2011).

According to Coase (1937), there are costs to transacting via the market mechanism, costs which were later called transaction costs by Williamson (1985). Williamson (1985) considers firms not only as a function of production but as a governance structure aiming at efficiency. The appropriate governance structure is chosen comparatively, considering its alignment with transaction attributes and assuming that individuals have bounded rationality and are inclined to act in an opportunistic manner.

The attributes of a transaction to which Williamson (1985) refers are: frequency, uncertainty, and asset specificity. Frequency refers to the number of times a transaction occurs. Transaction recurrence enables the recovery of the costs associated with more complex governance structures, stimulates reputation and trust, and enables less complex organizational forms (Ménard, 2004). Uncertainty is related to environmental (environmental contingencies, market fluctuations, etc.) and behavioral aspects (opportunism). Finally, asset specificity refers to the degree assets lose value in another use (Williamson, 1985). Williamson (1991) considers six specificity types: site; temporal; physical-asset; human-asset; dedicated-asset; and brand.

As an alternative to Williamson's proposal (1985), Barzel (2005), within MCE, argues that an asset has several dimensions and that the parties to a transaction should have their property rights distributed according to the possibility of measuring these dimensions. Barzel (2005) considers that even under high asset specificity, the possibility of measurement enables less complex governance structures. The rationale of the theory, therefore, is based on the efficiency in adopting governance structures which have greater capacity to maximize the value of the transaction by protecting property rights over the dimensions involved in the transaction (Zylbersztajn, 2018).

Governance structures follow a continuum from the market mechanism to vertical integration, distinguishing intermediate forms depending on attribute measurability and asset specificity. The market mechanism is adequate when there is no asset specificity and when asset dimensions are easily measurable and possible to be stipulated *ex-ante* the exchange. In such cases, there is no bilateral dependency and contracts cover the content of the transaction (Williamson, 1985; Barzel, 2005).

In cases in which there is asset specificity and some subjective measurements, governance forms can be hybrid or vertically integrated. Regarding hybrids, Ménard (2004) states that such forms involve more than bilateral and trilateral relations as they also encompass long-term relations and are coordinated more efficiently than the market without resorting to vertical integration. Vertical integration is adequate for cases with high asset specificity when information involves high costs and may not be accessed even after consumption (Williamson, 1985; Barzel, 2005).

Efficiency theories consider governance structures more for the value distribution than for the generation of innovations. However, in value chains, it is necessary to look at both efficiency and innovation, yet unexplored in the literature. Generated innovations can change the characteristics of transactions since they can design a product/service with greater added value which can lead to greater



asset specificity and dimensions which can be difficult to be evaluated and measured. Therefore, governance structures need to foster innovations (Lambrecht et al., 2015; Nain et al., 2019; Nijhoff-Savakki et al., 2012) while adequately enabling agents to distribute the value generated (Buainain & Batalha, 2007; Malorgio et al., 2012; Mancini et al., 2019).

More recent studies show that research on innovation and organizational arrangements focused on understanding how innovation allows development (Sobratee & Bodhanya, 2017) and better producer positioning (Ho et al., 2018) via governance and social innovation (Martínez & Rivera, 2018). Also, studies considering governance mechanisms — such as geographical indications (Mancini et al., 2019) that favor the economic upgrading of these producers (Pietrobelli & Staritz, 2018). Some researchers investigated how chain organization impacts innovation achievement (Burnasov et al., 2015; Nain et al., 2019), whereas others sought to understand how innovations drive a global value chain (Pietrobelli & Rabellotti, 2011) and enable solutions to constraints in value chains (Adu-Acheampong et al., 2017; Hinnou et al., 2018).

Despite these efforts, studies focus on parts of the problem, leaving a gap (as efficiency theories do) on the way the coordination of these chains simultaneously enables the achievement of innovations and the distribution of the value generated by them. Thus, considering the importance of using complementary theories as useful tools in understanding real world firms (Bánkuti & Souza, 2014), we think it is necessary to carry out empirical studies to understand how different systems work. The next section shows our methodological procedures.

## **Methodological procedures**

To improve the relationship between parties in the beef chain, actions were developed in Paraná to create and encourage new forms of organization. According to the Paraná Institute of Technical Assistance and Rural Extension (Emater), one way to leverage the competitiveness of this chain is production focused on quality to the detriment of scale and cost gains. For this, the organization of producers in cooperatives and alliances was encouraged (Emater, 2018).

Note that in the state of Paraná, herd and pasture areas have decreased in recent decades, leading producers to invest in quality instead of quantity (Emater, 2018). Allied to this, Paraná has a strong tradition in collective systems (cooperativism) — a way of inserting producers in the market, an efficient agribusiness strategy (Rodrigues et al., 2018). These socioeconomic aspects helped in the emergence and continuity of slaughter cooperatives (Pereira et al., 2019) since initiatives of this nature have been unsuccessful in other states in Brazil (Rocha et al., 2001).

Studies have argued that knowing how slaughter cooperatives and governance structures have influenced innovations and the distribution of value in the specialty beef chain in Paraná can serve as a parameter for Brazil, especially since other similar initiatives have failed in other states (Rocha et al.,

2001). According to the interviewees, there are currently seven cooperatives in the state, of which this study investigated two, called Cooperative A and Cooperative B.

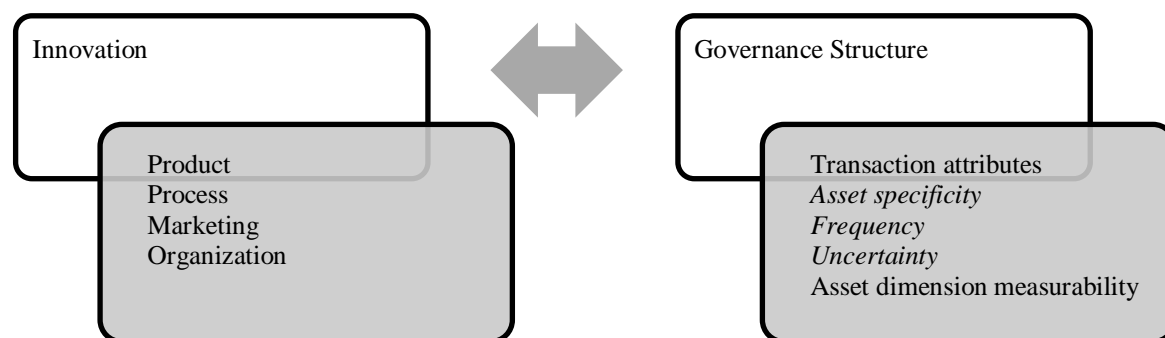
Of the seven cooperatives, two, located in different mesoregions [*Oeste Paranaense* (Western Paraná) and *Centro Ocidental Paranaense* (Western Central Paranaense)], were chosen to seek dialogue between them and better understand the problem. During a four-year research project, ending in 2020, a total of 17 agents in the specialty beef chain were interviewed. In Cooperative A, a representative (CA1), eight beef producers (PA1 to PA8), and a veterinarian from an input supply cooperative were interviewed. At Cooperative B, a representative (CB1), seven beef producers (PB1 to PB7), and the manager of a partner company supplying inputs were interviewed.

The selection of interviewed producers was based on a list provided by the cooperatives and snowball sampling. The number of respondents was based on information convergence and saturation. Moreover, the information obtained in the interviews was complemented by secondary data, such as printed and electronic institutional materials and copies of documents provided by the interviewees.

The interviews aimed to know, firstly, cooperative and producers' profile. Afterward, the innovations carried out by producers, aspects of commercialization, transaction, and measurement of the dimensions of the traded asset were investigated. The interviews, averaging about one hour, were recorded and later transcribed for analysis. Data analysis was performed using content analysis, which seeks to identify data categories via pre-analysis, material exploration, and result treatment (Bardin, 1979), using the Atlas.TI<sup>®</sup> software (ATLAS.ti, 2017). Our analysis categories emerged from the literature and were defined a priori. They are shown in Figure 1.

**Figure 1**

*Analysis categories*



**Source:** The authors.

The innovation category involves the product, process, marketing, and organizational subcategories. They were identified by the changes producers introduced, which could be, among others, the insertion of new breeds, improvements to or introduction of different production methods (such as confinement), improvements to animal genetics, specific activity training, insertion in new

organizational arrangements (such as alliances and cooperatives), and investment in marketing and certifications.

The governance structures category aimed to identify how transactions occur between livestock farmers and buyers, including forms of simple market relations with quantity and price negotiation, informal verbal agreements or formal written ones. This category involves transaction attributes and asset dimension measurability subcategories.

Transaction attributes were identified by asset specificity, frequency, and uncertainty. Asset specificity encompasses the identification of elements which make the traded asset specific to a transaction, generating losses in second-best transactions, such as facility investments, production systems, breeds, research and training, properties, people, and brands. Frequency includes transaction recurrence and payment, receipt, exchange, and renegotiation frequency. Uncertainty dealt with the influence of variations in prices, sanitary conditions, and the behavior of agents in attempts to circumvent the rules and hide information about exchange and quality.

Regarding asset dimension measurability, how and by whom dimensions were measured at the time of transactions was analyzed. The dimensions involved in the transaction may include weight, animal/carcass, size, age, and breed.

## Results

The research showed that the producers on the specialty beef chain had different technological levels, and that continuous innovations in product, process, and organizational aspects are important for the agents to enter and remain in the chain. Such innovations, both radical and incremental, depend on complex arrangements, demanding governance structures supported by the relational aspect. Despite the hybrid governance structure, failures in the value distribution can compromise the perpetuity of the chain since eventual appropriations or losses of value can discourage innovations. The findings that support these assertions are presented in this results section and in the discussion.

Cooperative A was founded in 2005 by 33 partners. It emerged as an alternative for sale to producers, with the main aim of providing adequate remuneration to producers who already focused on higher quality. The cooperative sells bovine half carcasses, with a monthly production capacity of 630 heads, and its buyers are supermarkets in the western region of the state. Its main product differentiation is the precocity of animals and the attributes associated with it, such as softness and fat cover.

The cooperative has 66 producers, 32 of which are active. Regarding the interviewed producers, half of them carry out all phases of animal production: breeding, rearing, and fattening/finishing, whereas the other half rears and fattens/finishes cattle. All have semi-confinement or confinement as their production system. Interviewees have properties of different sizes, ranging between 97 and 1,119 hectares. The production and proportion of animals delivered to the cooperative is also different among



producers. The quantity produced varies between 300 and 3,360 animals, and some producers deliver 9% of their production to the cooperative, whereas others deliver 100% of theirs.

Cooperative B was founded in 2003 as a result of the union of four producers whose aim was to diversify rural activity to mitigate the risks arising from agriculture. After implementing an integrated crop-livestock system, producers began slaughtering animals aged up to 24 months old. In 2008, the organization was formalized as a cooperative. Like Cooperative A, the main differentiating aspect of Cooperative B is precocity. Its buyers are supermarkets and butcher shops located throughout the state of Paraná and the slaughtering capacity of the cooperative is 1,000 heads per month, 90% of which is sold as carcasses and 10%, in vacuum-packed cuts.

The organization has about 150 members, of which 85% are active. Most interviewed producers only rear and fatten cattle. All respondents adopted semi-confinement or confinement as their productive system. As in Cooperative A, property size, production, and proportion delivered to the cooperative are different among producers. Property size varies between 93 and 1,500 hectares. Production varies between 180 and 6,041 heads per year, and the proportion delivered to the cooperative, between 10% and 95% of the total produced. The Chart 1 summarizes the results.

## Chart 1

### *Summary of the results*

Cooperatives	A	B
<b>Slaughter structure</b>	Leased	Outsourced
<b>Responsible for shipment/transport of animals</b>	Cooperative	Cooperative
<b>Technical monitoring of the cooperative</b>	No	Yes
<b>Retail performance</b>	Statewide	Regional
<b>Asset specificity</b>	Physical; human; temporal	Physical; human; temporal
<b>Frequency</b>	Regularity of delivery; moral sanctions for non-compliance with the scale; payment to the livestock farmer in 7 days;	Regularity of delivery; moral sanctions for non-compliance with the scale; payment to the livestock farmer in 30 days.
<b>Uncertainty</b>	Climatic; behavioral; market.	Climatic; behavioral; market.
<b>Measurable dimensions</b>	Age; sex; breed; weight; conformation of the animal; conformation of the carcass; fat layer; animal health.	Age; sex; breed; weight; conformation of the animal; conformation of the carcass; fat layer; regularity of delivery; animal health.
<b>Innovation</b>	Organizational, process and product innovations Passive participation in innovations – external sources	Organizational, process and product innovations Active participation in innovations – external and internal sources
<b>Governance Structure</b>	Hybrid supported by the relational aspect	Hybrid supported by the relational aspect

**Source:** The authors.

### *Transaction attributes*

The transactions between producers and cooperatives involve physical, human, and temporal specificities. Although producers point out that not all investments made to produce an early animal can be considered lost (as they generate gains in efficiency and a reduction in production time), such investments consist of sunk costs if they are not marketed with the cooperative. Regarding human specificity, the animal production required producers to learn how to produce, manage, feed, and breed cattle in this differentiated system.

Regarding temporal specificity, on the one hand the animal loses its differentiating characteristics if it is not slaughtered until the age of 24 months. On the other hand, changes in animal loading time to the slaughterhouse generated losses in asset value. Furthermore, non-compliance with the deadlines defined in the slaughter scale generated high costs for rural producers, as stated by PA3: *“it is to be loaded tomorrow and will be due next week, and all this generates a phenomenal cost in the trough”*.

Therefore, we found a bilateral dependence between parties. The cooperatives depend on their members' cattle supply and producers, on the remuneration only cooperatives provide. Thus, to ensure animal supply throughout the year, the cooperatives organize a stopover every six months with their members. At meetings, producers inform the quantity of animals to be produced in the period and based on the total supply, the cooperative prepares the scale. Thus, producers face the need to produce and deliver animals to the cooperative throughout the year, requiring different planning and organization compared to the conventional system.

Regarding frequency, the cooperatives demand no frequency and minimum periodicity in animal delivery from their members. Despite this, the cooperative B representative (CB1) points out that there are relational penalties in cases in which the commitment is unfulfilled, *“[...] from the moment you do not honor the commitment you make with me, you know, with the cooperative, you have also exempted me from fulfilling the commitment with you. It ruined the relationship.”*

The terms of trade are negotiated at each shipment, involving the number of animals to be slaughtered, the day, the loading time, and the price to be received per arroba, which depends on market conditions. In terms of payment, in Cooperative A, each delivery is paid within seven days after slaughter. In Cooperative B, payment can be made in cash, with a 2% discount on the amount to be received or in 30 days after slaughter, to which the producer agrees based on the cooperative's financial availability. As already identified by Caleman and Monteiro (2013), we found that the entry into the cooperative provides a reduction in uncertainties regarding the guarantee of receipt, a behavioral uncertainty characteristic of the conventional beef system.

However, we observed behavioral, climatic, and market uncertainties. Regarding behavioral uncertainty, producers can choose to produce only in favorable moments for the purchase of inputs, compromising the slaughter scale and the receipt of animals by the cooperative. Regarding the climate,

although interviewees pointed out livestock as a safer activity than agriculture, climate changes impact the availability of inputs for animal feed and compliance with slaughter scales, which can generate losses to asset value. Regarding market uncertainties, despite receipt certainty, there is uncertainty as to the amount to be received because, even in the differentiated system, value calculation considers the fat price at the conventional market, compromising the return to efforts in differentiation. Moreover, buying calves is also uncertain.

In Cooperative A, the purchase of these animals is made by the spot market, in which, in times of supply scarcity, shows a greater quality variability, impacting final animal performance. Unlike Cooperative A, Cooperative B has a program aimed at including calf producers. For CB1, this project involves greater security both for the producer of specialty calves and for the producer purchasing the calf, which has greater security regarding the future performance of the animals.

#### *Asset dimension measurability*

We observed that the dimensions involved in transactions are considered in two moments: before the slaughter, in relation to the animal; and after the slaughter, in the bovine carcass. The dimensions were: animal weight and carcass yield, sex, breed, age, fat conformation and finishing, injuries, animal health, medications, and animal feed.

- Weight and yield: measured before slaughter by producers and cooperatives by weighing animals on a scale, and after slaughter by cooperatives by weighing the carcass. Only Cooperative B requires, before slaughter, a weight between 390 kilos (13 arrobas) and 510 kilos (17 arrobas). While Cooperative A provides information on weight and yield in a list, Cooperative B only reports the final weight of the carcass, leaving the yield to be calculated by the producers. The final weight of the carcass depends on the weight of the live animal, as well as the washing and trimming of the carcass, necessary to remove excess fat and carcass injuries.
- Sex: The classification is visually made in males or females, both by cooperatives and producers. There is no exclusivity in slaughter, but producers receive a differential of R\$ 10.00 per sign for the slaughter of male animals. Finally, although Cooperative B pays the same as Cooperative A, it recommends producers the production of non-neutered male animals, depending on the final performance of the animals.
- Breed: Cooperatives require the delivery of animals of beef production breeds, whether taurine or zebu. Within this group, there is no differentiated remuneration for specific breeds. Verification is done visually, in all animals, before slaughter, by producers and cooperatives. This information is not made available in any formal document.

- Age: as these are young animals, the maximum age allowed for slaughter is 24 months. This verification is visually performed by cooperatives and producers before slaughter by checking the teeth of the animals. The presence of two definitive teeth is equivalent to the age of 24 months, whereas primary teeth correspond to a younger age. However, the slaughter of younger animals is not paid differently. This information is made available at the end of each slaughter in the slaughter list.
- Conformation, fat finishing, and injuries: fat finishing is measured before and after slaughter. Before slaughter, the standard required by the cooperatives is a visually verified, “well-finished” animal which, according to PB1, is an animal which is: “[...] very full. The tail is very flat, this here [photo] is all fat, this animal tends to be well-finished.” After slaughter, cooperatives have different means of measurement.

Technically there are objective parameters for measuring fat levels (Bridi & Constantino, 2009). Despite this, Cooperative A fails to perform such measurement. Verification is done visually, and the parameters are poorly defined, which may open the margin for failures in value distribution. At the end of each slaughter, only cases in which the standard is not reached are informed in a list. Although Cooperative B has specific parameters for measuring fat, it measures it visually. In both cooperatives, injuries are removed, impacting the final weight but information about injuries is unavailable.

- Animal health: questions about animal health are minimum requirements for slaughter. Before each slaughter, producers must issue a *Guia de Trânsito Animal* (Animal Transport Guide - GTA), which shows information about vaccines and tests performed on animals.
- Animal feed and medicines: Cooperative B has a list of foods and medicines which are prohibited to animals, such as cottonseed. This list is delivered to the producers who, in turn, sign a term of responsibility. Periodically, cooperative technicians visit the farms observing such practices.

Producers are paid depending on the sex and final weight of the carcass. Differences in races, age and fat finish fail to influence the amount received if they meet the necessary minimum requirement. Moreover, leather, tails, and offal are ignored in payment but are traded by the cooperatives. Attributes such as marbling (intramuscular fat) and super-precocity are disregarded in transactions. As a way of encouraging producers to improve the quality of the animal, the cooperatives encourage producers to monitor the slaughter and verify points of improvement, especially in carcass finishing.

### *Governance structure*

Both cooperatives have the main function of buying and slaughtering finished animals from producers, remunerating them, and marketing the carcass and leather with downstream agents. Producers tell the cooperatives about animal availability and a technician from the cooperative visits the farms and checks producers' compliance with cooperatives' standards. The cooperatives then load and transport the animals from the rural property to the slaughterhouse. We should mention that there is no effective participation of any of the agents to coordinate the entire chain, but rather a common producers' objective of producing specialty meat. After slaughter, the meat is sold to retail as demanded by the customer portfolio, without contracts.

In Cooperative A, slaughter is carried out in a leased slaughterhouse and thus a vertically integrated activity at this stage. For Cooperative B, slaughter is carried out at a third-party slaughterhouse, with the supervision of a cooperative manager.

Remuneration is carried out by the deadweight system, in which the amount to be paid varies depending on the final weight of the cold carcass, after trimming the leather, viscera, giblets, head, and tail. The price paid to producers is defined based on the combination of the carcass sale price by the cooperative to buyers and the price of an arroba (unit of weight corresponding to 33 pounds) of beef in the conventional market. Despite this, we found that, in both cooperatives, how this price is established is unclear to producers, as illustrated by CB1: *"[...] today we do not have our table like this: we pay this indicator plus 3% or common price plus x%. We work with the amount we can put on sale"*. Despite this, producers claim that the remuneration is always higher than that paid in the conventional market. In Cooperative A, payment differential varies between 5 and 10%, and in Cooperative B, around 7%.

Transactions are organized via verbal agreements, supported by documents such as cooperatives' bylaws, loading and slaughter invoices, GTA, and the post-slaughter schedule, as illustrated by PA1: *"it is a verbal agreement. I don't have anything in writing with them yet. [...] there is the issuance of an invoice and the animal transport guide. This is our contract"*. In Cooperative B, there is support for the standards manual and the term of responsibility. Producers claim that any disagreements and adjustments are verbally resolved as the partnership relationship is important, as can be seen in the statement of PA7: *"[...] the partnership you have within a cooperative, you cannot, however friendship you get, in private cold storage."*

However, we found problems which affect transactions, such as the lack of clarity about the formation of the price paid to producers, producers' lack of compliance with the pre-defined slaughter scale, and cooperatives' difficulty in absorbing the animals in times of high supply. On the one hand, producers may choose to defy the scale, as illustrated by PA1: *"Sometimes we cheat a little. [...] sometimes you have to sell good cattle or it [conventional market] doesn't buy anymore"*. This occurs due to both environmental and behavioral uncertainties.



To deal with this, cooperative B sought non-financial mechanisms to make the parties committed to the relationship, such as technical support, courses, and training. On the other hand, the difficulty in absorbing total supply means that a few specialty animals are commercialized in the conventional market, making producers unable to obtain a return on investments.

Other faults may be associated with housing classification. Even though Cooperative B has more objective measurement parameters than Cooperative A, the measurement is done visually. Thus, we observed that, although there are objective indicators to measure attributes, such as fat finishing, they are unused. Furthermore, even if the cooperative seeks to measure other quality attributes, such as breed and age of slaughter, producers are paid only for sex and the final weight of the cold carcass, which can trigger problems in the distribution of value.

### *Innovation*

In general, the insertion of producers in cooperatives demanded that they carry out organizational, processing, and product changes, as described:

- Organizational innovations: the abandonment of market relations and the insertion of producers in a cooperative system constitutes an organizational innovation. Note that this process implied the need for producers to better understand the stages down the chain. They came to know and manage slaughter, carcass classification, and marketing activities, which were previously unknown to them. Furthermore, the consequent change in contractual arrangement, changing from hot to cold carcass weight also represents an organizational innovation.
- Processing innovations: implementation of a new production system (confinement or semi-confinement) or improvements to the already used system, pasture fertilization, facility construction, feed mixer wagon inclusion, log and scale installation, and silo construction for silage. Moreover, we found changes regarding animal feed which, according to producers, is one of the main responsible for quality.
- Product innovations: purchase of calves of different breeds or suppliers and reduction in the age of slaughter.

Regarding degree of innovation, we observed that the insertion of producers in a new marketing system caused a complete change in the way animals were traded, such as, for example, changes in remuneration, considered attributes, deadlines, and relationship between parties. This type of innovation characterizes a radical innovation at the firm level and demanded other substantial changes in bovine production systems, such as change in the breed of animals, implementation of the confinement system,

purchase of machinery and equipment, construction of buildings and facilities, land staking, construction of new silos, and changes in the soil, such as fertilization and soil correction.

When considering incremental innovations, we observed improvements in the way activities were carried out, necessary changes both for producers who already worked in the containment system and for those who implemented it. Moreover, there was a reduction in slaughter age, improvements in animal feed, purchase of equipment, reorganization of physical space, and investments in improvements in animal genetics.

Regarding sources of information, cooperatives made different efforts. Cooperative A shows an indirect importance because, although it indicates to its producers the points of improvement, such as fat finishing and conformation, it fails to participate in this process. In line with the results found by Santini et al. (2005), its main sources were mostly external to the cooperative: such as veterinarians and technicians in the area; input suppliers, feed companies, supplements, and animals; family, friends, and neighbors outside the cooperative; courses; field days; television; and the internet were mostly external to the cooperative. Despite this, producers claim that the contact with other members of the cooperative, courses, and field days are essential for the exchange of information.

For Cooperative B, we noted that the cooperative played a fundamental role. In addition to enabling the exchange of experience between its members, it promoted lectures, courses, training, field days, and assistance and technical monitoring by veterinarians and nutritionists. Moreover, it maintains a partnership with an input supplier company which prepares supplements and feeds based on different needs. Other sources of information cited were: Emater, the Agronomy Institute of Paraná (Iapar), family members with professional training in agronomy or zootechnics, professionals from other cooperatives, friends, and input suppliers.

## Discussion

The governance structure adopted between producers and cooperatives was a hybrid form supported by their relational aspect. This provided the opportunity for interaction between members, the exchange of experiences, greater information transparency, and reduction of information asymmetry. Thus, our results show that the very form of organization of producers in cooperatives favors the achievement of innovations since such a relational aspect, channeled by cooperatives' common objective of continuity, is decisive for the innovation process. Moreover, in consensus with Lambrecht et al. (2015), we found that the recurrence of transactions was important in fostering innovation, as producers feel more secure about the return for their efforts and investments in innovations.

Although the main sources of information in Cooperative A were associated with agents outside it, they enabled the exchange of experiences between its members who, according to Lambrecht et al. (2015), are important sources for carrying out innovations. Despite this, we should mention that, even though Cooperative A points out possible improvements after the transaction is completed, it fails to

provide a long-term support for these changes. In the medium term, the consequences may be failure to support producers in maintaining production systems, which can cause loss of technical and productive efficiency. This represents a risk to the continuity of the specialty meat chain in Paraná.

We found that the lack of standardization and supply uncertainties are problems which still affect transactions in this unconventional system. As evidenced by Vinholis et al. (2014), joint innovation efforts identified in Cooperative B may be associated with the reduction of this uncertainty in the supply of the cooperative and the search for product standardization. Moreover, they can be related to the generation of mutual dependence as a guarantee of supply mechanism.

On the one hand, the support offered by cooperatives not only standardize assets but also enable producers to know where and how to innovate. Thus, since the final quality of the product is associated with the production process, the improvement of this process can reduce uncertainties regarding the result and, therefore, supply. However, it is important to note that such efforts involve greater asset specificity and quality attributes, such as super-precocity and marbling, which are not remunerated.

On the other hand, cooperatives depend on producers' animal supply as producers depend on cooperatives' commercialization to achieve differentiated remuneration. Thus, we observed that this mutual dependence between parties has a significant role in the efficiency of the transaction since producers are committed to cooperatives not only for financial returns but also for the gains resulting from non-financial assistance (training, lectures, and technical assistance).

Moreover, we could note that producers had different technological levels at the time they joined a cooperative. Reaching a specialty final product demanded different types and degrees of innovation for each producer. Some needed radical changes, whereas others, only improvements. In this scenario, we argue that the cooperative arrangement was able to help to improve processes and accommodate producers of different initial technological levels, but it is necessary to reduce this heterogeneity to guarantee a final product with the minimum characteristics required for slaughter.

Both cooperatives are based on the relational aspect. However, while in Cooperative A any changes are resolved in informal conversations, Cooperative B uses a greater number of documents for transactions. Furthermore, from the greater intensity of efforts made by Cooperative B, we can say that it has a more complex arrangement, whereas Cooperative A is closer to the market mechanism. In general, we found that both cases showed adequate governance structures but there may be flaws in the value distribution.

Considering final product quality (color, softness, marbling), producers are differently not remunerated by standards above the minimum required. Producers who strive for a higher standard are remunerated in the same way as those who invest less, reaching the minimum standard required by the cooperative. This situation is aggravated by the difficulty in measuring, before slaughter, in the live animal, the dimensions valued in the transaction, such as fat finishing and carcass weight. Contradicting the findings of Polaquini et al. (2006), we observed that failures in value distribution may still arise in the cases analyzed.

Although it is not necessarily a problem of appropriation of value between the parties analyzed, part of the value created by the producers may be lost. This may be associated with the lack of appreciation of the products by downstream agents or with the failure to develop an appropriate market. Producers may not be receiving all the return for their efforts in innovation, especially when we consider that the continuity of innovations must involve improvements in the system, increasing precocity, fat finishing, and marbling, among other aspects, as we indeed observed in some cases. Thus, since innovation is at the heart of economic development, this disincentive to invest can create problems in the progress of the chain, impacting its competitiveness in the long run.

Although part of the value created can be lost, this study showed that the efforts shared between the agents of the cooperatives generate gains for producers. In addition to gains associated with reducing uncertainty and animal performance and standardization, it is shared efforts that make innovations possible. Since producers can face barriers if acting individually, we concluded that the survival of this value chain depends not only on financial mechanisms but also on non-financial incentives that cooperatives share with the producers.

## Conclusions

As conclusions, despite the possible flaws in the distribution of the value created in the short term, the perpetuity of the differentiated system requires the long-term achievement of innovations. Therefore, we argue that the continuity of this subsystem depends on the efficient organization of transactions and mechanisms of non-financial incentives, so producers achieve innovations. That is, in theoretical terms, this study showed that the efficiency theories studied (TCE and MCE) are important to understand transactions. However, when it comes to differentiated systems, it is necessary to consider the role of innovation for the development and continuity of the system. In this context, we found that an agrifood system can be an innovative system, demanding innovations and generating specific assets and attributes which can be difficult to measure as a result.

In empirical terms, we emphasize that the insertion of producers in differentiated systems is a viable alternative for small producers to compete in the market. Moreover, public, and private incentive mechanisms can be created to mitigate the risks associated with failures which may occur in the long run. Therefore, as a way to boost this subsystem, in terms of public policies, we suggest the development of technologies and rural extension actions to encourage the organization of producers. We also suggest that parameters for pricing are defined according to the attributes which make up the product.

For slaughtering cooperatives, we recommend that the efforts made between producers and cooperatives aim at commercialization and technical improvements. This is because we observed that there are efforts to improve the producer link but there are no investments in the dissemination of quality for the sale of products to retail.

In general, such actions, at first, can cause regional advances. However, in a broader context, the spread of differentiated systems can promote chains competitiveness from an alternative perspective to conventional systems, which can be adapted at national level and for other Latin American countries.

Finally, we highlight that the limitations involved in this study were associated with logistical issues, such as location and availability of access to producers. Thus, the increase in the number of cases studied, as well as the expansion of the geographical scope, can complement the results found here. We also suggest that future studies assess the social aspects which involve transactions between parties and study the links down the chain.

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