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Multi-integration in agro-industrial production chains: a possible strategy

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Abstract
Family farming has been widely researched in the areas of economics and rural sociology. However, little focus is given to the strategic aspects of these establishments considering the supply of differentiated inputs or raw materials for agro-industry. Thus, this theoretical essay proposes a model for the formation of strategic alliances between agribusinesses positioned in integrated production chains seeking the maintenance and sharing of family farming as a strategic resource. Based on the literature on inter-organizational relationships and resource dependence theory, six theoretical propositions were elaborated. Three of them are related to the perception of integrating companies about integrated property, access to productive structures, and actions aimed at maintaining this resource; and the others, to the possibility of structuring an innovative model characterized by industry-industry multi-integration. This model argues that the structuring of a multi-integrated production system, based on the establishment of cooperative relations between agribusinesses, assumes characteristics of strategic alliances, with a view to guaranteeing access to the unique resources originating in small family farms. It also indicates that the formation of strategic partnerships aimed at multi-integration can ensure the maintenance of integrated production systems based on family farming as a supplier of essential raw materials.
Keywords: Inter-organizational Cooperation. Production chains. Agribusiness. Multi-integrated Production System.

Multi-integração em cadeias produtivas agroindustriais: uma estratégia possível

Resumo
A agricultura familiar tem sido largamente pesquisada pelas áreas da economia e da sociologia rural. Porém, pouco enfoque é dado aos aspectos estratégicos destes estabelecimentos considerando a oferta de insumos ou matérias primas diferenciadas para a agroindústria. Assim, neste ensaio teórico se propõe um modelo para a formação de alianças estratégicas entre agroindústrias posicionadas em cadeias produtivas integradas buscando a manutenção e o compartilhamento da agricultura familiar enquanto recurso

estratégico. Com base na literatura sobre relacionamentos interorganizacionais e na teoria da dependência de recursos, foram elaboradas seis proposições teóricas. Três relacionadas à percepção das empresas integradoras sobre a propriedade integrada, o acesso às estruturas produtivas e as ações visando à manutenção deste recurso, e as demais, à possibilidade de estruturação de um modelo inovador caracterizado pela multi-integração indústria-indústria. Este modelo sustenta que a estruturação de um sistema multi-integrado de produção, firmado no estabelecimento de relações de cooperação entre agroindústrias, assume características de alianças estratégicas, com vistas a garantir o acesso aos recursos singulares originados nas pequenas propriedades agrícolas familiares. Também indica que a formação de parcerias estratégicas visando a multi-integração pode assegurar a manutenção dos sistemas integrados de produção alicerçados na agricultura familiar como fornecedora de matérias primas essenciais.
Palavras–chave: Cooperação Interorganizacional. Cadeias Produtivas. Agronegócio. Sistema de Produção Multi-integrado.

Integración múltiple en cadenas de producción agroindustriales: una posible estrategia

Resumen

La agricultura familiar ha sido ampliamente investigada en los campos de la economía y la sociología rural. Sin embargo, se presta poca atención a los aspectos estratégicos de estos establecimientos considerando el suministro de diferentes insumos o materias primas para el agronegocio. Por lo tanto, este ensayo teórico propone un modelo para la formación de alianzas estratégicas entre empresas agrícolas ubicadas en cadenas de producción integradas que buscan mantener y compartir la agricultura familiar como un recurso estratégico. Basado en la literatura sobre relaciones interorganizacionales y la teoría de la dependencia de los recursos, se desarrollaron seis proposiciones teóricas. Tres relacionados con la percepción de empresas integradoras sobre propiedad integrada, acceso a estructuras productivas y acciones dirigidas a mantener este recurso, y los demás, a la posibilidad de estructurar un modelo innovador caracterizado por la integración múltiple industria-industria. Este modelo sostiene que la estructuración de un sistema de producción multi-integrado, establecido en el establecimiento de relaciones cooperativas entre agroindustrias, asume características de alianzas estratégicas, con miras a garantizar el acceso a los recursos únicos originados en pequeñas granjas familiares. También indica que la formación de asociaciones estratégicas destinadas a la integración múltiple puede garantizar el mantenimiento de sistemas de producción integrados basados en la agricultura familiar como proveedor de materias primas esenciales.
Palabras clave: Cooperación interorganizacional. Cadenas productivas. Agronegocios. Sistema de producción multi-integrado.

1 Introduction

Small family farms represent one of the main dimensions of Brazilian agribusiness (BUSTAMANTE; LEITE; BARBOSA, 2021; DELGADO; BERGAMASCO, 2017; GUILHOTO, 2006). These enterprises are responsible for a large part of the production of food for the supply of the entire national territory, in addition to the essential raw materials for agribusinesses. These production units represent one of the most complex links in the production chain, as they are usually geographically dispersed, are different from each other, and do not have sufficient information for decision-making, aiming to meet market demands with quality (WILKINSON, 2011; ZYLBERSZTAJN, 2000). Therefore, they constitute the basis of support for many of

the production chains and companies that depend on their production. It must also be added that the very definition of production chain (BATALHA, 2008; ZYLBERSZTAJN; NEVES, 2000) presupposes cooperative interactions between firms, and can be understood as a system composed of several forms of inter-organizational relationships.

Like all entrepreneurial activity, small family farms are subject to technological and market restrictions that can directly influence their sustainability (DA SILVA *et al.*, 2021; HUH; SILVA, 2019; SILVA; GODOY; BORTOLUZZI, 2016). In small farms, usually a single crop is exploited on a larger scale or animal husbandry is developed as an alternative for marketing to a given company, which generates the main income of the property. Despite the need for crop diversification to reduce risks and uncertainties, there is also a need to maximize the results of the family farm, as well as the sustainability of families who live on family farming (BUAINAIN; ROMEIRO; GUANZIROLI, 2003). What is observed in most companies that operate in the agribusiness production chains is the development of isolated actions, seeking to enable their organizational objectives. Each organization seeks to solve the problems related to its activity, its production chain, not observing the needs of the family farm, even though it is seen as the main source of the resources necessary for the production processes of the integrating agribusinesses.

Typically, the strategy of large agribusinesses is to work with an agriculture-industry integration model. This model, which has been widely studied by the fields of economics, sociology, and rural administration (BRANDENBURG; FERREIRA, 2020), was defined by Farina, Azevedo and Saes (1997) as an alternative used by agro-industrial companies to guarantee the obtaining of the raw material essential for the maintenance of their production processes. In the current model of agriculture-industry integration, the agricultural producer practically sells his labor to the integrating company. This contractual relationship between farmers and industry is usually formalized through an integrated production contract recognized by Brazilian law (Land Statute, Law 4,504 of November 30th, 1964; Law No. 11,443 of January 5th, 2007; and more recently the Integration Law, Law 13,288 of May 16th, 2016, which provides for integration contracts). Most of the products obtained through this model, called the integrated production system (IPS), have as their main characteristic the intense use of labor and high technical knowledge, and are therefore seen as a strategic resource by the integrating companies, which thus seek to maintain this resource in the productive activity (CARVALHO *et al.*, 2014). The IPS itself assumes a strategic character because through it the integrating agribusinesses can secure their sources of specialized raw material and, at the same time, raise the cost barriers for competitors who intend to enter their market (ZIEBERT; SHIKIDA, 2004).

Within this context, this theoretical essay intends to propose an inter-organizational relationship model (IOR), not yet presented, or examined by the specialized literature, characterized by industry-industry multi-integration. The denomination of multi-integration occurs because, from the structuring of this production model, companies begin to act in a joint and integrated manner with companies of different production chains, as a strategy for the strengthening of small rural property supplying raw materials and of the production chains in which these companies operate, forming strategic alliances. The multi-integrated production

model proposed in this essay consists of the establishment of inter-organizational cooperation by companies operating in different production chains, with the purpose of jointly sharing investments and resources for the viability of different production activities in family farms, under the prism of productive diversification. Such an approach is constructed from an evolutionary perspective of the integrated production developed by a single company for diversified integrated production in different production chains.

The starting point for proposing a model involving the partnership between integrating companies would be the recognition that several factors such as increased production costs, labor shortages, low product quality, price variations, among others, can negatively impact the production developed in family farming and consequently discourage its maintenance (EH; SILVA, 2019; BUAINAIN; ROMEIRO; GUANZIROLI, 2003; NAVARRO, 2001; CARNEIRO, 1997), and may bring consequences to production chains and agribusinesses that depend on the productive resources from these agricultural units. In addition to the negative impact on the supply of raw materials for agro-industries, such events can cause the displacement of the production matrix and consequent increase in the costs of its activities. Therefore, it is up to these companies to develop joint actions to strengthen these properties, based on the development of their available capacities and resources, since the strengthening of family farming can result in the strengthening of the production chain.

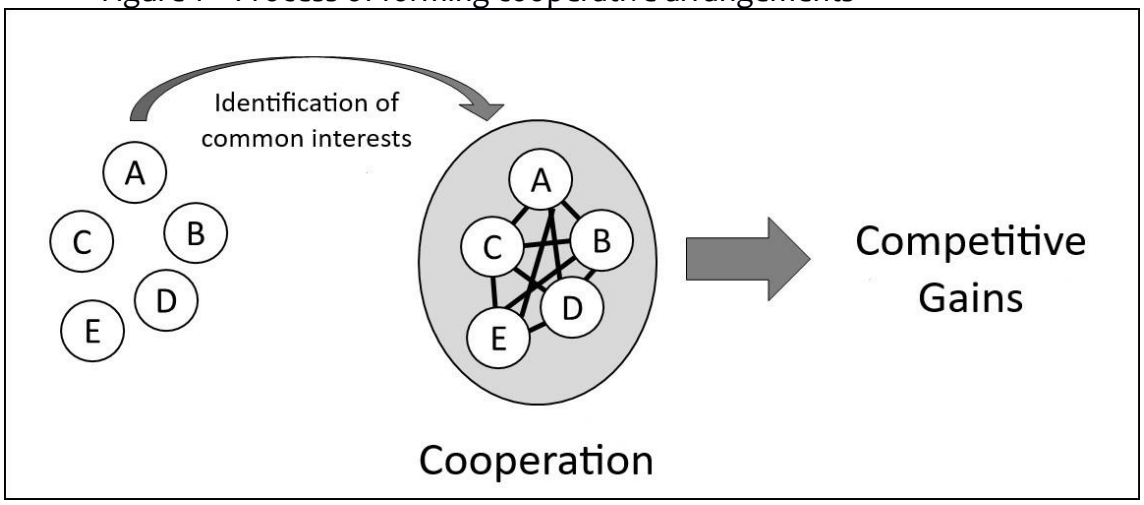
It must also be added that, from the formation of established alliances, individual capacities and resources are shared among partner companies, which can provide competitive advantages (HELFAT, *et al.*, 2007). The establishment of strategic alliances comprises the agreements made between two or more partners, aiming at the development of joint actions or the sharing of resources to achieve common objectives (RITALA; ELLONEN, 2010; LOWENSBERG, 2010; TEECE, 1992). Therefore, the formation of strategic alliances assists organizations in conserving resources, developing skills, and sharing business risks (CANZANIELLO; HARTMANN; FIFKA, 2017; DAS; KUMAR, 2011; TODEVA; KNOKE, 2005; TAUHATA; MACEDO-SOARES, 2004; DAS, 2000; HAMEL; DOZ; PRAHALAD, 1989; OHMAE, 1989). Thus, it is appropriate to investigate the possibility of developing a model of inter-organizational cooperation from industry-industry multi-integration, involving integrating companies positioned in different production chains.

For the construction of this model, the theoretical basis of IORs was taken as a starting point, supported by the contributions of Granovetter (1973 and 1985), Gulati (1998), Williamson (1999) and Hagedoorn (2006), among others, together and in a complementary way with the resource dependence theory (RDT) (PENROSE, 2006; PFEFFER; SALANCIK, 2003; BARNEY, 1991; WERNERFELT, 1984) and resource-based view (LAVIE, 2006; PARK; MEZIAS; SONG, 2004; BARNEY; WRIGHT; KETCHEN, 2001; DAS, 2000; PETERAF, 1993; BARNEY, 1991), so that it was possible to understand how and why such relationships could be established by configuring the multi-integration model. To that end, this article takes the form of a theoretical essay, organized into two main sections, in addition to the introduction and final considerations. The first main section presents the theoretical basis that supports the proposed model, which is itself presented in detail in the subsequent section.

2 Inter-organizational relationships: resource dependence, cooperation, and alliances

The image of atomized actors competing against each other for profits in an impersonal market is increasingly inadequate in a world where companies are embedded in relationships of social exchange with other organizational actors (GULATI; NOHRIA; ZAHEER, 2000). Inter-organizational relationships (IORs) gained greater visibility from the 1980s (LAVIE, 2006), focusing on the formation of partnerships, types of relationships and new organizational formats (OLIVIER, 1990). At the base of IORs is cooperation (BEGNIS; PEDROZO; ESTIVALETE, 2008); inter-organizational cooperation exists when two or more independent organizations act together, aiming at gains for the parties involved (Figure 1). Cooperation arises from the common interest bolstered by the understanding that only by operating together is it possible to carry it out (BALESTRIN; VERSCHOORE, 2008, p. 39). Therefore, applying this concept to the business context, cooperation appears aiming at competitive gains (PANT; YU, 2018).

Figure 1 – Process of forming cooperative arrangements



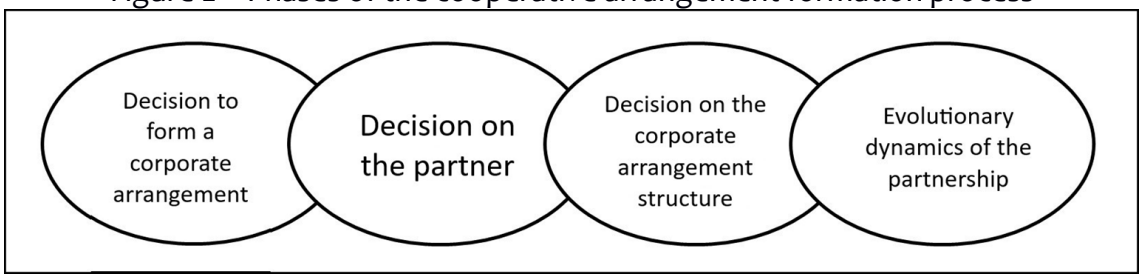
Source: Prepared by the authors.

As business decisions are usually made pragmatically, cooperation between organizations does not happen without noticeable results for the parties involved (SCHERMERHORN, 1975). In other words, there must be a real possibility of composing beneficial relationships between those involved, that is, of establishing relationships in which everyone wins (HOFFMANN *et al.*, 2018; BRANDENBURGER; NALEBUFF, 1995). In this context, cooperation, in which the goal is to generate benefits that only member companies can enjoy, makes these companies stronger and more competitive compared to those that are not part of the constituted group (GELDES, *et al.*, 2015; BALESTRIN; VERSCHOORE, 2008). Therefore, cooperation between organizations arises as a consequence of individual agents who aim to satisfy their own interests. Thus, companies collaborate with each other seeking gains that they could not obtain in isolation (HE *et al.*, 2020; VALE; LOPES, 2010; CHILD; FAULKNER; TALLMAN, 2005;).

The process of forming IORs begins when a company, on its own initiative, identifies the need for a partnership and then seeks the best available partner,

establishing an appropriate contract to formalize the alliance (GULATI, 1998). The adoption of cooperative strategies can offer significant competitive advantages (LAVIE; HAUNSCHILD; KHANNA, 2012; LAVIE, 2006; DYER; SINGH, 1998) especially for companies that have a deficiency in some type of competence or resource, since this strategy can ensure the supply of these deficiencies through the establishment of formal links with other companies that have complementary resources (HARRISON *et al.*, 2001) or competencies to their own. Gulati (1998) considers that these should include four phases (Figure 2).

Figure 2 – Phases of the cooperative arrangement formation process



Source: Adapted from GULATI (1998).

The first phase consists of the decision to form a cooperative arrangement. The second phase refers to deciding on the partner. The third phase involves deciding on the structure of the cooperative arrangement and, finally, in the fourth and final phase, we seek to explain the dynamics of operation of the cooperative arrangement over time. The first phase becomes especially relevant for this essay, since the proposition of a multi-integration model presupposes the formation of strategic alliances between the partner companies. Thus, it is necessary to understand how this choice is made within organizations, because as Whipple and Frankelé (1998) warn, it is essential to understand not only the process of forming the alliance, but also the strategic and operational considerations associated with each phase.

The decision on the formation of cooperative networks or arrangements between organizations is influenced by both economic and social factors GULATI (1998). Strategic and economic benefits enter as the first consideration in the formation of arrangements (O 'DWYER; GILMORE, 2018; IRELAND; HITT; VAIDYANATH, 2002). In principle, anything can be accomplished through collaboration because the organizations are not limited to their own resources and competencies (MAMÉDIO *et al.*, 2019; HUXHAM; VANGEN, 2005). The benefits can be relatively identifiable, given that IORs can provide access to information, resources, markets, and technologies, with learning advantages, economies of scope and of scale, and also allow companies to achieve strategic objectives, such as risk sharing and the outsourcing of steps in the value chain (GULATI; NOHRIA; ZAHEER, 2000). However, for the benefits to be achieved, issues such as familiarity and trust are essential for the formation of a strategic partnership (GRAEBNER; LUMINEAU; KAMAL, 2020; HAGEDOORN, 2006).

As explained by Gulati and Gargiulo (1999), organizations seek to create stable relationships, rich in exchange of information and based on trust. Such relationships aim to reduce the costs of seeking a partner and also to reduce the risk of opportunism. Relationships like this constitute a network that develops into an

information center for potential partners, with a view to achieving common goals and mutual gains. For the authors, the more the emerging network internalizes information about potential partners, the more organizations use the network to support their future decisions about alliances, which are probably immersed in the emerging network (GULATI; GARGIULO, 1999).

Information on competencies, needs and reliability of potential partners, as well as the placement of the potential partner in the network and indirect ties with third parties, are linked to the mechanisms that lead to the creation of new ties. This mechanism is called relational, structural and positional (GULATI; GARGIULO, 1999). Trust reduces the apprehension that a partner will act opportunistically (GULATI, 1995). The idea of inter-organizational trust is incrementally built by the repeated interaction of these organizations (MCKNIGHT; CUMMINGS; Chervany, 1998). Through these interactions, they learn about each other and develop trust (VANNESTE; PURANAM; KRETSCHMER, 2014; CONNELLY; MILLER; DEVERS, 2012; RING; VAN de VEN, 1994; WILLIAMSON, 1985; 1999). Das and Teng (1998) define trust in cooperation as the certainty perceived by the firm about the satisfactory collaboration of the partner. Trust decreases the cost of needing to make thorough contracts and so timesaving also occurs. However, contractual safeguards still represent an important confidence-building mechanism among alliance partners (SCHILKE; COOK, 2015; VANNESTE; PURANAM; KRETSCHMER, 2014). In addition, there is a reduction in the costs of seeking partners by forming alliances with those with whom one already has a relationship of trust (GULATI; NICKERSON, 2008; GULATI, 1995).

In recalling the main reasons why organizations seek cooperative relationships, the need for access to strategic resources emerges (IRELAND; HITT; VAIDYANATH, 2002). In this regard, resource dependence theory (RDT) is a fundamental theoretical perspective for understanding inter-organizational relations (HILLMAN, 2009). Resource dependence theorists have investigated a wide variety of inter-organizational arrangements, and their conclusions point to the ability of these arrangements to mitigate dependencies on external resources without creating excessive mutual dependencies between the focal organization and the external resource provider (DREES; HEUGENS, 2013).

From the theoretical perspective of the RDT, the firm (organization) is understood as a set of productive resources (PENROSE, 2006), which are the determining factors for the development of competitive advantages, growth and development of companies (PFEFFER; SALANCIK, 2003; BARNEY, 1991; WERNERFELT, 1984). Considering that the business resource market is imperfect (DAS; TENG, 2000) and firms are not self-sufficient in resources (PFEFFER; SALANCIK, 2003), they now depend on the environment in which they are inserted to access the resources necessary for the development of their activities.

Resource dependence theory is based on the principle that no organization is self-sufficient and therefore obtains resources through exchanges with the environment (BARRINGER; HARRISON, 2000). As such, it focuses on the control of these resources, which suggests that the more power and control an organization has over the resources it needs, the less vulnerable it becomes. In addition, such control can make the organization more competitive compared to the others (LOWENSBERG, 2010). RDT highlights the organizational need to adapt to

environmental needs and also to manage and control the flow of resources. To achieve external resources that cannot be created internally, organizations need to maintain exchange relations with other organizations. That is, organizations change their structures and behaviors to obtain and preserve the necessary resources. Therefore, they seek to form mutually beneficial bonds (PFEFFER; SALANCIK, 2003).

Pfeffer and Salancik (2003) argue that three elements are important in determining the external dependence of one organization on another. They are: a) the importance of the resource that the organization requires to continue its operations and survive; b) prudence in the allocation and use of resources; and, c) the few existing alternatives. It is noted that the dependence of one organization on any other is determined by the importance attributed to the resource necessary for the development of an activity, the number of potential suppliers, and the replacement cost of these suppliers. Pfeffer and Salancik (2003) report that organizations act in the direction of fulfilling the demands of other organizations or social actors, and that they act by managing dependencies that create restrictions on their freedoms of action. For these authors, organizations seek to exempt themselves from being controlled and at the same time seek stability and control over the exchange of resources essential to their continuity. Such a situation causes a stalemate for organizations.

According to RDT, organizational behavior is strongly associated with the restrictions and inter-dependencies of resources that organizational management faces (MALLAPRAGADA *et al.*, 2015; CASCIARO, PISKORSKI, 2005; PFEFFER; SALANCIK, 2003). Thus, the mission of management is to lead the organization to a beneficial environment by managing and establishing negotiated environments favorable to the organization (PFEFFER; SALANCIK, 2003). Therefore, the formation of strategic alliances has become a management strategy used by different companies at the national and international level (KLOTZLE, 2002; VONORTAS; SAFIOLEAS, 1997). The formation and development of strategic alliances involve the resources of partners who decide to act together, sharing these resources (DAS; TENG, 2000).

There are several definitions of strategic alliances found in the literature. Strategic alliances are cooperation plans or agreements between two or more organizations (TODEVA; KNOKE, 2005) to improve their competitiveness and performance (LEWIS, 1992) through resource sharing (IRELAND; HITT; VAIDYANATH, 2002; TEECE, 1992) but without sharing ownership of assets (LOWENSBERG, 2010; DICKSON; WEAVER, 1997). Dussauge and Garrette (1997) define strategic alliances as inter-organizational collaboration projects established by rival firms, sharing resources and actions, with the goal of achieving predetermined objectives. As explained by Das and Teng (2000), strategic alliances are established by companies because they do not have all the resources necessary for the development of their activities. Thus, one of the main benefits of alliances is access to previously unavailable resources and the joint development of new resources through the alliance (IRELAND; HITT; VAIDYANATH, 2002).

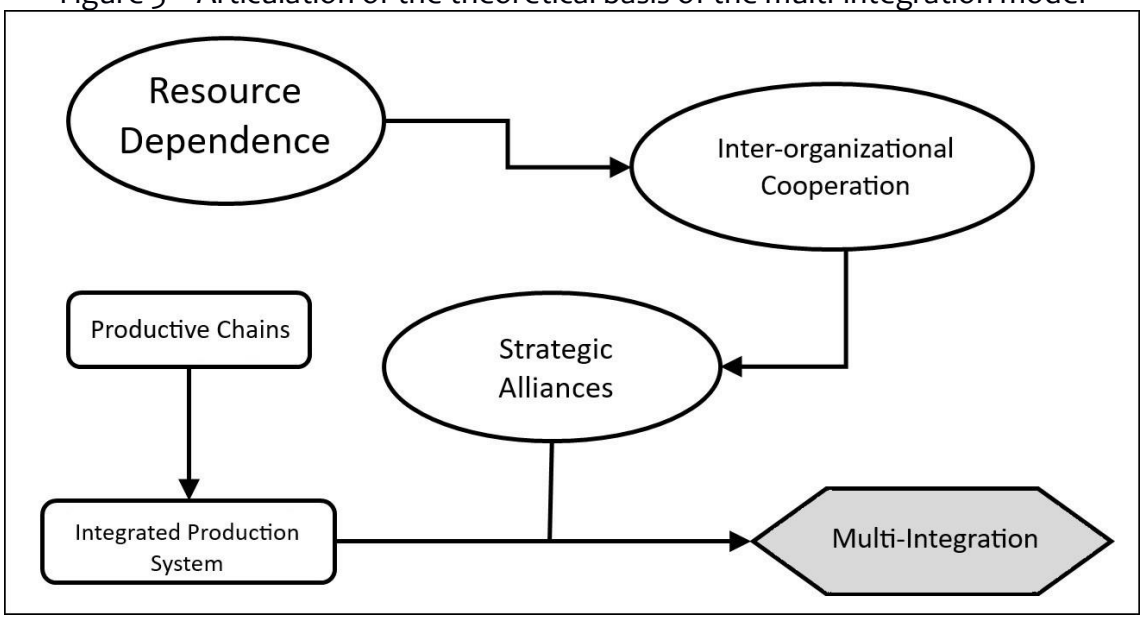
According to Gulati (1998), strategic alliances can be seen as voluntary arrangements between companies, involving exchanges and the sharing or co-development of products, technologies, or services, which can arise for various reasons and take different forms through vertical and horizontal limits. As inter-

organizational arrangements, alliances can take different forms, including joint ventures, franchises, marketing contracts and long-term licenses, reciprocal trade agreements, research and development (R&D) partnerships, and participation in research consortia (LAVIE, 2006). Therefore, it can be verified that horizontal alliances express the merger between two or more companies that operate at the same stage of the production process and use similar or complementary raw materials. In this type of alliance, the exchange of mutual benefits is more evident, as it is possible to explore collective marketing, carried out jointly, reducing costs and obtaining gains in scale (HAMEL; DOZ, 1999). The integration between two organizations based on different but complementary resources presents opportunities for synergy derived from economies of scope (HARRISON *et al.*, 2001).

Regarding the choice of governance structures in strategic alliances, Gulati (1995) focuses on the implication of repeated ties. In evaluating some strategic alliances established between different companies in the period from 1970 to 1989, the author found evidence suggesting that firms select contractual forms for their alliances, based not only on the activities they include, such as research and development, but also on the existence and frequency of previous ties with the partner. However, companies that enter into alliances face considerable concerns, due to the unpredictability of partner behavior and the likely costs to a company of opportunistic behavior, should it occur.

Building trust between partners is a challenge in many alliances (IRELAND; HITT; VAIDYANATH, 2002). Given the uncertainties about a potential partner, some companies seek information from existing networks, as well as other companies that commercially operate with these potential partners, which can contribute to reducing research costs and alleviating the risk of opportunism. In this context, it is observed that there is a widespread preference of companies to transact with individuals of known reputation (KRAUS *et al.*, 2018; GULATI, 1998; GRANOVETTER, 1973 and 1985). Therefore, the formation of strategic alliances aimed at the multi-integration of production systems between companies operating in different production chains can be facilitated between companies that have a good reputation in the market in which they operate, as well as in the relationships already established with their partners. The theoretical articulation that supports the propositions about the multi-integration model is presented in Figure 3.

Figure 3 – Articulation of the theoretical basis of the multi-integration model



Source: Prepared by the authors.

The dependence of agro-processing industries on access to family farms (for the maintenance of their productive structures) and the need to strengthen integrated properties are understood to be able to favor the inter-organizational cooperation to be established between companies in different production chains, aiming at the development of multi-integrated production structures. Therefore, the cooperation to be established would be developed strategically, adding value to the related parties. Such relationships are evidenced in the proposed multi-integration model.

3 From the integrated production system to the multi-integration model

The integrated systems of agricultural production have increasingly been adopted in Brazil by the most diverse industries in the private sector and cooperatives, which have designed specific integration models according to their interests and activities (BRANDENBURG; FERREIRA, 2020). The main integrated systems currently existing are related to the poultry, pig, tobacco, fruits, tomatoes, silkworm, seed production, milk, wood, coffee, and *yerba mate* sectors, among others. In general, integrated production systems provide security to the parties, as they complement the demands of the rural producer for the supply of production resources and for industrial activity, ensuring the supply in quantity and quality in a planned way.

In agricultural production in Brazil, since the beginning of the twentieth century, different models of an integrated production system (IPS) have been developed. They are systems organized vertically with the commitment of the parties. On the one hand, integrating companies generally provide resources, inputs and services. On the other hand, the integrated producer participates in the productive cycle with their capital, composed of available assets such as land, labor, facilities, and natural resources. In this integration model there is the formal or informal commitment of the parties on the purchase and sale of the products. Most

companies that operate in the agribusiness production chains seek to structure integrated production systems with farmers, looking to secure the supply of their raw material demands. As they do not have all the resources necessary for the development of their own production, integrated systems emerge from a cooperative production strategy, in which the agro-processing industries provide the inputs and, in some cases, the financial support necessary to structure the production systems in the integrated agricultural properties, guaranteeing to purchase their production. Meanwhile, the integrated properties provide these companies with their productive structures and the available family labor.

In this perspective, family farms play a strategic role in the agribusiness production chain, enabling the production of the inputs necessary for the development of the activities of the integrating companies, without which they cannot operate. Such conditions reveal a dependence of these companies on access to small family farms producing the raw material.

Several factors can negatively influence the maintenance of productive structures developed in small family farms. In general, there is a convergence in the literature regarding the main factors that can affect productive structures in agribusiness, which are the progressive scarcity of capital and labor resources (BUAINAIN; ROMEIRO; GUANZIROLI, 2003), family succession, and rural exodus (SCHNEIDER, 2010; NAVARRO, 2001). In addition, the sustainability of families, as well as the inability of the farm to earn income, are also factors that threaten such production structures (BUAINAIN; ROMEIRO; GUANZIROLI, 2003),

Conversely, diversification in family farming has been pointed out by some scholars of the subject as a possible solution for the strengthening of family farming and the maintenance of family labor in rural areas. Diversification is an alternative that can contribute to the reduction of risks and uncertainties, as well as the generation of income and the sustainability of properties that operate under a family economy regime (SCHNEIDER, 2010; BUAINAIN; ROMEIRO; GUANZIROLI, 2003). Diversification is the basis of the structure of the multi-integrated production system proposed in this research.

There is no definition in the literature for the term multi-integrated production systems (MIPS) or multi-integration. Since such systems are structured from the diversification of productive activities in family farms, supported by agro-processing industries from different production chains, a multi-integrated production system is understood as the inter-organizational collaborative relationships that can be established between partner companies that operate in different production chains in order to build strategic alliances and so ensure also strategic resources for both chains.

Similarly, to integrated production systems, in this productive structure, in addition to training producers to develop these activities, the companies that cooperate in the multi-integrated system also ensure the purchase of their production. In this sense, the proposed model deals with the possibility of building strategic organizational alliances in order to compete and cooperate in a multi-integration model, aiming to ensure the economic and social viability of family farms, and, consequently, the availability of the necessary inputs for the survival of the integrating companies, which will contribute to the strengthening of the productive chains (involved) as a whole.

The relationship of dependence between industry and agriculture in the rural family model indicates a need for inter-organizational cooperation, both from the perspective of agro-processing industries and from the perspective of the rural production unit. Considering that there is diversification in family farms, it is possible to admit that the convergence of efforts by companies operating in different production chains can enable the structuring of multi-integrated production systems. Thus, the multi-integration model proposes the formation of strategic alliances between two or more focal organizations positioned in distinct production chains.

The Multi-integration Model required the formulation of a set of propositions, which are supported in the reviewed literature. The first theoretical proposition deals with the perception of integrating companies in relation to family farms. From the perspective of RDT, companies are not self-sufficient in resources (PFEFFER; SALANCIK, 2003), which is why they need to form strategic partnerships to access resources necessary for the development of their activities (DAS; TENG, 2000). Similarly, the resource market is imperfect (DAS; TENG, 2000), and some resources can be considered more valuable and difficult to access. Thus, in the agribusiness production chains, the integrating companies become dependent on family farms to enable their production structure, since without inputs it is not possible to develop their activities. These properties, due to the specificities of their assets (land, labor, facilities and natural resources), become strategic for the viability of this production. In this context, the following proposition can be elaborated:

Proposition 1: Small family farms are considered a strategic resource by agro-processing industries, given the specificities of the production model.

In view of the dependence on access to these productive structures, agro-processing companies develop integrated production systems (IPSs). The IPS provides companies with greater efficiency in costs and quality, in addition to ensuring the production of inputs (ZYLBERSZTAJN, 2005; RICHETTI; SANTOS, 2000; SIFFERT-FILHO; FAVERET-FILHO, 1998), strategic determinants of the survival of an organization. One of the objectives of the IPSs is the preservation of family farms, producers of specific raw materials. Therefore, the structuring of such systems, by supporting agricultural production in the family property, provides the opportunity for the transfer of knowledge (one of the main benefits of inter-organizational relationships) and the generation of income, attractive for the maintenance of the family workforce in the rural environment and the sustainability of these properties (BUAINAIN; ROMEIRO; GUANZIROLI, 2003; NAVARRO, 2001), as well as the supply of raw materials to these organizations. In this way, it becomes possible to elaborate the second:

Proposition 2: Agribusinesses operating with IPSs compete for access to small family farms.

This dependence on the viability of productive structures, and the existing competition between companies that operate in agribusiness for access to family farms, makes the integrating companies develop strategies to secure family properties in their integrated production systems. To this end, in these integrated structures, the integrating companies provide the properties with the necessary

inputs to enable their production and specialized technical assistance, and guarantee the purchase of their production.

In view of the challenges of maintaining this resource, other actions can be developed, aiming at the strengthening of the family farm, the generation of income, and the sustainability of these properties (BUAINAIN; ROMEIRO; GUANZIROLI, 2003). In this context, it becomes possible to elaborate the third proposition:

Proposition 3: The dependence of the agro-processing industry on small family farms that produce raw materials requires the development of specific strategies to ensure access to this resource.

Although this evidence suggests the existence of such relationships, the limitation of resources in an organization can negatively influence the maintenance of its productive structures (PFEFFER; SALANCIK, 2003). In this case, the establishment of inter-organizational cooperation relationships can facilitate the development of joint actions (DAS; TENG, 2000), aiming to ensure the maintenance of IPSs and access to family farms. It is in this sense that the formation of strategic alliances has been highlighted in the literature of resources as an efficient strategy for accessing and sharing resources, costs and business risks (HELFAT *et al.*, 2007; TAUHATA; MACEDO-SOARES, 2004). Likewise, it can enable the achievement of common goals and the establishment of mutual gains (Balestrin; VERSCHOORE, 2008; TAVARES; MACEDO-SOARES, 2003; TEECE, 1992).

Considering that diversification in the agricultural environment has been identified as an alternative for income generation and the strengthening of family farms (BUAINAIN; ROMEIRO; GUANZIROLI, 2003), it is possible to admit that the development of joint actions between integrating companies operating in different production chains can be beneficial, enabling the structuring of a multi-integrated production model, with a view to ensuring access to integrated properties, as well as the strengthening of production structures and the availability of raw materials. Therefore, the fourth theoretical proposition of the research suggests that:

Proposition 4: The establishment of cooperative relations between agro-processing industries can guarantee the maintenance of small family farms and their production systems, ensuring the supply of essential raw materials to agro-industries.

From this perspective, it is understood that from the inter-organizational cooperation relations established between these companies, aiming at access to family farm property, the strengthening of their productive structures, and the availability of raw materials, it becomes possible to formalize and develop a multi-integrated production system, based on the sharing of resources, costs and risks. Evidence found in the literature suggests that the trust acquired in the relationships established between companies that have commercial agreements is fundamental to the success of cooperation (HAGEDOORN, 2006) and the sharing of resources in a complementary way (GULATI, 1998). Therefore, it is possible to admit the fifth theoretical proposition:

Proposition 5: The cooperation relations established between agro-processing industries can evolve to the composition of a multi-integration system based on the sharing of resources, costs and risks, through access to family rural property as long as it is considered a strategic factor for the viability of the productive structures of these companies.

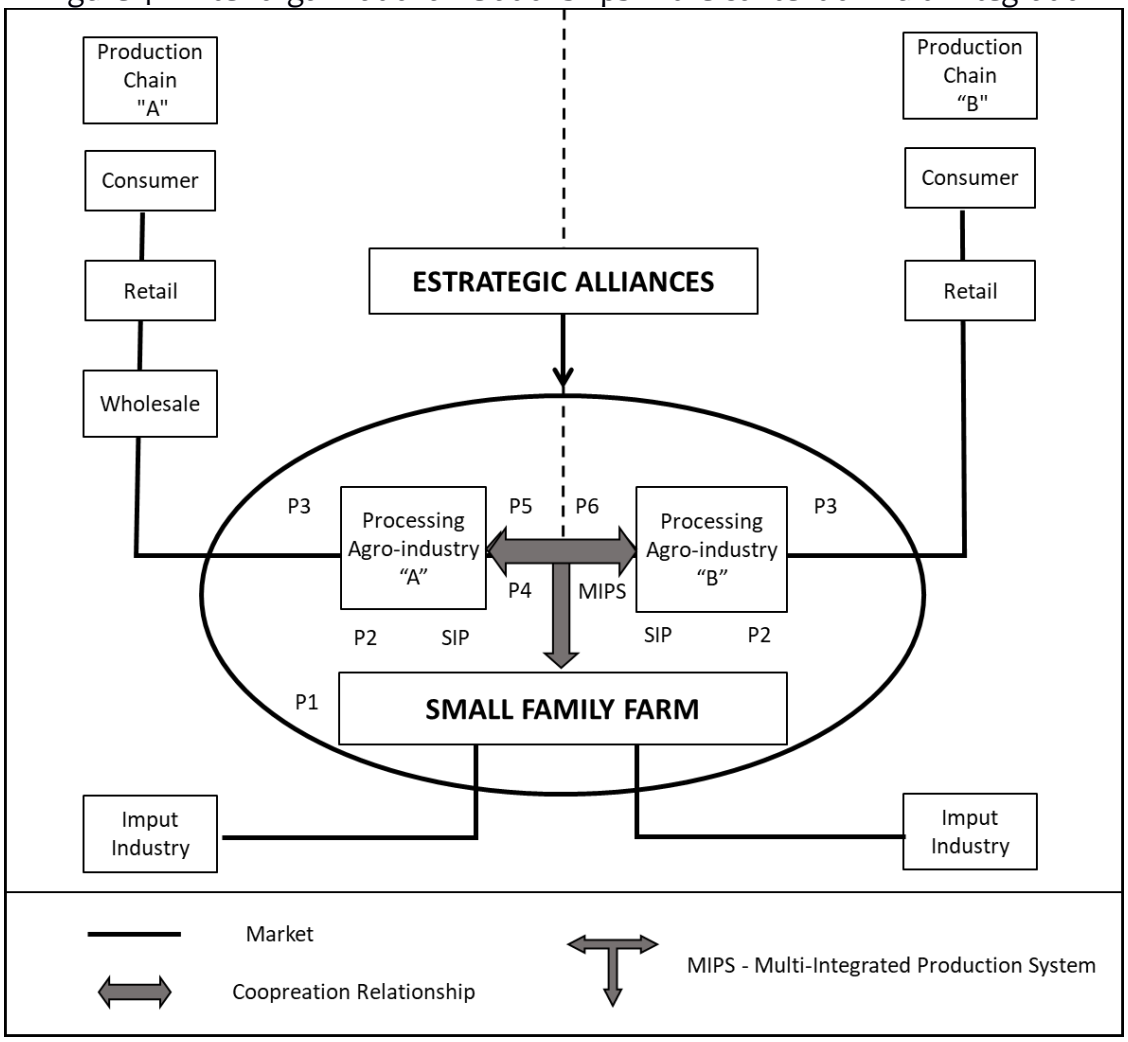
Consequently, the structuring of a multi-integrated production system assumes characteristics of strategic alliances. The strategic alliances comprise the agreements made between partner companies, aiming at the development of joint cooperation actions, to achieve common objectives and obtain mutual gains (TEECE, 1992). The sharing of resources, costs and risks of the business aims to strengthen agro-processing companies (HELFAT *et al.*, 2007; TAUHATA; MACEDO-SOARES, 2004).

Evidence found in the literature also suggests that strategic alliances help organizations in the development of their capabilities, which can provide competitive advantages (HELFAT *et al.*, 2007). The formation of these alliances also contributes to the access and conservation of resources (HAMEL; DOZ; PRAHALAD, 1989; OHMAE, 1989). Such factors are present in established relationships that aim at structuring multi-integrated production systems. Therefore, it becomes possible to elaborate the sixth proposition:

Proposition 6: The structuring of a multi-integrated production system between agro-processing industries positioned in distinct production chains assumes characteristics of strategic alliances, aiming to ensure their access to the strategic resource represented by rural family property.

As can be seen in Figure 4, the proposed model aims to aggregate the existing relationships between the agro-processing industries, the integrated production systems, the family-economy agricultural properties, and the possibility of structuring a multi-integrated production system, given the dependence on existing resources between these relationships.

Figure 4 – Inter-organizational relationships in the context of multi-Integration



Source: Prepared by the authors.

In the multi-integration model, as outlined in Figure 4, propositions 1, 2 and 3 are related to the perception of integrating companies about integrated property (P1), access to such productive structures (P2) and the actions developed by these companies aiming at maintaining this resource (P3). In turn, propositions 4, 5 and 6 are related to the possibility of structuring a complementary model of multi-integrated production.

Considered as a strategic resource by the processing agribusinesses, the rural small family production units (P1) are disputed by these agribusinesses (P2) due to the specificities of their production models. As the agro-processing industries are dependent on the raw materials produced in a given technological context appropriate to the small family farm model, this dependence introduces the need for specific strategies to guarantee access to the productive resource with such specificities (P3).

This situation indicates the possibility that the agro-processing industries establish cooperative relations in order to guarantee the maintenance of small family farms and their specific production systems as producers of crucial raw materials (P4). It is from the formation of cooperation relations between agro-processing industries that the favorable environment for structuring a multi-integration system

based on the sharing of resources, costs and risks is formed (P5). The multi-integrated production system (MIPS) formed by agro-industries positioned in different production chains would assume characteristics of the models of strategic alliances (P6).

4 Final considerations

The argument of this theoretical essay is based on the inter-organizational relationship (IOR), characterized by industry-industry multi-integration through the proposal of an innovative model, since nothing similar has been identified in the specialized literature or put into operation by agro-industries. Based on the resource-based theory, this theoretical essay fulfills its objective of proposing a structured model based on the diversification of productive activities in family farms, supported by agro-processing industries from different production chains. Thus, innovation and advancement in the area are consolidated by the proposal of a multi-integrated production system whose inter-organizational collaborative relationships can be established between partner companies. These organizations operate in different production chains with the purpose of building strategic alliances and thus ensuring also strategic resources for both chains.

The proposed model also establishes six propositions to understand and structure a multi-integrated model of production, or multi-integration. Proposition 1 points out that rural small family property is a strategic resource for knowledge transfer and income generation, to maintain the family workforce in rural areas and provide the sustainability of these properties (NAVARRO, 2001; BUAINAIN; ROMEIRO; GUANZIROLI, 2003). The second Proposition is that agribusinesses operate with an IPS, competing for access to small family farms. Proposition 3 defines that the dependence of the agro-processing industry on small family farms requires the development of specific strategies to ensure access to this resource. Thus, propositions 1, 2 and 3 are related to integrating companies under integrated property (P1), access to productive structures (P2) and actions aimed at maintaining this resource (P3).

Propositions 4, 5 and 6 on the other hand, support the structuring of the complementary model of multi-integrated production. Proposition 4 proposes that cooperative relations between agro-processing industries can guarantee the maintenance of small family farms and their productive systems. In the fifth proposition, the cooperation relations established between agro-processing industries can evolve to the composition of a multi-integration system based on the sharing of resources, costs and risks, with family rural property being a strategic factor. Finally, the sixth proposition establishes that the structuring of a multi-integrated production system among agro-processing industries positioned in distinct production chains assumes characteristics of strategic alliances, aiming to ensure their access to the strategic resource represented by family rural property. Both individually and as a whole, the propositions find support in the literature used as a basis.

This theoretical essay argues, based on RDT, that cooperative relations between agro-processing industries can guarantee access to new family farms, the

development of their productive structures, the strengthening of family farming, and their qualification as suppliers of raw materials essential to agro-industries.

From the propositions, new studies can confirm or refute, in whole or in part, the elements of the innovative multi-integration model. Future studies in companies from different production chains or from different geographic regions can provide information that can confirm or refute the proposals raised here.

Finally, studies can be carried out to understand the factors that favor or hinder the formation of strategic partnerships aimed at Multi-integration, as well as the benefits that can be achieved by companies from the establishment of such productive structures, themes little investigated in the national literature.

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Análise Formal (Formal analysis) - – RODRIGUES, C. – BEGNIS, H. S. M. – DOLCI, P. C.
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Software – não se aplica
Supervisão/orientação (Supervision) - BEGNIS, H. S. M. – DOLCI, P. C.
Validação (Validation) - – RODRIGUES, C. – BEGNIS, H. S. M. – DOLCI, P. C.
Visualização (Visualization) – RODRIGUES, C. – BEGNIS, H. S. M. – DOLCI, P. C.
Escrita – Primeira Redação (Writing – original draft) - RODRIGUES, C. – BEGNIS, H. S. M.
Escrita – Revisão e Edição (Writing – review & editing). –BEGNIS, H. S. M. – DOLCI, P. C.

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