

New Perspectives for Knowledge Management in Inter-Organizational Networks and Relations in Agribusiness

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Abstract: Inter-organizational networks appear in the literature as an alternative to collaborative arrangements to help the agribusiness sector in obtaining a competitive advantage and for the promotion of innovation. Obtaining complementary knowledge is one of the main reasons for the emergence of these networks. In this way, knowledge management can help in the creation and transfer of knowledge in a collaborative way between the network participants. However, there is a gap in the literature when it comes to studies of inter-organizational relations and knowledge management, especially in relation to networks in the agribusiness sector. In this context, the present study aims to deepen the studies by addressing: a) how scientific research has worked on networks and inter-organizational relations in agribusiness; and b) the role of KM as an element of viability of this arrangement model. In order to answer these questions, a literature review was carried out through a systematic search in the databases Web of Science and Scopus, in order to verify how the researches are discussing the topic. As a result, the potential contribution of intensifying studies involving KM as an element of enhancing the capabilities of inter-organizational network participants is highlighted, and that the absorptive capacity presents itself as an important theory to explain how organizations manage to explore new innovative knowledge.

Keywords: Inter-organizational network, inter-organizational relations, agribusiness, knowledge management, business

1. Introduction

The process of globalization and digital transformation has had significant effects on the competitiveness and sustainability of companies. While the industrial economy valued vertical integration, the knowledge economy is stimulated by the formation of inter-organizational relations and network business arrangements (Franco and Esteves, 2020).

Different forms of organization have therefore emerged in the agribusiness sector (Detoni et al., 2020). In fact, the characterization of new collaborative business models in this sector, such as inter-organizational networks and relationships is verified in the literature (Wiśniewska and Paluszak, 2019). These networks emerge as a strategic option in the face of the challenges of the sector.

Inter-organizational networks have also been occurring in organizational studies as an innovation strategy and obtaining complementary knowledge (Abbade, 2015, Balestrin and Verschoore; Reyes Jr, 2010). According to Franco and Esteves (2020), knowledge resource management is achieved through an open and collaborative process and is no longer an individual and endogenous process dominated by a single organization. In this way knowledge management (KM) can have a crucial role so that knowledge can be created and transferred collaboratively, through interactive processes of the participants of a network (Ortiz, Donate, and Guadamillas, 2017).

Although the theme of an inter-organizational network has deepened at the present time, a gap in research can be seen when it comes to studies of inter-organizational relations and KM, especially considering networks in the agribusiness sector (Franco and Esteves, 2018; Wiśniewska and Paluszak, 2019).

In this context, the present study aims to deepen the studies by addressing: a) how scientific research has worked on networks and inter-organizational relations in agribusiness; and b) the role of KM as an element of viability of this arrangement model. This is achieved through a literature review aimed at synthesizing the most relevant studies, to verify how the article's topics are being discussed and explored in the studies .

2. Theoretical Foundation

2.1 Networks and inter-organizational relations

Inter-organizational networks can be defined as a group of three or more autonomous, geographically distributed organizations (Müller-Seitz, 2012), which establishes mutual exchange relationships (Manser et al.,

2016). Its origins may be due to the pressure of different factors, such as: reduction of costs of commercial transactions, specialization, reputation improvement, innovation strategy, space for knowledge creation and learning, sustainability (environmental, economic, and social), and cultural and digital transformation (Abbade, 2015; Wegner, 2019, p 186).

Inter-organizational networks are supported by two main dimensions: the relational level, between the participants, and the structural level (Franco and Esteves 2020). Regarding the relational dimension, the literature describes it as: vertical (e.g. between buyers and sellers/suppliers), horizontal, strategic alliances, joint ventures, consortia, clusters, franchises, industrial districts, technological hubs, hub, central purchasing, cooperation networks, innovation networks, and virtual business communities (Grandori and Soda, 1995; Hoppen; Klein and Rigoni, 2017).

As for the structural dimension, for Castells (1999) the performance of networks depends on the following fundamental attributes: a) connectivity (the structural capacity to facilitate communication); and b) coherence (shared interests between the objectives of the network and its participants). Grandori and Soda (1995) add that governance is also fundamental, since it establishes the rules of operation and ethical assumptions to be observed by the participants. According to Balestrin and Verschoore (2010), inter-organizational networks have the ability to facilitate joint actions and resource transactions to achieve organizational objectives, such as knowledge. For Dalkir (2005), recognizing that the competitiveness of organizations is linked to the robustness of their knowledge assets, makes KM an organizational objective.

2.2 Knowledge management

The knowledge economy based on the valuation of intangible assets points to the importance of managing the organizational knowledge process, as such knowledge is capable of creating competitive value (Edvinsson, 2013). Thus, KM presents itself as a process through which the organization perceives and generates value, through its intellectual and knowledge assets (Uriarte, 2008).

KM can be understood by different epistemologies and for the present study we adopted the cognitivist view. Where knowledge is understood as a fixed and representable entity (data), which can be stored in databases, it can be shared in an organization (Venzin; Krogh and Roos, 1998). Thus, KM can be seen as a process that involves the creation, transfer, integration and application of knowledge (Alavi and Leidner, 2001). These processes, managed in an integrated way, allow the development of initiatives and strategies to create, share, transform, and apply knowledge to maximize organizational effectiveness, growth (Sveiby, 1998), and innovation (Papa; Chierici; Ballestra; Meissner and Orhan, 2021), organizational performance (Andreeva and Kianto, 2011).

The present study focuses on KM in the agribusiness sector and is based on Zanuzzi's research *et al* (2020), which highlight that KM practices and processes collaborate with agribusiness managers in the identification, creation, use, and knowledge storage, which is considered a necessary input for the sustainable development of the sector, assisting in its digital transformation. Thus, alternative sources of knowledge are important to raise the dynamic capacity of creation and use of knowledge among farmers and managers of the sector (Vieira Filho and Da Silveira, 2016). Networks are a means of obtaining complementary knowledge to assist in the reconfiguration of the participants' capacities and the strategic renewal of the organization.

3. Methodology

The research methodology is exploratory and descriptive, the review was elaborated according to the scoping review methodology, seeking the contribution of interorganizational networks and relationships and KM in agribusiness. The technical procedure was performed following the protocol of Cronin, Ryan and Coughlan (2008) of systematized search, which consists of five steps. The protocol steps are described in Table 1.

Chart 1: Steps of the systematic literature review protocol developed for the study.

Protocol steps	Article development
1. Formulation of the research question	How has scientific research worked in inter-organizational networks and relationships in agribusiness? What is the role of KM as an element to make this arrangement model viable?
2. Establishment of inclusion and exclusion	1. Scientific papers and conference papers; 2. Articles in English;

criteria	3. Publication period: 2011 to 2022; 4. With the use of boolean operators, presence of words: "inter-organizational networks" OR "inter-firm networks" AND "agriculture" OR "agribusiness" OR "agroindustry" OR "food system" AND "knowledge management" 5. With more than one quote. 6. Databases: Web of Science (Core Collection / All field) and Scopus a Social Science. 7. Date of searches: April 2022
3.Selection and access to literature	According to the previous item, the search took place from the Web of Science (Core Collection / All field) and Scopus to Social Science databases. Applying the established inclusion and exclusion criteria.
4.Quality assessment of the literature included in the review	Previous reading of the studies selected in the previous step to verify if they include information that helps in answering the research question.
5. Analysis, synthesis, and description of the results	Careful analysis and synthesis of the articles selected in the fourth stage and preparation of tables 4 and 5 with the results. In this last phase, each article considered important to answer the objective question of the research was analysed in detail.

Source: adapted from the protocol of Cronin, Ryan, and Coughlan (2008).

In the first search performed in both databases, the keywords "inter-organizational networks" OR "inter-firm networks" AND "agriculture" OR "agribusiness" OR "agroindustry" OR "food system" AND "knowledge management" were used and no article was found. So the search was adapted as follows:

Search 1: keywords used: "inter-organizational networks" OR "inter-firm networks" AND "knowledge management". The results are presented in Chart 2:

Chart 2: Summary of the search for articles of number 1

Database	Number of articles	Application of selection criteria
Scopus	57	14
WoS	20	5
Total	77	19

Source: prepared by the authors.

In this search, 19 articles were found. Right after the selection criteria was applied, it was verified that 3 articles were duplicated, therefore 16 articles remained. After that, the article's abstracts were read and 7 articles were selected for full reading, as they were related to the research question.

Search 2: keywords used were: "inter-organizational networks" OR "inter-firm networks" AND "agriculture" OR "agribusiness" OR "agroindustry" OR "food system". The results are shown in Chart 3:

Chart 3: Summary of the search for articles of number 2

Database	Number of articles	Application of selection criteria
Scopus	9	6
WoS	11	8
Total	20	14

Source: prepared by the authors.

In this second search 14 articles were found. After applying the selection criteria, 3 duplicate articles were removed, therefore 11 articles remained, of which the abstracts were read and 7 articles were selected for complete reading, as they were related to inter-organizational networks and relations in agribusiness.

The organization of the articles' data and all the analyses were carried out in *Microsoft Excel* and in the text editor *Microsoft Word*.

4. Results and Discussions

4.1 Inter-organizational networks and relations in agribusiness

In the context of agribusiness, the literature presents numerous theories that contribute to the analysis of the different forms of organization of the sector. Some authors indicate that agribusiness can, and should, be seen

as a business network approach (Wiśniewska; Paluszak, 2020). The integration of this approach enables organizational interdependencies within the network, adoption of different coordination mechanisms, and as sources of resources (Lazzarini; Chaddad; Cook, 2001).

The reading of the articles made it possible to map and analyze the scientific production on inter-organizational networks and relations of agribusiness. In total, 7 articles were identified in the systematic search and were read in full. A summary of the articles is presented in Chart 4.

Chart 4: Summary of selected articles in the systematic search

Article title, year of publication, type of study	Purpose of the article	Results
<p>NETWORK STRUCTURE IN SUSTAINABLE AGRO-INDUSTRIAL PARKS</p> <p>Nuhoff-Isakhanyan et al.(2017).</p> <p>Case study</p>	<p>To explore the structures of inter-organizational network ties that can improve the perception of sustainability performance in agro-industrial parks.</p>	<p>The results show that organizations in agro-industrial parks have improved sustainability performance; reputation; economic performance, and innovation performance. They also show that a structure of decentralized formal ties combined with interdependence has a positive influence on perceptions of improving sustainability. Decentralization of the network is important for organizations to avoid dependence on a central participant.</p>
<p>The role of inter-organizational relations and networks in agribusiness: the case for the Polish fruit and vegetable industry</p> <p>Wiśniewska-Paluszak and Paluszak (2020)</p> <p>Case study</p>	<p>To recognize and evaluate the distinguishing features of network relationships, which lead to better defined networks in agribusiness.</p>	<p>Different theoretical approaches of analysis of social networks and inter-organizational relations have allied themselves to the contemporary context of agribusiness.</p> <p>The study confirms the hypothesis that inter-organizational network relationships have distinct and complex attributes dependent on network objectives, which define the categorization of the agribusiness networks.</p> <p>The most important results of the study show the importance of the network for the exchange of knowledge and information, standardization and implementation of quality standards, and adaptation and adjustment to market changes.</p> <p>The study highlights the fragility of the correlations for: resources, innovation, and social relations in the network.</p>
<p>Brokering Rural Community Food Security: An Organizational Network Case Study in Central Appalachia</p> <p>Engle (2021) Case study</p>	<p>To analyze whether the establishment of rules for the network functioning and sustainable production brings food security to the participants of the network.</p>	<p>The establishment of rules and practices help in increasing organizational capacity, community membership, and to build relationships. The benefits outweigh the costs, yet undermine the community's food security mission by marginalizing some participants who did not adhere to the rules.</p>
<p>Rural inter-firm networks as a basis for multifunctional local system development: Evidence from an Italian Alpine Area</p>	<p>To contribute to a greater understanding of the usefulness of Social Network Analysis (SNA) in the collection of information for the planning of rural development agendas.</p>	<p>The results show the difference between knowledge networks and business networks: companies know each other very well, especially those located in the same city, however business ties between them are less frequent. It shows the need to strengthen relations. In this case an awareness network can be seen as the basis for strengthening relational assets and strengthening social capital.</p>

Article title, year of publication, type of study	Purpose of the article	Results
Bassia; Zaccarin and DeStefano (2014) Case study		The use of SNA can provide information on existing conflicts between local participants, identify marginalized groups, and provide guidance to policymakers to involve participants in project planning.
Cooperation in tradition or tradition in cooperation? Networks of agricultural entrepreneurs Dias and Franco (2018) Case study	Understand the inter-organizational networks of agricultural enterprises.	The results show that inter-organizational networks of agricultural enterprises have played a key role in the development of agricultural activities, through horizontal and vertical networks and collaboration with third parties. The spatial relationship between farms is the main determinant for cooperation in agricultural production. The analysis of cooperation relationships shows that in horizontal networks the collaboration with third parties is present in all categories, except for relationships related to new products, where vertical networks with customers predominate.
Small and Medium-Sized Enterprises' (SME) Preference for Innovation Networks: A Choice Experimental Approach (Lefebvre et al. 2014) Case study	Evaluate the network preferences of SMEs in terms of aligning network attributes.	SMEs with previous collaborative experience with other participants are better able to develop and benefit from new relationships in the network. Food SMEs have a preference for innovation networks made up of manufacturers and chain members, rather than research institutes. This is probably because they provide resources for radical innovations and due to the challenges inherent in the management and exploitation of knowledge. They also prefer networks where information is shared confidentially between the network partners, thus affecting the decision of the SME to join the network.

Source: prepared by the authors.

Networks of inter-organizational relationships are considered arrangements where participants cooperate to acquire external intangible resources (Wiśniewska-Paluszak and Paluszak, 2020), often motivated by costs. By participating in these networks, organizations aim to improve sustainable performance, reputation, and economic and innovation performance (Nuhoff-isakhanyan et al., 2017).

However, in the context of agribusiness, the participation of organizations in inter-organizational networks to obtain innovation does not present a consensus among the authors. The results of this study show adverse positions: Lefebvre et al. (2014) presents as a result of his research that participants prefer networks that support them to build their networks of partnerships (relationship), rather than networks that offer support for the development of innovations.

Wiśniewska-Paluszak and Paluszak (2020) identify that innovation is the network attribute with the lowest correlation with the objective of belonging to the network. For the authors, agribusiness networks need to increase their investments to improve relationships in networks aiming at shared resources and innovation. Still on innovation, recent studies by Long Cheng et. al (2021) demonstrate that the participation of agribusiness companies in an inter-organizational cooperation network becomes essential to enhance innovation. The authors also highlight the need to invest in actions of network relationships that leads to innovation, such as trust.

It should be noted that the results of research on inter-organizational agribusiness networks highlight the difficulty in the innovation process by the network participants, especially when it comes to SMEs and farms. Some studies attribute the difficulties of innovation to cognitive and organizational differences, lack of confidence, type of culture, and the organization business model, among others. Lefebvre et al. (2014) also highlight the need to coordinate the risk of opportunistic partners and the occurrence of unintentional knowledge leakage.

4.2 Inter-organizational networks and relations and KM

The analyzed articles suggest that KM plays a crucial role in the development of competitive advantage and innovation, where knowledge is the key resource. They also point out that the acquisition of external knowledge is crucial for the reconfiguration of the capacity and strategic renewal of the organization (Lavi, 2006) and that inter-organizational networks are a means to obtain the external and complementary knowledge through their KM processes and practices.

This study identified that the analyzed papers include more frequently the concepts of transfer, creation and acquisition of knowledge, individual and inter-organizational learning, intellectual capital (being the relational the most cited in the articles), and absorptive capacity. In order to identify the scientific contributions on KM in networks and inter-organizational relations, a chart with a synthesis of the findings of the 7 articles is presented (full reading, plus the abstracts of the other articles). Chart 5 presents the contributions of articles on how KM is studied in inter-organizational networks and relationships.

Chart 5: contributions of articles on inter-organizational networks and relations and KM

INTER-ORGANIZATIONAL NETWORKS AND RELATIONS AND KM		
KM perspectives	Knowledge transfer, creation and acquisition; co-creation of knowledge; Inter-organizational learning; Absorptive capacity; Intellectual capital; (mainly relational)	Articles: Del Giudice and Maggioni (2014); Morgan; Fellen and Finnegan (2014); Papa; Chierici; Ballestra; Meissner and Orhan (2021); Martins (2016); Ortiz, Donate and ,Guadamillas (2017); Franco and Esteves (2020); Bagheri, Kusters, Trieneken and Van Der Zandt (2016); Ye, De Moortel and Crispeels, (2020); Kolloch and Reck (2017); Lage and Alturas (2012); Carneiro-Da-Cunha; Macau and Alssabak (2013); Huber; Nöhammer and Stummer (2011); Barbeira; Franco; and Haase (2012); Poorkavoos; Duan and Edwards (2011); Cruz-Gonzalez, Lopez-Saez, Navas-Lopez and Delgado-Verde (2014).
Motivation to join inter-organizational networks and adoption of KM	Innovation, Competitive advantage, Value creation New capabilities	
Critical success factors	Connectivity (structured communication channels and information and communication technology— ICT— use); Network governance and management adoption; Network structure (formal and informal); Commitment of participants aligned with the network objective; Relational capabilities; Leadership commitment; trust and identity; Adoption of KM practices.	

Source: prepared by the authors (2022)

The findings of the articles allow us to identify the KM potential and the difficulties related to its implementation in inter-organizational networks. Below we highlight those that we consider important for the purpose of the study.

According to Del Giudice and Maggioni (2014), KM presents a crucial role so that the knowledge that is dispersed in the networks can be transferred to the participants. Thus, the knowledge is created and transferred in a collaborative way, through interactive processes involving the network participants (Ortiz, Donate and Guadamillas, 2017). For Franco and Estevan (2020) these processes should establish and maintain relationships between participants in order to integrate and lead interdisciplinary teams in the search for reciprocal and cooperative actions oriented to network results.

Most of the results are related to the ability of organizations to recognize the value of knowledge embedded in their inter-organizational network (Ortiz, Donati, Guadamillas, 2017). For the authors, organizations with greater

ability to identify this value will be the most likely to design better strategies to acquire and integrate such knowledge into their bases.

Being that the different capacities of organizations may be related to the effects of the absorptive capacity of companies that participate in inter-organizational networks. Absorptive capacity comprises how companies can recognize the value of given information, and assimilate and apply this knowledge commercially (Zahra and George, 2002). For Castrillón (2016) the absorptive capacity of companies is a determining element to explain how companies manage to exploit new knowledge.

Both knowledge and innovation depend on resources and capabilities internal and external to the organization (Capó-Vicedo, Expósito-Langa and Molina-Morales, 2008). Inter-organizational relationships generate opportunities to share these resources and access to new technologies (Zancan et al., 2013) and specialized knowledge dispersed in different organizations (Manser et al., 2016). Thus, investing in the relationships between the inter-organizational network participants is fundamental.

Inter-organizational relationships have distinct and complex attributes, dependent on different dimensions of analysis (Wiśniewska-Paluszak and Paluszak, 2019). A study by Lavfvre et al. (2014) presents the following dimensions: structural (hierarchy, density, and connectivity; cognitive (shared common interests and intermediation); and relational (trust, identity, and norms).

These dimensions are widely studied and substantiated by the theory of intellectual capital. Franco and Esteves (2020) highlight the importance of relational capital in inter-organizational networks, in order to keep the participants motivated and to create an environment of trust, thus establishing transparency and respect among them. Structural capital is part of the findings of Wegner (2019) for the author the inter-organizational relations in networks depend on: geographic concentration of the participants, formality of the relationship, and concentration of power.

Another finding of the articles deals with KM practices used in inter-organizational networks. Martins (2016) describes KM practices used in an organizational network formed by SMEs to identify, access, and leverage new knowledge. The author identifies as practices: meetings with customers and suppliers; dialogue with the government (establishing research and technology transfer policies); membership in sectoral associations; immersion in scientific and technological parks; entities supporting entrepreneurship; and development of human resources and relations with universities.

Finally, most of the analyzed articles deal with the benefits of adopting KM in inter-organizational networks, but Cruz-Gonzalez, et al. (2014) mention that, despite the benefits of knowledge and external learning, studies leave aside the associated costs and the cognitive limits for the acquisition and assimilation of external knowledge.

5. Final Considerations

The present study sought to map and analyze the scientific production involving business and management models based on inter-organizational networks and relations in agribusiness. Among the motivations identified in the analyzed studies, it was verified that inter-organizational networks and relationships emerge as an alternative of collaborative arrangement to help the sector in meeting market requirements, obtaining competitive advantage, and promoting innovation.

The formation of networks and collaborative arrangements is motivated by different factors, including obtaining complementary knowledge, which is highlighted in the analyzed literature. It is through the relationships of the participants in a network that knowledge is created and transferred in a collaborative way. Therefore, investing in actions to promote inter-organizational relations is fundamental according to most of the analyzed studies.

One of the findings that stands out in this research is the lack of emphasis in the studies on the ability of organizations involved in agribusiness networks to innovate. Some studies attribute this difficulty to cognitive differences of the network participants, lack of confidence, low intellectual capital, and the organizations' type of culture.

In this sense, the potential contribution of the intensification of studies involving KM is highlighted as an element of potentialization of the inter-organizational networks' participants. The research presents different concepts of KM that have already been explored, such as transfer, creation, and acquisition of knowledge, intellectual

capital, and absorptive capacity. The absorptive capacity appears in the analyzed studies as an important theory to explain how organizations manage to explore innovative knowledge.

Finally, the analysis of KM in inter-organizational networks still constitutes a practical challenge. In this sense, there is a lack of empirical studies exploring KM with the aim of improving the capabilities of organizations and promoting their innovative performance. Therefore, it is recommended for future studies, to conduct research on inter-organizational agribusiness networks and KM in different continents, such as Latin America, since most of the networks studied were concentrated in Europe.

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