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State-of-the-art of knowledge management in inter-organizational relationships

Introduction

The knowledge-based view suggests that firm-specific knowledge constitutes the most strategically important source of competitive advantage (Spender and Grant, 1996) and that firms are platforms where processes of creation and application of knowledge occur (Spender, 1996). Over the last decades, the research about knowledge and knowledge management (KM) has expanded from a perspective strongly focused on the internal processes and strategies adopted by the organizations to a perspective that also considers the role of inter-organizational relationships to access, generate and successfully manage knowledge (Meier, 2011). Due to the increasing tendency toward slackening of the boundaries of the firm (Håkansson and Snehota, 1989), firms increasingly use external sources to fill internal knowledge gaps and to respond to competitive and innovation challenges, particularly in dynamic environments (Bojica *et al.*, 2018). Therefore, the issue of knowledge and its management in inter-organizational contexts has gained momentum.

Such a move to the inter-organizational level offers intriguing research opportunities but also poses unique challenges because of the multifaceted nature of knowledge (Burg *et al.*, 2014), various motives and large scope of different types of inter-organizational relationships (Khamseh and Jolly, 2014; Agostini and Nosella, 2017).

Although research on KM in inter-organizational relationships has accumulated into a considerable body of knowledge, addressing topics such as knowledge acquisition and transfer from partners (Bouncken *et al.*, 2016) and the challenges and risks of managing knowledge in these contexts (Larsson *et al.*, 1998; Gast *et al.*, 2019), there is still considerable room to advance our comprehension of this field. The distinct types of knowledge and the complex nature of knowledge and related processes (Burg *et al.*, 2014; Natalicchio *et al.*, 2017) in the context of a wide variety of inter-organizational relationships unfold new research avenues that can advance our understanding of the topic.

This article has three objectives. First, we discuss the importance of examining KM processes in inter-organizational relationships and reflect on the state of the art. Second, we highlight important research gaps and offer a future agenda for examining KM in inter-organizational relationships. Finally, we discuss the key contributions of the research articles included in this special section by reflecting on the theoretical perspectives, theoretical focus, empirical methods and findings.

Importance of state-of-the-art of knowledge management in inter-organizational relationships

KM fosters value creation and organizational competitiveness (Spender and Grant, 1996). Especially in dynamic environments where technology continuously changes, and new competitors regularly enter the market, organizations need strong capabilities to access, generate and absorb knowledge (Cohen and Levinthal, 1990). The body of literature about the relevance of knowledge to organizations and the ability to manage it is based primarily on the knowledge-based theory of the firm (Grant, 1996). This approach extended previous

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resource-based perspectives proposed by [Penrose \(1959\)](#), [Wernerfelt \(1984\)](#) and [Barney \(1991\)](#) and suggests that organizational effectiveness is derived from knowledge-based resources and the ability of the organization to use and develop this knowledge ([Grant, 1996](#); [Spender and Grant, 1996](#)).

The initial focus of studies on KM emphasized the processes and activities developed at the intra-organizational level. For instance, seminal studies such as those by [Nonaka \(1994\)](#), [Nonaka and Takeuchi \(1995\)](#); and [Grant \(1996\)](#) discussed how knowledge is created and managed within the organizational boundaries. These theoretical frameworks, such as the socialization-externalization-combination-internalization model ([Nonaka and Takeuchi, 1995](#)), offer relevant insights not only to researchers but also to practitioners about the strategies and practices organizations may implement to increase and change their knowledge bases ([Nonaka et al., 2000](#); [Li et al., 2009](#)).

Despite these advances in the field of KM within organizational boundaries, organizations have increasingly recognized the role of partnerships, alliances, and networks to access new knowledge and accelerate R&D strategies ([Larsson et al., 1998](#)). Accordingly, the connection to external partners has become particularly relevant for organizations to create idiosyncratic knowledge-based resources ([Dyer et al., 2018](#)) and to combine them into new routines, processes, and products ([Buckley et al., 2009](#); [Dyer and Nobeoka, 2000](#)). The recognition of external connections as a critical source of knowledge for organizations is reflected in the studies on KM, which expanded to examine how organizations use their relationships to access knowledge in different types of inter-organizational relationships ([Powell et al., 1996](#); [Du Plessis, 2007](#)). A large body of literature has accumulated to understand the specificities of KM in inter-organizational settings ([Del Giudice and Maggioni, 2014](#); [Rathi et al., 2014](#); [Cheng et al., 2014](#)).

While these studies have advanced our comprehension about KM in and through inter-organizational relations, such as alliances and networks, successful KM in partnerships is still among the most complex challenges for managers ([Khamseh and Jolly, 2014](#)). Accessing the partner's knowledge and combining knowledge across organizational boundaries requires significant efforts to develop routines and foster trust among partners ([Milagres and Burcharth, 2019](#)). Coopetitive inter-organizational relationships are even more complex ([Fang et al., 2013](#)) because of the need to share some parts of the knowledge base while simultaneously avoiding the spillover of other parts of the knowledge base that could be appropriated by a competitor to erode the firm's competitive advantage ([Larsson et al., 1998](#); [Gast et al., 2019](#)).

In addition, the great variety of inter-organizational relationships – such as alliances, mergers and acquisitions, franchising, networks and ecosystems ([Todeva and Knoke, 2005](#); [Cricelli and Grimaldi, 2010](#); [Link and Sarala, 2019](#); [Sarala and Vaara, 2010](#)) to name a few – also imposes challenges for the research of KM and for the development of broadly applicable theories. The type and goals of inter-organizational relationships, as well as the characteristics of the participant organizations, impact the knowledge flows and their management. For instance, managing knowledge in a supply chain ([Attia and Eldin, 2018](#)) fundamentally differs from KM in open innovation partnerships ([Bican et al., 2017](#); [Natalicchio et al., 2017](#); [Matricano et al., 2019](#)), mergers and acquisitions ([Liu et al., 2017](#)) and franchising systems ([Iddy and Alon, 2019](#)). Differences in power asymmetries ([Junni et al., 2018](#)) across different types of inter-organizational relationships and across different partner organizations imply a multitude of different strategies and mechanisms to make KM effective.

Thus, a better understanding of KM in inter-organizational relationships offers relevant insights to researchers and practitioners. By examining how KM takes place in different types of inter-organizational relationships, researchers obtain a more nuanced understanding of the topic to build more fine-grained and advanced theory of KM. In addition, practitioners benefit by an increased understanding of how to perform strategies, practices and

processes to foster knowledge process through a variety of alliances, partnerships and networks. This is increasingly relevant as most contemporary organizations are closely connected to external partners and operate in network-based environments.

Research gaps and future avenues for research on KM in inter-organizational relationships

The extant literature has examined different aspects of KM in inter-organizational relationships, with a particular focus on knowledge acquisition and transfer (Bouncken *et al.*, 2016). However, we still need to know more about the role of different types of knowledge in KM. For example, different types of knowledge include technological, market and managerial knowledge (Burg *et al.*, 2014). Also, knowledge has different levels of tacitness, embeddedness, complexity and ambiguity. In addition, we need to know more about the role of different types of inter-organizational relationships in KM, each of which comes in different shapes and forms. For example, alliances range from horizontal to vertical, equity based to non-equity based, single to multiple-stages and innovation-oriented to marketing-oriented (Khamseh and Jolly, 2014; Agostini and Nosella, 2017). The type of knowledge and the type of inter-organizational relationships have important implications for KM. For example, tacit knowledge typically requires more intensive interactions before it can be understood and transferred (Becerra *et al.*, 2008). Similarly, the complexity and ambiguity of technical information require actors to develop cognitive structures that transform a complex information environment into a tractable one (Burg *et al.*, 2014). Accordingly, there are important contingencies stemming from the different types of knowledge and different types of inter-organizational relationships that need to be addressed with different KM practices (Natalicchio *et al.*, 2017), including the related organizational routines, control and coordination mechanisms and systems (Meier, 2011).

Furthermore, there are important differences in KM dynamics between large firms and small- and medium-sized enterprises (SMEs). Because SMEs have fewer assets to build their strategies on than large firms, they often rely to a greater extent on knowledge resources to compete successfully (Bojica *et al.*, 2018). Interestingly, despite the growing importance of SMEs, only a small portion of literature addresses the topic of KM within and between SMEs (Massaro *et al.*, 2019; Link and Sarala, 2019). Moreover, our understanding is limited regarding the specific mechanisms that allow SMEs to access multiple types of new knowledge in inter-organizational relationships. The concept of knowledge multiplexity illustrates partners concurrently exchanging multiples types of knowledge (Albrecht and Hall, 1991). Research has not systematically analyzed the dynamics of acquiring different types of knowledge concurrently in the same relationship, and little is known about the conditions under which multiplexity develops in inter-organizational relationships (Bojica *et al.*, 2018).

In addition, the risk of losing core knowledge is inherently present in inter-organizational relationships. While firms can benefit a great deal from establishing inter-organizational relationships to expand their knowledge, making their knowledge available to partners increases the risk of misappropriation of private knowledge beyond the scope of the collaboration itself (Massaro *et al.*, 2019). This kind of “knowledge leakage” has been inadequately investigated in extant research (Jiang *et al.*, 2013), and more comprehensive studies that deal with this issue are called for. For example, whereas the literature recognizes the importance of both formal and informal mechanisms of preventing knowledge leakage, no empirical research exists that describes their interaction and effect on knowledge transfer (Massaro *et al.*, 2019). Reducing opportunism and knowledge leakage benefits mutual knowledge creation, labeled as *copoiesis* (Bouncken *et al.*, 2016), where different entities work jointly to create new knowledge. At present, research tends to ignore the joint knowledge creation processes among firms, which calls for a more detailed understanding about the underlying processes, mechanisms and contextual factors of sharing knowledge (Bouncken *et al.*, 2016; Natalicchio *et al.*, 2017).

Finally, there is a need to pay more attention to the institutional context and temporal issues. Although prior literature has recognized the importance of intermediaries and the role of national and regional institutions in promoting and developing IORs, this issue has received limited attention in KM literature (Agostini and Nosella, 2018). Also, while studies have used a cross-sectional approach, the lack of longitudinal designs has led to limited insights regarding temporality of KM in IORs, such as capturing the dynamism of KM over different alliance life cycle.

The aim of this special section is to shed more light on these under investigated areas of research to enhance our understanding of different aspects of KM in inter-organizational settings. While the six articles included in the special section cannot cover all the identified gaps, they provide an important step toward bridging them. In particular, the articles in this special section illustrate transferring different types of knowledge in various contexts. The articles point to the importance of using both formal and informal governance mechanisms and illuminate the role of institutionalized KM services and mechanisms. Several articles also offer unique longitudinal and qualitative insights on the dynamics of KM in inter-organizational contexts.

A brief introduction to the articles in this special section

In the following, we introduce six articles in this special section. [Table I](#) offers an overview of these six articles along some key dimensions.

In the first article, Balle, Steffen, Curado and Oliveira study the interesting context of science and technology parks, to examine inter-organizational knowledge sharing. The theoretical grounding of the study is based on the theory of knowledge sharing mechanisms and innovation ecosystems. Using a qualitative approach and a fuzzy set qualitative comparative analysis, they examine knowledge sharing in a science and technology park in southern Brazil based on the accounts of 51 managers of organizations located in the park. The article contributes by showing that there are more possibilities of sharing knowledge than abstaining from knowledge sharing. When comparing managerial knowledge and technical knowledge, there are more possibilities of sharing managerial knowledge than technical knowledge. The authors conclude that only older organizations abstain from knowledge sharing in science and technology parks. The findings exemplify the multiplexity of KM in inter-organizational relationships by highlighting the role of different types of knowledge and the related knowledge mechanisms.

The second article of the special section is coauthored by Galati and Bigliardi and focuses on explaining inter-firm knowledge transfer in R&D relationships. Building on prior theory on knowledge transfer in the alliance context, the authors empirically dyadic inter-firm R&D relationships in international “engineering to order” firms. The novelty of the study is depicting trust as a relational condition to illuminate why R&D relationships evolve or do not evolve over time. The study also demonstrates differences in knowledge and technology bases as a trigger for inter-firm R&D collaboration, which is an intriguing finding considering the emphasis on knowledge similarity in prior literature. A further contribution is showing both equity agreements and legal clauses as effective governance mechanisms in R&D relationships, which illustrates the complementary role of different types of governance mechanisms in inter-organizational relationships.

In the third article, Bouncken and Aslam examine the contemporary phenomena of co-working spaces with a focus on knowledge sharing processes. The study builds on the theory of spatial co-location and takes a practice perspective. Using a qualitative approach, the research team studies 26 spatially co-located knowledge professionals in co-working spaces. These knowledge professionals have different employment affiliations. The study contributes by focusing on a growing contemporary phenomenon of co-working spaces and by showing the importance of physical proximity and social and collaboration opportunities

Table I An overview of articles included in the special section

<i>Authors</i>	<i>Topic</i>	<i>Theoretical perspective</i>	<i>Method</i>	<i>Key findings</i>	<i>Type of inter-organizational relationship examined</i>	<i>Sample</i>
Balle, Steffen, Curado, and Oliveira	Inter-organizational knowledge sharing in a science and technology park	Knowledge sharing mechanisms- Innovation ecosystems	Qualitative	There are more possibilities of sharing knowledge than abstaining from knowledge sharing in science and technology parks There are more possibilities of sharing managerial knowledge than technical knowledge in science and technology parks- Only older organizations do not engage in knowledge sharing in science and technology parks	Science and technology parks	51 managers of organizations in a science and technology park in southern Brazil
Galati and Bigliardi	Inter-firm knowledge transfer in R&D relationships	Knowledge transfer	Qualitative	Trust is a relational condition that explains why collaborations evolve or do not evolve over time- Inter-firm R&D collaboration is triggered when there are specific differences in knowledge and technology bases Equity agreements and legal clauses are effective governance mechanisms in R&D relationships	R&D relationships	34 dyadic inter-firm R&D relationships in international "engineering to order" firms
Bouncken and Aslam	Knowledge sharing processes in co-working spaces	Spatial co-location-practice perspective	Qualitative	Co-location increases tacit knowledge exchange, supports social disembodiment of ideas, synthesizes domain-related knowledge sharing and promotes inter-domain learning. Institutionalized knowledge-management services can facilitate mutual learning and increase knowledge sharing opportunities in co-working spaces	Knowledge professionals in co-working spaces	26 spatially co-located knowledge professionals, who do not share employment affiliations, in Germany
Chen, Xu, and Zhai	KM in corporate universities	Network perspective: knowledge networks	Qualitative	KM in corporate universities consists of three mutually reinforcing functions: knowledge transfer, knowledge creation and knowledge services for intrapreneurship Knowledge networks of corporate universities are expanding, and the scope of KM is becoming broader	Corporate university-based knowledge networks	Two Chinese corporate universities

(continued)

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Dooley and Gibbins	Dialectic tensions of university–industry knowledge discovery	Network perspective: knowledge and learning networks	Qualitative	Dialectic tensions are a natural part of the network existence and can facilitate knowledge creation Governance mechanisms at multiple levels within the network help to optimize knowledge exchange and discovery	University–industry network	A longitudinal case of a university–industry life-sciences network
Shi, Zhang, and Zheng	The impact of external search in collaboration networks on firm innovation outcomes	Network perspective: technology-based collaboration networks and knowledge networks-embeddedness view-innovation	Quantitative	A moderate level of breadth and depth in external search is the most beneficial to innovation outcomes (inverted U-shaped relationship)– Network centrality and structural holes positively moderate this relationship	Technology-based collaboration networks	58 firms in the global smart phone industry

as facilitators of cognitive proximity. Co-location facilitates tacit knowledge exchange, supports social disembodiment of ideas, synthesizes domain-related knowledge sharing and promotes inter-domain learning. Another novel finding is uncovering the facilitating role of institutionalized knowledge-management services that enable mutual learning and increase knowledge-sharing opportunities in co-working spaces, which illustrates the role of specific institutional mechanisms and tools to manage shared knowledge in IORs.

The fourth article, written by Chen, Xu and Zhai, builds on the network perspective with a focus on corporate university-based knowledge networks. Through a detailed case analysis, the authors examine two Chinese corporate universities and explain the associated KM functions. An important contribution is discovering three functions of KM, including knowledge transfer, knowledge creation and knowledge services for intrapreneurship. These functions reinforce each other in a synergistic interplay. The study also shows how the university-based knowledge networks change and evolve over time, which demonstrates the temporal dynamics of KM through the inter-organizational relationship life cycle.

In the fifth article, Dooley and Gibbins provide a novel analysis of dialectic tensions of university–industry knowledge discovery. Applying the network perspective, especially regarding knowledge and learning networks, the authors empirically examine a university–industry life-sciences network using a longitudinal qualitative case study. The study contributes by describing dialectic tensions as a natural aspect of the university–industry network. The findings show that dialectic tensions can actually facilitate knowledge creation. In addition, the study contributes by showing the role of governance mechanisms at multiple levels as facilitators of knowledge exchange and discovery. The focus on tensions as a constructive mechanism provides a fresh perspective on KM in inter-organizational relationships.

Finally, Shi, Zhang and Zheng examine the impact of breadth and depth of external search in collaboration networks on firm innovation outcomes. The theoretical grounding of the study is based on applying the network and knowledge-based perspectives and embeddedness view to understand technology-based collaboration in knowledge networks. The empirical

sample is based on examining patents of 58 leading firms in the global smart phone industry. A key contribution of the study is showing that a moderate level of breadth and depth in external search results in the best innovation outcomes for the firm. Another important contribution is examining the interplay of external search, network centrality and structural holes in collaboration networks. Overall, the study contributes to a more fine-grained understanding of structure and management of collaboration networks and thereby extends our knowledge of dynamics and contingencies of KM in inter-organizational relationships.

Together, these six articles elucidate the broad phenomenological scope of KM in inter-organizational relationships by examining contexts as diverse as technology and R&D-based relationships, corporate universities, co-working spaces, science and technology parks and university–industry networks. On the theoretical side, while the studies build on different theoretical underpinnings, network and knowledge-based perspectives play a central role. This suggests that these perspectives can be particularly helpful for depicting contemporary KM processes, mechanisms and practices in inter-organizational relationships. On the methodological side, while the processes and mechanisms related to KM can be examined quantitatively, as in the study of Shi *et al.* (in this issue), the qualitative studies in this special section demonstrate how the use of qualitative techniques allows for illustrating and elaborating on the details of KM processes, to highlight the nuances and complexities of KM in inter-organizational relationships. We hope that our special section will be beneficial for KM scholars across different theoretical fields and empirical methods while also offering actionable insights for practicing managers.

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