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Knowledge Transfer in Interorganizational Partnerships: What Do We Know?

Abstract

Purpose

Review the literature on knowledge transfer in interorganizational partnerships. The aim is to assess the advances in this field by addressing the questions: What factors impact knowledge transfer in interorganizational partnerships? How do these factors interact with each other?

Design/methodology/approach

The study reports results of a literature review conducted in ten top journals between 2000-2017 in the fields of strategy and innovation studies.

Findings

The review identifies three overarching themes, which were organized according to fourteen research questions. The first theme discusses knowledge in itself and elaborates on aspects of its attributes. The second theme presents the factors that influence interorganizational knowledge transfer at the macroeconomic, interorganizational, organizational and individual levels. The third theme focuses on the consequences, namely effectiveness and organizational performance.

Originality/value

Propose a novel theoretical framework that links antecedents, process and outcomes of knowledge transfer in interorganizational partnerships, while also identifying aspects that are either less well researched or contested and thereby suggesting directions for future research.

Practical implications

Partnership managers may improve and adjust contracts, structures, processes and routines, as well as build support mechanisms and incentives to guarantee effectiveness in knowledge transfer in partnerships.

Keywords

interorganizational partnerships; alliances; network; collaboration; knowledge transfer

Article classification

Literature review

1 Introduction

Knowledge transfer across organizations is central to the development of sustainable competitive advantages, as firms rarely innovate in isolation and depend to a large extent on external partners (Combs and Mecalfe, 1998; Powell *et al.*, 1996; Ring, *et al.*, 2005). Defined as a process through which an organization purposefully learns from another, interorganizational knowledge transfer is an important sub-field of research in partnerships, which has undergone noteworthy progress in recent decades (Easterby-Smith *et al.*, 2008; Battistella *et al.*, 2016).

Despite the proliferation of valuable contributions in this tradition, knowledge transfer tops the list of the most complex challenges managers face in interorganizational arrangements (Mazloomi Khamseh and Jolly, 2008). Even if considered a promising strategy, a large number of alliances yield disappointing results (Inkpen, 2008). Of particular interest is the way partners deal collectively with knowledge management and the learning process (Easterby-Smith *et al.*, 2008; Larsson *et al.*, 1998). Knowledge transfer is an intricate process that encompasses a myriad of sub-processes, including search (i.e. the identification of useful knowledge), access (i.e. the acquisition of externally generated knowledge), assimilation (i.e. the processing, understanding and absorption of outside knowledge) and integration (i.e. the combination of new external knowledge with existing internal one) (Filiari and Alguezaui, 2014).

Partnerships demand significant time and effort to find the right partners and to develop routines that support interaction, particularly in contexts where the tension between competitive and cooperative forces are in play (Fang *et al.*, 2013). They also include a number of operational challenges, such as the commitment of the involved parties and the mechanisms for the congregation, harmonization and integration of the individual contributions (Inkpen and Tsang, 2007). A recurrent conundrum in managing multi-party

settings is to ensure fit between knowledge, communication channels and partner characteristics (Hutzschenreuter and Horstkotte, 2010). The inherent characteristics of knowledge, such as context-dependency, ambiguity and tacitness, make it sticky, that is, difficult to transfer, once such characteristics require corresponding governance mechanisms (Fang *et al.*, 2013). Another issue refers to the multiplicity of learning processes that occur simultaneously (i.e. learning about the partner, with the partner, from the partner and about alliance management). These imply high complexity due to the differences among partnering organizations in terms of, for instance, technological capabilities, physical distance, culture (Battistella *et al.*, 2016), absorptive capacity¹ (Mazloomi Khamseh and Jolly, 2008) and social capital (Filiari and Algezau, 2014). Besides, partnerships encompass a number of risks that range from the leakage of critical knowledge (Khanna *et al.*, 1998) to the conflicts over the division of unexpected returns. Conflicts may arise when new knowledge is generated, as returns may not be clear at the onset of an alliance (Lee *et al.*, 2010). The relationship between the actors is indeed of critical nature for the effectiveness of knowledge transfer, which presupposes trust, intensity of connections, a degree of familiarity and reciprocity (Battistella *et al.*, 2016).

The contrast between the promise partnerships represent as vehicles for knowledge transfer (Faulkner and De Rond, 2000) and the challenges they pose for strategy scholars and managers alike motivates our research. *What factors impact knowledge transfer in interorganizational partnerships? How do these factors interact with each other?* We address these questions by carrying out a systematic literature review. Research in this field draws on various traditions that encompass evolutionary theory, transaction cost theory, theories of the firm, learning, motivation and dynamic capabilities. It is based on multiple methodological

¹ For a detailed review of the literature on absorptive capacity, see: Lane, P. J., Koka, B. R., and Pathak, S. (2006); Volberda, H. W., Foss, N. J., and Lyles, M. A. (2010)

approaches, including secondary data, questionnaires, interviews, observations and interventions. Given the conceptual and methodological diversity, as well as the relative fragmentation, a holistic view is needed.

Understanding knowledge transfer in interorganizational contexts is relevant because it has been a widely applied strategy (Mazloomi Khamseh and Jolly, 2008; Lee *et al.*, 2010). Empirical studies point to a significant surge in several countries and sectors, particularly since the 1990s (Hagerdoorn, 2002; Schilling, 2015). The phenomenon is interpreted as a response to the growing uncertainty in the economic environment, the intensification of the globalization process, the increase in R&D complexity and costs, the reduction in product life cycles and the technological shocks (Powell *et al.* 1996; Child *et al.*, 2005; Schilling, 2015). Partnerships help organizations minimize risks, uncertainties and costs, allocate resources more efficiently, access partners' resources and markets, and increase the portfolio of products and services (Schilling, 2015). They are seen as an effective way of transferring, accessing, generating and absorbing knowledge (Inkpen and Dinur, 1998; Lorenzoni and Lipparini 1999; Inkpen, 2000; Simonin, 2004). Learning is hence an important driver of interorganizational cooperation (Inkpen, 2008; Dyer and Nobeoka, 2000; Kogut, 1988).

We carry out a synthesis of the literature through a systematic review of the top ten journals in the fields of strategy and innovation studies during the 2000-2017 timeframe. Our review is presented in three overarching themes – knowledge in itself, its impacting factors and consequences – which were organized according to fourteen research questions. We propose a novel theoretical framework that integrates the three themes at multiple levels: macroeconomic, interorganizational, organizational and individual. Our framework highlights the importance of 1) the attributes of the knowledge at stake; 2) the organizational context from where knowledge is sent and received; 3) the motivation and the governance of the alliance; 4) the individual behavior and ability in receiving and transferring knowledge; 5) the

complexities of the transfer process. Of particular interest is the need to advance our understanding of the relations between the different levels and their outcomes, especially those relative to the dynamic mechanisms that arise with time.

Our contribution thus lies in a novel theoretical framework that identifies and links the antecedents, process and outcomes of inter-organizational knowledge transfer. It provides a consolidation and a critical evaluation of the findings of this research field, together with an overview of the limitations and less contested issues. Another contribution of our study is to suggest directions for future research, methodological improvements and guidance for practice.

2 Methodology

We carried out a systematic literature review following Massaro *et al.* (2016), Petticrew and Roberts (2008) and Tranfield *et al.* (2003). A systematic literature review is a scientific method of making sense of a large body of information that explicitly aims to limit the bias of traditional reviews (e.g. preferences of the author for pet theories), mainly by attempting to detect, appraise and synthesize all relevant studies that address a particular set of questions (Petticrew and Roberts, 2006). As to ensure rigor, objectivity and relevance to our methodology, we first developed a literature review protocol that laid out the course of the study, which we detail below. This structured process guided the identification, selection and assessment of the relevant literature and it is efficient and effective (Watson, 2015). In addition to a description of our research topic, our protocol stated the questions we wanted to explore: How is research on knowledge transfer in inter-organizational contexts (i.e. partnerships, alliances, networks, joint ventures, etc.) evolving? What do we know about it (the focus) and what do we need to explore (the critique)? What recommendations can we

offer to practitioners who face the task of developing a favorable learning environment for alliance partners?

The protocol also included our search strategy, which was designed to be transparent, replicable and focused (Massaro *et al.*, 2016). We aimed at achieving this by screening the most relevant outlets in the highly accredited EBSCO database (hosted by Business Source Premier) and by employing an exhaustive list of keywords and search terms (Tranfield *et al.*, 2003). Once we wanted to prioritize the inclusion of highly impactful research, we selected ten top journals in the fields of strategy and innovation studies according to the impact factor (IF) calculated by JCR (Journal of Citation Reports 2013/2014). After selecting the relevant journals (see Table 1), we searched for papers in the title or in the abstract using a number of keywords that expressed our research field in a far-reaching and comprehensive fashion². Even if semantically distinct, knowledge and technology are often used interchangeably in scholarly work. Hence, we added both ‘knowledge transfer’ and ‘technology transfer’ as our search terms. Besides, since the phenomenon of inter-organizational collaboration is referred to in the literature by a number of related concepts and labels (i.e. partnership, alliance, network, joint venture, consortia, among others), we used a series of keywords that the research team had identified as relevant synonyms³. We considered the period 2000-2017, once we wanted to capture recent contributions. This search retrieved a total of 5,685 papers.

After excluding papers that were either duplicated or constituted non-novel contributions (such as book reviews and editorial pieces), we independently examined the remaining abstracts and filtered them according to fit. Two authors carried out this classification process simultaneously to establish clarity about the selection criteria and to

² Search term used in the EBSCOhost Search Screen – Advanced Search Database – Business Source Premier: JN “*journal name*” AND (AB *keyword1* OR TI *keyword1*). Date from: 2000-2017

³ Keywords used in the literature search: knowledge transfer, technology transfer, alliance, network, consort*, collaborat*, co-opet*, coopet*, interorgani*, inter-organi*, interfirm, inter-firm, joint venture, partnership.

reassure reliability and rigor (Petticrew and Roberts, 2008). Our review protocol included a number of inclusion/exclusion criteria regarding the topics of interest, since all study designs were welcome. As we were particularly concerned with research addressing knowledge transfer and/or integration between organizations, we eliminated papers that investigated other aspects of partnership management or that did not relate to phenomena at the inter-organizational level⁴. Specifically, we removed papers dealing with personnel mobility, mergers & acquisitions and cross-business unit (intra-organizational) interactions. Besides, given our focus on managerial issues, we discarded papers at the aggregate level emphasizing a regional development perspective, such as cluster policy, agglomerations and industrial districts. Studies on the university-industry linkages, the outcomes of scientific production or the commercial engagement of academics were covered by only two articles, as we did not intend to evaluate universities as specific players. In a similar vein, international knowledge transfer in the context of multinational corporations or foreign direct investment was disregarded. Besides, papers related to the structural or morphological aspects of social networks (i.e. nature of ties and configuration), as well as to supply chain integration were considered off-topic. Using the above-mentioned criteria for relevance, we eliminated 5,458 articles. Both authors separately inspected the full text of the remaining 227 articles and then jointly examined the decision to include or exclude each one until agreement was reached. At this stage, we also excluded studies that did not address knowledge exchange in collaborative multi-party settings. As a result, we classified 174 papers inappropriate.

We subsequently read the 53 papers that met all inclusion criteria and discussed them in a detailed fashion during evaluation meetings, where the whole research team was present. We coded the papers and synthesized them in data-extraction forms that encompassed general

⁴ Our paper quite solely focuses on ‘knowledge transfer’, which includes the search, acquisition, assimilation and integration of knowledge (Filieri and Algezauzi, 2014). Other perspectives emphasize that knowledge is not only transferred, but also co-created in inter-organizational contexts.

information (author and publication details), key topic, study features (analytical level, empirical context, method, partnership form, data) and main results (Tranfield *et al.*, 2003). During this phase, we also used a number of preliminary tables, schemes and reports to facilitate our joint interpretation. Table 1 provides an overview of the papers selected, alongside their corresponding analytical level and type of methodology⁵. More detailed information can be found in Appendix A (see Table A1).

Insert Table 1 about here

The majority of articles (62%) were published in two journals, namely Strategic Management Journal and Research Policy. Regarding the yearly distribution of articles presented in Figure 1, we did not recognize any pattern; it seems that the topic maintained the same rate of interest during these 17 years.

Insert Figure 1 about here

The literature can be further broken down into different levels of analysis, namely macroeconomic, interorganizational, organizational and individual. As Figure 2 portrays, the interorganizational and organizational are the most central levels, which amount to 85% of the investigated papers, taking into account that some papers addressed multiple levels of analysis. It means that scholars are particularly concerned with factors such as structure of the partnership, motivation, alliance capability, absorptive capacity and trust. Surprisingly, the others levels of analysis, i.e. macro-context and individual, received scant attention in the field. Regarding the methodological choice, quantitative methods are clearly favored over qualitative, conceptual and other study designs, once 64% of the papers applied a quantitative approach (see Figure 3).

⁵ We included in our search the journal Administrative Science Quarterly too; yet none of the retrieved paper was selected.

Insert Figure 2 about here

Insert Figure 3 about here

As a final step of our analysis, we applied two techniques to support our research synthesis. As recommended by Petticrew and Roberts (2008), we first organized the description of the studies into logical categories. For this purpose, we identified common research questions throughout the articles and grouped them accordingly, with the view of summarizing the essence of this literature. The second stage was to analyze the findings *within* each category of research question and produce tables that succinctly systematized them. In the third phase, we strived to synthesize and integrate the findings *across* the different studies. Specifically, we codified the findings into three different dimensions – antecedents, process and outcomes – with a number of sub-codings for each dimension. In line with Tranfield *et al.* (2003), we supplemented this structured and deductive protocol-based process with an inductive approach for the resulting interpretation of findings.

3 Literature Review

Our review shows that the literature covers three overarching themes. The first theme discusses knowledge in itself and elaborates on the types and characteristics. The second theme presents the factors that impact knowledge transfer, either in the decision to form a partnership or during its operation. The third theme encompasses aspects related to the consequences of interorganizational knowledge transfer, i.e. effectiveness and organizational performance. We formulated fourteen research questions that reflect these overarching themes, as described in Table 2¹. Next, we discuss the research questions in detail.

Insert Table 2 about here

3.1 Theme 1: Knowledge

Inteorganizational transfer is the migration of knowledge between partnering firms (Beamish and Berdrow, 2003). Yet, it is not an uniform process that may be classified according to diverse approaches. Williams (2007) differentiates two mechanisms related to knowledge transfer, which may be utilized simultaneously: replication and adaptation. While replication is the attempt to recreate identical activities in two localities, adaptation is the attempt to modify or combine practices of the source organization. Zhao *et al.* (2004) and Zhao and Anand (2009) propose a further differentiation between collective and individual transfer. They distinguish learning at the individual level from the group (organization) level as regards their nature, strategic importance and level of difficulty. The transfer of collective knowledge is the most valuable, difficult, and prone to error, since it is restricted to tacit knowledge shared among employees, which often occurs in a veiled and unconscious way.

3.1.1 Knowledge attributes

The characteristics and types of knowledge, as well as how and why they influence the transfer process are among the most debated topics in the literature. Nearly one third of reviewed papers (32%) deal with this issue in one way or the other. Tables 3 and 4 organize our main findings in relation to these aspects – What type of knowledge is being transferred? What are the characteristics of the knowledge being transferred?

Insert Table 3 about here

Insert Table 4 about here

The characteristics and types of knowledge are thus highly relevant. The more tacit (Baghat *et al.*, 2002; Osterloh and Frey, 2000), complex (Baghat *et al.*, 2002), technological (Kotabe *et al.*, 2003; Hagerdoorn *et al.* (2008), collective (Zhao *et al.*, 2004) and systemic (Baghat *et al.*, 2002) knowledge is, the more difficult is its transfer. Also relational knowledge, which is developed within the boundaries of the dyad, sets up transfer barriers (Mesquita *et al.*, 2008). Regarding characteristics of knowledge, the degree of similarity (Inkpen, 2000), cumulateness and appropriability (Herstad *et al.*, 2014) facilitate use and assimilation, whereas causal ambiguity (Dyer and Hatch, 2006; Williams 2007; Inkpen, 2008), context-dependency (Baghat *et al.*, 2002; Williams, 2007), viscosity (Inkpen, 2008), stickiness (Baghat *et al.*, 2002) and sensitivity (Jarvenpaa and Majchrzak, 2016) interfere negatively, in the sense of making knowledge transfer more challenging.

3.2 Theme 2: Factors Impacting Knowledge Transfer

The second theme related to factors impacting knowledge transfer gathers the most discussed topics in the literature, particularly those at the interorganizational and organizational (divided into the source and the recipient firm) levels of analysis. Besides, we grouped factors pertaining to the macroeconomic and individual levels too. Table 5 lays out our classification and key underlying variables.

Insert Table 5 about here

3.2.1 Macro-environmental factors

Among the reviewed papers, few deal with the macro context in which partnerships are situated. This should nevertheless be considered with caution given our choice of journals, the majority of which are focused on business and management.

What factors of the macro environment affect the motivation to form partnerships for knowledge transfer? According to Guennif and Ramani (2012), the factors to be considered are industrial policy, competition policies, macroeconomic policies, intellectual property regime and price regulation. They stress the role of the State as a generator of “windows of opportunity” and of positive externalities similar to the radical technological changes that lead to the formation of partnerships. The outcome of public policies depends on the perception of stakeholders. The expectations of the companies define if the window of opportunity will be sensed and exploited, initiating the formation of partnerships. In evaluating catching up processes, Guennif and Ramani (2012) conclude that it is determined by the interaction between organizations, institutions and policies in the National Innovation System: State, public laboratories, universities, companies, financial organizations, consumers and civil society groups. Following the same line of reasoning, Bozeman *et al.* (2014) stress the role of the State as an inducer of demand for a specific type of knowledge.

In turn, Hagerdoorn *et al.* (2008), together with Grimpe and Sofka (2016), highlight industry characteristics, specifically appropriability regime and the level of technological sophistication, which they consider to affect firm preferences for the type of partnership contract. The more sophisticated and R&D intensive the industry is, and the greater the efficacy of appropriability secrets, the greater will be the propensity of companies to choose technology transfers through partnerships. This is because partnerships allow for high degree of involvement between partners, as well as monitoring and controlling technology transfer (Hagerdoorn *et al.*, 2008). Equally, the more shallow the markets for technology in an industry are, the more likely firms will be to opt for relational collaboration in the form of alliances (Grimpe and Sofka, 2016).

Knowledge characteristics may also impact the choice of firms to establish collaboration agreements. In contexts where knowledge is analytical, presents high

appropriability and low cumulateness, as well as opens new market and technological opportunities, it increases preferences for partnerships⁶. As this kind of knowledge presupposes formal and systematic R&D processes, it may be supported by reports, electronic files and patent descriptions. This set of tools tends to be less sensitive to distance effects, once they build on common language and criteria. Consequently, global innovation partnerships are positively associated with the availability and the use of IPR protection measures in a given industry (Herstad *et al.*, 2014).

The macro-environmental factors therefore impact knowledge transfer indirectly by influencing the motivation of organizations to form partnerships with this purpose.

3.2.2 Interorganizational factors

Part of the literature is dedicated to investigating how motivation and governance affect knowledge transfer.

How do the drivers of partnership formation affect knowledge transfer? Two kinds of drivers for entry into partnerships are identified: cost-sharing and synergy-seeking motives (Lee *et al.*, 2010). Unexpectedly, accessing knowledge and new skills (i.e. synergy) turn out to be secondary motives to market positioning against competitors and sharing risks (i.e. cost-sharing) (Beamish and Berdrow, 2003). In alliances where partners are in a position of substitution and not of complementarity, the costs arising from conflicts are greater and partners have higher incentives to appropriate benefits in an exclusive fashion. As a consequence, they do not invest in the development of mutual trust. The result may be the unforeseen end of the partnership or ineffective results – understood here as not achieving synergies and complementarities. In other words, partners do not succeed in accessing each

⁶ Cumulateness is associated with complexity and system embeddedness, which implies the necessity of more communication and opens the possibility of lock-ins to collaboration partners. Regarding appropriability, engaging in collaborative knowledge development entails exposure of proprietary knowledge and opens space for uncertainty concerning the control of jointly developed knowledge assets.

other's complementary assets and capabilities. Partnerships are hence not very attractive for knowledge transfer when partners have cost-sharing as key motivation (Lee *et al.*, 2010).

How do partnership structures affect knowledge transfer? The characteristics that determine the design of partnerships (structural governance), such as their contractual form and scope, are understood as fundamental for knowledge transfer.

A key finding is that knowledge is transferred and shared more effectively in equity-based partnerships (i.e. joint ventures), if compared to non equity-based ones. As equity-based partnerships promote direct and frequent interaction, they produce better mutual understanding and favor the adoption of transfer practices at lower cost. Furthermore, their hierarchical structures guarantee *de facto* incorporation of partners' knowledge and stimulate mutual trust (Jiang and Li, 2009), thereby constraining opportunism and unintended knowledge leakage (Yang *et al.*, 2015). This is especially true for situations where technology flows turn the monitoring of partnership activities and the distribution of cooperation rents hard to control, such as the case of combination of already existing technologies (García-Canal *et al.*, 2008).

Remarkably, formal contracts facilitate knowledge transfer between partners that collaborate remotely and are geographically distant. Such governance mechanisms counterbalance the absence of other interaction forms, such as personnel mobility, socialization, face-to-face exchanges and informal ties (Berchicci *et al.*, 2015).

Defined as the extent to which partners combine multiple and sequential functions or value chain activities such as R&D, production or marketing, scope shows a positive relationship with knowledge transfer. The greater the scope, the greater will be the opportunities for interaction, the sharing of ideas and the development of mutual trust (Jiang and Li, 2009). In investigating the option of partners to reduce the scope of international alliances in face of the risk of technological leakage, Oxley e Sampson (2004) corroborated

the relevance of scope for the effectiveness of knowledge transfer. What is more, partnerships in which actors contribute asymmetrically to knowledge tend to favor skill transfers (Dussage *et al.*, 2000).

How do routines affect knowledge transfer? The structural elements are complemented with a perspective that emphasizes the coordination mechanisms through which interactions between partners occur, i.e. processes and routines. Such coordination mechanisms are part of the so-called procedural governance – instruments that regulate the day-to-day aspects of interactions.

Zollo *et al.* (2002) introduce the concept of interorganizational routines, defined as stable patterns of structural governance interactions developed between partners over repeated collaboration agreements. Prior experience with specific partners favors the formation of such routines. As they facilitate information sharing, communication, decision-making and conflict resolution, they contribute to the achievement of expected results. This aspect applies particularly to non-equity based alliances. Companies that have a background of partnerships with specific allies have less need of formal structures to align incentives and monitor activities. In this way, interorganizational routines can be seen as substitutes of the more formal mechanisms of coordination, which are generally found in equity-based partnerships. Social interactions between partners play an important role in this regard, particularly when a partnership involves a more experienced firm in alliance management. More intensive and frequent interactions provide room for the development of mutual trust and enhance tacit information exchange, thereby contributing to the exposition of the routines of the more experienced partner, including those related to external collaboration (Howard *et al.*, 2016).

Alliance management routines perform a coordination function (Ireland *et al.*, 2002; Kotabe *et al.*, 2003), whose primordial role is to support the flow of information between partners, facilitate learning and, at the same time, protect strategic knowledge. Managers need

to understand the partner's objectives relative to learning and to establish appropriate monitoring mechanisms as to achieve alignment at the strategic, relational and operational levels. The coordination activities involve observing whether the partnership meets particular objectives; whether there is balance in the degree of importance given by the partners; whether the partnership will deliver the expected value; what will be the response of the stakeholders; whether there are differences between the organizational structures and how possible conflicts will be managed (Ireland *et al.*, 2002).

An example of the importance of alliance management routines is presented in Inkpen's (2008) study of the joint venture formed between GM and Toyota, NUMMI. The case details the creation of the mechanisms supporting each partner's learning process, which proved to be fundamental for the exploitation of the opportunities of knowledge application and for the break down of transfer barriers related to causal ambiguity. Examples include training, visits, documentation and consulting services. It was the establishment of these specific mechanisms and the involvement of a large number of staff that guaranteed systematic and continuous knowledge transfer.

However, interorganizational routines may also act as barriers. According to Dyer and Hatch (2006), knowledge embedded in routines can only be transferred if a new set of routines is implemented by the recipient organization, what makes the process considerably more difficult.

Beyond routines, other coordinating tools include the integration of systems and databases and market knowledge related to customers (Cheung *et al.*, 2011).

How do relations in a partnership affect knowledge transfer? In addition to structures and processes, there are important relational and cognitive factors that affect knowledge transfer. Among the relational governance factors, the literature emphasizes the role of trust,

control and the perception of justice. Among the cognitive factors, it highlights cultural differences, collective identity and the formation of interorganizational teams.

Trust and control influence not only the definition of objectives, such as knowledge transfer, but also the choice of the type of contract and the establishment of rules (Ireland *et al.*, 2002). Amesse and Cohendet (2001) argue that the functioning of partnerships depends to a large extent on mutual trust, as it reduces the risk of super specialization and facilitates cooperation. In general, empirical studies point to a positive relationship between trust and partnership performance (Ireland *et al.*, 2002; Lane *et al.*, 2001). Trust determines the effort spent in collaboration, the commitment and the disposition to take risks, thereby reducing transaction costs (Inkpen and Tsang, 2005). Defined as the conviction and belief in another party in a risk situation in which the possibility of opportunistic behavior exists, trust is an outcome of the relationship between actors and the institutional context. Control relates to the process utilized by a player to influence others to behave in a determined manner, using power, authority, bureaucracy or peer pressure (Inkpen and Curren, 2004). In partnerships, controls may be formal – judicial actions, directives and periodical meetings – or informal – values, unwritten codes of conduct, norms and culture. The latter is known as relational governance (Mesquita *et al.*, 2008). Inkpen and Curren (2004) propose a dynamic relation of substitution between trust and control. The presence of trust minimizes the need for control and vice-versa. As time goes by, partners learn about each other and partnerships become operational entities, changing the level of trust. The authors portray trust as a non-static and evolutionary element, which is by-product of the interactions between the parties involved.

The common sense of justice is another outcome of the relationship between partners that produces effects akin to trust. It improves efficiency, increases engagement and reduces operational and administrative costs. Conceptualized as “procedural justice” (Luo, 2005), it concerns the criteria adopted in decision-making and execution processes such as impartiality,

representativeness, transparency and ethics. By diminishing the need for control and conferring stability to the relationship, procedural justice affects positively knowledge exchange. Luo (2005) found that profitability is greater when there is a common understanding of procedural justice. His empirical evidence reveals that the shared sense of justice becomes more important for partnerships portraying a high degree of uncertainty and internationalization, that is, when the cultural distance between partners is large.

Research further highlights the importance of building a collective identity – the development of a common objective, as well as of joint rules and regulations. The case of the joint venture formed between Renault and Nissan, which started from an unstable relationship with dubious potential for synergy, reveals the role of managerial support for the consolidation of a collective identity as a means of conferring legitimacy to the collaboration (Segrestin, 2005). A key driver in the process of building a collective identity are interorganizational teams, to the extent that they promote the formation of shared meanings about the partnership's strategy and objectives. In this regard, Mesquita *et al.* (2008) and Cheung *et al.* (2011) emphasize the investment in relation-specific assets as mechanisms of knowledge integration, information exchange and joint problem solving. Such investment support the development of a shared memory where values and beliefs are stored and later incorporated into routines and other formal and informal processes.

How does knowledge absorption occur in a partnership? The literature identifies the abilities of partners to learn from each other, conceptualizing it as “relative absorptive capacity” (Schildt *et al.*, 2012). The capability of an organization to assimilate and utilize outside knowledge is neither absolute nor stable, but depends on the knowledge source, once it is specific to each relationship. Relative absorptive capacity is determined by the degree of similarity between partners from a technological (i.e. knowledge base), a cultural - i.e. formalization, centralization and compensation practices (Ireland *et al.*, 2002) and an

institutional standpoint - compatible norms and values and similar operational priorities or dominant logics (Lane *et al.*, 2001). By the same token, knowledge exchanges between partners may be asymmetrical. Yang *et al.* (2015) introduce the concept of “partner-specific learning capability” as to highlight the competitive dimensions of learning in a multi-party setting. One firm may out-learn a partner by developing processes and routines that enable the acquisition of partner’s know-how quicker than the partner, while simultaneously using safeguards against unintended transfer of information.

Recent studies show that the evolution of relative absorptive capacity is rather intricate. Schildt *et al.* (2012) found that it takes the format of an inverted U-shaped curve, thereby introducing dynamics into the construct. While there is a lot of knowledge exchange in the initial period of a partnership, when relative absorptive capacity is under development, it decreases with time, as the partner’s knowledge loses relevance. Interorganizational relationships thus evolve with time: as collaboration matures, ties and routines for knowledge transfer are developed together with partner-specific knowledge, which in turn transform the initial relative absorptive capacity.

Another mechanism used for knowledge absorption is managerial involvement via supervision and daily operation; the latter being most effective. This holds true especially in young joint ventures, where exchange flows and information-processing channels are not yet development, turning knowledge acquisition via direct channels difficult. The more strategic a joint venture is, the higher the investment of managers’ time and, consequently, the higher the learning (Tsang, 2002).

3.2.3 Organizational factors

A significant part of this research body is dedicated to investigating how firm-level characteristics – of the source and the recipient organizations – affect knowledge transfer. It

discusses capabilities (e.g. alliance management⁷ and alliance learning capability), intangible resources (e.g. credibility, previous experience), behavioral aspects (e.g. motivation, credibility and trust) and internal processes.

Which organizational characteristics affect knowledge transfer? A fundamental characteristic examined in various studies refers to the experience of the company in forming partnerships, which determines its ability to recognize, assimilate and apply external knowledge (Draulans *et al.*, 2003). Previous alliance experience also contributes to the speed of knowledge integration on the part of the recipient organization, in particular when sourced knowledge is distant from the company's knowledge base or when partners are unknown to each other (Tzabbar *et al.*, 2013). Openness to external knowledge partners is an outcome of the evolution of past experiences, in the sense that it encompasses an interactive process of information processing for the selection of adequate partners and for the development of management systems designed to handle relationships (Love *et al.*, 2013). In addition to general experience, experience with a specific partner is also relevant (Hagedoorn *et al.*, 2011; Inkpen and Tsang, 2005), to the extent that it facilitates the development of interorganizational routines and diminishes the probability of opportunistic behavior (Zollo *et al.*, 2002). According to Liu and Ravichandran (2015), information technologies (IT) enhance learning from past experiences, once they both support knowledge spillovers and mitigate the barriers in such spillovers. IT supports knowledge sharing and distribution and thereby contributes to overcome the challenges of handling tacit knowledge. On the one hand, learning from past experiences demands des-contextualization and the ability to generalize from acquired knowledge. On the other, knowledge reutilization requires the search and the

⁷ More details see Wang, Y. and Rajagopalan, N. (2015) and Andrevski *et al.* (2016).

selection of appropriate routines for the new context. Once managers are subject to cognitive limitations, IT contributes to diminish potential biases.

Numerous studies emphasize the importance of accumulating experience with a broad range of partners for firms to develop an alliance management capability (Kavusan *et al.*, 2016), defined as the mechanisms and routines utilized to accumulate, stock, integrate and disclose relevant organizational knowledge on alliance administration (Draulans *et al.*, 2003). An organization's success increases as it enters more partnerships, however at a decreasing rate, suggesting the existence of an optimum portfolio size (Frankort *et al.*, 2011; Vandaie and Zaheer, 2015). This evidences the existence of an alliance management capability, but at the same time points to its limit, which is around six alliances. In line with Draulans *et al.* (2003), Schilke and Goerzen (2010) and Ireland *et al.* (2002) also discuss the concept of alliance management capability and find similar empirical results.

For Frankort *et al.* (2011), a firm reaches the greatest knowledge inflows with a portfolio of intermediate size and with a balanced mix of novel and repeated partners. Vandaie and Zaheer (2015) also noted the negative consequences of a broad portfolio of partnerships with respect to knowledge absorption stemming from partnerships with resource-rich and resource-poor partners. This is attributed to the frustration of the expectations of the resource-rich firm in relation to the facilitating role a resource-poor partner is able to play in the collaboration. Since the resource-poor partner has a broad portfolio of partnerships, the resource-rich firm realizes that its investment capacity in the partnership will be divided between diverse partners.

Experience thus seems to promote interest alignment and facilitate the exploitation of complementarities. In this regard, partner repetition allows the firm to benefit from established routines supporting knowledge exchange. Yet new partners bring in novel inputs that expand the partnership's learning potential. In face of technological uncertainty, firms

profit mostly from leveraging established routines, since they limit eventual problems related to the understanding, identification and recognition of new knowledge. For this reason, a firm tends to form partnerships with repeated partners or with partners of its partners in contexts of high uncertainty, as long as there is still knowledge to be explored (Hagedoorn *et al.*, 2011).

In the view of Schilke and Goerzen (2010), alliance management capability is a second-order construct, formed by a set of routines connected to interorganizational coordination, alliance portfolio coordination, interorganizational learning and market proactivity (i.e. the capacity to understand the environment and identify new market opportunities). These authors found that a dedicated function to alliance management has a positive effect on final performance. For Ireland *et al.* (2002), alliance management capability is equally qualified as fundamental to gaining competitive advantage and creating value with collaborative arrangements. Effective alliance management includes a thorough consideration of the benefits an alliance aims to obtain and a careful selection of appropriate partners.

In addition to management systems, there are behavioral factors to be considered, such as motivation and credibility. The lack of motivation, either from the source or the recipient organization, sets up barriers that make the learning process challenging. This can be ascertained through the time spent in the knowledge transfer process. In the case of Toyota, for instance, the longer the company exchanged knowledge in its supplier's factory, the quicker it improved performance. The lack of credibility refers to the source organization and arises out of a subjective evaluation made by the partner and is connected to the trust established between them (Dyer and Hatch, 2006).

Several authors have dealt with cultural differences. Bhagat *et al.* (2002) studied the influence of culture on knowledge transfer, particularly when partnering organizations come from different countries. They propose a theoretical model based on the premise that each society transfers and absorbs knowledge in a distinctive manner, depending on the standards

of cultural action that characterize it: individualism-collectivism and verticality-horizontality. Such standards determine the forms and preferences for the various types of knowledge (explicit vs. tacit, human vs. social vs. structured). Their key argument is that interorganizational knowledge transfer is most efficient when partners are located in contexts with identical cultural standards. Also for Ireland *et al.* (2002) and Inkpen and Tsang (2005), the less the cultural distance between the partners, the easier it is the exchange of any type of knowledge.

Kotabe *et al.* (2003) corroborate this argument by showing that the effort of transferring knowledge from one country to another is difficult and potentially unfruitful. In an investigation of American and Japanese suppliers of the automobile industry, they found that the specificities of each country must be observed. In Japan, companies are more reluctant to exchange partners and encounter difficulty in benefiting from short-term relationships for the exchange of technical knowledge. In the United States, companies take longer to reap the benefits of technological transfer as compared to Japan, but achieve short-term gains in the exchange of technical knowledge. The time duration of the relationship is an important mediator between knowledge transfer and the performance of the recipient organization.

Conversely, the findings of Cheung *et al.* (2011) point to a decrease of relevance of cultural differences. The reason is attributed to one of the most important outcomes of globalization, namely the cross-pollination beyond national borders, which has fostered a cohort of multicultural managers.

What is necessary for an organization to receive external knowledge? An organization needs absorptive capacity, autonomy (to circumvent network restrictions), flexibility (from the point of view of production), internal processes of knowledge dissemination and training.

Possibly one of the most studied constructs in this literature, absorptive capacity refers to the capability of the recipient firm to recognize, transform and assimilate external

knowledge. One first important differentiation is between individual and collective absorptive capacity. Collective absorptive capacity is the sum of individuals' absorptive capacities and of organizational characteristics such as coordination and motivation. In order to absorb new external knowledge, individuals need to change the way they think, act and conduct their activities, as well as how they communicate with colleagues. A second characteristic is the resistance of individuals to new knowledge, which brings uncertainty and the possibility of the loss of privileges. Consequently, motivation must be present. A high degree of collective absorptive capacity helps overcome the challenges connected to coordination and motivation (Zhao and Anand, 2009).

Zhang et al. (2007) examine how resources and structures affect knowledge transfer. They argue that absorptive capacity is not determined exclusively by R&D expenditure, but also by management. The breadth of the knowledge base and the centrality of the R&D department influence positively a firm's absorptive capacity and, consequently, its propensity to form partnerships. Defined as the number of knowledge fields covered, the breadth of the knowledge base confers greater ability to recognize and assimilate the development of potentially new technologies. Likewise, when R&D is centralized (concentrated in few business units), central planning and control take place at the corporate level. This results in faster decision-making processes, greater capacity to renew knowledge, as well as economies of scale and scope that are beneficial to alliances. In a similar vein, Lane *et al.* (2001) noted that new knowledge acquired from a partner in a joint venture only impacts learning if combined with high levels of training provided by the source organization. Through training the source organization helps the partner to understand the applicability and meaning of this knowledge, thereby minimizing ambiguity and tacitness.

Likewise, the management of the recipient organization plays a role in the internal process of knowledge dissemination (Inkpen, 2008). In the case of NUMMI, GM learned how

to capture and share internally the knowledge obtained through the joint venture. It established a well-informed process that included, among other mechanisms, the choice of appropriate personnel and specific training. It is not enough to expose individuals to new knowledge; the creation of internal mechanisms of knowledge dissemination is necessary too. Experimentation by the recipient organization is similarly crucial. As learning processes are marked by trial and error, it is only through the course of collaboration that the opportunities for knowledge exploitation become clear (Inkpen, 2008).

The lack of adaptability in organizations is considered a barrier to knowledge transfer. For Dyer and Hatch (2006), barriers exist even when partners are motivated and the recipient organization shows high levels of absorptive capacity. Knowledge transfer may become difficult and costly in the presence of network restrictions and of rigidity in the internal processes. Network restrictions are the policies or specific demands of each partner that determine the production process. In the case of the automobile industry, suppliers are subject to marked differences in the specifications of each client. These restrictions limit the adoption of best practices for all the buyers. In an analogous fashion, the rigidity of internal processes refers to the lack of flexibility of the recipient organization in changing its production line. For example, in highly automated factories, suppliers do not always manage to adapt their productive process due to the pre-established layout (Dyer and Hatch, 2006).

3.2.4 Individual factors

There is relatively limited research about the behavior of people involved in partnerships. The majority of papers deals with interorganizational knowledge transfer from a collective and non-personalized perspective. The few studies that work at this level of analysis identified the following variables as relevant: motivation, cognitive styles, emotions, learning behavior, individual absorptive capacity and resistance.

What leads individuals to transfer knowledge? Individual motivation, be it intrinsic or extrinsic, is related to distinct forms of knowledge transfer. Since the transfer of tacit knowledge can neither be observed directly nor attributed to one person, it cannot be rewarded. It depends, therefore, on the intrinsic motivation of individuals. The challenge resides in the fact that companies have little control over this aspect. Contrariwise, the transfer of explicit knowledge is visible and may be rewarded and encouraged. It is therefore better leveraged by extrinsic motivation. However, both incentive mechanisms cannot coexist due to the prevalence of a crowding-out effect. An individual intrinsically motivated to perform a determined task may lose such motivation if he or she receives a financial reward, leading him or her to depend on extrinsic mechanisms in the future. This makes the management of motivation a complex issue and, at the same time, a fundamental one (Osterloh and Frey, 2000).

Emotions are another variable that impact how individuals behave in interorganizational settings, as to cope with the uncertainties related to partners' behavior. In a context in which some knowledge needs to be shared and some knowledge needs to be protected, emotions provide the cues to individuals to interpret events and to decide whether or not to "segment" knowledge of sensitive nature, that is, to switch from not sharing knowledge to sharing gradually knowledge bites in a self-regulated dynamics (Jarvenpaa and Majchrzak, 2016).

How do individuals learn? Knowledge transfer across organizations necessarily encompasses the process through which individuals assimilate knowledge. Bhagat *et al.* (2002) elaborate on this issue by drawing on the concept of cognitive styles. They identify three distinct individual styles: tolerance for ambiguity, signature skills and mode of thinking. In their view, each cultural context favors certain cognitive styles to the detriment of others. Individuals with a high tolerance of ambiguity deal better with tacit, complex and systemic knowledge. Signature skills refer to favorite problem solving and information-seeking styles

developed by each person, including his or her cognitive approach (the way of structuring a question) and preference for certain tasks, tools and methodologies. Individuals with very distinct signature skills will experience greater difficulty in exchanging knowledge. Mode of thinking refers to how an individual analyses information. Those taking a holistic perspective analyze the whole spectrum of available information in an associative manner before using it, while those taking the analytical perspective scrutinize each portion of information separately. Bhagat *et al.* (2002) contend that individuals with different modes of thinking will encounter greater challenges in learning from each other.

In addition to the diversity of styles, individual learning behavior can be formal (via planned events) or informal (via spontaneous interactions). Both formal and informal learning behaviors have positive effects on learning that are complementary. Formal behavior through projects and visits encourages informal behavior, that is, socialization beyond organizational boundaries. The latter in turn facilitates the overall exchange of tacit knowledge. There is nevertheless a limit to this relation, once a high degree of formalization restricts learning to the extent that it stifles informality (Janowicz-Panjaitan and Noorderhaven, 2008).

Also Zhao and Anand (2009) identified the importance of individual absorptive capacity and the necessity of individuals to change their mindset, the way of acting and conducting their daily activities, as well their communication style. They further pinpointed the resistance of individuals to new knowledge, which brings uncertainty and the possibility of loss of privileges.

3.3 Theme 3: Consequences of Interorganizational Knowledge Transfer

In addition to the results obtained by the partnership as a whole, there is a vivid discussion about how to measure learning outputs and their effects on individual organizations.

How to evaluate knowledge transfer? A fundamental issue from the perspective of partners is the evaluation of the effectiveness of knowledge transfer. Nevertheless, most scholars do not explicitly refer to this aspect and seem to infer a dichotomous judgment, based on whether or not knowledge transfer took place. The works of Bozeman (2000) and Bozeman *et al.* (2014) expand this evaluation in proposing seven parameters and indicators.

The first criterion – “out of the door” – evaluates whether the organization received (or not) knowledge from the partner, without considering its impact. Because of its practicality and ease of measurement, it is the most used criterion. Bozeman (2000) calls attention to its limitations, because the recipient organization may or may not have implemented external knowledge *de facto*. The second criterion refers to the market impact in terms of commercial outputs such as profitability and market share. The third one is economic development and contemplates similar effects to the previous criterion, but from a collective perspective that goes beyond the gains achieved by an organization individually. It considers, for example, the financial impact of knowledge transfer on the economy of a region. The political criterion is the fourth one and is based on the expectation of non-financial rewards. It may translate into support for a social group, the legitimization of a policy or for the expansion of political influence. The opportunity cost criterion examines the choices for the utilization of resources employed and their possible impact on other knowledge transfer tasks. The criterion of human, technological and scientific capital takes into account the gains accrued in the development of the people implicated in the process, that is, if there has been technically relevant learning for a determined work group. Finally, the criterion of public value analyses more wide-ranging objectives of public interest connected to societal grand challenges, e.g. sustainability of the planet (Bozeman *et al.*, 2014).

How does knowledge transfer affect organizational performance? The types of performance improvements organizations achieve through partnerships are subject to

extensive debate and a myriad of empirical exercises. Mesquita *et al.* (2008) propose an interesting distinction between redeployable and relational performance. They call ‘redeployable performance’ the gains that improve general firm performance as to refer to the learning that is not adapted to the needs of a specific partner and that can be used in other contexts. Contrariwise, they refer to ‘relational performance’ as the specific gains of the intimate and symbiotic interaction brought about by the dyad. Relational performance may not be appropriated by organizations outside the partnership, as it arises from dyad-specific investments in assets and capabilities and from the acquisition of know-how within and the dyad. The study of Cheung *et al.* (2011) corroborates the relationship effects for performance too, while emphasizing that outcomes differ for each party in buyer-supplier agreements. Yet evidence is not entirely positive. Beamish and Berdrow (2003) suggest that there is no direct relationship between learning and joint venture performance in terms of operational and financial gains.

Regarding the consequences of partnerships for organizational performance relative to innovation output, the work of Frenz and Ietto-Gillies (2009) noted that the acquisition of knowledge through alliances is less efficient than the acquisition of knowledge through own investments, R&D purchase and intra-firm transfer. For international collaboration, the effects are positive for internal networks; while very small for external networks. That is, collaboration between units produces more benefits relative to innovation. One possible explanation is the sharing of organizational culture, which may facilitate the exchange of knowledge within the same company (e.g. expatriate programs guarantee face-to-face interaction). In contrast, Herstad *et al.* (2014) found that global innovation linkages are positively associated with technology and markets opportunities, since they generate more sales from innovation. Grimpe and Sofka (2016) detected complementary effects between relational collaboration that involves partner-specific investments and transactional

collaboration occurring via external R&D contracts and in-licenses in markets for technology. Only the joint adoption of both collaboration strategies enhances innovation performance, as they allow firms to simultaneously overcome the disadvantages of each approach and to leverage scarce absorptive capacities most efficiently. The complementarity effect is stronger in industries with less developed markets for technology.

Following a similar reasoning, other contributions discovered a more nuanced relationship between technological collaboration and product innovation, where the effect is contingent on market competition, sectoral characteristics (Wu, 2012), absorptive capacity (Tsai, 2009) and technological or market relatedness (Frankort, 2016). Intense market competition diminishes the positive outcomes of interorganizational collaboration, as short-termism and opportunism prevail (Wu, 2012), whereas absorptive capacity enhances effective learning between collaborating firms resulting in new product development outcomes (Tsai, 2009), especially when partners are active in similar technological domains but operate in distinct product markets (Frankort, 2016).

4 Analysis

With the view of coherently integrating our findings, we adopt an antecedents-process-outcomes framework, in line with Bengtsson and Raza-Ullah (2016) and Oliver and Ebers (1998). We therefore organize our analysis in three blocks: factors that antecede knowledge transfer, the process of transference itself and the outcomes. We classified the antecedents as factors that precede knowledge transfer, either driving the formation of the partnership or throughout it. These are variables that influence an organization's decision to establish a partnership, like appropriability regimes, technology sophistication (macro-context) and the existing internal processes of the recipient firm. In turn, process variables are those directly connected to the operational dimensions of knowledge transfer, such as routines, managerial

supervision and social relations. Outcomes refer to the results (gains and losses) obtained through the partnership.

Our interpretation of the systematic literature review indicates that there are six dimensions antecedent to knowledge transfer processes in partnerships, namely: (1) knowledge attributes, (2) the macro context, (3) interorganizational factors, (4) the source organization, (5) the recipient organization, and (6) individual factors. With respect to the knowledge transfer process, it is determined by (1) procedural governance, (2) relational and cognitive governance, and (3) dynamics, which are the learning effects over time. We further observe that the literature includes two dimensions connected to outcomes: (1) effectiveness and (2) organizational performance. All these dimensions are linked in a novel theoretical framework, depicted in Figure 4. The framework offers an overarching explanation of knowledge transfer in interorganizational contexts, permeated by a myriad of cause-and-effect relationships among multilevel factors.

Insert Figure 4 about here

The links between the antecedents and the process suggest that the same set of antecedents can stimulate knowledge transfer in distinctive ways. For instance, formal contracts (structural governance) may or may not support the development of knowledge sharing routines (procedural governance) (Inkpen, 2008), depending on the level of initial trust among partners, the cultural context they are embedded in (Kotabe *et al.*, 2003), their alliance management capabilities (Draulans *et al.*, 2003; Tzabbar *et al.*, 2013; Zollo *et al.*, 2002), as well as the preference of interacting individuals for formal or informal exchanges (Janowicz-Panjaitan and Noorderhaven, 2008). In a similar rationale, the lack of credibility of the source organization (Dyer and Hatch, 2006) in the partner-specific competence to deliver

what was agreed upon influences the investments and effort dispensed by the source firm in the transfer process.

As knowledge attributes and the macro context are independent (not impacted by other variables) and affect other antecedents (as well as each other), they are represented in the outer part of our theoretical framework. Knowledge attributes determine appropriability regimes and technological sophistication of the industry (Hagerdoorn *et al.*, 2008), as well as the intellectual property regime (Guennif and Ramani, 2012) and the demand of the State (Bozeman *et al.*, 2014), which in turn influence companies' decisions to form partnerships driven by synergy-seeking motives (Lee *et al.*, 2010). Knowledge attributes similarly influence interorganizational variables such as governance. Jiang and Li (2009), for example, argue that tacitness favors joint ventures. At the individual level, tacit knowledge influences the intrinsic motivation to handle external sources (Osterloh and Ferey, 2000). Besides, complex and systemic knowledge are privileged in the cognitive styles with greater tolerance of ambiguity (Baghat *et al.*, 2002).

The knowledge transfer process lies at the center of the framework as to suggest that it is necessary to understand it as a multilevel phenomenon. Characteristics such as causal ambiguity and context-dependency determine to a large extent the transfer mechanisms employed. Inkpen (2008) advocates that, as context-dependent and collective knowledge is embedded in routines, it can only be transferred when a new set of routines is implemented. It is during the partners' interaction via mechanisms of knowledge replication and adaptation (Williams, 2007), routines (Inkpen, 2008), training (Lane *et al.*, 2001) and managerial involvement (Tsang, 2002) that partner-specific knowledge advances, and consequently transforms the initial relative absorptive capacity (Schildt *et al.*, 2012). This further indicates that, despite the initial conditions given by the antecedents, the quality of the transfer process determines the outcomes. The efforts and investments made by the source and recipient

organizations in adjusting the process in accordance with knowledge attributes (Hagedoorn *et al.*, 2008; Baghat *et al.*, 2002; Osterloh and Frey, 2000; Schildt *et al.*, 2012); in accommodating different types of governance (Jiang and Li, 2009; García-Canal *et al.*, 2008; Berschicci *et al.*, 2015); in modifying internal structures (Dyer and Hatch, 2006; Tsang, 2002) and in developing and adapting routines (Zollo *et al.*, 2002) facilitate or hinder the achievement of the expected outcomes. Individual learning behaviors are relevant to the form in which the knowledge should be transferred too. For instance, certain knowledge attributes such as tacitness call for more social interactions and mentoring.

When comparing the different facets, it seems noteworthy that antecedent variables assume more central focus within the field than outcomes. The effectiveness of knowledge transfer remains a marginal concern, since most studies (with the exceptions of Bozeman (2000) and Bozeman *et al.* (2014)) assume an implicit dichotomous evaluation of whether or not knowledge was moved, irrespective of its applicability and other intangible by-products, such as the advancement of human capital. Still there seems to be an increasing focus on the performance outcomes, particularly with respect to innovation in more recent years. Existing evidence on performance outcomes of partnerships is overall mixed (Frenz and Ietto-Gillies, 2009; Grimpe and Sofka, 2016; Herstad *et al.*, 2014), suggesting great heterogeneity in the extent to which firms are able to capture value from interorganizational knowledge transfer. Several empirical contributions demonstrate that these seemingly contradictory findings stem from a complex and nuanced causal relationship, moderated by a number of contextual variables: markets for technology, sectoral characteristics, market competition and absorptive capacity (Grimpe and Sofka, 2016; Frankort, 2016; Tsai, 2009; Wu, 2012).

As our framework demonstrates, absorptive capacity is a highly relevant concept treated not only as an antecedent (at the interorganizational, organizational and individual levels), but also as part of the knowledge transfer process itself and as a moderator of the relationship

between collaboration and innovation outcomes. The literature is however not conclusive with respect to the dominating influence of this variable or to which extent the various effects overlap with each other. These are issues that clearly deserve more careful consideration in future studies.

In addition to these cause-and-effect relations, it is worth mentioning that we found relevant time effects, which brings dynamics to the analysis and which we illustrate by the grey circular arrow. Dynamics represent the changing effects of learning upon variables as time goes by. Several authors pinpoint the role of time. Kotabe *et al.* (2003) discuss the importance of the duration of the alliance, which, depending on the culture, may impact knowledge transfer in a positive or negative fashion. Dyer and Hatch (2006) point out the need to invest time in the knowledge transfer process, as integration demands commitment (Tzabbar *et al.*, 2013). Segrestin (2005) and Mesquita *et al.* (2008) highlight the importance of building a collective identity, while Inkpen and Currell (2004) contend that partners learn about each other and change the level of trust as collaboration matures. Likewise, time changes the macro context, and the combination of both can modify the motivation to join partnerships at different levels – interorganizational, organizational and individual. Individual factors, such as resistance, emotions and individual absorptive capacity, also evolve with time. For instance, if uncertainties related to partner's behavior are mitigated, knowledge sharing may be improved (Jarvenpaa and Majchrzak, 2016).

By elucidating the cause-and-effect relationships and the interactive character driven by time, our framework thus not only illuminates the encompassing picture of knowledge transfer, but also enlightens the role of learning and provides an evolutionary perspective of the process.

5 Opportunities for future research

Our literature review and framework reveal that the study of knowledge transfer requires distinct analytical and methodological approaches. Since interorganizational partnerships are arrangements characterized by different forms of governance and involve at least two organizations, which, in turn, are composed by innumerable individuals, the understanding of knowledge transfer process claims a multilevel analysis. Aspects such as the motivation of individuals and organizations to engage in collaboration along with formal and informal governance instruments require different conceptual backgrounds. As our framework was organized around antecedents, process and outcome factors, it elucidated that the understanding of relationship between levels and variables is a vital issue. Moreover, since our framework unravels the dynamic character of collaboration, it calls for longitudinal studies in addition of quantitative cross-sectional methods that prevail in this research stream.

Our literature review discloses that most part of the articles is concentrated in one level of analysis and used quantitative methods. In fact, this concentration poses limitations in terms of inferring causal relationships between variables situated at different levels and hinders the comprehension of their evolution. The papers that discuss dynamics do so in a conceptual manner (with few exceptions such as Schildt *et al.*, 2012 and Tzabbar *et al.*, 2013); the empirical evidence being scanty. Even if this is a challenging task due to the inherent efforts in data collection, it is crucial for the future development of research in this field. There is room for multiple approaches that draw on qualitative data more intensely. Case studies may expand our understanding of contextual aspects and uncover less contested issues such as structural governance. Regarding the relationship among different levels, we propose some questions for future investigations. For instance, how does alliance governance – structural, procedural, relational and cognitive – shape individual learning? Does the

formation of a collective identity increase or diminish the predisposition of agents to collaborate and share knowledge?

Likewise, our study uncovers that scant attention is devoted to the individuals involved in the knowledge transfer process. Although this may be a reflection of our choice of journals (which have a limited tradition of studies at this level of analysis) and of the dominating concern on the collective-level that has traditionally pervaded the strategy and innovation research fields, the role of individuals is naturally a key point. As a matter of fact, until the novel contribution of Felin and Foss (2005) calling for contributions on the micro-foundations of aggregate concepts, the role of individuals has been largely disregarded. In a recent review on the topic of interorganizational R&D, Smith (2012) also discovered a predominant tendency of researchers to focus on the management and firm level of analysis with few pioneering studies investigating the phenomenon at the micro-level, i.e. the level where knowledge creation and innovation take place. For a special issue on behavioural foundations, Powell *et al.* (2011) similarly contended that the strategy field lacks adequate psychological grounding. Since the field's central concern has been to explain firm heterogeneity, there is a restricted number of studies dealing with individuals and related behavioural aspects.

We also see individual-level investigations as a fruitful and much needed avenue for further research in the area of interorganizational knowledge transfer. We welcome studies focused on individuals to complement and extend the learning mechanisms identified at aggregate levels. A promising question is, for instance: what leads a person to collaborate *de facto* in an interorganizational alliance? In particular, the not-invented-here syndrome (Katz and Allen, 1982) – the negative attitude to knowledge sourcing defined at the individual and the team levels – which may potentially affect interorganizational knowledge transfer, did not appear in the studies investigated in our review.

From an empirical standpoint, as demonstrated in Table A1, the literature prioritizes the context of industry (especially the automobile, pharmaceuticals, IT and telecommunications industries), while the service sector is examined to a limited extent. Whereas many studies focus on the relations between buyers and suppliers, few look into partnerships between competitors. Besides, the majority favors joint ventures and R&D agreements, with limited attention to other forms of collaboration. In the current political agenda where public-private partnerships are highly valuable as objects of public policy in many countries, this would be a subject of great practical interest. The bulk of the literature investigated in this review focuses on private companies, without questioning the legitimacy of the results for partnerships involving public organizations. We therefore encourage the development of studies in this empirical context too.

6 Conclusions

Knowledge transfer is central to the development of competitive advantages, as organizations increasingly depend on partnerships with external partners. However, this is far from a trivial task, especially when it takes place in interorganizational arrangements. Our systematic literature review aims at uncovering the state-of-the-art on this topic by addressing the following questions: What factors impact knowledge transfer in interorganizational alliances? How do these factors interact with each other? Our study extends existing literature in three ways. First, we offer a synthesis of the variables, how and why they influence knowledge transfer in partnerships. Given the complexity and heterogeneity of the field, we point out the position of individual variables and their segmentation, emphasizing areas of divergence and convergence that had not been self-evident in the literature. We also identify themes that are less well investigated and contested, indicate methodological deficiencies and other weaknesses. We particularly pinpointed the need for multilevel inquiries since, in our

view, important interactions have so far not received the attention they deserve. In this way, we have suggested an agenda for future research.

Second, we bring together our main findings in a novel theoretical framework that integrates antecedents, process and outcomes. In the framework we elucidate the cause-and-effect relationships among factors and their interactive and dynamic character. Therefore our model not only illuminates the systemic picture of the knowledge transfer process, but also enlightens the role of learning and provides an evolutionary perspective of the process. In this way, we hope to facilitate the dialogue between otherwise unconnected approaches.

Third, we offer recommendations for practitioners who face the challenge of developing a suitable environment for learning in an interorganizational partnership. A possible reason for the high failure rate of partnerships may be the lack of a holistic picture of knowledge transfer. Positive outcomes hinge on the ability of managers of the partnering firms to see how multiple levels affect one another throughout the collaboration process. Alliance managers may make use of our study to improve and adjust contracts, structures, processes and routines, as well as to build the support mechanisms that guarantee effectiveness in knowledge transfer.

Although there exists limited understanding about the practical implications, since research results offer a restricted set of insights on the 'how-to-do', some takeaways are worth mentioning. As a starting point, partnership managers should try to characterize and understand in-depth the attributes of the knowledge at stake. This initial characterization may help him or her to dimension the challenge in question and find adequate transfer mechanisms. In striving to achieve fit between knowledge, partner characteristics and appropriate governance, managers should think hard which transfer processes to implement, including routines, training, visits and informal social interactions. As regards the partner, managers ought to observe his motivations and previous experiences that indicate his

capability to manage alliances, thereby favoring partners with whom they enjoy prior experience and a trustworthy relationship. Partners of partners may also be considered, particularly in cases where novel inputs are needed and there exists limited technological uncertainty. Yet, expanding too far the number of collaborations in play at a given point of time is a risky endeavor. A very extensive portfolio of partnerships likely diminishes a firm's ability to capture value from interorganizational knowledge transfer. The organizational structure with respect to the position of the partner's R&D department may be a valuable indication (and a fairly easily one to assess) of proficiency in using external knowledge, alongside the breadth of the knowledge base. Regarding his or her own organization, managers should evaluate motivation, absorptive capacity and flexibility of existing structures. An honest and careful appraisal of his/her capability to manage partnerships is recommended too. Another aspect to consider is time. The duration of the agreement, the time dedicated to knowledge transfer, the evolution of absorptive capacity and trust, and the time needed for knowledge integration are some crucial issues. Finally, the individual motivations, as well as their cognitive styles and learning behaviors should be assessed.

Our results are relevant for policy makers too; in special those formulating policies in countries that have opted for partnerships as a way of promoting technological catch-up in selected sectors. For policy makers, it is crucial to disentangle the drivers of the learning process, as to be able to design more effective mechanisms and incentives for a stimulating environment where the choice to form partnerships for knowledge transfer is made.

Having said this, we are aware that our study could have been improved in various ways. The papers from the ten journals we examined certainly do not exhaust the population of papers on interorganizational knowledge transfer. As we covered the leading journals in the fields of strategy and innovation studies, we are nevertheless confident that we covered a representative sample of the most influential research; albeit not fully comprehensive. Our

choice of journals also limits our capacity to make proposals for public policy, as there are few studies dedicated to this issue. The selection of keywords represents another limitation worth mentioning. Even if we included a broad range of search terms encompassing relevant synonyms of 'knowledge transfer' and 'partnership', some have been left out. The keyword cluster, for instance, was not added; even though it might represent an important phenomenon connecting the interorganizational and macro levels. Finally, our triangulation strategy was limited to coder triangulation, as both authors carried out an independent classification of papers. Yet, it did not include other reliability measures such as a citation analysis.

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¹ Variables relative to time are treated across themes.