

## Technology Strategic Alliances and the Institutional Foundation of Networks

Paper prepared for the International Conference on Economics and Management of Networks (*EMNet*), Rotterdam, 28 – 30 June, 2007

R. Coeurderoy<sup>1</sup>, V. Duplat<sup>2</sup>

### Abstract

A wide literature in strategic management<sup>3</sup> is dedicated to the study of technology networks as a locus of innovation. They shape an organizational field in which strategic alliances leverage firm capabilities to generate new knowledge and access complementary assets. Much attention, however, has been focused on inter-firm relationships within the technology networks and much less on other particular players - that we label 'intermediary institutions'- that, even if not directly involved in the manufacturing of goods or provision of services, are present in numerous networks, and contribute to designing their institutional foundation.

In the present paper, our intent is to highlight the role played by those 'intermediary institutions' in terms of backing up firms networking activities and helping go beyond the conflict between 'trying to learn' and 'trying to protect', which is typical of technology networks (Kale et al., 2000). We argue that the 'intermediary institutions' support the viability of networks by deploying one or more mechanism(s) linked to the network content definition, the reputation of firms, the reduction of information asymmetry, the control of firms' activities, the arbitration, the collective sanctions, or the coordination tools. In order to illustrate our arguments, we focus in this paper on the functions undertaken by 'intermediary institutions' in the innovation process specifically (Howells, 2006), and develop propositions regarding the impact of the existence of and the resort by firms to those 'intermediary institutions' on the levels of relational, structural, and cognitive embeddednesses.

**Keywords:** Technology networks; 'intermediary institutions'; relational, structural, and cognitive embeddednesses.

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<sup>1</sup> Régis Coeurderoy is a Professor in Strategic Management at the Louvain School of Management - Catholic University of Louvain, Belgium, and director of the CReCIS (Center for Research in Change, Innovation, and Strategy).

<sup>2</sup> Valérie Duplat is a PhD student at the Louvain School of Management - Catholic University of Louvain, Belgium, and is currently visiting the University of Maastricht, the Netherlands.

<sup>3</sup> And a wide literature in organizational theory and behavior, business studies, health care services, public administration, sociology, communications, computer science, physics, and psychology as well for the study of network in general (for a recent literature review of the empirical research on networks, read Provan et al. (2007)).

## 1 Introduction

Within the framework of the literature on inter-organizational network that is now quite extensive (for a literature review, read Dacin et al., 1999; Gulati et al., 2000; Borgatti and Foster, 2003; Brass et al., 2004; Inkpen and Tsang, 2005; Hagedoorn, 2006; Provan et al., 2007), our intent is to focus in the present paper on the institutional foundation of networks themselves that we believe - in line with Provan et al. (2007) - has generally been underresearched. We propose to approach the technology networks at the network level rather than at the firm level of analysis, and that by shedding light on the existence of ‘intermediary institutions’ within numerous networks and on their ability to support inter-firm relationships and to help develop innovation processes.

Indeed, we draw our attention on particular players that have rarely been studied up to now, and that despite the significant role they may play in the design of the institutional foundation of networks. We argue that mechanisms implemented by these ‘intermediary institutions’ undertaking, in technology networks, functions such as foresight and diagnostics, brokering, accreditation, arbitration, etc. have a positive impact on the ability to manage the relational, structural, and cognitive embeddednesses and, therefore, to deal with the tensions between ‘trying to learn’ and ‘trying to protect’.

The paper proceeds as follows. In the first section, we expose the internal conflict that technology strategic alliances face - namely the conflict between ‘trying to learn’ and ‘trying to protect’<sup>4</sup> (Kale et al., 2000) - , and show on the basis of the existing literature how relational, structural, and cognitive embeddednesses contribute to dealing with this internal conflict. The next section is dedicated to shedding light on the existence of and the resort to ‘intermediary institutions’ when trying to cope with the internal conflict. We position our view of these ‘intermediary institutions’ within the broad existing organizational network literature, and depict the mechanisms that can be deployed by these ‘intermediary institutions’

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<sup>4</sup> “to balance the acquisition of new capabilities with the protection of existing proprietary assets in alliance situations” (Kale et al., 2000).

to support the inter-firm relationships; namely mechanisms based on the network content definition, the reputation of firms, the reduction of information asymmetry, the control of firms' activities, the arbitration, the collective sanctions, and the coordination tools. Following this, we analyze an individual firm's incentives to invest in these 'intermediary institutions' and develop propositions regarding the positive impact of the resort by firms to those 'intermediary institutions' on the relational, structural, and cognitive embeddednesses.

## **2 Embeddedness as a way to deal with the internal conflict between 'trying to learn' and 'trying to protect'**

While the benefits of technology strategic alliances have been proved to be numerous, tensions between 'trying to learn' and 'trying to protect' (Kale et al., 2000) are always prevalent. Several ways to deal with these tensions have been explored by scholars. In this section, we present two streams of literature that investigate this issue: Transaction Cost literature and inter-organizational network literature.

### **2.1 Internal conflict of technology strategic alliances: 'trying to learn' vs. 'trying to protect'**

In the field of strategic management literature, a wide area of research has been dedicated to the benefits and difficulties encountered by strategic alliance partners in technology intensive industries (e.g., Teece, 1986, 2000; Hill, 1990; Gulati and Singh, 1998; Hagedoorn and Schakenraad, 1994). The expected advantages of cooperating are numerous. First, alliance partners can share the up-front capital investments needed to develop the technology and implement a new value chain. In innovative industries, this substantially reduces both managerial risks and cash requirements for expected but uncertain future revenues. Moreover, strategic alliances can allow access at a relatively low cost to complementary assets needed to value the innovation (Teece, 1992). Scholars have also emphasized that cooperation increases the strategic flexibility and empowers innovators by enabling them to quickly penetrate new

markets (Teece, 2000). Another argument is that alliance partners can acquire new knowledge or learn and develop new capabilities through the cooperative agreement (Kogut, 1988). Strategic alliances are also a way to economize on bureaucratic costs since they allow to develop activities without enlarging corporate bureaucracy (Williamson, 1985). As a result, the undeniable potential and effective benefits reached through technology strategic alliances explain the significant increase in their adoption for the recent decades (Hergert and Morris, 1987; Hagedoorn, 2002).

Despite the numerous benefits just exposed, authors have pointed out that alliances require to deal with challenging tensions between ‘trying to learn’ and ‘trying to protect’, which are particularly prevalent in learning alliances<sup>5</sup> (Gulati and Singh, 1998; Kale et al., 2000). Tensions stem from the fact that *“one of the main reasons that firms participate in alliances is to learn know-how and capabilities from their alliance partners [and] at the same time, firms want to protect themselves from the opportunistic behavior of their partner to retain their own core proprietary assets”* (Kale et al., 2000).

Indeed, in order to allow the value creation, each side proprietary assets have to be exposed and learning from each other has to be favored to build up a cooperative process. Therefore, through the technology strategic alliance, a firm is able *“to absorb or learn some critical information or capability from its partner”* (Kale et al., 2000). Simultaneously, beyond usual concerns on the real efforts of each partner within the alliance (free riding), these absorption and learning raise concerns on the externalities generated by the cooperation (independent redeployment of new assets or competences into other projects or dilution of specific corporate competitive advantage). Indeed, the alliance process increases *“the likelihood of unilaterally or disproportionately losing one’s own core capability or skill to the partner”* (Kale et al., 2000). In other words, the value appropriation inhibits the process of value creation but value appropriation is meaningless without value creation.

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<sup>5</sup> *“in which the partners strive to learn or internalize critical information or capabilities from each other (Prahalad and Hamel, 1990; Hamel, 1991; Khanna, Gulati, and Nohria, 1998)”* (Kale et al., 2000).

This dilemma between creating and appropriating value leads to tensions between ‘trying to learn’ and ‘trying to protect’. On the one hand, alliance partners will try to get new information and knowledge from the other parts that could be used for other purposes than the cooperation’s ones themselves. Since partners do not ‘unlearn’, they will try to build on their new skills and capabilities and exploit them in other projects. On the other hand, each alliance partner will prefer to protect its own assets and competences which are core; otherwise it will be at risk to lose the basis of competitive advantage.

## **2.2 Hierarchy as a way to deal with the internal conflict: several limits**

Several ways to deal with these tensions have been explored by scholars. The Transaction Cost literature on strategic alliances suggests that this issue can be dealt through the choice for more hierarchical modes of governance (e.g., Williamson, 1991; Oxley, 1999; Hagedoorn et al., 2005; Oxley and Sampson, 2004). Basically, when partners cannot set up an agreement on value appropriation, they will opt for an equity agreement (Equity Joint venture). In that case, the strategic alliance is governed by a bilateral hierarchy, which is more able to closely coordinate and monitor the partners inside the alliance via enhanced communication, organizational routines, and necessity for continuous collaboration (Kogut, 1988). Such solution, however, suffers from limitations: (1) it implies that partners support bureaucratic costs; (2) it does not allow to control for partners’ behavior outside the alliance; and (3) it remains depending on the external credibility to enforce the decisions of partners in case of conflicts.

## **2.3 Beyond the dyadic level to the network level**

As pointed out by Kale et al. (2000), another stream of literature can simultaneously be considered when evoking the ways to deal with the internal conflict and to achieve both objectives simultaneously; namely the inter-organizational network literature and more particularly the social embeddedness dimension.

The notion of social embeddedness has been introduced in economic sociology by Granovetter (1985) and extensively studied by Gulati (e.g., Gulati, 1995; Gulati, 1998; Gulati and Garguilo, 1999; Gulati and Singh, 1999). Granovetter (1985) has shed light on the necessary embeddedness of all economic behavior in larger social networks<sup>6</sup> of relationships and on the influences on these economic behaviors of the social structure of ties within which they are embedded. Gulati has applied this social network perspective to the study of strategic alliances. According to this scholar, “*it is important to recognize that although strategic alliances are essentially dyadic exchanges, key precursors, processes, and outcomes associated with them can be defined and shaped by the social networks within which most firms are embedded*” (Gulati, 1998). Thus, in contrast to previous research examining the causes and consequences of strategic alliances between firms at the dyadic level, Gulati (1998) studies some of the key questions related to strategic alliances while going beyond the dyadic level to the larger network in which firms are embedded.

Three types of embeddedness will be considered in the present paper to understand how networks enable to balance the tensions between ‘trying to learn’ and ‘trying to protect’; namely relational embeddedness, structural embeddedness, and cognitive embeddedness.

First, relational embeddedness is relative to the quality and depth of a dyadic tie (Granovetter, 1985,1992; Uzzi, 1996,1997; Jones et al., 1997). It captures “*the degree to which exchange parties consider one another’s need and goals (Granovetter, 1992) and the behaviors exchange parties exhibit, such as trust, confiding, and information sharing (Uzzi, 1997)*” (Jones et al., 1997).

Relational embeddedness resulting from prior cohesive ties between alliance partners allows to mitigate the tensions between ‘trying to learn’ and ‘trying to protect’ since prior cohesive ties increase the mutual trust, respect, and friendship for subsequent cooperation (Podolny, 1994; Burt and Knez, 1995; Gulati, 1995, Gulati and

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<sup>6</sup> A social network can be defined as ‘a set of nodes (e.g., persons, organizations) linked by a set of social relationships (e.g., friendship, transfer of funds, overlapping membership) of a specified type’ (Laumann, Galaskiewicz, and Marsden, 1978).

Gargiulo, 1999). So as shown by Kale et al. (2000), “*on the one hand, relational capital facilitates learning through close one-to-one interaction between alliance partners. On the other hand, it minimizes the likelihood that an alliance partner will engage in opportunistic behavior to unilaterally absorb or steal information or know-how that is core or proprietary to its partners*”.

Second, structural embeddedness reflects the extent to which “*a dyad’s mutual contacts are connected to one another*” (Granovetter, 1992). In other words, structural embeddedness means that parties may have relationships with the same third party, and are therefore indirectly linked (Granovetter, 1985, 1992; Uzzi, 1996,1997; Jones et al., 1997). The underlying tenet of the structural embeddedness dimension is that inter-firm networks cannot be validly decomposed into independent ‘bilateral monopolies’ (Baker, 1990; Simsek et al., 2003). The study of the influence of social relationships on the firm behaviors requires to go beyond the firm dyads as unit of analysis (Granovetter, 1992). As pointed out by Gulati and Gargiulo (1999), “*the frame of reference shifts from the dyad to the triad, while the focus of analysis shifts from direct communication between actors to indirect channels for information and reputation effects*”.

Structural embeddedness enables to mitigate the tensions between ‘trying to learn’ and ‘trying to protect’ for reasons that have notably been stressed by Gulati and Gargiulo (1999). When two firms share common ties, it signals that both are considered as suitable and trustworthy by the same firms. Moreover, common third-party ties contribute to creating a reputational lock-in and opportunistic behavior may be reported. This spiral effect serves as an effective deterrent (Raub and Wessie, 1990; Burt and Knez, 1995).

Third, cognitive embeddedness “*refers to the similarity in the representation, interpretation, and systems of meaning among firms (Nahapiet and Ghoshal, 1998)*” (Simsek et al., 2003). In line with Abrahamson and Fombrun (1994), it is defined as “*the degree of similarity among network actors concerning their beliefs about the types of issues perceived to be important, how such issues are conceptualized and, perhaps, alternative approaches for dealing with such issues*” (Simsek et al., 2003).

Cognitive embeddedness also contributes to mitigating the tensions between ‘trying to learn’ and ‘trying to protect’ since it fosters a network culture notably based on a “*convergence of expectations*” (Williamson, 1991), an idiosyncratic language to summarize complex routines and information (Williamson, 1975,1985), and “*broad tacitly understood rules... for appropriate actions under unspecified contingencies*” (Camerer and Vepsalainen, 1988).

### **3 ‘Intermediary Institutions’**

#### **3.1 Positioning of ‘intermediary institutions’ within the existing organizational network literature**

Our intent in the present paper is to highlight the role played by particular entities - that we label ‘intermediary institutions’- in the levels of relational, structural, and cognitive embeddednesses and, therefore, in the management of the conflict between ‘trying to learn’ and ‘trying to protect’. We argue that these entities - not directly involved in the manufacturing of goods or provision of services but present in numerous networks - contribute to designing the institutional foundation of networks, and that via the mechanisms they may deploy based on the network content definition, the reputation of firms, the reduction of information asymmetry, the control of firms’ activities, the arbitration, the collective sanctions, and the coordination tools.

Therefore, our focus is on the institutional foundation of the networks themselves that we believe - in line with Provan et al. (2007) - has generally been underresearched. We propose to approach the technology networks at the network level rather than at the firm level of analysis, and that by shedding light on the existence of these ‘intermediary institutions’ and on their ability to support inter-firm relationships. Here are some examples of ‘intermediary institutions’, which are essentially made for illustrative purposes and are not exhaustive: industry union, voluntary agency federation, chamber of commerce, reviser agency, technology transfer institutions such as industrial liaison office, technology transfer office and incubator.

Prior research on the governance mechanisms within the networks is rather limited (Provan and Kenis (2006); Provan et al., 2006). Among the rare exceptions, we can mention Bazzoli et al. (1998), Johnsen et al. (1996), and Provan and Milward (1995). A typology of distinct types of governance has recently been proposed by Provan et al. (2006): shared governance, lead-organization governance, and network administration organization (NAO) governance. First, *“shared governance networks occur when the organizations composing the network collectively work to make both strategic and operational decisions about how the network operates.”* Second, *“the lead-organization or hub-firm (Dhanaraj and Parkhe, 2006; Jarillo, 1998; Sydow and Windeler, 1998) governance occurs in networks in which all organizations may share a common purpose but where there is a more powerful, perhaps larger, organization that has sufficient resources and legitimacy to play a lead role.”* Third, *“NAO governance is similar in nature to the lead organization model in that all activities and decisions are coordinated through one organization (Human and Provan, 2000). The difference is that the NAO is an organization (or even an individual) specifically created to oversee the network.”* (Provan and Kenis, 2006; Provan et al., 2007). Within this framework, one might say that we adopt a still different approach when investigating the governance mechanisms within the networks since our focus is neither on the role played by firms composing the network nor on NAO governance which *fully* coordinates networks.

### **3.2 Link between ‘intermediary institutions’ and embeddedness: propositions**

In order to illustrate our arguments, we decided to focus in the present paper on the functions undertaken by ‘intermediary institutions’ in the innovation process specifically, and to develop propositions about the link between those functions and the levels of relational, structural, and cognitive embeddednesses.

To this end, we took as a starting point the ten functions identified by Howells (2006)<sup>7</sup>. Indeed, on the basis of a set of case studies that involved semi-structured interviews with managers in 22 organizations<sup>8</sup> considered as innovation intermediaries in the UK, of secondary documents made available by these organizations, and of discussions at meetings in some of these organizations, Howells (2006) identified ten functions that can be undertaken by ‘intermediary institutions’ in the innovation process; namely, (1) foresight and diagnostics, (2) scanning and information processing, (3) knowledge processing, generation, and combination, (4) gatekeeping and brokering, (5) testing, validation, and training (6) accreditation and standards, (7) regulation and arbitration, (8) IP: protecting the results, (9) commercialization: exploiting the outcomes, (10) assessment and evaluation.

### **3.2.1 Functions: (1) foresight and diagnostics, (2) scanning and information processing, (3) knowledge processing, generation, and combination**

These three first functions reflect the firms’ potential need for help to “*identify what they might need from partners or even more generally what their innovation and business strategy should be*” (Howells, 2006). Some ‘intermediary institutions’ provide firms with scanning and technology intelligence functions<sup>9</sup> to help them identify where they should be searching and seeking information in the first place. To this end, these ‘intermediary institutions’ are commonly involved in more fundamental functions as well, which are relative to technology foresights and forecasting, and articulation of needs and requirements, and are dedicated to complementing their technology intelligence and search functions.

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<sup>7</sup> As pointed out by Howells (2006), the names attributed to these entities have been various: third parties (Mantel and Rosegger, 1987), intermediary firms (Stankiewicz, 1995), bridgers (Bessant and Rush, 1995; McEvily and Zaheer, 1999), brokers (Hargadon and Sutton, 1997; Provan and Human, 1999), information intermediaries (Popp, 2000), and superstructure organizations (Lynn et al., 1996).

<sup>8</sup> AIRTO, AMTRI, BRE, BSI Group, Campden and Chorleywook Food Research Association (CCFRA), CERAM Research, DsX, Generics, LCG Bioscience, LGC, MERL, NCC, Oakland, PA Group, PERA, Premier Research, Roke Manor Research, Seipher, TTP, TTP Communications, UbiNeties, UMIP.

<sup>9</sup> The role of ‘intermediary institutions’ can be at this level to “*provide advices on what the client company should be doing in the future with regard to analytical activities, how it should react to the changing regulatory environment, provide hazard assessments, and outline what improvements can be made in relation to measurement and testing techniques and so on.*” (Howells, 2006).

The third function goes further and consists either in “*combining [the collected information from foresight, diagnostics, and scanning] in a more specific directed way with existing information from either outside or within the firm, or in generating in-house research and technical knowledge to combine with the client’s knowledge.*” (Howells, 2006)

When guiding firms at these preliminary levels and helping them “*identify what they might need from partners or even more generally what their innovation and business strategy should be*” (Howells, 2006), ‘intermediary institutions’ have the ability to strongly influence the content of networks in terms of *which innovation approach* to foster within networks. This allows them to favor, at the same time, a network innovation culture. A consistent innovation culture will be determining to ease and enhance the future collaboration within the network and is allowed “(1) *by creating “convergence of expectations” through socialization so that members do not work at “cross purposes” (Williamson, 1991), (2) by allowing for idiosyncratic language to summarize complex routines and information (Williamson, 1975,1985) (3) by specifying “broad tacitly understood rules... for appropriate actions under unspecified contingencies” (Camerer and Vepsäläinen, 1988).*” (Jones *et al.*, 1997).

A consistent innovation culture contributes to harmonizing the representations, interpretations, and system of meaning among firms, and so to fostering the cognitive embeddedness (Nahapiet and Ghoshal, 1998; Provan *et al.*, 2007). Earlier the intervention of ‘intermediary institutions’ in the innovation process, stronger their ability to influence the network innovation culture, and so higher the cognitive embeddedness.

**Proposition 1: ‘intermediary institutions’ involved in foresight and diagnostics, scanning and information processing, and/or knowledge processing, generation, and combination have a positive impact on the cognitive embeddedness.**

### 3.2.2 Functions: (4) gatekeeping and brokering

The fourth function consists in matchmaking and brokering collaborative deals for the client firm(s) on the one hand, and in providing contractual advice, on the other hand (Howells, 2006).

The main difficulty firms may face in determining with whom to ally is to obtain information about the competencies, needs, and reliability of potential partners (Van de Ven, 1976; Stinchcombe, 1990; Gulati and Gargiulo, 1999). As pointed out by Gulati and Gargiulo (1999), “*imperfect information about potential partners raises search costs and the risk of exposure to opportunistic behavior (Gulati, 1995; Gulati and Singh, 1999)*”. ‘Intermediary institutions’ contribute to mitigating this difficulty since they may serve as formal or informal repositories of information about players’ resources, capabilities and needs on the one hand, and about players’ reputation, on the other hand.

First, regarding the information about players’ resources, capabilities, and needs, the role of ‘intermediary institutions’ may be to collect it, disseminate it, and so to enable firms to gather superior information on each other (Gulati, 1995; Gulati et al., 2000) and to identify potential partners and learn about their resources and capabilities. Second, obtaining information about players’ reputation is particularly crucial within technology networks since the assets are often characterized by high relationship-specificity and represent sunk costs that have little value outside of the particular exchange relationship. Therefore, the continuity of the relationship within technology networks is highly valued and, in the presence of opportunism, the relationship-specificity poses a serious safeguarding problem. ‘Intermediary institutions’ may allow to avoid allying with recurrent opportunistic partners since they may have a higher ability to collect, convey information, and to publicize defaults under the rules<sup>10</sup> (Hadfield, 2000) within the network.

As a result, ‘intermediary institutions’ allow to complement information stemming from structural embeddedness about

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<sup>10</sup> They can serve as repositories of players’ reputational information regarding, for instance, the debts unpaid or the low-quality goods delivered.

competences, needs, and reliability of firms. Indeed, when considering the structural embeddedness, the focus of analysis is on “*indirect channels for information and reputation effects*” (Gulati and Gargiulo, 1999). In this line, ‘intermediary institutions’ may be considered as additional nodes that develop for themselves numerous direct and indirect links since, as pointed out by Howells (2006), “*intermediaries do not operate in a simple triadic ‘one-to-one-to-one’ basis [but] are increasingly involved in more complex relationships, such as ‘many-to-one-to-one’, ‘one-to-one-to-many’, ‘many-to-one-to-many’, or even ‘many-to-many-to-many’ collaborations, forming both vertical and horizontal relationships*” .

We can therefore suggest, on the basis of the network centrality arguments (Freeman, 1979; Krackhardt, 1990; Gulati and Gargiulo, 1999), that more central the informational position of these ‘intermediary institutions’ is, more accurate their own representation of the existing network is, more efficient their impact on the decisions about new cooperative ties can be. Given the informational benefits<sup>11</sup> ‘intermediary institutions’ get from being central<sup>12</sup>, they allow firms to go beyond their proximate direct and indirect ties.

**Proposition 2: ‘intermediary institutions’ involved in gatekeeping and brokering have a positive impact on the structural embeddedness.**

### 3.2.3 Functions: (5) testing, validation, and training

The fifth function involves (1) testing, diagnostics, analysis and inspection, (2) prototyping and pilot facilities, (3) scale-up, (4) validation, and (5) training. At this level of the innovation process, ‘intermediary institutions’ may put at the firms’ disposal their specialist facilities and/or may perform activities such as diagnostics, testing, prototyping, and training dedicated to facilitating the inter-firm collaboration (Howells, 2006).

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<sup>11</sup> Central organizations have a larger ‘intelligence web’ through which they can learn about collaborative opportunities, hence lowering their level of uncertainty about partnerships (Gulati, 1999; Powell et al., 1996).

<sup>12</sup> As pointed out by Gulati and Gargiulo (1999), “*the position an organization occupies in the emerging network can influence its ability to access fine-grained information about potential partners as well as its visibility and attractiveness for other organizations through the network, even if it is not directly or indirectly tied to them*”.

Beyond the purpose of facilitating and supporting the inter-firm collaboration, those functions contribute to controlling the activities carried out by each party and its task performance on behalf of the other parties. This second purpose enables firms to mitigate risks from behavioral uncertainty and to reduce direct measurement costs (Eisenhardt, 1985) of outputs and/or behaviors of other parties. As a result, testing, validation, and training functions correspond to coordination and control tools, which contribute to building trustworthy relationships favoring the consideration of one another's need and goals, the information sharing, and so the relational embeddedness.

**Proposition 3: ‘intermediary institutions’ involved in testing, validation, and training have a positive impact on the relational embeddedness.**

#### **3.2.4 Functions: (6) accreditation and standards, (7) regulation and arbitration**

‘Intermediary institutions’ may either provide formal or informal regulation and/or favor self-regulation<sup>13</sup>. First, ‘intermediary institutions’ may specify and dictate “*roles, role relationship, conventions*” (Jones et al., 1997), and set standards and norms, which formally drive the collaboration within the network. Second, ‘intermediary institutions’ may diffuse values and foster a network culture (Jones, 1996; Jones et al., 1997).

Those formal and informal regulations may lead to formal and/or informal collective sanction(s). As defined by Jones et al. (1997), “*collective sanctions involve group members punishing other members who violate group norms, values, or goals and range from gossip and rumors to ostracism (exclusion from the network for short periods or indefinitely) and sabotage*”. Collective sanctions

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<sup>13</sup> Informal control is performed by the other members when the ‘intermediary institution’ culture (i.e., set of norms, values, and practices) is diffused through the network and minority that does not conform to the culture is visible (Oliver, 1991). Moreover, the system of legitimacy implemented by the ‘intermediary institution’ (through the system of external referees) has a critical influence on the activity of members. Despite informally, the refereeing mechanisms strongly controls for the respect of community rules and behaviors.

make the opportunism more costly since opportunistic behaviors damage not only the specific alliance in which one behave opportunistically, but also the other current and potential alliances (Blumberg, 2001). As pointed out by Jones et al. (1997), collective sanctions “*define and reinforce the parameters of acceptable behavior by demonstrating the consequence of violating norms and values*” (Jones et al., 1997).

Moreover, some ‘intermediary institutions’ may provide arbitration mechanisms. When opting for arbitration, parties voluntarily agree to refer their dispute to an impartial third person and agree, in advance, to be bound by the decision of that person (Bonn, 1972). These mechanisms enjoy sources of efficiencies over the public courts<sup>14</sup> (Richman, 2004; McMillan and Woodruff, 2000, Hadfield, 2000), and that is particularly true in the case of innovation.

The functions of accreditation, regulation, and arbitration may strongly impact on the network development. As pointed out by Provan et al. (2007), “*network development may be seen as the result of the use not only of resources but also of rules and norms produced as steering mechanisms to drive development of the network (Sydow and Windeler, 1998). These rules are dependent on the meaning the individual actors attach to them, so the development of the network is dependent on the knowledge of those mechanisms and the meanings, goals, and value of all organizations within the network (Lipparini and Lomi, 1999; Van Rank and Paulus, 2001).*” These formal or informal rules and norms may support bilateral relationships and magnify their quality and depth since they contribute to increasing trust, confiding, information sharing, and to diminishing the uncertainty associated with future partnerships.

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<sup>14</sup> First, arbitrators are market participants more expert and specialized than public courts and are chosen on the basis of their expertise regarding the subject matter in dispute. Second, specialized rules are tailored to the idiosyncratic needs and transactional challenges of firms having recourse to a specific ‘intermediary institution’. The principles guiding the dispute resolution process rest on custom rather than on law (Bonn, 1972). Third, specialized procedures are used to act more swiftly, at lower costs, and with more nuances than public courts. Indeed, they permit “*greater flexibility in decision making and they are considered to be more private, economic, rapid, certain, and conducive to business relationships*” (Bonn, 1972). Fourth, the arbitrator can consider information that could not be introduced in public court.

**Proposition 4: ‘intermediary institutions’ involved in accreditation, and/or regulation and arbitration have a positive impact on the relational embeddedness.**

**3.2.5 Functions: (8) protecting the results, (9) commercialization, (10) evaluation of outcomes**

The eighth and ninth functions are respectively associated with protecting and commercializing the outcomes of innovation and collaboration (Howells, 2006). They consist respectively in providing IP advice and management, and in identifying market opportunities, developing business plans, and assessing and providing filtering capability for funding. The tenth function is relative to the assessment and evaluation of ‘post innovation’ (Howells, 2006).

When guiding firms at these last levels in the innovation process, ‘intermediary institutions’ have the ability to influence current and future contents of networks in terms of *which innovation approach* to foster. This stems from the fact that they help both organizations and the network to gain legitimacy<sup>15</sup> on the one hand (functions 8 and 9), and work for assuring a continuous updating<sup>16</sup> of the network innovation content (function 10) on the other hand.

**Proposition 5: ‘intermediary institutions’ involved in protecting the results, commercialization, and/or evaluation of outcomes have a positive impact on the cognitive embeddedness.**

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<sup>15</sup> This legitimacy facilitates network development (Bazzoli et al., 2003).

<sup>16</sup> The more general assessment function can be seen as a starting point for many firms and, therefore, feed directly into undertaking functions 1 and 2 (Howells, 2006).

**Table 1.** Link between the functions of the ‘intermediary institutions’ in the innovation process and the social embeddedness

Functions of the ‘intermediary institutions’ in the innovation process	Underlying mechanisms	Embeddedness reinforced
Foresight and diagnostics	Content definition mechanisms	Cognitive embeddedness
Scanning and information processing		
Knowledge processing, generation, and combination		
Gatekeeping and brokering	Information asymmetry reduction mechanisms + Reputation mechanisms	Structural embeddedness
Testing, validation, and training	Coordination tools + Control mechanisms	Relational embeddedness
Accreditation and standards	Arbitration mechanisms + Collective sanction mechanisms	Relational embeddedness
Regulation and arbitration		
IP: Protecting the results	Content definition mechanisms	Cognitive embeddedness
Commercialization: exploiting the outcomes		
Assessment and evaluation		

## 4 Conclusion

The purpose of the present paper was to shed light on the critical role played by ‘intermediary institutions’ - more specifically ‘intermediary institutions’ involved in the innovation process - in balancing the conflicting objectives ‘trying to learn’ and ‘trying to protect’, and that through their positive impact on the relational, structural, and cognitive embeddednesses.

This paper is a first attempt to explicitly address the *raison d’être* of particular entities that contribute to designing the institutional foundation of networks and, however, have rarely been studied up to now. It endeavors to provide a theoretical framework complementary to the accepted knowledge on social networks. We are aware that

further investigation is still necessary to improve the exploratory argumentation that we propose.

## References

- Abrahamson E., Fombrun C.J. [1994]. ‘Macrocultures: determinants and consequences’, *Academy of Management Review*, 19, pp. 728-755.
- Baker W.E. [1990]. ‘Market Networks and Corporate Behavior’, *American Journal of Sociology*, 96, pp. 589-625.
- Bessant J., Rush H. [1995]. ‘Building bridges for innovation: the role of consultants in technology transfer’, *Research Policy*, 24, pp. 97-114.
- Blumberg B.F. [2001]. ‘Cooperation Contracts between Embedded Firms’, *Organization Studies*, 22(5), pp. 825-852.
- Bonn R.L. [1972]. ‘Arbitration: an alternative system for handling contract related disputes’, *Administrative Science Quarterly*, 17, pp.254-264
- Borgatti S.P., Foster P.C. [2003]. ‘The Network Paradigm in Organizational Research: a review and typology’, *Journal of Management*, 29(6), pp. 991-1013.
- Brass D.J., Galaskiewicz J., Greve H.R., Tsai W. [2004]. ‘Taking stock of networks and organizations: a multilevel perspective’, *Academy of Management Journal*, 47(6), pp. 795-817.
- Burt R.S., Knez M. [1995]. ‘Kinds of Third-Party Effects on Trust’, *Rationality and Society*, 7, pp. 225-292.
- Camerer C., Vepsäläinen A. [1988]. ‘The Economic Efficiency of Corporate Culture’, *Strategic Management Journal*, 9, pp. 115-126.
- Dacin, M.T., Ventresca M.J., Beal B.D. [1999]. ‘The Embeddedness of Organizations: Dialogue & Directions’, *Journal of Management*, 25, pp. 317-356.
- Dhanaraj C., Parkhe A. [2006]. ‘Orchestrating innovation networks’, *Academy of Management Review*, 48, pp. 147-167.
- Eisenhardt K.M. [1985]. ‘Control: Organizational and Economic Approaches’, *Management Science*, 31, pp.134-149.
- Freeman L.C. [1979]. ‘Centrality in Social Networks: Conceptual Clarification’, *Social Networks*, 1, pp. 215-139.
- Granovetter M. [1985]. ‘Economic action and social structure: a theory of embeddedness’, *American Journal of Sociology*, 91, pp. 481-510.
- Granovetter M. [1992]. ‘Problems of explanation in economic sociology’, in N. Nohria and R.G. Eccles (eds.), *Networks and organizations: structure, form, and actions*, 25-56. Boston Harvard Business School Press.
- Gulati R. [1995]. ‘Social structure and alliance formation pattern: a longitudinal analysis’, *Administrative Science Quarterly*, 40, pp. 619-652.
- Gulati R. [1998]. ‘Alliances and Networks’, *Strategic Management Journal*, 19, pp. 293-317.
- Gulati R., Singh H. [1998]. ‘The Architecture of Cooperation: Managing Coordination Costs and Appropriation concerns in Strategic Alliances’, *Administrative Science Quarterly*, 43, pp. 781-814.
- Gulati R., Garguilo M. [1999]. ‘Where do inter-organizational networks come from?’, *American Journal of Sociology* (in press).
- Gulati R., Nohria N., Zaheer A. [2000]. ‘Strategic Networks’, *Strategic Management Journal*, 21 (3), pp. 203-215.
- Hadfield G.K. [2000]. ‘Privatizing Commercial Law: lessons from the middle and the digital ages’, *Social Science Research Network*, Working Paper, 195.
- Hagedoorn J., Schakenraad J. [1994]. ‘The Effect of Strategic Technology Alliances on Company Performance’, *Strategic Management Journal*, 15(4), pp. 291-309

- Hagedoorn J. [2002]. "Inter-firm R&D partnerships: an overview of major trends and patterns since 1960", *Research Policy*, 31, pp. 477-492.
- Hagedoorn J., Cloudt D., van Kranenburg H. [2005]. "Intellectual property rights and the governance of international R&D partnerships", *Journal of International Business Studies*, 36, pp. 175-186.
- Hagedoorn, J. [2006]. "Understanding the cross-level embeddedness of interfirm partnership formation", *Academy of Management Review*, 31(3), pp. 670-680.
- Hamel G. [1991]. "Competition for competence and inter-partner learning within international strategic alliances", *Strategic Management Journal*, Summer Special Issue, 12, pp. 83-103.
- Hargadon A., Sutton R.I. [1997]. "Technology brokering and innovation in a product development firm", *Administrative Science Quarterly*, 42, pp. 728-749.
- Howells J. [2006]. "Intermediation and the role of intermediaries in innovation", *Research Policy*, 35, pp. 715-728.
- Inkpen A.C., Tsang E.W.K. [2005]. "Social Capital Networks, and Knowledge Transfer", *Academy of Management Review*, 30(1), pp. 146-165.
- Jarillo J.C. [1988]. "On Strategic Networks", *Strategic Management Journal*, 9, pp. 911-945.
- Jones C. [1996]. "Careers in project networks: the case of the firm industry", in M.Arthur and D. Rousseau (eds.), *The boundaryless career*, pp. 58-75, New York: Oxford University Press.
- Jones C., Hesterly W.S., Borgatti S.P. [1997]. "A General Theory of Network Governance: Exchange Conditions and Social Mechanisms", *the Academy of Management Review*, 22(4), pp. 911-945.
- Kale P., Singh H., Perlmutter H. [2000]. "Learning and protection of proprietary assets in strategic alliances: building relational capital", *Strategic Management Journal*, 21(3), pp. 217-237.
- Khanna T., Gulati R., Nohria N. [1998]. "The Dynamics of Learning Alliances: Competition, Cooperation, and Relative Scope", *Strategic Management Journal*, 19(3), pp. 193-210.
- Kogut B. [1988]. "A study of the life cycle of joint ventures", in F.K. Contractor and P. Lorange (ed.), *Cooperative Strategies in International Business*, Lexington Books, Lexington, MA, pp. 169-186.
- Krackhardt D. [1990]. "Assessing the Political Landscape: Structure, Cognition, and Power in Organizations", *Administrative Science Quarterly*, 35, pp.342-369.
- Laumann E.O., Galaskiewicz J., Marsden P.V. [1978]. "Community structure as inter-organizational linkages", *Annual Review of Sociology*, 4, pp. 455-484.
- Lipparini A., Lomi A. [1999]. Interorganizational relations in the Modena biomedical industry: a case study in local economic development. In A. Grandori (eds.), *Interfirm Networks: Organization and industrial competitiveness*: 120-150. London: Routledge.
- Lynn L.H., Reddy N.M., Aram J.D. [1996]. "Linking technology and institutions: the innovation community framework", *Research Policy*, 25, pp. 91-106.
- Mantel S.J., Rosegger G. [1987]. "The role of third-parties in the diffusion of innovations: a survey", in Rothwell R., Bessant, J. (eds.), *Innovation Adaptation, and Growth*. Elsevier, Amsterdam, pp. 123-134.
- McEvily B., Zaheer A. [1999]. "Bidding ties: a source of firm heterogeneity in competitive capabilities", *Strategic Management Journal*, 20, pp. 1133-1156.
- McMillan J., Woodruff C. [2000]. "Private Order under Dysfunctional Public Order", *Social Science Research Network*, Working Paper, 189.
- Nahapiet J., Ghoshal S. [1998]. "Social Capital, Intellectual Capital, and the Organizational Advantage", *Academy of Management Review*, 23, pp. 242-266.
- Oliver C. [1990]. "Determinants of Interorganizational Relationships: Integration and Future Directions", *The Academy of Management Review*, 15(2), pp. 241-165.
- Oxley J.E. [1999]. "Institutional Environment and the Mechanisms of Governance: the Impact of Intellectual Property Protection on the Structure of Inter-Firm Alliances", *Journal of Economic Behaviour and Organization*, 38(3), pp. 283-

- 309.
- Oxley J.E., Sampson R. [2004]. "The Scope and Governance of International R&D Alliances", *Strategic Management Journal*, 25(8-9), pp. 723-749.
- Poldolny J.M. [1994]. "Market Uncertainty and the Social Character of Economic Exchange", *Administrative Science Quarterly*, 39, pp. 458-483.
- Popp A. [2000]. "Swamped in information but starved of data': information and intermediaries in clothing supply chains", *Supply Chain Management*, 5, pp 151-161.
- Prahalad C.K., Hamel G. [1990]. "The Core Competence of the Corporation", *Harvard Business Review*, 68(3), pp. 79-91.
- Provan K.G., Milward H.B. [1995]. "a preliminary theory of network effectiveness: a comparative study of four community mental health systems", *Administrative Science Quarterly*, 40, pp. 1-33.
- Provan K.G., Human S.E. [1999]. Organizational learning and the role of the network broker in small-firm manufacturing networks. In: Grandori, A. (eds. ), *Interfirm Networks: Organization and Industrial Competitiveness*. Routledge, London, pp. 185-297.
- Provan K.G., Kenis P. [2006]. Modes of network governance: Structure, management and effectiveness, Working Paper, Eller College of Management, University of Arizona, Tucson.
- Provan K.G., Fish A., Sydow J. [2007]. "Interorganizational Networks at the Network Level: a review of the empirical literature on whole networks", *Journal of Management*, 33, pp. 479-516.
- Raub W., Weesie J. [1990]. "Reputation and Efficiency in Social Interactions: an example of network effects", *American Journal of Sociology*, 96 (3), pp. 626-654.
- Richman B.D. [2004]. "Firms, Courts, and Reputation Mechanisms: towards a positive theory of private ordering", *Columbia Law Review*, 104, pp. 2328-2368.
- Simsek Z., Lubatkin M.H., Floyd S. W. [2003]. "Inter-Firm Networks and Entrepreneurial Behavior: a structural embeddedness perspective", *Journal of Management*, 29 (3), pp. 427-442.
- Stankiewicz R. [1995]. The role of the science and technology infrastructure in the development and diffusion of industrial automation in Sweden. In: Carlsson, B. (eds.), *Technological Systems and Economic Performance: the case of factory automation*. Dordrecht, Kluwer, pp. 165-210.
- Stinchcombe A.L. [1990]. *Information and Organization*, Berkeley and Los Angeles: University of California Press.
- Sydow J., Windeler A. [1998]. "Organizing and evaluating interfirm networks: a structurationist perspective on network processes and network effectiveness", *Organization Science*, 9 (3), pp. 265-284.
- Teece D. [1992]. "Competition, cooperation, and innovation : Organizational arrangements for regimes of rapid technological progress", *Journal of Economic Behavior and Organization*, 12, pp.1-25.
- Teece D. [1986]. "Profiting from Technological Innovation : Implications for Integration, Collaboration, Licensing, and Public Policy", *Research Policy*, 15, pp. 285-305.
- Teece D. [2000]. *Managing Intellectual Capital: Organizational, strategic, and policy dimensions*, Oxford University Press., New York, 2000.
- Uzzi B. [1997]. "Social Structure and Competition in Interfirm Networks: the paradox of embeddedness", *Administrative Science Quarterly*, 14, pp. 35-67.
- Van de Ven A.H. [1976]. "On the Nature, Formation and Maintenance of Relations among Organizations", *Academy of Management Review*, 1, pp. 24-36.
- Williamson O.E. [1975]. *Markets and hierarchies: Analysis and antitrust implications*, New York: Free Press.
- Williamson O.E. [1985]. *The Economic Institutions of Capitalism : Firms, Markets and Relational Contracting*, New York, Free Press.
- Williamson O.E. [1991]. "Comparative Economic Organization: The Analysis of

Discrete Structural Alternatives”, *Administrative Science Quarterly*, 36, pp. 269-96.