



HAL
open science

Relationship governance within value creation systems. Analytical framework applied to the biobased sector

Loïc Sauvée, Latifa Daadaoui

► **To cite this version:**

Loïc Sauvée, Latifa Daadaoui. Relationship governance within value creation systems. Analytical framework applied to the biobased sector. 8 th International Conference on Management in Agrifood Chains and Networks, Wageningen University and Research, May 2008, Ede, Netherlands. <hal-04297549>

HAL Id: hal-04297549

<https://normandie-univ.hal.science/hal-04297549v1>

Submitted on 21 Nov 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

Relationship governance within value creation systems Analytical framework applied to the biobased sector

Loïc Sauvée*

LaSalle Beauvais Polytechnic Institute
and Université Paris-Dauphine, DRM, UMR CNRS 7088, France

*Corresponding author. Postal and email addresses: LaSalle Beauvais Polytechnic Institute
19 rue Pierre-Waguet, BP 30313, F 60026 Beauvais Cedex

Email: loic.sauvee@lasalle-beauvais.fr

&

Latifa Daadaoui

Université Paris-Dauphine, DRM, UMR CNRS 7088
and LaSalle Beauvais Polytechnic Institute, France

Abstract

Market and product innovations in the emergent biobased sector are highly dependent upon the efficacy of knowledge transfer, control and protection between organizations, firms, institutions and also individuals involved in these innovations. The governance of these complex relationships is thus critical. Stemming from the literature about governance of interorganizational relationships, as well as value creation processes and systems, we propose an analytical framework of relationship governance in radical innovation settings based on several propositions. This framework is applied to governance structures in biobased value systems, especially devoted to the context of the French cluster 'Industries et Agro Ressources'.

Keywords: biobased, governance, inter organizational relationships, network, value

1- Introduction

Market and product innovations in the emergent biobased sectors are highly dependent upon the efficacy of knowledge transfer between research organizations and private firms. This is especially the case in the context of industrial clusters such as the French cluster 'Industrie et Agro Ressources', where public authority monitors and brings together private firms and research competences. The governance of these Industry-Research relationships (hereafter IRR) is thus critical to managers and appears to be a crucial element of their competitiveness. Our research explores this question in focusing on two main topics: firstly the role of institutional environment and more specifically of meta network forms such as industrial clusters, in the design of proper governance structures; secondly the identification of the main determinants of governance designs in this specific context of radical product innovations.

The context of the research is thus the biobased economy. The idea of biobased economy is not new (Anex, 2004). In the 30s, the farm chemurgy movement already developed the necessity of industrial products coming from crops, aiming at reducing low prices and declining markets for farmers. But the new environmental context (global warming) and the risks of shortage for fuel or other non renewable products give a completely different landscape of what could be the biobased economy in the next decade. For Anex (2004), agriculture seen from an historical perspective is a 'conventional' biobased economy: in using "fuels and chemicals to produce the bountiful harvests that have allowed human population to grow beyond what was possible as recently as 100 years ago." (Anex, 2004: 1). But he adds: "attempts to reverse the trends of the last century and a half, and return to satisfying significant amounts of the human appetite for power and material using plant-derived raw materials, will have complex social and environmental impacts" (Anex, 2004:2).

The paper is organized as follow. In a first part (2), after recalling the origin of the concept of interorganizational governance, we focus on the traditional views developed by researchers concerning IRR relationships. Then we show that in the specific contexts of radical innovations and value creating systems, the understanding of governance of IRR necessitates a global view upon the whole value creation process. In a second part (3) we develop this idea in reference to research works on value and organization. Then we turn to our proposal of an analytical framework and a set of propositions for the study of governance in biobased value creation systems (4). Some connections to real innovation processes in biobased businesses are done. A few concluding comments on the perspectives of the research as well as on the managerial implications are developed (5).

2. Governance of relationships between industry and research

In a first part we will define the notion of relationship governance in a functional perspective (2-1). Then we will summarize the main perspectives that have been usually devoted to the study of IRR (2-2). Finally we will turn to the interests and limitations of the concept of interorganizational governance in a context of radical innovations (2-3).

2.1. Relationship governance: genealogy of a concept

Generally the term of governance can be defined as the management of collective activities of a group (Nye & Donahue, 2000). Governance means the way of organizing transactions (Williamson, 1994) and by extension relationships. Its purpose is to achieve a correct public or private order through the use of coordination mechanisms. The governance structure is the design of an institutional model in which the integrity of a transaction or related set of transactions is decided (Williamson 1996), or an institutional model that governs the exchange controlling the opportunism (Dyer, 1997). Heide (1994), in the vein of Palay, defines governance as a multidimensional phenomenon surrounding the introduction, the conclusion and maintenance of relationships between several parties.

Ehlinger et al. (2007) build the notion of governance according to the roles assigned to the governance structure: adaptation to demand, coordination of actors and security to ensure taking into account the interests of various objectives. Governance and its structures are also seen as meta-management, which is assigned the role of developing the overall strategy, a responsibility to regulate the relationship between actors in terms of power, and the coordination of different strategies. Fréry determined the role of governance by defining the hub governing the network: “the design of the value chain, the coordination of the structure obtained by ensuring the governance of transactions between partners, and the control of the structure.” (Fréry, 1997)

In this vein and under a functional approach, we can define governance upon two functions: coordination and the regulation of exchanges (Dyer, 1996; Heide, 1994).

- Coordination: not only related to: (i) formations exchange but also to (ii) decision making two issues which are sensitive to process, and in cooperation the difficulty is more important. Ansoff identifies three main levels of decision: strategic, tactical and operational. Organization theorists distinguished among several types of coordination: division of responsibilities, shared resources, meetings, communication technology (Cummings and Kiesler, 2007). In terms of the nature of the information exchanged and the interfaces, Monateri and Ruffieux (1996) suggested an interesting typology of information exchanged: information utilities, spontaneous information, presentation and cohesion information. Each type requires a support: notes, records, meetings and working group, exchange meetings, team brainstorming, videoconferences, seminars, electronic mail, computer network, exchange of personnel.

- The regulation of exchanges: We will deal with the issue of regulation in terms of enforcement according to Dyer and Singh (1998). By enforcement, we will consider three components: the control, incentive and adjustment (Heide, 1994). Dyer and Singh (1998) argue that most relationships are based on the form of self confidence. The adjustments in mutual monitoring procedures are almost nonexistent. The incentive to create value is maximized through the commitment and trust that increase with the maturity of the relationship. Thus governance will be more effective and the ‘relational rent’ will be greater. Because the cooperative relationship is a dynamic process, adaptability competence is required. It is therefore essential to see the evolution and dynamics of governance mechanisms and at the same time the factors that influence its evolution.

Dyer and Singh in the vein of Williamson assign to the governance a unique objective: costs minimization. The synthetic corporate governance theory (Bouglet, 2006) proposes dichotomous function of governance which is interesting in the way that it gives a global and complete view of ‘negative and positive’ function of governance :

- A disciplinary function: mainly the aim is to reduce costs and avoid the opportunism of the actors. The governance system is the set of mechanisms that sustain the node of contract and secure the financial investment, the governance mechanisms role here is to create the rules of the interactions (Brousseau et al., 2007) ;

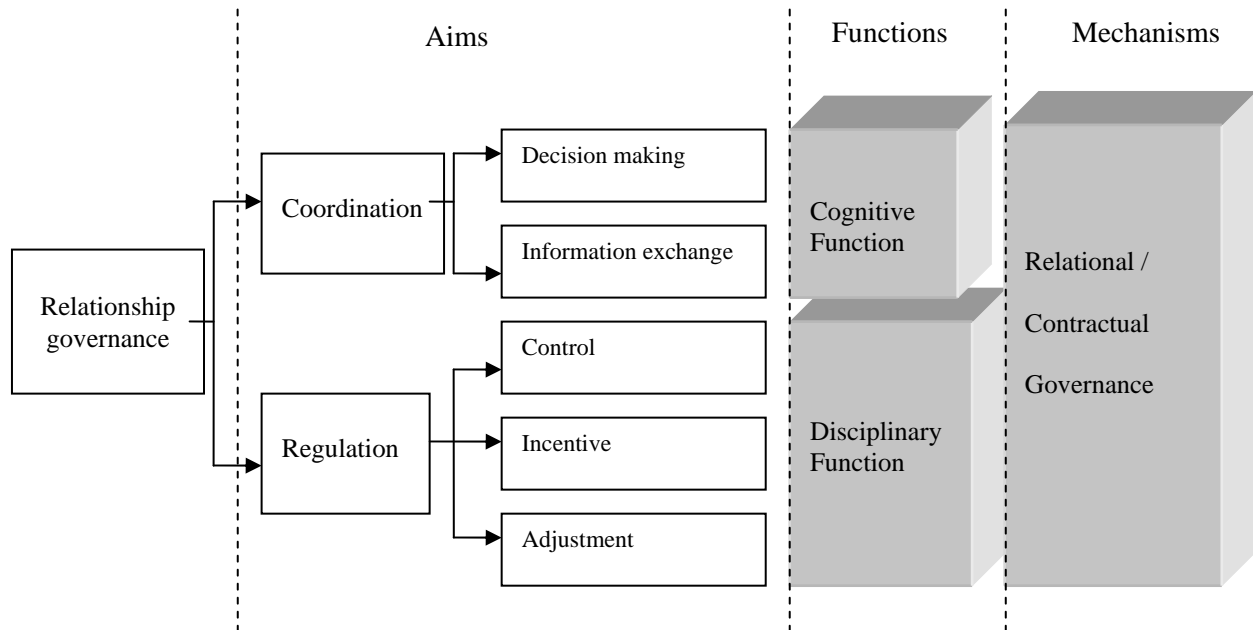
- A cognitive function: the aim is to increase the gains arising from the cooperation. According to this productive point of view, governance mechanisms are seen as ways to invent opportunities and align patterns mentally. *We believe that in the special context of innovation the governance structure is aimed to accomplish this role more than being the ‘guard’ of the system.*

According to the functions assigned to the governance, contractual or relational mechanisms can be distinguished. The first one is more formalized by complex but incomplete contracts. The second one is inherent to the relationship between the partners. In the vein of Poppo and Zenger (2002), Hoetker and Mellewight (2004) we advocate the idea of complementarity between the two mechanisms instead of the idea of substitution that existed

in the transaction-cost theory and the strategic management literature (Gulati, Dyer and Singh, Hill). Thus, well-tied contracts will guarantee the stability, preserve the longevity of relationships, and can build trust and cooperation. Relational governance helps to overcome the contracts limitations especially in the area of adaptation by nurturing commitment and trust.

We summarize in figure 1 the main components of relationship governance based upon our literature discussion and in a functional view.

Figure 1: Relationship governance: aims, functions and mechanisms



2.2. The governance of industry-research relationships (IRR): main theoretical perspectives

In exploring the research-industry literature, we have summarized in table 1 two research trends: one focusing on university-industry relationships and another one on laboratory and industry, the need for studies on broader research-industry definition is observed. By IRR in the process of developing new products, we mean “any rapprochement between two or more organizations belonging to one or another sphere: research center and / or training center (e.g. university) and public or private firms. This rapprochement, including heterogeneous organizations from different organizational environments aims to fulfill a common vision and innovation which involves the accumulation of resources and coordination of actions” (adapted from Monateri and Ruffieux, 1996). We are interested in the broader relationship between the two spheres of business firms and research organization, more than punctual transactions because innovation collaborations need more frequent and regular transactions (Brousseau, 2000).

Cohen, Nelson and Walsh (2002) distinguished three possible uses of research output: (i) the results of research, (ii) prototypes, and (iii) the new instruments and techniques. According to the same authors the channels of the knowledge that flows from the academic sphere to the industry are varied. This could be patents, informal exchange of information, publications and reports, public conferences, the recruitment of young graduates, licensing, collaborations, research contracts, and consulting, temporary staff mobility. In the literature the main perspective is transactional, positioning the research among the industry in a classical design of value system. It is interesting to analyze the relationships between research and industry in the new project development from a relational perspective suggesting a great level of commitment, trust, a long term orientation, a high level of uncertainty and positioning them side by side in an interactive value constellation (Normann & Ramirez, 1993).

This IRR has three main characteristics: (1) The organizational diversity of the various partners (2) The transfer of a mix of tangible and intangible assets (knowledge and technology) that will go along with the relationship (3) From an organizational point of view, no subordination link between the partners. These particular characteristics suggest a different mode of organization transaction (relations) in terms of coordination and regulation. In that way the question of studying governance is pertinent especially since a small but growing body of literature on transaction value is emphasizing the influence of governance on the value creation initiatives of alliance partners (Dyer, 1996; Barney & Hansen, 1997; Ring & Van de Ven, 1992; Zajac & Olsen, 1993).

In the new biobased activities, the long-term orientation of relationships and the high uncertainty and ambiguity of the result and the future of research complicate the deal. Then the question is: what kind of governance is suitable for these particular relationships for an effective knowledge transfer?

Table 1:
Two research streams on IRR

| University-industry relationships | Public laboratory-industry relationships |
|---|---|
| <p>The most popular in the literature (Anderson et al, 2007):</p> <ul style="list-style-type: none"> - Organizational structures, in particular the study of TTO-Technology Transfer Offices-; - Regional / international comparisons and case studies (Owen-Smith et al. 2002; Meyer-Kramer and Schmoch, 1998; Beise and Stahl, 1999; Lopez-Martinez et al., 1994) - The impact of university research (Feller et al. 2002; Cohen et al. 2002; Shane & Stuart, 2002; Siegel et al. 2003) - The outputs of university research; - Effectiveness of university research (Zucker et al., 2002; Anderson et al., 2007). | <p>According to Gonard (1999) there are two types of research:</p> <ul style="list-style-type: none"> - descriptive studies, which didn't discuss key factors for success or failure of these relationships, it was generally case studies; - the evaluation studies which adopt various perspectives (Gonard, 1999): * the public policy -makers such as Mansfield, Rosenberg, Rosenberg and Nelson (1994); * the perspective of public R&D bodies or laboratories : Crow & Bozeman, Callon, Laredon, Mustar who studied the synergies which take place between the different activities of a laboratory * the industry perspective :which received little attention except the contribution of Bailetti, Callahan, Faulkner, Senker |

2-3 Interests and limitations of the IRR research stream:

Considering the dependence theory, dependence and uncertainty are the main key variables motivating the establishment of interfirm relationships (Salancik & Pfeffer, 1970), it is also correct for the IRR: they emerge and evolve more and more in a turbulent and uncertain surrounding and need each others to complete resources and competences. But this theory gives a short and global insight about the mechanisms within which these relationships are organized. A new analysis perspective of these relationships is needed.

In the main researches the IRR have been studied as dyadic relations. We propose to analyse networked relationships between the two spheres in order to have a wide and complete idea of the logic and dynamic of interactions. This exchange involves more and more different types of organisations from different levels and different chains of value creation. Firms, universities, private and public laboratories deliberately create structure and negotiate and assign roles and goals. It's truer in the emergent biobased activities where a constellation of actors agreed to create a new activity with new value creation logic combining different and complementary resources and capabilities. The issue of governance is explicitly raised as a mean of steering the network and ensuring consistency of the projects of the various partners (Ehlinger et al, 2007).

In our research we propose to full up the several shortcomings of the literature on IRR:

- (i) The integration of new theories like network theory, the creation value logic, the synthetic corporate governance give a new vision to understand the governance of IRR;
- (ii) The lack of an integrative model of the different components of governance applied to the IRR in emerging Biobased activities;
- (iii) The issue of choice and determinants of governance is almost limited to the specificity of the exchange (Williamson, 1994), i. e. specific knowledge or physical assets (Hoetker & Mellewigt, 2004), and the structure of the exchange in terms of dependence, formalization, and socialization (Gençtürk and Aulakh, 2007). But we need to take into account other organizational aspects, as well as relational and contextual aspects.
- (iv) Mobilizing the network theory reconsider the different levels that constitute a net. The concept of governance levels borrowed from political science is interesting to consider in the networks. The combination in the context of IRR helps to understand the complementarity or substitution between the levels: project level, meta-organizational (relational) and institutional). The question is whether these levels are substitute or complementary?
- (v) We often forget that the IRR is a dynamic process. Its evolution leads to governance adaptation by the effects of positive or negative feedbacks. Studying these effects helps investigating the factors that trigger the positive feedbacks or avoid the negative ones.
- (vi) We find in the IRR: actors, resources and activities building a 'value net' or 'strategic net' (Möller and Rajala, 2007). In this new business the uncertainty and ambiguity are higher and we believe that 'the value creation logic or system through which the net creates value has a fundamental role in influencing effective mechanisms for governance'. The aim of these relationships is to create value to develop a new business. The value creating logic is thus pertinent to analyse, describe and understand the governance of this special net (Möller and Rajala, 2007; Parolini, 1999). *Our analysis unit is then the value-creating system- in biobased activities.*

3- Value systems and governance

We consider the concept of value creation process and logic as the central point of our analysis. Thus we will define firstly the notion of value system (3-1). Then we will link this notion of value system with that of value creation (3-2). Then we will turn to the question of governance of the relationship within value systems, i.e. when innovation is at stake (3-3)

3-1 Value system: the core concept

The objective of value creation is at the basis of any economy. The main difficulty of this notion of value creation is that it has been given many meanings throughout the literature. The definition of Porter's (1985) value chain referring to firm-level or industry-level activities has been criticized by many authors. For instance, Normann and Ramirez (1993) show that the linearity of vertical chains reflects only the reality of some value networks, and not when the nature of exchanges between partners is not solely business transactions but also intangible information.

Håkansson and Snehota (1995) also enrich the vision of value creation systems with their conceptualization of business relationship. They propose a broad descriptive framework centered on the substance and the functions of any relationship, defined as "a mutually oriented interaction between two reciprocally committed parties" (Håkansson and Snehota, 1995). The substance of any relationship is described in terms of resource ties, actor bonds and activity links. The functions can be conceived as the effects or the output any relationships will have at the individual partner, dyad and network levels. While not explicitly devoted to value creating systems, these authors provide a powerful theoretical apparatus for the study of industry-research relationships.

Stabell and Fjeldstad (1998) also propose an extension of the original value chain analysis in using Thompson's typology of 'long-linked, intensive and mediating technologies'

(Stabell and Fjeldstad, 1998:414). For Thompson, the choice of technologies is to be related to the type of problem, in a particular competitive setting, the firm has to solve. For instance, the long-linked technology will transform object according to a predefined set and sequence of activities, while the intensive technology will solve problem by a custom combination of activities. The authors propose a value configuration analysis, defined as an ‘analysis of firm-level competitive advantage based on a theory of three value creation technologies and logics’ (Stabell and Fjeldstad, 1998: 415). To identify discrete value configurations, the authors identify critical points to be studied: the primary technology, the primary activity categories, the main interaction relationship logic, the primary activity interdependence, the key cost and key value drivers, and the business value system structure. Doing so, the authors thus propose one of the first analytical frameworks that connect organizational configurations with value creation logics of firms.

In the chain and network science literature, the concept of value system has also been widely used. In their study of netchains, Lazzarini et al. (2001) propose an integration of social network and supply chain management approaches. They focused their analysis on the underlying link between interdependencies, following Thompson’s typology and sources of value in different interorganizational settings. For instance, the reciprocal interdependency occurs when “one agent’s input is another agent’s output and vice-versa” (Lazzarini et al., 2001). This situation will produce knowledge co-specialization. Interestingly, the authors give the example of regional clusters, of small firms and of close-knit groups through the development of dense networks. Another idea of the netchain analysis is the alignment principle of interdependencies with distinct coordination mechanisms. In reciprocal interdependencies for instance, the mutual adjustment mechanism, i. e. the “mutual feedback processes with joint solving problem and decision making” (Lazzarini et al., 2001) is the most efficient.

3-2 Value system and value creation: the question of innovation

In the chain and network science, Omta (2002) suggests that “good innovation systems are possibly even more important at chain and network level than for innovation at the company level” (Omta: 2002:76). Following Uzzi (1997), Omta suggests that the network position, i.e. the positioning of the actor in the network, is critical to the success of innovation. For him, “one party can be in a strategic position for the implementation of innovations if it is a partner in more than one tightly-knit cluster of relationships such that it can serve as a bridge by introducing innovations from one network into the other. (...) This leads to the paradoxical situation in which the chance of achieving completely new innovations (the so-called radical innovations) decreases as more and more companies in the network establish mutual contractual arrangements” (Omta, 2002: 77). The role of network heterogeneity is also stressed: when markets and technologies are turbulent and prone to rapid changes, the diversity of contacts is a way to reduce insecurity. Finally the author identifies three elements critical for the success of innovations, with two of them directly related to business organization: structural position (of the firm), and social embeddedness in the network.

In their study of innovation networks, Dhanaraj and Parkhe (2006) also identify the fact that network form of organization has “profoundly impacted how companies innovate” (Dhanaraj and Parkhe 2006: 660). In many sectors such as pharmaceutical industry or other types of high-tech industries, the classical value chains disintegrated and innovations are carried out by complex sets of firms or organizations. For the authors, “such innovations typically involves high levels of transactional uncertainty and exchange of tacit knowledge – problems that demand strategic actions from core actors to form and maintain a network and to extract value from it” (Dhanaraj and Parkhe, 2006: 660). In such innovation situations, where knowledge is at the core of the value configuration, firms should focus on the

processes. For Dhanaraj and Parkhe, some firms or other entities within the network need to perform a leadership role: a role of pulling together the resources and capabilities of the network members.

With their study of biotechnology innovations, Salman and Saives (2005) give an interesting illustration of these new modular organizational forms in relation with innovation processes. The authors suggest a distinction between direct and indirect networks, based on network position. Grounded in social network analysis, network position refers to the fact that network members are embedded in an array of relationships. Direct ties such as alliances between firms may provide benefits, but the authors suggest that indirect ties, i.e. firms that are affiliated to one another through their common direct partnerships, could also be a strategic resource. For the authors, in the emergent knowledge-based economy, channels of information between two firms stem “by virtue of their common partnership” to, for instance, a university. Thus the partner’s partners also benefit from a community of knowledge. This is not only the relational content of the exchange that is relevant to the indirect partnership, but also the network position of the firm. The authors suggest that “indirect ties may potentially lead to access to a combination of non-mutually exclusive intangible resources such as information, knowledge, and skills that flow through the network” (Salman and Saives, 2005: 205).

In a recent article, Möller and Rajala (2007) provide an extension of the value creation approach to business organization. In considering that intentional business networks, i.e. networks that are created with the purpose of creating value, as the starting point of the analysis, Möller and Rajala open the vision of the value configuration continuum. Following Parolini (1999) they define the value system of a business net as “a set of specific activities carried out by the actors constituting the net. (...) These activities are based on the resource constellations controlled by actors” (Möller and Rajala, 2007: 898).

But resources are not given per se. Instead, it can be seen as a set of dynamic capabilities: “the bundle of capabilities that a net has and controls influences directly the efficiency of its current value production and its renewal potential” (Möller and Rajala, 2007: 898). For them, any business net can be described in considering the level of determination of the system, in other words “how well known are the value activities of the net and the capabilities (resources) of the actors to carry them out, and to what extent can these activities be explicitly specified” (Möller and Rajala, 2007: 898). And, in turn, they consider that this level of determination of knowledge is directly related to its level of codification. This point of their framework is of tremendous importance when one considers the question of innovation. This continuum of knowledge codification underlies their classification of business nets. At one end of the continuum (high level of determination), the ‘current business net’ has a stable and well define value system. In the middle, the business renewal net’ has an established value system, with incremental improvements. Finally, at the other end (low-level of determination), the ‘emerging business net’ has an emerging value system with radical changes. This situation concerns “radical, continuous and system-wide change. (...). It is characterized by dispersed and vaguely identifiable ideas about the future involving great uncertainty” (Möller and Rajala, 2007: 900).

3-3 Relationship governance within value systems

Knowledge, central to any innovation, is a combination of intangible information and of specific skills (or capabilities). Thus the role of the network architecture, defined by concepts such as centrality, interconnectedness, network level, complementarity, information flows... is to provide the conditions of access, distribution, protection of this knowledge between the network members. At the same time it shows the idiosyncratic nature of knowledge: considering the situation of innovation/value processes and its dynamics especially links to market and competition conditions, the approach must be contextual. But how to monitor

value creation processes within one given value system?. Several authors have developed this specific question of monitoring applied to the broad question knowledge and innovation. In spite of theoretical heterogeneity, their main findings put the stress on a few characteristics and concepts that will be helpful to our analytical framework.

For Möller and Rajala (2007), innovation networks are loosely-coupled systems in a sense that several organizations without real business links are formed around collective actions. The main objective of some of their members is scientific discovery and for that reason the management of such networks cannot be centralized by one company. For Möller and Rajala, “a key managerial challenge on this early phase of emergence is the identification and sense making of widely dispersed and inherently the local nature of technological and breakthrough business ideas. Ideas are often fuzzy, that is, there is ambiguity about the possible cause and effect relationships between existing knowledge and the emergent knowledge” (Möller and Rajala, 2007: 904). The role of management is that of an environmental scanning, bringing new ideas of products, markets or business concepts.

Because of high uncertainty and poor heuristic content, the management of these emerging new business nets places the role of sense making ability and its enhancement as a central point. This early sense making has a better chance to form when firms are interconnected with a wide range of different networks, even if these connections are ‘weak ties’. Weak ties usually bring a profitable context that will help sense making of new ideas.

Another interesting contribution is found in Möller and Svahn (2003): the distinction of explicit levels of network management, that provide “managers with an understanding of the stratified nature of the questions and decision they should face” (Möller and Svahn, 2003:226). For instance, applied to the emerging business nets, the macro network level deals with ‘network visioning’: the ability to evaluate the potentiality of new product development and to assess their value. Instead, at the strategic net level, the managers mainly deal with the questions of mobilizing and coordinating different value activities.

In a quite different approach but still in line with the question of innovation monitoring, Dhanaraj and Parkhe (2006) place the orchestration in innovation network at the center of their analysis. For them, three main tasks need to be performed by hub firms: knowledge mobility, innovation appropriability and stability. Knowledge mobility is defined as ‘the ease with which knowledge is shared, acquired, and deployed within the network (Dhanaraj and Parkhe, 2006: 660).

Considering the double constraints of dispersion and of complexity of knowledge exchange, the ‘orchestrator’ (whatever its status) must be able to create the conditions of identifying the value of relevant knowledge. Moreover, the orchestrator must also be able to arrange the transfer of this relevant knowledge among the network members. To do so, the orchestrator has three main management tools:

- Innovation appropriability: this is an environmental property that, in the words of Teece’s seminal work, “governs an innovator’s ability to capture the profits generated by an innovation” (Teece, 1986).

- Legal protection of innovations usually comes with instruments such as patents or copyrights. They are part of the institutional environment: but in a rapidly evolving and uncertain environment, one must recognize the leading role of some network members is stimulating or even in creating the appropriability regime surrounding innovations.

- Stability of the innovation networks refer to the general atmosphere of trust that is necessary for the network members to perform efficiently. Dhanaraj and Parkhe (2006) consider specifically the dynamic stability “which aims for a non negative growth rate while allowing for entry and exit of network members” (Dhanaraj and Parkhe, 2006:661).

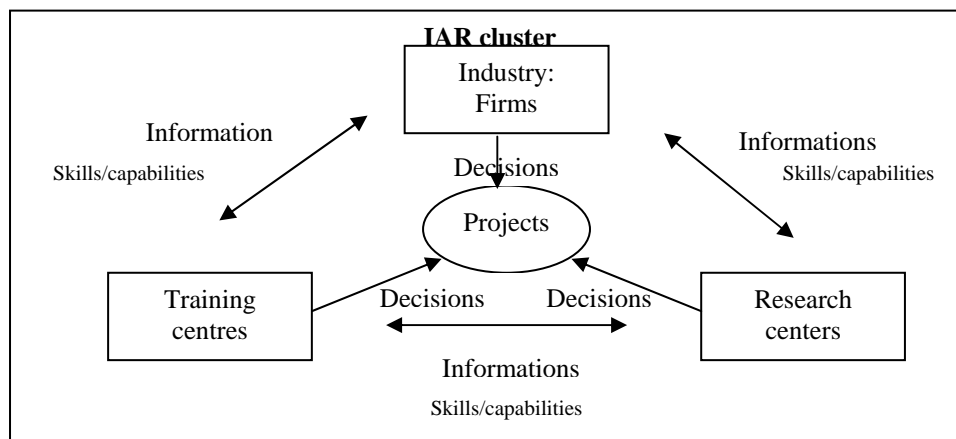
4. Analytical framework, research propositions and application to biobased sector

The literature had extensive discussions on the issue of governance, but left in the shadow of the descriptive and explanatory framework, concrete structures and governance mechanisms (Ehlinger et al. 2007). We will present the IRR in Biobased activities within the cluster (4-1) and then apply our analytical framework of governance choice to the biobased activities (4-2).

4.1. The Industries and Agro Resources cluster ('pôle de compétitivité Industrie et Agro Ressources', hereafter IAR cluster): plurality and uncertainty

Our empirical focus is on the emerging biobased industry where innovation has many facets. On the one hand, the origin of products for which it will give birth, 100% derived from renewable agricultural, functionality to the extent that they will produce no nuisance to the natural environment (biodegradability..), the technology that will be used to produce these products, which is still unknown in large part. But more important the framework which has been created in 2005 for governing innovation by launching the French model of clusters called 'Pôles de Compétitivité'. The development of this process follows a model of encouraging open innovation industry-research-training relationships. The relationship in this context is tripartite between industry, research centers and training centers exchanging different streams of information and skills (cf. figure 2).

Figure 2: Actors in IAR cluster



This new net (different actors detaining resources and capabilities and designing new activities) proposes to break with the existent technology a radical change that involve the creation of a new value system, ideas still fuzzy and exogenous uncertainty related to the project concerning the process, the results and the opportunities and endogenous one uncertainty associated to the difficulty of assessing performance are higher. Also, the net is characterized by a significant level of complexity relating to the subject of the relationship (biobased activities), the diversity of partners which belong to different organizational environment (Plewa et al, 2004), a complexity that induces a specificity of human, physical (Heide, 1994) and relational (network, other relations) assets. Thus, the governance of this value net called innovation network in Möller and Rajala' acceptance is particular far from the classical governance modes (market, hierarchy and hybrids).

Möller and Rajala (2007) suggest that these nets with weak ties require: self-coordination, informal leadership, and cannot be managed by one actor alone. The ambiguity suggests an environmental scanning, bringing new ideas of products, markets or business concepts and the uncertainty suggests the important of sense making role.

In the definition of the IAR cluster (Jacquet & Darmon, 2005), each actor has a specific role, clearly defined and identified: the private sector is responsible for the cluster and the government represented by the public collectivities accompanying the device and participating in coordinating committees and funding. It is important to know the role of each one in terms of governance functions and mechanisms.

The French model of clusters is different in the way that: (1) The French government was the initiator of those poles: strategic comity of Raffarin government 2002 and then the invitation to tender launched by the Villepin government in 2004. In the case of IAR cluster the Picardie and Champagne-Ardenne regional councils (the regional authority of two regions on the north of France) saw an opportunity to develop competences and visibility on the non food valorization of agricultural product and then they looked for researchers and industrials to support the project, while the American model cluster emerged from the industrial initiative (entrepreneur) to join the research in respecting a geographic and social proximity (Saxenian, 1990). (2) This geographic proximity is also at the origin of the 'pôle de compétitivité' but without being as close as 'the innovation campus' (the Silicon Valley or San Francisco Bay) or Marshallian district (Italian districts). (3) The idea of 'innovation project' or 'territory of projects' (Blanc, 2004) is rooted in the design of the French clusters. For IAR cluster the development of non food valorization activities is the project that motivate all the actors to join the constellation (4) the conceptualization of the cluster as 'ecosystem of innovation' (Blanc, 2004). This organic view suggests that the system is alive, acting and reacting, evolving.

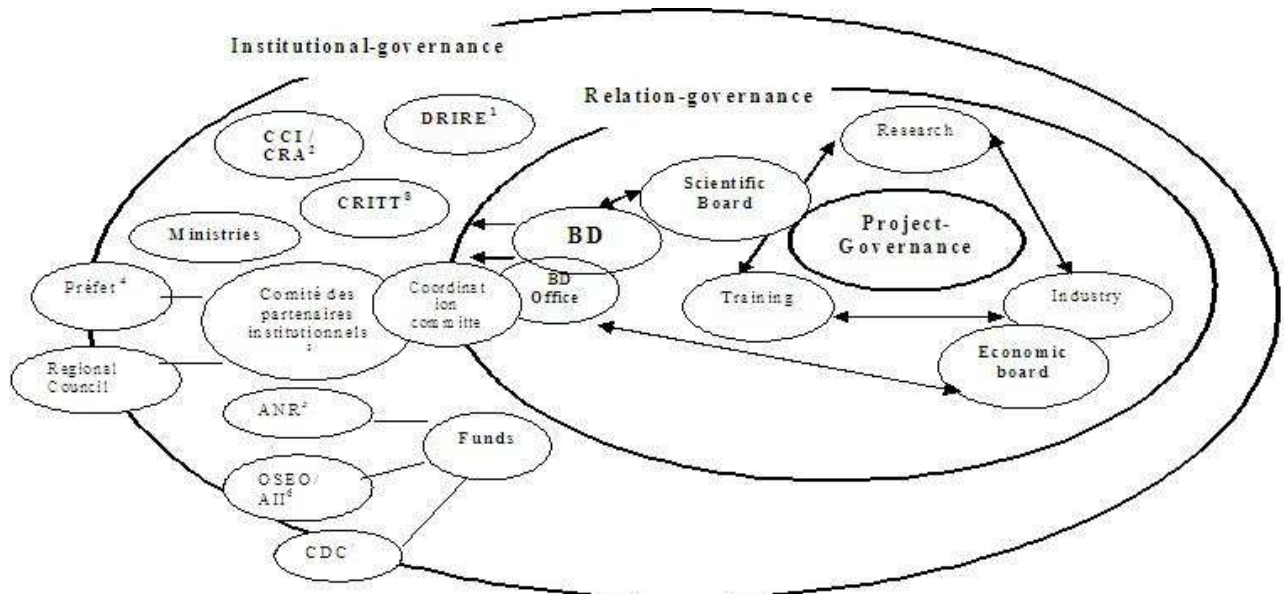
The IAR cluster joins the associative and the territorial governance (Ehlinger et al. 2007). The associative configuration is based on the appartenance to a solidarity community between pairs (no subordination link) on developing a community hub. It allows maintaining equilibrium between research and Industry, and also 'representativity' of the two regions (Picardie and Champagne-Ardenne). Its main challenge is to identify, accompany and help educate regional R&D projects in the field of agro resources (www.iar-pole.com). The local powers (regional council, DRIRE, CCI, CRA) and local collectivities help forming and maintaining the economic actors without participating directly in the cluster governance (Figure 3) via the 'Institutional partners committee'. The institutional frame plays a crucial role on governing the links between actors (Brousseau, 2000). The association is organized around a steering committee that selects the projects with a view to their labeling by the pole based on an independent audit by a scientific committee. The labeling allows projects to be oriented, to be submitted to the committee for funding, and to the possibility of different funding related to its content (figure 3). To execute the plan of actions defined by the association, several working groups 'COS Comité d'Orientation Stratégique' (strategic orientation committee) have been established. They are spaces to meet, to think, to animate the network, to break boundaries and particularly project ideas incubation.

We distinguish then three different network dimensions in terms of coordination and regulation: project dimension, relational dimension and institutional environment. Each dimension refers to different governance levels: project governance, meta-governance (private governance; Brousseau, 2000) and institutional governance (figure 3).

4.2. Research propositions about relationship governance within the IAR cluster

In the innovation network, relationship governance influences the quality of the relationship in terms of trust, commitment, conflicts, willingness to invest on assets and the expectation of continuity which affects the knowledge/technology transfer between research areas and business firms (cf. figure 3). In this value system, the uncertainty makes difficult the establishment of contracts, so market governance seems risky. Also the diversity of partners which belong to different organizational environments makes hierarchy not appropriate or not realist to implement. The hybrid mode of governance seems to be the most appropriate and the most efficient in innovation network governance of Biobased sectors. The more the partners are various, different and the more the environment is uncertain, the more we need a specific governance structure far from market and hierarchy.

Figure 3: Governance levels in the IAR cluster



The lack of subordination link and the reciprocal interdependence of the various partners (Thompson, 1967) need the development of a specific function of governance in order to foster cooperation and to try to align the mental patterns of the various partners. In the case of innovation network in the emergent Biobased activities, it is needed to create an interactive space where different actors could exchange and help the fuzzy ideas to become project-ideas and then projects. This function could not be accomplished by the project governance because it is needed upstream on the value system. The intermediate level of the network is then competent. In describing the relations between industry and research in the biobased industry we found that there are different levels: (1) the institutional environment constituting by national public institutions but especially regional institutions (2) the ‘meta-governance’ or ‘relation-governance’ materialized by the ‘pôle de compétitivité’ association where the different partners meet to maximize the benefits of the cooperation between the different actors and (3) the ‘project-governance’ governing the relation-project assumed by a pilot (generally a firm).

There is a complementarity between the relation-governance assumed by the ‘pôle de compétitivité’ and the governance of the relation. We suggest that the relation-governance has mainly a cognitive function while the relation governance guarantees the double function. The effectiveness of the relation depends on the capacity to create the complementarity between the different governance levels.

Proposition 1: In innovation network of Biobased activities there are three levels and different governance functions with different mechanisms with a complementarity in functions.

| | <i>Institutional-governance</i> | <i>Relation-governance</i> | <i>Project-governance</i> |
|------------------------------|---------------------------------|------------------------------|--|
| <i>Disciplinary function</i> | | | <i>Contractual governance</i> |
| <i>Cognitive function</i> | <i>Contractual governance</i> | <i>Relational governance</i> | <i>Relational and contractual governance</i> |

The development of the biobased industry is a project of a defined territory (in our case Picardie and Champagne-Ardenne) and the creation of the cluster emphasize the choice to cooperate between different partners: research, industry and local communities. We believe that the relation has at its formation stage an initial capital of trust that we will describe as ‘instantaneous’. The spatial proximity, to belong to the same territory, and the existence of a

cluster based on spatial but also social proximity (pairs, friendships, ex-colleagues, alumni network, neighbors, etc.) create an instantaneous trust and commitment feelings. The willingness to cooperate (trust history) stressed by the instantaneous trust and reputation which are organizational determinants, results from the relational (interorganizational) factors (proximity) and the meta-organizational determinants materialized by the existence of an institutional environment that favors cooperation (figure 4). In addition, this proximity helps to build a collective sensemaking for organized action in innovation network. Loosely-coupling occurs (Douglas Orton & Weick, 1990) in this network in the meta-level (relation-level) sense making is thus crucial to create shared values and focusing attention on the most important relation in the system. The relation-governance have to assume this role in order to compensate the loosely links. More we are close to the project level, more ideas become précised, projects designed and the partners fixed, the system occurs tightly coupled.

Proposition 2: the interpersonal, organizational, relational determinants interact each other according to the context factors and influence the governance design. Depending on the level, the network is loosely or tightly coupled which influence the level governance.

The specificity of the exchange and the static view are not sufficient. The Biobased value system evolves and changes the governance functions and mechanisms by a game of positive/negative effect resulting from the quality evaluated of the relationship.

Proposition 3: the relationship governed by relational mechanisms favor positive feed-backs by promoting and nurturing trust and commitment (cf. figure 4).

5. Conclusion

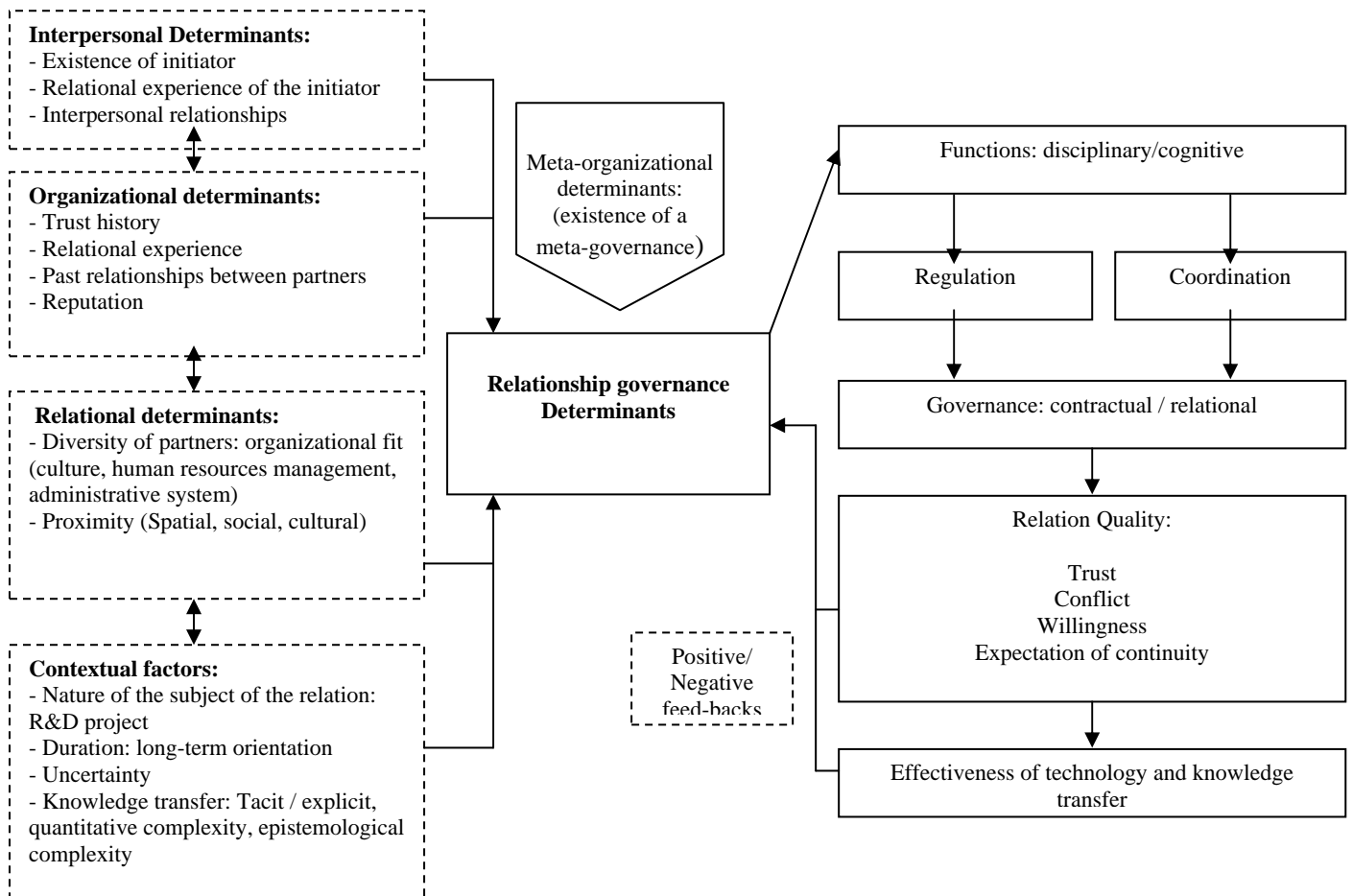
For several years, many researchers stressed the need to pay attention to the black box of governance and yet few studies have been undertaken in this area. This gap is due in part to the difficulty of building a theoretical framework of relations which have borders in constant evolution and with multiple contingency factors.

The interest of our research is to propose an integrative theoretical framework for understanding the governance in value creation system that is still missing in literature. From a managerial point the objective of this framework is to simplify a complex managerial situation in order to have a better understanding of the decision-making processes.

We have seen that the governance of relations between knowledge-based and business activities in the biobased sector has multidimensional aspects: interpersonal, organizational, inter-and meta-organizational. Choosing the effective governance is required to improve the quality of the global relationships within the system and thus ensure the effectiveness of knowledge transfer. These governance relationships are characterized by the existence of different levels, and between them a complementarity of functions is suggested. A global level of governance, called relation-governance, is assuming cognitive function primarily via relational mechanisms. A second level is called project-governance, which in addition to the cognitive function will ensure a disciplinary one to ensure the safety and the continuity of the contracts. An overarching level of institutional-governance helps to identify the roles of institutional environment with regards to innovation atmosphere.

Our research has yet to be fine-tuned by an analysis of the players' games that will identify the players involved, their degree of influence and some of their strategic challenges, the objectives of each actor involved and their level of divergence and convergence, in order to provide an in-depth understanding of the design of governance mechanisms in innovation settings.

Figure 4: Conceptual framework for relationship governance in biobased activities



References

- Ahuja, G., 2000. Collaboration networks, structural holes, and innovation: a longitudinal study. *Administrative Science Quarterly*, 45, 425-455.
- Anderson, T. R., T. U. Daim. 2007. Measuring the efficiency of university technology transfer. *Technovation*. 27, 306-318.
- Anex, R., 2004. Something new under the Sun? The Industrial Ecology of Biobased Products. *Journal of Industrial Ecology*, 7, 1-4.
- Barney, J.B. and Hansen M. H. 1998. Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15, 175-190.
- Beise, M. and H. Stahl, 1999. Public research and industrial innovations in Germany. *Research Policy* 28, 397-422
- Bouglet J. 2006. Contribution à la connaissance de la gouvernance d'entreprise : cas des entreprises nationales, PhD thesis, université Paris-Dauphine.
- Blanc C. 2004. Pour un écosystème de croissance.
- Brass, D. J., J. Galaskiewicz, H. R. Greve and W. Tsai, 2004. Taking stock of networks and organizations: a multilevel perspective. *Academy of Management Journal*, 47, 795-817.
- Brousseau, E. 2000. La gouvernance des processus de coopération. *La coopération industrielle*. Economica. Paris.
- Brousseau E. Raynaud E. 2007. The Economics of Multilevel Governance. Paper presented at the 2006 ISNIE Conference (U. Colorado, Boulder).
- Brown R. C., 2003. Biorenewable Resources. *Engineering New Products from Agriculture*. Ames, Iowa: Iowa State Press, 240 pp.

Cohen, W. M. and R. R. Nelson, 2002. Links and impacts: the influence of public research on industrial R&D. *Management science* 48, 1-23.

Cummings J. Kiesler S. 2007. Coordination costs and projects outcomes in lulti-university collaborations. *Research policy*, 36 (10), 1620-1634.

Dhanaraj C. and A. Parkhe, 2006. Orchestrating innovation networks. *Academy of Management Review*, 31, 659-669.

Dorsch, R. R. and R. W. Miller, 2004. Carbon, Carbon, Everywhere, nor Any Drop to... Market. *Journal of Industrial Ecology*, 7, 13-15.

Dyer, J. H. 1996. Does governance matter? Keiretsu and asset specificity as sources of Japanese competitive advantage. *Organization Science*, 7.

Dyer J.H. and H. Singh, 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*

Dyer J.H. 1997. Effective interfirm collaboration: how firms minimize transaction costs and maximize transaction value. *Strategic management journal*. 18: 535-556.

Ehlinger, S., V. Perret and D. Chabaud, 2007. Quelle gouvernance pour les réseaux territorialisés d'organisations ? *Revue Française de Gestion*, 155-171.

Faulkner, W. and J. Senker, 1994. Making sense of diversity: public-private sector research linkage in three technologies. *Research Policy*. 23, 673-695.

Feller, I., C. P. Ailes, 2002. Impacts of research universities on technological innovation in industry: evidence from engineering research centers. *Research Policy*. 31, 457- 474.

Frery F. 1994. La nébuleuse: peut-on proposer un modèle des structures transactionnelles ? PhD thesis in economics, université Panthéon-Sorbonne.

Gençtürk, E. F. and P. S. Aulakh, 2007. Norms- and Control-Based Governance of International Manufacturer–Distributor Relational Exchanges. *Journal of International Marketing* 15, 92–126.

George, G., Zahra, S.A. and Wood Jr., D.R., 2002. The effects of business–university alliances on innovative output and financial performance: a study of publicly traded biotechnology companies. *Journal of Business Venturing* 17, 577–609.

Gnyawali, D. and R. Madhavan, 2001. Cooperative networks and competitive dynamics: a structural embeddedness perspective. *Academy of Management Review*, 26, 431-445.

Gonard, T. 1999. Public research/industry relationships: efficiency conditions in current innovation. *International Journal of Technology Management*. 17, 334-350.

Grandori, A. Knowledge governance mechanisms and the theory of the firm presented to the Isdie-SPRU conference ‘Knowledge and the firm’, Nice, France, December 2000.

Grandori A. Soda G. 2006. A relational approach to Organization Design. *Industry and Innovation* 13, 151-172

Gulati, R. 1995. Does familiarity breed trust? The implication of repeated ties for contractual choice in alliances. *Academy of Management Journal*. 38, 85-112.

Gulati, R., N. Nohria and A. Zaheer, 2000. Strategic networks. *Strategic Management Journal*, 21, 203-216.

Håkansson H. and I. Snehota (editors) 1995. *Developing Relationships in Business Networks*. Routledge, London and New York, 433 p.

Heide, J, 1994. Interorganizational governance in marketing channels. *Journal of Marketing*, 58, 71-85.

Hoetker, G. and T. Mellewigt, 2004. Choice and performance of governance mechanisms: matching contractual and relational governance to sources of asset specificity. Working paper http://www.business.uiuc.edu/Working_Papers/papers/04-0118.pdf.

Jacquet N. and Darmon D., 2005. Les pôles de compétitivité. Etudes de la documentation française.

Lazzarini S.G., F. R. Chaddad and M. L. Cook, 2001. Integrating supply chain and network analyses: the study of netchains, *Journal on Chain and Network Science*, 1, 7-22.

Lopez-Martinez, R. E., E. Medeli, 1994. Motivations and obstacles to university industry cooperation: a Mexican case. *R&D Management*, 24, 17-32

Mansfield, E. 1991. Academic research and industrial innovation. *Research Policy*. 20, 1-12.

Mesquita, L. F. and S. G. Lazzarini, 2004. Vertical and horizontal relationships in an industrial cluster: implications for firms 'access to global markets. *Academy of Management Proceedings*.

Meyer-Krahmer, F. and U. Schmoch, 1998. Science-based technologies: university-industry interactions in four fields. *Research Policy*. 27, 835-851

Möller, K. and S. Svahn, 2003. Managing strategic nets. A capability perspective. *Marketing Theory*. 3, 209-234.

Möller, K, Rajala, A. and S. Svahn, 2005. Strategic business nets - their type and management. *Journal of Business Research*. 58, 1274-1284.

Möller, K. and A. Rajala, 2007. Rise of strategic net – New modes of value creation. *Industrial Marketing Management*. 36, 895-908.

Monateri H., Ruffieux B., 1996. Cohérence et pertinence des frontières d'entreprises, in *Cohérence, pertinence et évaluation*, ECOSIP, directed by Cohendet P., Jacot J.-H. and Lorino P., Economica.

Normann R. and R. Ramirez, 1993. From value chain to value constellation: designing interactive strategy. *Harvard Business Review*, 71, 65-77.

Nye, J. and Donahue J.D., 2000. *Governance in a Globalizing World*. Washington, DC: Brookings institution Press.

Omta, S. W. F., 2002. Innovation in chains and networks. *Journal on Chain and Network Science*, 2, 73-80.

Owen-Smith, J. and M. Riccaboni, 2002. A comparison of US and European University-Industry relations in the life science. *Management Science* 48, 24-43.

Parolini, C., 1999. *The value net: a tool for competitive strategy*. Chichester (UK): Wiley.

Parkhe, A., 1998. Building trust in International Alliances. *Journal of World Business*. 33, 417-437.

Pfeffer J., Salancik G.R. 1970. *The external control of organizations. A resource dependence perspective*. Harper & Row publishers.

Plewa C., P. Quester and T. Baaken, 2005. Relationship marketing and university-industry linkages: a conceptual framework. *Marketing Theory*. 5, 433-456

Poppo, L. and Zenger T. 2002. Do formal contracts and relational governance function as substitutes or complements? *Strategic Management Journal*. 23, 707-725.

Porter, M., 1991. Towards a dynamic theory of strategy. *Strategic Management Journal*. 12, 95-117.

Powell W.W, D. R. White, K. W. Koput and J. Owen-Smith, 2005. Network dynamics and field evolution: the growth of interorganizational collaboration in the life science. *American Journal of Sociology*. 110, 1132-1205.

Rindfleisch, A. 2000. Organizational trust and inter firm Cooperation: An Examination of Horizontal versus Vertical Alliances. *Marketing Letters*. 11, 81-95.

Ring P. M., Van de Ven, A. 1992. Structuring cooperative relationships between organizations. *Strategic Management Journal*, 13: 483-498.

Ritter, T and H. G. Gemünden, 2003. Interorganizational relationships and networks: an overview. *Journal of Business Research*, 56, 691-697.

Rosenberg, N. and Nelson R. R., 1994. American universities and technical advance in industry. *Research Policy*. 23, 323-348.

- Salman, N. and Saives A. L. 2005. Indirect networks: an intangible resource for biotechnology innovation. *R&D Management*, 35, 203-215.
- Saxenian A.L. 1990. Regional networks and resurgence of silicon valley. *California Management Review*, 89-112.
- Saxton, T. 1997. The effects of partner and relationship characteristics on alliance outcomes. *Academy of Management Journal*. 40, 443-461.
- Shane, S., Stuart, T. 2002. Organizational endowments and the performance of university start-ups. *Management Science* 48, 154–170.
- Sheth, J. N. and Sisodia, R. S., 1999. Revisiting Marketing's Law like Generalizations. *Journal of the Academy of Marketing Science*, 27, 71-87.
- Siegel, D. S. and D. Waldman, 2003. Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. *Research Policy*. 32, 27-48.
- Stabell C.B. and Ø. D. Fjeldstad, 1998. Configuring value for competitive advantage: on chains, shops and networks. *Strategic Management Journal*, 19, 413-437.
- Teece, D J., 1986. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy*, 15, 285-305.
- Thomson J.D. 1967. *Organizations in Action*. McGraw-Hill
- Uzzi, B., 1997. Social structure and competition in inter firm networks: the paradox of embeddedness. *Administrative Science Quarterly*. 42, 35-67.
- Williamson O.E., 1994, *Les institutions de l'économie*. InterEdition.
- Williamson O. E., 1996. *The mechanisms of governance*. New York: Oxford university press.
- Young-Ybarra, C. and M. Wiersema 1999. Strategic flexibility information technology: the influence of transaction cost economics and social exchange theory. *Organization Science*. 4, 439-459.
- Zajac, E-J., and Olsen C.P. 1993. From Transaction cost to Transaction Value Analysis: Implications for the study of Interorganizational Strategies. *Journal of Management Studies*, 30, 1, 131-145.
- Zucker L. G. and M. R. Darby, 2002. Commercializing knowledge: university science, knowledge capture, and firm performance in biotechnology. *Management Science*. 48, 138-153.
- Website: Industry and Agro Resources cluster www.iar-pole.com
- [1] Regional direction for Industry, Research and environment
- [2] Regional consular for industry, commerce and agriculture
- [3] Institutional Partners Committee: the two president of the regional council and the chef of department
- [4] Head of an administrative area
- [5] National Agency for Research
- [6] OSEO-ANVAR-AII: Regional agency for innovation
- [7] Caisse Des Dépôts: Public fund for the economic development
- [8] Regional Center for Innovation and Technology Transfer in Chemistry and Environment