The V-Network Form: Economic Organization and the Theory of the Firm

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Abstract

In this paper, we characterize what we call the "V-network form," a vertical organization distinct from a horizontal network of firms, in which a "hub-firm" organizes and coordinates regular essential operations such as provision, production and distribution between legally independent entities. The hub-firm's economic problem is the provision of incentives to the parties in the network while coordinating their complementary capabilities or competences without recourse to equity ownership. We discuss the relation of this organizational form to the "firm versus market" typology and stress that the V-network form is not a "hybrid form." We argue that valuable insights for the theory of the firm may be gained from a thorough theoretical analysis of the V-network form. In particular, some of these insights may be used as an attempt to clarify the terms of the current debate between the contractual and competence theories of the firm. The approach also inevitably raises questions related to the legal apprehension of the V-network firm.

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The V-Network Form: Economic Organization and the Theory of the Firm

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1. Introduction[1]

The term "network" is used in various strands of literature in various ways. In sociology, Granovetter (1973) and Burt (1980), among others, have drawn attention to formal and informal social exchange networks with a particular emphasis on connections. In organizational economics, the network has often been conceptualized as falling between markets and hierarchies according to Williamson's (1979, 1985, 1991) famous typology. More recently, industrial economics has been reinvigorated by the study of network industries and network externalities with the works of scholars such as Katz and Shapiro (1985) and Economides (1996). Academics from the management and marketing arenas such as Thorelli (1986), Miles and Snow (1986), Jarillo (1988) or Gulati, Nohria and Zaheer (2000) have been looking at what they call strategic networks. Furthermore, the analysis of networks in market economies has been considerably refined in different directions by Kirman (1997) and Kali (1999). Finally, innovation networks have been a theme for standard economists such as Baumol (2001) as well as for evolutionary economists like Freeman (1991), Robertson and Langlois (1995) or Nooteboom (1999).

In this paper, our interest lies neither in network industries nor in social networks but in the vast domain of inter-firm relations. As a new form of inter-firm relations, business networks are one of the salient features of what may be termed the emerging institutional structure of production, a phenomenon emerging from the vertical disintegration of large firms and from the changing forms of competition. In the literature, one stumbles on expressions such as "network of firms," "firm networks" and "network-firm." These should be understood as relating to the horizontality or verticality of a given network. While "network of firms" and "firm networks" designate horizontal networks quite uncontroversially, the term "network-firm" sometimes describes vertical networks. This not only adds to the already abundant confusion surrounding the definition of the firm but also makes unclear whether we are speaking of a network member in a given position or of the network as a whole that acts in a unified sort of way. We argue that in order to clarify these matters we should begin by using the term "form" instead of "firm." We thus distinguish vertical network forms ("V-network forms") from horizontal network forms ("H-network forms") on which most if not all of the literature has concentrated.

The paper is organized as follows. In section 2, we characterize what we call the V-network form, a vertical form of network organization of firms, in which a "hub-firm" coordinates regular essential operations such as provision, production and distribution between legally independent firms. In a vertical network, participant firms correspond to different points in the

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value chain with the hub-firm sometimes delivering the final product to the market and sometimes franchising this function. We discuss the relation of this organizational form to the "firm vs. market" typology. With the exception of Kranton et Minchart (2000), the subject has so far sparked little interest from pure economic theory. We stress that the V-network form is not a "hybrid form." On the contrary, it is a specific form which is neither the result of market failure nor an extension of hierarchy. Following Richardson (1972), Powell (1990) and Hodgson (2002), we believe that a tripartition of forms of economic organization is analytically valid.

In section 3, we argue that valuable insights for the theory of the firm may be gained from a thorough empirical and theoretical analysis of the V-network form, some of which may be used as an attempt to clarify the terms of the current debate between the contractual and competence theories of the firm. Indeed, given its characteristics, the V-network form seems to beg the combination of the two perspectives. Both incentive-based contracts and the productive aspects of firm capabilities come into play. Rajan and Zingales' (1998, 2001) recent work on economic organization may have aspects to offer for such an analysis. In fact, we believe that their work is applicable, with some adjustments, to the V-network form and could contribute to its theoretical conceptualization. Finally, we revisit the differences between the legal definition of the firm and the economic definition of organization based on Rajan and Zingales contribution, stressing the economic implications of the specificity of the V-network form, the legal apprehension of which is inevitably raised by the approach. Section 4 summarizes our conclusions and restates what we consider to be future research.

2. The organization of production: firms, markets and the V-network form

In a world of hypercompetition, large firms are pressured to vertically disintegrate and to re-center their activities on their core competencies.[2] In this context, the V-network form may be encountered in various key sectors ranging from the automobile to the aerospace industries, from textile and garments to the construction industry, from the food-processing business to the film industry and to computers and semiconductors, etc.[3] We first characterize the major features of the V-network form and then position this form of organization of production – a form of "dynamic network" in Snow, Miles and Coleman's (1992) sense – in relation to the standard dichotomy between the firm and the market.

2.1. Characteristics of the V-network form

Four elements characterize the V-network form. We underline in particular two crucial aspects. First, intra-network exchange is partly "non-market," with market exchange being understood in its usual sense. This implies a particular role for the hub-firm in securing network integrity. Second, high asset specificity notwithstanding, vertical integration is not the chosen strategy. We then turn to the specific incentive and motivation mechanisms at the hub-firm's

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[2] The disadvantages of vertical integration are apparent in the context of high competitive pressures due to rapid technological change, product life-cycle acceleration, extreme market specialization, etc. Explanations of the emergence of various network forms are, of course, multiple and much more complex than what would seem from the present article. For an analysis of these multiple causes, see for instance Grandori and Soda (1995). It must however be noted that vertical integration and mergers and acquisitions continue and are certainly not a part of the past.

[3] E.g., Renault, PSA, Toyota, Volvo, Aprilia, Aérospatiale, Danone, Benetton, Nike, Reebok, Calvin Klein, Marks & Spencer, Bombardier, Cisco Systems, Intel, Dell, Motorola, etc. The common feature of these firms is their dense network of suppliers regardless of the fact that some also conclude various strategic alliances and/or set up franchise networks of distribution. These firms also differ as to their choice of core competencies to focus on. This does not change our analysis in significant ways.

disposal.

Non-market exchange and the hub-firm's role

(1) A "V-network form" contractually binds a set of firms that are (a) legally independent yet (b) vertically linked, (c) in which the main firm, called the "hub-firm," the "core-firm," the "focal firm," the "lead firm," the "broker firm" (Snow, Miles, and Coleman, 1992) or the "flagship firm" (Rugman and D'Cruz, 1997), continuously coordinates provision, production and distribution activities. It is literally a "core network" (Robertson and Langlois, 1995) in which the hub-firm may be situated upstream (e.g., Intel) or downstream (e.g., Calvin Klein) in the value chain.

(2) One of the major originalities of the V-network form is that intra-network exchange is "non-market" in that most of the products exchanged do not pre-exist the exchange. The product exists either in the form of a "project" conceived by the hub-firm with the supplier-member of the network actually accomplishing it, or in the form of a "need" expressed by the hub-firm in which case the product's design is the result of a collaborative venture between both the hub-firm and the supplier-member with the supplier eventually producing it.

(3) The hub-firm's central problem is the organization of production. In other words, the hub-firm needs to find and retain the capabilities that it does not possess (or no longer possesses) and coordinate them on a project basis. This implies designing the rules of intra-network interaction, meaning that the hub-firm is the strategic center managing the web of partners (Lorenzoni and Baden-Fuller, 1995). Inside the network, inter-firm coordination relates to complementary, non similar activities (Richardson, 1972) accumulated around the critical resources (Rajan and Zingales, 1998, 2001) situated at the core of the network and controlled by the hub-firm. We qualify these resources below.

(4) In terms of its organizational architecture, the V-network form is often structured in a pyramidal form composed of two, three or more levels.[4] This implies a certain delegation of responsibilities. For example, in the case of two levels, the hub-firm delegates to the firm at the first level the responsibility of organizing transactions with the firms at the second level while keeping control of the choice of firms at the second level, and so on. This dense network of suppliers and of suppliers of suppliers may in some cases include several hundreds of more or less small firms organized around the hub-firm.

These features allow the decoupling of strategy and production both operationally and in terms of ownership whereas taylorism was, among other things, the decoupling of design and execution only in operational terms, i.e., under unified ownership. In the same vein, while the M-form entailed the division of knowledge, the V-network form implies its permanent combination and as such is an example of Hedlund's (1994) N-form.[5] The absence of unified ownership in the V-network form challenges the validity of transaction cost and property rights theories.

Asset specificity and the absence of vertical integration

Empirical research on networks stresses the fact that their operation fosters the creation and accumulation of numerous dedicated or specific assets (e.g., Dyer, 1996; Powell, 1998; Dyer and Nobeoka, 2000; Sobrero and Toulan, 2000). These may be in the form of physical, human,

[4] In this sense, the phenomenon we are describing differs from the "spherical firm" of Miles and Snow (1995) which, according to the authors, will be tomorrow's organization. Theirs is a vision based on the image of an atom around which electron-like components (firms or project teams) rotate at will, in a quasi-spontaneous, transversal way.

[5] With N standing for "novelty" and being the letter after M as in the M-form (Hedlund, 1994).

site, immaterial or time specificity created through repeated relations fraught with uncertainty. Of course, this amounts to both technical and organizational irreversible investments characterized by high sunk costs. Nevertheless, the network does not contract by vertical integration. Thus, regardless of significant contractual incompleteness, vertical integration is not the unique solution to the problem of potential hold-up (Holmström and Roberts, 1998).

From a theoretical point of view, two questions come immediately to mind. First, how can one explain this apparent deficiency of transaction cost theory? Williamson's (1985) arguments explaining vertical integration insist on the simultaneous presence, in the case of frequent transactions, of both uncertainty and asset specificity. This is clearly the case with the V-network form. Second, how do the firms participating in the network elude the risk of hold-up? Received arguments stemming from the property rights theory (Grossman and Hart, 1986; Hart and Moore, 1990; Hart, 1995) hinge on the attribution of property rights, defined as residual control rights, to the party most crucial to the relationship. However, the hub-firm usually does not hold property rights to the network members – in the V-network form, network members are not connected by means of equity ownership – substituting other incentive mechanisms to insure the motivation of all agents critical to production.

The answer to these questions needs to be based on conceptual clarification as well as on thorough empirical work. That asset specificity and potential hold-up do not automatically lead to vertical integration questions the universal relevance of the theories in question. This does not mean in any sense that they are wrong but simply that the variables they highlight are not the only relevant ones. However, that transaction cost theory and property rights theory do not apply directly in our case should come as no surprise since these theories aim at explaining and predicting vertical integration whereas the V-network form springs from vertical disintegration. We discuss these issues further below.

Incentive mechanisms and the protection of network integrity

The V-network form sets up alternative incentive devices guaranteeing protection from eventual opportunism of network members and thus ensuring the network's integrity. These devices substitute formal property rights. Specifically, the hub-firm sets up two different but complementary "incentive-based" mechanisms that regulate its relations with suppliers.[6] The first mechanism can be seen as a selection procedure: the hub-firm chooses some firms and refuses access to other firms. The retained firms are licensed (certified, approved) and constitute the panel at the hub-firm's disposal. Competition among the firms wishing to compose this first-level panel is highly effective in providing incentives since it is common knowledge that the reward awaiting the lucky few is close access to the hub-firm on a long-term basis. The selection and retention of firms by the hub-firm to compose this close network of suppliers is not made on a product or price basis.[7]

The second mechanism is an allocation procedure. Its function is the allocation of intra-network tasks, i.e., between those firms chosen through the selection procedure. Contrary to before, this incentive-based scheme functions on a much shorter term and, here, competition between network members may be extremely fierce. The hub-firm has the possibility of organizing and regulating intra-network power and dependence relations by influencing members' capacities to compete. In order to avoid giving too much power to any network member, the hub-firm uses strategies such as double sourcing allowing it to bypass lock-in

[6] We use the term "incentive-based" in order to underline the existence of incentive compatibility and participation constraints in network interaction.

[7] Fundamentally, it is the capacity of these firms to satisfy the hub-firm's expectations in terms of technological expertise, of production and distribution efficiency, and so forth, that counts.

situations and to retain operational flexibility.

Three conditions must be met for these mechanisms to fulfill their role of eliciting cooperation in terms of specific asset building and avoidance of opportunistic behavior: (a) exchange between the hub-firm and other member firms at relevant levels must be repeated, (b) each member's specific assets must be protected and (c) incentive mechanisms must be credible, i.e., no member must expect to be held-up. The hub-firm's reputation is therefore crucial. Indeed, in a network where intangible assets and expertise are the primary sources of value (e.g., design capacity and brand name of the hub-firm), reputation, commitments and trust (be it calculative) are essential. Most if not all of the literature has emphasized this point. Overall, the result is the continuity, integrity and effectiveness of the structure on the whole.

As an organizational form, the V-network form generates high coordination costs for several reasons: the products circulating are dedicated to the hub-firm, the delivery systems do not allow for any stock accumulation and cooperation implies information sharing and dissemination. In other words, one of the relative disadvantages of the V-network form, compared to the integrated firm, is the greater difficulty of ensuring coordination between agents critical to production. *In fine*, to counter this complication, the hub-firm uses two important schemes, namely the institutional procedure of certification allowing and regulating the choice of network members and thus decreasing ex ante adverse selection risks, and the logistic ICT integration of the system allowing greater ex post control.[8]

2.2. The V-network form and the standard dichotomy

Our preceding account poses the fundamental question of positioning the V-network form relatively to the standard dichotomy between the firm and the market. Such a question is directly implied by the theory of the firm and its Williamsonian development. As a first approximation, it would seem that elements of both markets and hierarchies are present. However, we argue that the V-network form is not a "hybrid form" and that a tripartition of organizational forms is analytically more constructive.

The V-network form is not a hybrid form

In the usual acception of the Coasian dichotomy thesis rehabilitated by Williamson (1979, 1991), the V-network form is a contractual "hybrid form" somewhere between markets and hierarchies, the two polar cases of a continuum. From ideal-types, one is drawn to the analysis of intermediate "plural forms" (Bradach and Eccles, 1989) that compose the "swollen middle" (Hennart, 1993). The rise of the economics of hybrid forms with relatively permeable boundaries that followed has been spectacular as is shown by Ménard (2004). The shift of emphasis to this continuum of contractual forms is such that some have deemed the standard dichotomy absurd (e.g., Cheung, 1983). Yet others continue to argue in favor of maintaining ideal-types in the analysis (e.g., Ménard, 1995).

At the same time, in the fields of managerial and organizational theories, horizontal inter-firm networks as well as vertical forms such as we have described, have been the object of a number of debates. First, some questioned the "transitional" or "new development" character of these new organizational forms (e.g., Miles and Snow, 1986; Powell, 1987).[9] Then, in a second surge of the debate, the research interest turned to the "sustainability" of networks (Jarillo and

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[8] Certification is a quality signal. For example, Toyota's suppliers are considered efficient and trustworthy by outside market actors. Logistic ICT integration allows "just-in-time" delivery and more generally the reduction of coordination costs.

[9] Williamson (1991) seems to think that hybrid forms are essentially unstable and evolve towards the hierarchy pole of the continuum.

Ricart, 1987; Jarillo, 1988). A third but related question was whether what we call the V-network form can be considered "between markets and hierarchies" (Thorelli, 1986) or "neither market nor hierarchy" (Powell, 1990). While some writers believe that a "network paradigm" in industrial economics is emerging (Thorelli, 1986; Johanson and Mattson, 1987), others qualify this discussion as being "metaphysical" (Grandori and Soda, 1995), veiling the thorough conceptual analysis of the problem.

But it is not just a matter of semantics. The continuum thesis is both fallacious and analytically objectionable (Powell, 1990; Robertson and Langlois, 1995). The hybrid form concept only makes sense if one admits the existence and the analytical validity of the firm-market dichotomy.[10] This conception has been the source of diffusion of fuzzy conceptual definitions such as "quasi-firm" and "quasi-market" (Hodgson, 2002). Indeed, terms such as "market-like" and "firm-like" are sometimes used to describe hybrid forms of organization or other observed vague forms. Contrary to some who may see "markets" or "market-like" mechanisms in the incentive schemes we described above, we clearly distinguish between market exchange and intra-network exchange. If everything is contractual, then everything is a matter of degree of "more or less firm-likeness" (Demsetz, 1988). But the term "firm-like" begs the question of the definition of the firm which should logically pre-exist. It is inconsistent to eliminate the definition of the firm by introducing notions of "firm-likeness." Following Hodgson, we believe that "hybrid forms" are yet another fuzzy, muddled and elastic concept. The V-network form is neither the result of market failure nor an extension of hierarchy. Its attributes are not a juxtaposition of polar characteristics. The difference between the V-network form and both the firm and the market is one in nature and not in degree.

A tripartition of forms of economic organization

Classifications based on the dichotomy thesis become quickly very complicated when firms are interconnected in a network of transactions with strong complementarities but in the absence of formal arrangements in terms of equity ownership. We conjecture that a different vision is necessary, one that admits at least three basic forms of economic organization. Instead of the usual binary choice between "make-or-buy," we should be looking at "make-or-buy-or-make-together," etc.[11] In this spirit, some authors speak of "markets, firms and inter-firm cooperation" (Richardson, 1972) while others prefer "markets, firms and relational exchange" (Goldberg, 1980) or "firms, market exchange and non-market exchange" (Hodgson, 2002). Williamson's (1985) "firms, markets and relational contracting" is also in line with this point but with crucial differences.

Williamson adopts a purely contractual perspective based on contract law and considers that forms of relational contracting are hybrid forms. This denies them ultimate theoretical status reserved to markets and hierarchies. In this debate, Richardson's (1972) position is somewhat ambiguous. Indeed, the usual interpretation of his analysis is the one we have mentioned, that is, in favor of a tripartition of forms of economic organization, i.e., without appeal to the hybrid forms concept. But the author states that reality does not exhibit sharp lines of distinction between "species of industrial activity" and that in this "dense network" of inter-firm cooperation, cooperation is a matter of degree. The ambiguity is such that it undermines the potential scope of the argument. It is not so much the fuzziness of boundaries but the conclusion that everything is a matter of degree that is the problem. If reality does not exhibit sharp line of

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[10] Notice the peculiar mode of reasoning that this implies: (1) one observes organizational forms that are *neither* strictly firm *nor* strictly market; (2) one is immediately drawn to the conclusion that these forms are "hybrid," i.e., *both* firm and market.

[11] Kogut, Shan and Walker (1992) speak of "make-or-cooperate." See Gibbons (2001) for a game-theoretic approach of the problem.

distinction in some cases, this does not mean that such lines do not exist or should not exist conceptually. A conceptual clarification is thus still necessary.

In this vein, the idea of "non-market exchange" proposed by Hodgson (2002) is both more precise and more promising: in the same way that the firm is a "non-market entity," the V-network form and other such forms of non-market cooperation are "non-market entities." Intra-network exchange remains a legal exchange in property rights since member-firms are legally independent. But this is clearly non-market exchange since products do not pre-exist the exchange. The V-network form is thus *neither* firm *nor* market. But this does not mean that it is *both* firm and market any more than it means that it is *between* the firm and the market. It is specific organizational form that needs to be treated as such. Not to admit this is to hinder its thorough conceptual analysis. As noted by Van Alstyne (1997: 87), "to conceive of networks as falling exclusively between markets and hierarchies is to employ a false and misleading scale."

3. Some Theoretical Implications

Several fundamental theoretical questions are implied by our assessment. The V-network form, a vertically organized non-hybrid form, needs to be related to the theory of the firm. The question of the boundaries of the firm is essential not only from the point of view of neo-dichotomy type constructions such as the transaction cost and the property rights theories of the firm. It is also an indispensable part of the theoretical analysis of the firm *per se* since the firm is an entity that can be said to be economically and legally "bounded." The fact that boundaries may be difficult to draw in some cases does not mean that definitions of the firm must abandon all reference to them (Hodgson, 2002). We discuss the implications of our analysis of the V-network form for the theory of the firm. We then turn to some institutional considerations.

3.1. The V-network form: insights for the theory of the firm

The insights for the theory of the firm are numerous and of considerable theoretical importance. MacMillan and Farmer (1979) argued in favor of the expansion of the theory of the firm to what they called "managed economic systems" of which inter-firm collaboration is a part. This expression clearly covers our V-network form. We develop two associated matters. The first matter is related to the current debate between the contractual and the competence or capability theories of the firm. Arguably, the V-network form may be used as an attempt to clarify some of the the terms of the debate. The second point underlines the potential usefulness of Rajan and Zingales' (1998, 2001) recent theory of economic organization.

On the debate between the contractual and competence perspectives

The fact that the contractual paradigm dominates the theory of the firm is incontestable. The accent on exchange, on contracts, on property rights and on incentives is familiar to any economist. However, Milgrom and Roberts (1988) stated that too great a weight had been accorded to these elements in the explanation of economic organization and that future research will have to put more emphasis on production, on technology, on knowledge and learning, etc.[12] This is exactly what the competence perspective, broadly defined, is all about, with a particular emphasis on collective learning and knowledge. While the contractual paradigm cannot really explain firm heterogeneity, firms differ and it matters (Nelson, 1991) from the competence

[12] While transaction cost theory and property rights theory are based on the concept of asset specificity and thus cannot be said to fully ignore production and technology aspects of economic organization, these approaches lack an in-depth analysis of the economic implications of distributed knowledge, learning processes and other collective and dynamic factors crucial to the explanation of the firm.

perspective, at least from the competitive advantage point of view. If one includes in this loose family the resource-based theory of the firm (e.g., Wernerfelt, 1984), the knowledge-based theory of the firm (e.g., Grant, 1996) and the dynamic capabilities approach to strategy (e.g., Teece, Pisano and Shuen, 1997), not to mention the Marshallian approach (e.g., Loasby, 1998) or more explicitly evolutionary theories (e.g., Winter, 1988; Hodgson, 1998b; Hodgson and Knudsen, 2004), one cannot help but notice the emergence of an alternative paradigm and of a *bona fide* debate.

The protagonists of this debate have all too often stressed the superiority of their respective approach. For example, defenders of the contractual paradigm have accused the competence perspective of being "immature" and "lacking operational content" (Williamson, 1999). Symmetrically, theorists defending the alternative approach have attacked transaction costs economics' exclusive insistence on opportunism and incentive-based contracts in the explanation of the existence, nature and boundaries of the firm (e.g., Grant, 1996; Conner and Prahalad, 1996). Nevertheless, it would seem that an at least partial combination is possible and desirable (Langlois and Foss, 1997; Hodgson, 1998a; Dosi, Levinthal and Marengo, 2003). This view is also adopted by Gibbons (2005) under the heading "breaking loose." The V-network form may be an application of this debate.[13]

In our characterization, there are purely contractual elements as well as productive capability elements. To mention a just few, both procedures set up by the hub-firm to ensure network integrity are highly competitive and deliver relatively high-powered incentives. Furthermore, the hub-firm manages to protect itself (and the network) from eventual opportunism without resorting to the use of property rights concentration while advancing the overall network knowledge.[14] Finally, the hub-firm's main problem is the coordination of complementary capabilities. It is clear that explanations relying on one and not both perspectives taken in isolation fall a little short of the phenomenon at hand. This is even more so the case when one considers the interconnection of concepts belonging to both approaches: firm capabilities influence the dynamic evolution of transaction costs and, symmetrically, the costs of transacting influence firms' capability accumulation (Langlois, 1992; Nooteboom, 1992; Jacobides and Winter, 2005).

In this respect, the description given above of the incentive-based procedures that limit various forms of ex ante and ex post opportunism is incomplete in its account of network integrity and continuity. One cannot simply assume that the distributed knowledge of member firms will just meld spontaneously together once coordination costs are reduced through procedures such as certification and ICT integration. These aspects are important, but so are knowledge combination, learning and absorptive capacity; this implies combining concepts from both perspectives. For instance, incompleteness of contract lays down the path for learning (Foss, 1996). Since products generally do not pre-exist intra-network exchange but are progressively elaborated through close collaboration, knowledge sharing and problem-solving are essential. Incomplete contracts provide room for both incentive issues and for learning: in a world of complete contracts, both incentive issues and knowledge issues would be solved ex ante. Unforeseen contingencies that complicate inter-firm coordination are part of the problem-solving process.

Another interesting bridge to be built between the two perspectives is the articulation of intra-network information processing and knowledge processing. Here, one can relate

[13] In the same vein, the related issue of inter-firm collaboration is explored by Heiman and Nickerson (2002). Here, we set aside the matter of innovation networks, most of which are horizontal, though their explanation is clearly a matter of combining both perspectives. See Pyka's (2002) apposite discussion.

[14] See the related discussion of Helper, MacDuffie and Sabel (2000).

Fransman's (1994) distinction between the "firm as an information processor" (contractual perspective) and the "firm as a repository of knowledge" (competence perspective) to our discussion of the V-network form's organizational structure and of the hub-firm's main role. Indeed, we consider that the core of the network, the inner circle of the hub-firm and its close collaborators linked through productive complementarities, is the locus of the network's knowledge and thus the main source of value. Second-level (and lower-level) suppliers' access to the network knowledge repository is limited and the main difficulties they face are of a contractual, informational sort. In other words, if one were to draw economic boundaries of the V-network form regardless of the legal independence of member firms, one would draw two types of boundaries based on the distributed character of expertise (Sobrero and Toulan, 2000). Network position of a given firm determines its possibility to dedicate its resources and participate in the main knowledge-creating process, depending on its absorptive capacity (Tsai, 2001).

To rely solely on contractual aspects and to take the transaction as the fundamental unit of analysis would be eventually possible for one of the firms participating in the outer core of the network but certainly not for firms in the inner circle or for the network taken as a whole.[15] Symmetrically, to analyze the network as a whole while ignoring the particularities of its individual firm members would be to commit the same sort of analytical shortcut. Both dimensions have to enter the picture. To date and to our knowledge, a readily applicable synthesis does not exist and has yet to be developed. Ideally, the appropriate unit of analysis would incorporate or allow to build analytically the parts-whole relations characteristic not only of the V-network form but also of all firms. Indeed, such parts-whole relations are not only structurally part of the organization but also productively so since different aspects of overall capabilities relate to different organizational levels. All work in this direction, particularly from a methodological point of view, will thus be extremely useful for further developments.

Towards a theory of economic organization

Our discussion here rests on the implicit hypothesis that the theory of the firm is directly applicable to the V-network form, a vertically organized network of firms. But can we analyze the V-network form in the exact terms of the theory of the firm? This last question is deeply meaningful. We have argued that the V-network form is distinct from both the market and the firm. It follows that the theory of the V-network form should be distinct from both the theory of the market and the theory of the firm. The V-network form is not *a* firm but an organization comprising *several* firms. It is, to use MacMillan and Farmer's (1979) terminology, a "managed economic system," which means that it is managed or governed by the hub-firm. Governance mechanisms are thus crucial. The hub-firm exerts decisive formal and informal influence on network members without any recourse to property rights concentration.[16] The source of its power must lie elsewhere and the analysis of this power, i.e., of its sources and workings, is thus

[15] One of the major differences between the contractual approach and the competence perspective resides in the choice of the appropriate unit of analysis. Williamson and contractual theorists in general consider the transaction or the contract as the fundamental unit of analysis whereas in the competence approach it is the firm as a productive entity that is at the center of the analysis. One can also consider that the (inter-firm) relation is the relevant unit of analysis (Holmlund and Törnroos, 1997) or that it is the network as a whole (Benson, 1975; Powell, 2001). See Hagström's (2000) discussion of this point.

[16] Such formal influence does not make the network a hierarchy. In a sense, we can think of the network as a "polyarchy" à la Sah and Stiglitz (1986) except that Sah and Stiglitz associate polyarchy with decentralized economies, i.e., with markets. The informal influence can be analyzed using Baker, Gibbons and Murphy's (2002) "relational outsourcing" concept. In any case, the V-network form cannot (and does not try to) imitate the market any more than it can (or does) imitate the firm. This could be seen as a double "selective intervention" problem.

essential to the understanding of the V-network form. In fact, the intra-network decision process may be considered to be a political process (Benson, 1975; Elg and Johansson, 1997).

In this context, the analysis of power recently developed by Rajan and Zingales (1998, 2001) seems promising.[17] The hub-firm possesses "critical resources" generating an economic rent. These can be the brand name, its reputation, goodwill, a market niche, etc. Conceptually, we can consider that the critical resources are situated at the core of the network under the hub-firm's control. The participating firms, those chosen through the selection procedure, obtain the possibility and the right to specialize their own resources to the relation but this "access right" may be revoked. Therefore, this is one of the decisive sources of the hub-firm's intra-network power. Applying Rajan and Zingales (2001), this means that the control of access rights creates the power to design intra-network organization so as to initiate and supervise complementary inter-firm specific investments or, put differently, capability building. Once specialized, member firms create and compile their own forms of critical resources since their switching costs rise considerably for the hub-firm. Intra-network power, while still in favor of the hub-firm, is consequently somewhat balanced. In this account, power is not unilateral as it is usually considered in property rights theories. Network position becomes a crucial factor since the closer to the core of co-specialized critical resources, the more the positional power and the rents. This analytical construction seems to fit our preceding discussion.

In Rajan and Zingales' perspective, access is a temporal activity that presupposes long-term relations. From the point of view of a potential member firm, access may be a critical resource in itself. In a competitive setting, belonging to a network as the one we are describing may be a synonym of protection and can be seen as a niche assuring survival. The logistic ICT integration and the certification procedures mentioned above in relation to the incentive mechanisms at the hub-firm's disposal may also be considered access instruments for firms without particular comparative ex ante critical resources. Hence, an economy formed of network structures in which inter-network competition is acute may be considered an "economy of access."[18]

More specifically, in Rajan and Zingales' (2001) view, an economic organization is a unique web-combination of complementary specific investments (human and non-human) accumulated over time and formed around a core of critical resources. We believe that their definition of economic organization could constitute a first step towards the conceptual analysis of the V-network form because it encompasses the "organizational glue" that protects the network's integrity and ensures its continuity. Without such glue there is nothing to keep the network from falling to pieces since member firms are legally independent. The stronger the glue, i.e., the stronger the unity, the more one can speak of an economic unit or of an active complex entity. Also of importance, the definition strongly resembles the focus of the competence perspective largely defined. However, Rajan and Zingales underline the fact that there is a difference between the boundaries of the firm defined by its property rights and their economic definition of the organization. Thus, we now turn to the legal apprehension of the V-network form.

3.2. Some law and economics of the V-network form

The distinction underlined by Rajan and Zingales (2001) between the legal definition of the firm and their economic definition of organization implies the possibility that the economic organization thus qualified may transcend the boundaries of the "legal shell," i.e., the firm. In a similar thrust, Dyer and Singh (1998) show that a firm's critical resources may extend beyond

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[17] Kali (2001) applies Rajan and Zingales' analysis to business groups. In the same manner, we contend that applying these ideas to the V-network form may be fruitful.

[18] We can therefore push Rifkin's (2000) idea of the "age of access" beyond the possibilities offered by ICT in the new global economy.

firm boundaries. This point deserves a more detailed discussion. In what follows, we consider the differences between legal and economic definitions of the firm and of the V-network form in order to pave the way for the consequent examination of the institutional structure of production.

The legal definition of the firm and the definition of economic organization

The hub-firm has to coordinate the productive activities of legally independent firms. If the V-network form as a whole is an "economic organization" in Rajan and Zingales' sense, then each firm composing the network piloted by the hub-firm is a "firm." That much does not seem very controversial. The idea that the legal definition of the firm is basically one in terms of property rights implies the clear delineation the firm's boundaries, as in the case of Grossman, Hart and Moore's approach in which the firm is simply a collection of non-human assets. According to Rajan and Zingales (2000), clear boundaries defined by property rights were characteristic of the traditional Chandlerian firm but such is no longer the case when it comes to new forms of economic organization. Presumably, this is also the case with the V-network form. If one were to apply their argument, the economic boundaries of the organization, i.e., of the V-network form, would correspond to the limits of the hub-firm's power. Note the theory of the firm flavor.

While this line of reasoning seems relatively straightforward, one of its major difficulties is the insistence on the fact that the "legal" definition of the firm hinges solely on property rights. This is the vision usually adopted in the contractual theories of the firm, from Williamson to Hart. Be that as it may, such a vision neglects the legally fundamental definition of the firm. From a legal point of view, the first and foremost definition of a firm is that it is a judicially recognized entity, an established "legal person," endowed with the right to enter into contracts , possess assets, sue or be sued (Soderquist, 2000; Kraakman, 2001; Hodgson, 2002).[19] The establishment of such "legal personality" may be seen as an instrument of transaction cost minimization (Kraakman, 2001) or as a device devoted to the protection and accumulation of specific assets characteristic of team production (Blair and Stout, 1999). Whatever the economic justification, the bottom line is that this reality is indisputable and unavoidable. Rajan and Zingales' position according to which the legal definition relates only to property rights is thus inaccurate and ambiguous. To their credit, however, is the discussion of the links between legal and economic definitions of the firm.

The network is not instituted. The network is not a legal person. "Network" is not even a legal concept (Buxbaum, 1993) and is not suited to be one (Teubner, 2003). In this sense, the V-network form, as an organizational form, does not benefit from a legal recognition comparable to that of the firm strictly speaking. A question directly related to the preceding discussion comes immediately to mind: can we consider that the V-network form is *a productive entity in toto* or is it simply *an aggregation of productive entities*? From the legal standpoint, for example in terms of the limited liability of shareholders, it seems clear that we are dealing with multiple legally recognized entities in which case the network as a whole does not benefit from limited liability, as is the case of the firm (or, more precisely, of the corporation). The hub-firm's shareholders do not hold shares in the network but only in the hub-firm which itself does not hold property rights to member firms. But in terms of product liability, the problem is different (Reich-Graefe, 2005). Consumers sue hub-firms, not other network-members whose existence they probably ignore. The issue to be consequently settled between the hub-firm and the liable member is of no concern to the consumer. While in such cases the parent-subsidiary relations

[19] To consider this a "legal fiction" is not entirely false but to stop at that obscures the analytical importance of the fact that the firm is a legal and economic entity regardless of whether it is personified. Even a *de facto* corporation is a legal entity. Arguably, one cannot sue a collection of non-human assets any more than a set of contracts.

inside corporate groups implies *de jure* parent liability given equity ownership, in the V-network form there is a form of *de facto* liabity of the hub-firm.[20] In a sense, we may speak of "piercing the contractual veil" (Teubner, 2003).

Corporate law cannot apply directly to the V-network form. Reich-Graefe (2005) argues that "relational networks" – of which our V-network form is an example – need to be handled with more general principles of enterprise law or, put differently, with legal doctrines emphasizing enterprise over legal entity, substance over form. From an economic point of view, how can one deny that networks compete with each other as well as with other firms, acting as economic units? In this case, and here we come back to Rajan and Zingales' discussion, the question of whether the V-network form constitutes an autonomous economic entity turns on the analysis of the limits of the hub-firm's power. Can the hub-firm effectively pilot the network, governing the behavior of satellite firms? Can the hub-firm effectively ensure the durability of its organization, preventing its dissolution? Given our characterization, the answer would seem to be affirmative.[21] This does not mean that one will always encounter sharp boundaries. But again, if the boundaries of the V-network form may be difficult to draw in some circumstances, this does not mean that it cannot be considered an economic unit in its own right.

By demonstrating that their definition of an economic organization does not fully overlap with the "legal" definition of the firm, Rajan and Zingales (2001) conclude that the legal definition is inadequate and ill-adapted to today's firms. We can think of several comments on this point. While it seems perfectly logical that the law co-evolves with industrial realities, their conclusion is a bit hasty. The emergence of new forms of economic organization of production does not imply that the legal form of the corporation is an anachronism (Kraakman, 2001). Networks do not mean the demise of the most standard legal form to date. The contrary is quite true: inter-firm networks could not exist in the absence of legal entity status and thus of firms.

Furthermore, it is unclear from Rajan and Zingales' conclusion whether a new legal definition of the firm is necessary or whether jurists, with the help of economists, should come up with a legal definition for their economic organization. What if the new organization of Rajan and Zingales, just as our V-network form, turns out to be a transitional form? Are we to multiply entities as soon as some new form emerges? That matters have never been dealt with in this way may actually be quite beneficial: new forms, whether transitional or not (how does one determine whether a given form is "transitional"?), may actually benefit form legal incompleteness. When we think of the V-network form as an economic unit in its own right, we do not mean to imply that the law should sanction this formally by statute. Whether and how the law should evolve is an open question.

The institutional structure of production

Given the incontestable legal reality according to which the firms are legally recognized entities, let us go back to Coase's (1992) position. When speaking of the "institutional structure

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[20] On this issue, Kraakman (2001) argues that it would eventually be possible to consider that the network has some sort of *de facto* limited product liability: since the network as a whole is not a legally recognized entity, no one member may be held liable for other members. However, Kraakman adds, this form of "homemade liability" has little economic value and on the contrary may be the source of coordination and opportunism problems. Kraakman's point applies more to H-network forms.

[21] This line of reasoning is also defended by Orts (1998) who dubs "relational firms" those complex structures that economically act as an entity while maintaining internal legal boundaries. Applied to our discussion, we *legally* distinguish structures such as conglomerates, holding companies and business groups – all "relational firms" for Orts – from the V-network form by the dispersed ownership and shareholder liability of the latter. We *economically* distinguish those forms from the V-network form by the essentially productive strategy of the latter.

of production," Coase (1992: 713) had in mind those "features of the economic system so obvious that … they have tended to be overlooked." Among other things, Coase urges for the inclusion in our analysis of the institutional environment which affects both transaction costs *and* production viewed not only from the production costs perspective. The institutional division of labor between firms, beyond the technical intra-firm division of labor, implies that inter-firm relations must enter the story. Beyond the governance of individual transactions, it is this analysis of the global, system-level distribution of activities among firms that Coase (1972) had hoped would emerge.

From this standpoint, insights from both the contractual and the competence perspectives must be combined in the effort of theorizing the institutional structure of production. The two dimensions of inter-firm exchange and production must play a complementary role (Madhok, 2002; Jacobides and Winter, 2005). Although Williamson (1991, 1999) admits that governance structures differ in their costs and competencies, few economists have gone down this road traveled more often by business management scholars. Coase (1991, 1992) has repeatedly insisted on the need for more thorough empirical work on the actual activities of firms. For a given firm, the choice of activities does not depend exclusively on transaction costs and on the counterfactual comparison of governance structures. This does not mean that these elements are not important but simply that they cannot explain everything. Firm resources and capabilities as well as the institutional possibilities (e.g., formal and informal rules, prevailing legal doctrine, accounting methods, etc.) that the system has to offer are important. In this sense, modes of control and various working rules at the hub-firm's disposal are essential (Benassi, 1995). Institutions are not only constraints. They are also resources.

In order to understand new forms of economic organization, we need to understand how "capabilities co-evolve with transaction costs to the set the menu of available choices that firms face in an industry" (Jacobides and Winter, 2005: 396) both in the short run and in the long run. If organizational forms are composed of several firms then it is crucial to understand how and why this is allowed by the institutional structure at a given time. When a large firm chooses to vertically disintegrate, the distribution of productive capabilities in the industry is at least as important if not more important than transaction costs. When vertical integration was the main empirical observation and thus the main research interest, economic theory lost sight of inter-firm relations with a few rare exceptions. Now that we observe a recombination of the value chain outside the original vertically integrated firm, research interest for inter-firm relations has considerably grown. The V-network form is an illustration of this new division of labor between firms.

4. Conclusions

Networks constitute without any doubt one of the major characteristics of the emerging institutional structure of production in various key sectors. The institutional structure of production is not resumed by a binary choice of firm or market with the rest being a mix of both. To analyze the V-network form as a mix of price and authority is convenient but such a view veils more than it illuminates. The V-network form is specific relatively to both the firm and the market and this specificity endows it with analytical importance in its own right. Hence our use of the term "form" instead of "firm," as in "network form" as opposed to "network-firm," and our characterization of intra-network exchange as being "non-market." Intra-network control mechanisms at the hub-firm's disposal are said to be "incentive-based" but should not to be confused with market incentives.

Compared to the theory of the firm, we hope to have shown that the V-network form may be terrain for compromise and bridge-building between the contractual and competence

perspectives rather than a field of battle. By taking the debate "outside the (theory of the) firm" we have underlined some crucial links between the two perspectives not only in order to understand the V-network form but also to highlight some possible solutions for the theory of the firm. Indeed, aspects from both perspectives need to be combined in order to understand *all* firms. In discussing Rajan and Zingales' important contribution to the analysis of economic organization, we have spelled out some of the economic and legal implications of our analysis. Much methodological work remains in terms of which units of analysis are to be chosen and how the parts-whole problem is to be dealt with. These are questions that a theory of the firm needs to address as well. In this spirit, our aim is not only to theorize the V-network form but also to add precision to the definition of the firm. Vague realities are no excuse for vague theoretical definitions. In fact, vagueness should stimulate conceptual clarification. This means a close re-examination of our existing language and theories.

Future research will have to engage in much more terminological and conceptual clarification. For instance, the term "network" is too large, embracing everything, depending on the commentator, from social and business relations to inter-firm collaboration, from the Japanese *keiretsu* to industrial districts and various forms of alliances, partnerships and business associations. In this paper, the aim of our characterization was to outline one of these forms of network that we have called the V-network form – a network vertically organized and led by a hub-firm, comprising several satellite firms, the number and function of which depend on the circumstances. More precision is needed in developing a meaningful theoretical account of this managed economic system. The present paper may thus be considered a preliminary sketch, one that puts the accent more on general structure than on process. More work on combinations of the contractual and competence perspectives is needed. Our examples of possible bridges to be built are by no means the only ones. The analytical framework has yet to be improved by thorough consideration of the law and other institutional realities. Economic theory must take more interest in the actual institutional roots of firms, markets *and* various other forms, of which networks are but an example, constantly replacing the analysis in a historically valid framework.

References

Baker, George, Robert Gibbons and Kevin J. Murphy (2002). Relational Contracts and the Theory of the Firm. *Quarterly Journal of Economics* 117(1), 39-84.

Baumol, William J. (2001). When Is Inter-Firm Coordination Beneficial? The Case of Innovation. *International Journal of Industrial Organization* 19(5), 727-737.

Benassi, Mario (1995). Governance Factors in a Network Process Approach. *Scandinavian Journal of Management* 11(3), 269-281.

Benson, Kenneth J. (1975). The Interorganizational Network as a Political Economy. *Administrative Science Quarterly* 20(2), 229-249.

Blair, Margaret M. and Lynn A. Stout (1999). A Team Production Theory of Corporate Law. *Virginia Law Review* 85(2), 247-328.

Bradach, Jeffrey L. and Robert G. Eccles (1989). Price, Authority and Trust: From Ideal Types to Plural Forms. *Annual Review of Sociology* 15(1), 97-118.

Burt, Ronald S. (1980). Models of Network Structure. *Annual Review of Sociology* 6, 79-141.

Buxbaum, Richard M. (1993). Is "Network" a Legal Concept? *Journal of Institutional and Theoretical Economics* 149(4), 698-705.

Cheung, Steven N. S. (1983). The Contractual Nature of the Firm. *Journal of Law and Economics* 26(1), 1-21.

Coase, Ronald H. (1972). Industrial Organization: A Proposal for Research, *in* Victor R. Fuchs (ed.), *Policy Issues and Research Opportunities in Industrial Organization*. New York: NBER, 59-73.

Coase, Ronald H. (1991). Contracts and the Activities of Firms. *Journal of Law and Economics* 34(2), 451-452.

Coase, Ronald H. (1992). The Institutional Structure of Production. *American Economic Review* 88(4),

713-719.
Conner, Kathleen R. and C. K. Prahalad (1996). A Resource-Based Theory of the Firm: Knowledge versus Opportunism. *Organization Science* 7(5), 477-501.
Demsetz, Harold (1988). The Theory of the Firm Revisited. *Journal of Law, Economics and Organization* 4(1), 141-161.
Dosi, Giovanni, Daniel Levinthal and Luigi Marengo (2003). Bridging Contested Terrain: Linking Incentive-Based and Learning Perspectives on Organizational Evolution. *Industrial and Corporate Change* 12(2), 413-436.
Dyer, Jeffrey H. (1996). Specialized Supplier Networks as a Source of Competitive Advantage: Evidence for the Auto Industry. *Strategic Management Journal* 17(4), 271-291.
Dyer, Jeffrey H. and Harbir Singh (1998). The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. *Academy of Management Review* 23(4), 660-679
Dyer, Jeffrey H. and Kentaro Nobeoka (2000). Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case. *Strategic Management Journal* 21(3), 345-367.
Economides, Nicolas (1996). The Economics of Networks. *International Journal of Industrial Organization* 14(6), 673-699.
Elg, Ulf and Ulf Johansson (1997). Decision-Making in Inter-Firm Networks as a Political Process. *Organization Studies* 18(3), 361-384.
Foss, Nicolai J. (1996). Firms, Incomplete Contracts and Organizational Learning. DRUID Working Paper 96-2, Copenhagen Business School.
Fransman, Martin (1994). Information, Knowledge, Vision and Theories of the Firm. *Industrial and Corporate Change* 3(3), 713-757.
Freeman, Christopher (1991). Networks of Innovators: A Synthesis of Research Issues. *Research Policy* 20(5), 499-514.
Gibbons, Robert (2001). Firms (and Other Relationships). *in* Paul DiMaggio (ed.), *The Twenty-First-Century Firm: Changing Economic Organization in International Perspective*. Princeton: Princeton University Press, 186-199.
Gibbons, Robert (2005). Four Formal(izable) Theories of the Firm? *Journal of Economic Behavior and Organization* 58(2), 200-245.
Goldberg, Victor P. (1980). Relational Exchange: Economics and Complex Contracts. *American Behavioral Scientist* 23(3), 337-352.
Grandori, Anna and Guiseppe Soda (1995). Inter-Firm Networks: Antecedents, Mechanisms and Forms. *Organization Studies* 16(2), 183-214.
Granovetter, Mark S. (1973). The Strength of Weak Ties. *American Journal of Sociology* 78(6), 1360-1380.
Grant, Robert M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal* 17(1-2), 109-122.
Grossman, Sanford and Oliver D. Hart (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy* 94(2), 691-719.
Gulati, Ranjay, Nitin Nohria and Akbar Zaheer (2000). Strategic Networks. *Strategic Management Journal* 21(3), 203-215.
Hagström, Peter (2000). Relaxing the Boundaries of the Firm. *in* Julian Birkinshaw and Peter Hagström (eds.), *The Flexible Firm: Capability Management in Network Organizations*. Oxford: Oxford University Press, 207-212.
Hart, Oliver D. (1995). *Firms, Contracts and Financial Structure*. New York: Oxford University Press.
Hart, Oliver D. and John Moore (1990). Property Rights and the Nature of the Firm. *Journal of Political Economy* 98(6), 1119-1158.
Hedlund, Gunnar (1994). A Model of Knowledge Management and the N-Form Corporation. *Strategic Management Journal* 15, 73-90.
Heiman, Bruce and Jack A. Nickerson (2002). Towards Reconciling Transaction Cost Economics and the Knowledge-Based View of the Firm: The Context of Interfirm Collaboration. *International Journal of the Economics of Business* 9(1), 97-116.
Helper, Susan, John P. MacDuffie and Charles Sabel (2000). Pragmatic Collaborations: Advancing Knowledge While Controlling Opportunism. *Industrial and Corporate Change* 9(3), 443-488.
Hennart, Jean-François (1993). Explaining the Swollen Middle: Why Most Transactions are a Mix of

"Market" and "Hierarchy." *Organization Science* 4(4), 529-547.

Hodgson, Geoffrey M. (1998a). Competence and Contract in the Theory of the Firm. *Journal of Economic Behavior and Organization* 35(2), 179-201.

Hodgson, Geoffrey M. (1998b). Evolutionary and Competence-Based Theories of the Firm. *Journal of Economic Studies* 25(1), 25-56.

Hodgson, Geoffrey M. (2002). The Legal Nature of the Firm and the Myth of the Firm-Market Hybrid. *International Journal of the Economics of Business* 9(1), 37-60.

Hodgson, Geoffrey M. and Thorbjørn Knudsen (2004). The Firm as an Interactor: Firms as Vehicles for habits and routines. *Journal of Evolutionary Economics* 14(3), 281-307.

Holmlund, Maria and Jan-Ake Törnroos (1997). What are Relationships in Business Networks? *Management Decision* 35(4), 304-309.

Holmström, Bengt and John Roberts (1998). The Boundaries of the Firm Revisited. *Journal of Economic Perspectives* 12(4), 73-94.

Jacobides, Michael G. and Sidney G. Winter (2005). The Co-Evolution of Capabilities and Transaction Costs: Explaining the Institutional Structure of Production. *Strategic Management Journal* 26(5), 395-413.

Jarillo, J. Carlos and Joan E. Ricart (1987). Sustaining Networks. *Interfaces* 17(5), 82-91.

Jarillo, J. Carlos (1988). On Strategic Networks. *Strategic Management Journal* 9(1), 31-41.

Johanson, Jan and Lars-Gunnar Mattsson (1987). Interorganizational Relations in Industrial Systems: A Network Approach Compared with the Transaction-Costs Approach. *International Studies of Management and Organization* 17(1), 34-48.

Katz, Michael L. and Carl Shapiro (1985). Network Externalities, Competition and Compatibility. *American Economic Review* 75(3), 424-440.

Kali, Raja (1999). Endogenous Business Networks. *Journal of Law, Economics and Organization* 15(3), 615-636.

Kali, Raja (2001). The Nature of the Business Group: Power, Relational Contacts and Scope. Mimeo. University of Arkansas.

Kirman, Alan (1997). The Economy as an Evolving Network. *Journal of Evolutionary Economics* 7(4), 339-353.

Kogut, Bruce, Weijan Shan and Gordon Walker (1992). The Make-or-Cooperate Decision in the Context of an Industry Network. *in* Nitin Nohria and Robert G. Eccles (eds.), *Networks and Organizations: Structure, Form and Action*. Boston: Harvard Business School Press, 348-365.

Kraakman, Reinier (2001). The Durability of the Corporate Form. *in* Paul DiMaggio (ed.), *The Twenty-First-Century Firm: Changing Economic Organization in International Perspective*. Princeton: Princeton University Press, 147-160.

Kranton, Rachel E. and Deborah F. Minchart (2000). Networks versus Vertical Integration. *Rand Journal of Economics* 31(3), 570-601.

Langlois, Richard N. (1992). Transaction Costs in Real Time. *Industrial and Corporate Change* 1(1), 99-127.

Langlois, Richard N. and Nicolai J. Foss (1997). Capabilities and Governance: The Rebirth of Production in the Theory of Economic Organization. *Kyklos* 52(2), 201-218.

Loasby, Brian J. (1998). The Organisation of Capabilities. *Journal of Economic Behavior and Organization* 35(2), 139-160.

Lorenzoni, Gianni and Charles Baden-Fuller (1995). Creating a Strategic Center to Manage a Web of Partners. *California Management Review* 37(3), 146-163.

MacMillan, Keith and David Farmer (1979). Redefining the Boundaries of the Firm. *Journal of Industrial Economics* 27(3), 277-285.

Madhok, Anoop (2002). Reassessing the Fundamentals and Beyond: Ronald Coase, The Transaction Cost and Resource-Based Theories of the Firm and the Institutional Structure of Production. *Strategic Management Journal* 23(6), 535-550.

Ménard, Claude (1995). Markets as Institutions versus Organizations as Markets? Disentangling Some Fundamental Concepts. *Journal of Economic Behavior and Organization* 28(2), 161-182.

Ménard, Claude (2004). The Economics of Hybrid Organizations. *Journal of Institutional and Theoretical Economics* 160(3), 345-376.

Miles, Raymond E. and Charles C. Snow (1986). Organizations: New Concepts for New Forms.

California Management Review 28(2), 52-72.

Miles, Raymond E. and Charles C. Snow (1995). The New Network Firm: A Spherical Structure Built on a Human Investment Philosophy. *Organizational Dynamics* 23(4), 5-18.

Milgrom, Paul and John Roberts (1988). Theory of the Firm: Past, Present, Future. *Canadian Journal of Economics* 21(3), 444-458.

Nelson, Richard R. (1991). Why do Firms Differ, and How Does it Matter? *Strategic Management Journal* 12(1), 61-74

Nooteboom, Bart (1992). Towards a Dynamic Theory of Transactions. *Journal of Evolutionary Economics* 2(4), 281-299.

Nooteboom, Bart (1999). Dynamic Efficiency of Networks. *in* Anna Grandori (ed.), *Inter-Firm Networks: Organization and Industrial Competitiveness*. London: Routledge, 91-119.

Orts, Eric W. (1998). Shirking and Sharking: A Legal Theory of the Firm. *Yale Law and Policy Review* 16(2), 265-329.

Powell, Walter W. (1987). Hybrid Organizational Arrangements: New Forms or Transitional Development? *California Management Review* 30(1), 67-89.

Powell, Walter W. (1990). Neither Market Nor Hierarchy: Networks Forms of Organization. *Research in Organizational Behavior* 12, 185-336.

Powell, Walter W. (1998). Learning From Collaboration: Knowledge and Networks in Biotechnology and Pharmaceutical Industries. *California Management Review* 40(3), 228-240.

Powell, Walter W. (2001).The Capitalist Firm in the Twenty-First Century: Emerging Patterns in Western Europe. *in* Paul DiMaggio (ed.), *The Twenty-First-Century Firm: Changing Economic Organization in International Perspective*. Princeton: Princeton University Press, 33-68.

Pyka, Andreas (2002). Innovation Networks in Economics: From the Incentive-Based to the Knowledge-Based Approaches. *European Journal of Innovation Management* 5(3), 152-163.

Rajan, Raghuram G. and Luigi Zingales (1998). Power in a Theory of the Firm. *Quarterly Journal of Economics* 113(2), 387-432.

Rajan, Raghuram G. et Luigi Zingales (2000). The Governance of the New Enterprise. *in* Xavier Vives (ed.), *Corporate Governance: Theoretical and Empirical Perspectives*. Cambridge: Cambridge University Press, 201-227.

Rajan, Raghuram G. and Luigi Zingales (2001). The Firm as a Dedicated Hierarchy: A Theory of the Origins and the Growth of Firms. *Quarterly Journal of Economics* 116(3), 805-851.

Reich-Graefe, René (2005). Relational Networks and Enterprise Law: Comparative Trends of Network Liability in the United States and Europe. Mimeo. University of Connecticut School of Law.

Richardson, George B. (1972). The Organisation of Industry. *Economic Journal* 82(327), 883-896.

Rifkin, Jeremy (2000). *The Age of Access.* London: Penguin.

Robertson, Paul L. and Richard N. Langlois (1995). Innovation, Networks and Vertical Integration. *Research Policy* 24(4), 543-562.

Rugman, Alan and Joseph D'Cruz (1997). A Theory of the Flagship Firm. *European Management Review* 15(4), 403-412.

Sah, Raaj K. and Joseph E. Stiglitz (1986). The Architecture of Economic Systems: Hierarchies and Polyarchies. *American Economic Review* 76(4), 716-727.

Soderquist, Larry D. (2000). Theory of the Firm: What a Corporation Is. *Journal of Corporation Law* 25(2), 375-381.

Snow, Charles C., Raymond E. Miles and Henry J. Coleman (1992). Managing 21st Century Network Organizations. *Organizational Dynamics* 20(3), 5-20.

Sobrero, Maurizio and Omar Toulan (2000). Task Partitioning, Communication Activities and the Performance of Supplier Relations in Product Development. *in* Julian Birkinshaw and Peter Hagström (eds.), *The Flexible Firm: Capability Management in Network Organizations*. Oxford: Oxford University Press, 21-42.

Teubner, Gunther (2003). *Coincidentia oppositorum*: Hybrid Networks Beyond Contract and Organization. Mimeo. Yale Law School.

Thorelli, Hans B. (1986). Networks: Between Markets and Hierarchies. *Strategic Management Journal* 7(1), 37-51.

Teece, David J., Gary Pisano and Amy Shuen (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal* 18(7), 509-533.

Tsai, Wenpin (2001). Knowledge Transfer in Intraorganizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance. *Academy of Management Journal* 44(5), 996-1004.

Van Alstyne, Marshall (1997). The State of Network Organization: A Survey of Three Frameworks. *Journal of Organizational Computing and Electronic Commerce* 7(2-3), 83-151.

Wernerfelt, Birger (1984). A Resource-Based View of the Firm. *Strategic Management Journal* 5(2), 171-180.

Williamson, Oliver E. (1979). Transaction Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics* 22(2), 233-261.

Williamson, Oliver E. (1985). *The Economic Institutions of Capitalism: Firms, Markets and Relational Contracting*. New York: Free Press.

Williamson, Oliver E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Forms. *Administrative Science Quarterly* 36(2), 269-296.

Williamson, Oliver E. (1999). Strategy Research: Governance and Competence Perspectives. *Strategic Management Journal* 20(12), 1087-1108.

Winter, Sydney G. (1988). On Coase, Competence and the Corporation. *Journal of Law, Economics and Organization* 4(1), 163-180.