



Managing strategic nets: A capability perspective

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Abstract. *This conceptual article focuses on the management of strategic business networks. Networks are seen to offer firms collective benefits beyond those of a single firm or market transaction. We aim to contribute to the development of the emerging theory of network management by integrating notions from the Industrial Network Approach, strategic management, and the Dynamic Capabilities View. Our starting premise is that the characteristics of the task that organizations try to accomplish through forming a specific strategic net influence the management of that net and thus the capabilities required. In other words, we expect different types of strategic nets to require different managerial skill sets or capabilities. On the basis of this premise, we suggest a classification system for different types of strategic nets, identify key management issues that arise in operating in a network context, and consequently identify the basic capabilities required in managing different types of strategic nets.*

Key Words ● business networks ● dynamic capabilities ● interorganizational networks ● strategic nets ● value nets

Introduction

This article addresses the issue of management in intentionally created business networks. Before articulating our more specific research questions, we will explain our motivation. Recent years have seen an unprecedented growth in corporate



collaboration and different forms of partnering and interorganizational networks (Achrol and Kotler, 1999; Brandenburger and Nalebuff, 1996; Gulati, 1998; Hagedoorn, 1990, 1995; Powell et al., 1996; Spekman et al., 2000; Webster 1992). Interorganizational networks include supplier and marketing or distribution networks, technological-innovation and product-development networks, and different competitive coalitions used, for example, for establishing industry standards and for competing against other networks or a specific dominant player such as Microsoft (Ford et al., 2002; Frels et al., 2003; Gummesson, 2002; Möller and Halinen, 1999; Thorelli, 1986).

Networks are seen to offer firms collective benefits beyond those of a single company or market transaction. The division of labour allows network members to specialize in the value-creation activity supported by their own distinctive competence, thus leading to increased efficiency (Jarillo, 1988; Miles and Snow, 1986; Park, 1996). For example, supplier networks allow major marketing firms such as Dell, Ikea and Nokia to grow more quickly, and they give them flexibility in an economic recession leading to diminished demand. Specialization, while allowing firms to economize, increases their interdependency. Today, no firm can pursue major innovations or systemic product offerings alone because of the dispersion of knowledge and technological resources. Firms try to overcome this by seeking knowledge transfer and, more ambitiously, the joint creation of new knowledge and innovations through vertical and horizontal networking (Håkansson and Snehota, 1995; Kogut and Zander, 1997; Powell et al., 1996; Teece et al., 1997; Teece, 2000). Networks of firms producing compatible and complementary products and services, including software, are also seen to offer end customers better value by providing them with a 'whole product' (Frels et al., 2003; Lambkin and Day, 1989; Srivastava et al., 1999), or 'offer' (Ford et al., 2002).

In general, networks are claimed to be better adapted to knowledge-rich environments because of their superior information-processing capacity and flexible governance, compared with market and hierarchical organisations (Achrol and Kotler, 1999; Foss, 1999; Powell, 1990; Snow, 1992). Empowered by the digital media, network organizations are expected to take the leading role in economic and social innovations in the world of increasing globalization, connectivity, and knowledge intensity (Castells, 1996; Grabher, 1993; Jarillo, 1993; Parolini, 1999; Thompson et al., 1994). From the economics perspective, the relative strengths of what Frels et al. (2003) call 'user network', 'complements network', and 'producer network' have been shown to influence the adoption of a specific product offer beyond the perceived value in the product itself (Arthur, 1994; Brynjolfsson and Kemerer, 1996; Frels et al., 2003). In this respect, a firm's capability to influence and leverage various networks can have a significant impact on its market and financial performance.

Network benefits do not come for free, however. We argue that they require the development of specific organizational capabilities, which we will call network capabilities. This view is supported by the work of Gemunden and Ritter, who speak about network competence (Gemunden and Ritter, 1997; Ritter, 1999). From this perspective, business networks can be related to a fundamental question



in the field of strategic management: how do firms achieve and sustain competitive advantage? Ever since Teece et al. (1997) produced their seminal article, the focus has been on exploring the capabilities through which management renews resources and competencies. We suggest that this evolving Dynamic Capabilities View should be related to the challenges posed by operating in a network context, as studied in the Industrial Network Approach (Axelsson and Easton, 1992; Håkansson and Snehota, 1995, 2000; Turnbull et al., 1996), and to the issues faced in building so-called strategic value nets (Jarillo, 1993; Parolini, 1999).

Business networks have been the subject of many different approaches; Araujo and Easton (1996) identified no less than 10 different schools or traditions. However, the majority of research has focused on the general characteristics of organically evolved networks, and on their structure and development processes (Möller and Halinen, 1999). This is common to both sociological studies and to the Industrial Network Approach pursued by the Industrial Marketing and Purchasing Group (for a description of the IMP Group's research, see Turnbull et al., 1996; Håkansson and Snehota, 2000), both of which emphasize the long-term evolutionary character of networks. Much less attention has been paid to intentionally developed nets and their management, with the notable exceptions of the work of Jarillo (1993) and Parolini (1999) on value nets, and the emerging theory of network governance in strategic management (Ahuja, 2000; Amit and Zott, 2001; Dyer and Nobeoka, 2000; Gulati et al., 2000; Jones et al., 1997; Park, 1996; Uzzi, 1997).

The main thrust in the discussion on dynamic capabilities has been on how firms integrate, reconfigure, renew and transfer their own or controllable resources. This internal emphasis is logical because the capability perspective originates from the resource-based view of the firm (RBV), which considers strategic capabilities as a pool of the internal resources that are important for the creation of competitive advantage (Penrose, 1959; Rumelt, 1974; Wernerfelt, 1984; Barney, 1991; Zollo and Winter, 2002). Although the relevance of exploiting 'external resources' (Teece et al., 1997), the importance of 'alliance and acquisition routines that bring new resources into the firm from external sources' (Eisenhardt and Martin, 2000: 1108), and the 'ability to integrate efforts of different actors' (Grant, 1996) have been mentioned, the challenges involved in operating in a complex network remain fairly unarticulated (Kenis and Knoke, 2002; Park, 1996). Past work, as Lorenzoni and Lipparini (1999: 318) note, 'has tended to consider networks as given contexts, rather than a structure that can be deliberately designed'. This view also permeates the theory formation of the Industrial Network Approach (Håkansson and Ford, 2002; Håkansson and Snehota, 1995).

We aim to contribute to the development of the emerging theory of network management by integrating notions from the Industrial Network Approach, strategic management, and the Dynamic Capabilities View.¹ Our starting premise is that the characteristics of the task that organizations aim to accomplish through forming a network influence the governance of that network and thus the capabilities needed. In other words, we expect different types of strategic nets to



require different managerial skill sets or capabilities. This view is supported by Zollo and Winter (2002), who suggest that the processes of acquiring dynamic capabilities are contingent on the characteristics of the tasks to be learned, and by Park (1996), who argues that the nature of network governance is dependent on the type of interdependence between its members.

Following our premise, we aim to (1) suggest a classification system for different types of strategic nets, (2) identify key management issues in operating in a network context, and based on themes one and two, to (3) identify the basic capabilities required in managing different types of strategic nets, and to elaborate on their characteristics and interrelatedness.

The article is organized as follows. We start by discussing the nature of strategic networks and suggest that it is useful to adopt a value-system view for describing the differences between various nets. A classification system for strategic nets is then proposed and illustrated with contemporary examples. Second, the basic domains and characteristics of the management capabilities required in the context of strategic nets are identified. A contingency framework of network capabilities is then proposed and examined. Discussion on the theoretical and managerial conclusions, and suggestions for future research, conclude the article.

The multiplicity of strategic nets – a value-system perspective

The term interorganizational network is being used to refer to a wide range of phenomena, and consequently ambiguity ensues (see e.g. Ahuja, 2000; Dyer and Nobeoka, 2000; Frels et al., 2003; Jones et al., 1997; Håkansson and Ford, 2002; Kenis and Knoke, 2002; Nohria, 1992; Park, 1996). It is therefore essential to establish what we mean by strategic business nets. First, it is important to distinguish between a 'network of organizations' and a 'network organization'. The former refers to any group of organizations or actors that are interconnected in relationships. According to Industrial Network Approach, any market can be described as this kind of macro network (Axelsson and Easton, 1992; Håkansson and Snehota, 1995). This perspective is also close to that of scholars in economic sociology (Burt, 1992; Coleman, 1988; Granovetter, 1973, 1985; Knoke, 2001; Uzzi, 1996), and – although more implicitly – dominant in the network externalities discussion in economics (Katz and Shapiro, 1985) and in the recent ideas about 'network markets' advocated by marketing scholars (Srivastava et al., 1998; Frels et al., 2003). Achrol (1997: 59) suggests that 'a network organization is distinguished from a simple network . . . by the density, multiplicity, and reciprocity of ties and a shared value system defining membership roles and responsibilities'. This is in line with Amit and Zott (2001) and Gulati et al. (2000), who see strategic networks as 'stable interorganizational ties, which are strategically important to participating firms'. Park (1996: 797), following Jarillo (1988) and Miles and Snow (1986), sees a strategic network as 'a purposeful and conscious arrangement among distinct, but related profit-seeking organizations'. This



is in line with our view of strategic business nets as intentional structures that firms try to design deliberately for specific purposes. We feel, however, that the expression 'profit-seeking organizations' is too restrictive, as many strategic nets may also involve, at least temporarily, governmental organizations and university-based research institutes. Moreover, we reserve the term 'network' to refer to macro networks, and use the 'net' to refer to intentional nets of a restricted group of actors.

In order to understand the management challenges posed by different types of strategic nets – supplier nets, distribution nets, R&D nets, competitive coalitions such as airline alliances, and technology-coalition nets such as Bluetooth – we need a systematic description of their characteristics. Park (1996: 805–807), adopting a transaction-cost-economics perspective on the management of interorganizational networks, uses the type of interdependence (vertical or horizontal) between the net members, and the nature of 'network governance' (bilateral or trilateral), for classifying strategic nets and for identifying the 'institutional mechanism for network control'. Although this is useful, we feel that the task or goal that the net aims to achieve, and especially the underlying system through which it attempts to do this and produce value, is more fundamental. The task and the related value system are assumed to influence both the type of member interdependence and the effective 'governance form', not vice versa. Recent conceptual work by Zollo and Winter (2002) and Christopher et al. (2002) supports this view. The former contend that task characteristics, i.e. what the organization aims to achieve, influence the relative effectiveness of various learning mechanisms. In our context, this means that the task of the net influences the relative effectiveness of various net-management capabilities, suggesting that different types of nets require different management and organizational forms. Christopher et al. (2002), in examining value production for customers in relationship marketing, maintain that the mode in which value is created is of strategic importance.

On the basis of these arguments, we have adopted a value-system construct for classifying different types of business nets. This construct is based on the notion that each product/service requires a set of value activities performed by a number of actors forming a value-creating system, using Parolini's term (1999: 59–68). A key aspect is that value creation spans firm boundaries (Amit and Zott, 2001) and can be encapsulated in the value system. This is not a new concept, and has been given different shades of meaning by authors such as Håkansson and Snehota (1995), Normann and Ramirez (1993), Parolini (1999), Porter (1985), Richardson (1972), and Rayport and Sviokla (1995).

We contend that the value system and its level of determination provide the key for identifying the management requirements of business nets. In other words, how well known are the value activities of the net and the capabilities of the actors to carry them out, and to what extent can these value activities be explicitly specified? All other things being equal, the greater the level of determination of the value system, then the less uncertainty there is and the less demanding is its management. This idea is based on the notion that the characteristics of informa-

tion and knowledge – as reflected in the level of determination of the value system – influence both the learning mechanisms and the required managerial capabilities (Eisenhardt and Martin, 2000; Zollo and Winter, 2002).

In order to use a complex concept such as the value system for classifying strategic nets, we need to simplify it. Theoretically, one could conceive of a continuum of value systems extending from fully determined systems to emerging and undetermined systems. Identifying the characteristics of the value system underlying a specific strategic net would enable it to be positioned on this theoretical continuum.

Figure 1 shows a continuum based on three ideal value systems (VSC). The left end describes clearly specified and relatively stable systems. The actors producing and delivering specific products, and their value activities and capabilities, are basically known. The multi-tiered supply nets in the automobile industry provide a typical illustration (Dyer, 1996). Benetton, Dell, IKEA and Nike also illustrate well-specified supplier and distribution solutions (Gadde and Håkansson, 2001) based on strategic nets that we believe can also be positioned on this part of the value-system continuum. It is notable that all of these example nets primarily pursue efficiency gains in terms of production/logistics and time compression, rapid growth opportunity, and access to a wider customer base. As a bold generalization, we argue that strategic nets producing relatively mature offerings and based on relatively stable and well-determined value systems primarily seek efficiency gains through network organizations.

The right-hand end of the continuum describes emerging value systems. The constructors of these aim at creating nets through which new technologies, products or business concepts can be commercialized. These future-oriented nets may require radical changes in existing value systems and in the creation of new value activities. This is the landscape that Eisenhardt and Martin (2000) describe as 'high-velocity markets' (one could say that there are no markets in the early emergence, as markets presume structures that are constituted by relatively identifiable actors). For example, emerging mobile services are generally created through strategic nets involving a telecom operator, several 'middleware-type' software producers, and content/services producers. Emerging value systems involve complex learning processes (e.g. the Symbian and Bluetooth coalitions), and an interorganizational relationship formation that is difficult to specify in advance. Uncertainty related to value activities and to actors and their capabilities is an inherent feature. This is a very probabilistic world characterized by the birth of the commercial Internet and mobile telephony and services, involving both old actors and new actors and old and new value activities. In essence, nets creating emerging value systems pursue technology and business solutions that are significantly more effective than the existing ones.

The middle of the continuum describes value systems that are relatively well determined, but which are being modified through incremental and local improvements. Most multi-actor R&D project nets, generally involving lead suppliers and pilot customers, as well as nets established for business-process modifications, exemplify these kinds of changes. Generally, these nets aim at

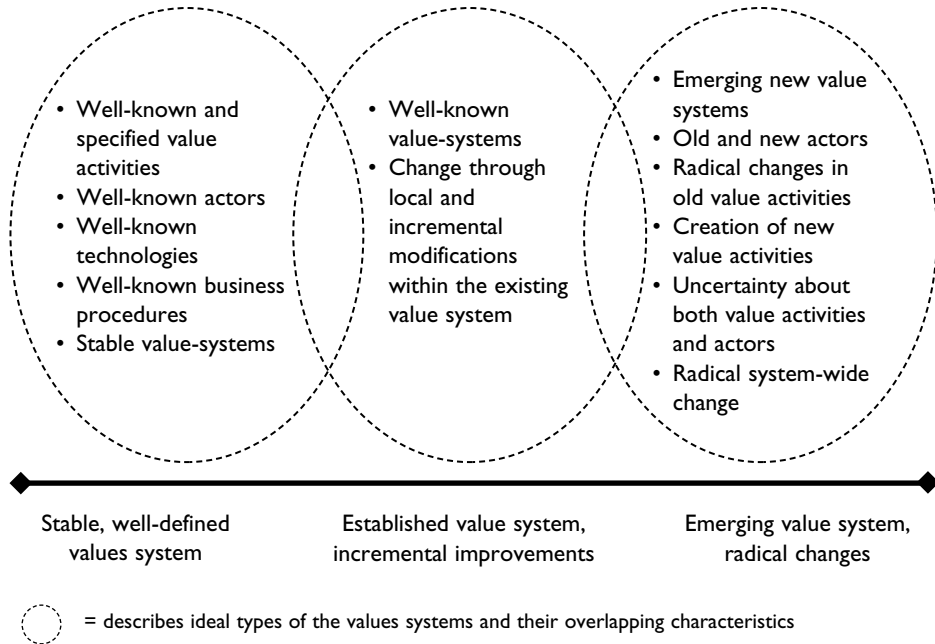


Figure 1

Value-system continuum

increasing the efficiency of the existing system, but may also lead to more effective solutions that could turn into new business opportunities.

A critical issue for all types of strategic nets is their capability to create value. The ultimate test of value is how end-customers perceive and evaluate the offerings which competing strategic nets provide. For this reason, an understanding of customer behaviour is essential in the pursuit of developing nets whose members can produce an attractive configuration of core products, complementary products and services with competitive costs. The key role of customers in the value creation process is articulated in the 'market-based-assets' approach (Frels et al., 2003). In the value-system continuum context we assume that while customer preferences are reasonably well known in value-systems located in the left end of the continuum, their identification is a real problem and simultaneously one source of potential competitive advantage in emerging value-systems.

When looking at value-creation from the individual actor's perspective, a resource-based view provides some key observations. An actor that commands resources through which it can carry out activities that are valuable, rare, inimitable, and nonsubstitutable (i.e. the so-called VRIN attributes, Eisenhardt and Martin, 2000; Wernerfelt, 1984) holds a very strong power position in a strategic net and can often appropriate the largest share of the revenue that the net creates. Value itself is determined by the relative importance of the task that an actor



carries out in the creation of a net's end offering. These propositions are illustrated by the strong positions of both Intel and Microsoft in the value-system of PC market. These firms systematically earn higher profits than companies which assemble and market PCs.

The proposed value-system continuum is a highly abstract and static framework, and its ideal character must be underlined. In reality, we will never find completely determined or undetermined systems. The continuum distorts the networked world in other respects, too. Most large corporations have roles in various nets. Moreover, many strategic nets 'stretch' across at least two ideal types. Various nets are generally interrelated through actors having roles in several. This kind of multiple involvement allows innovative companies, through their accumulated knowledge of other relevant actors and their capabilities and liaisons, to create temporal strategic nets for specific development purposes. Finally, the 'contents' of the value-system continuum, the strategic nets, are in constant evolution. Once nets creating innovative services such as Internet banking and mobile banking are specified, they 'move' towards the left end of the continuum.

This brief analysis reveals the inherent diversity in the value systems underlying strategic nets. It is obvious that different capabilities are needed for successful management in stable and well-specified nets than in the emerging, complex nets characterized by high levels of uncertainty.

Network management as a set of dynamic capabilities

A few guidelines can be used to clarify the idea of network management as a set of dynamic capabilities. First, we should identify the special characteristics required for network management as opposed to intra-organizational management and managing dyadic business relationships. Second, the requirements identified should be compared with the extant knowledge of dynamic capabilities. These are broad and complex issues; we address them by relying on a limited set of recent publications and maintaining a high level of abstraction.

Management in nets – specific requirements

We follow Möller and Halinen (1999) in addressing the key issues in managing strategic nets on four interrelated levels: (1) macro networks, (2) strategic nets, (3) net and relationship portfolios and (4) strategic relationships. Only the first three are briefly dealt with because strategic relationships are well covered in the extant literature (Ford et al., 2002; Doz and Hamel, 1998; Dyer and Singh, 1998; Gummesson, 2002; Halinen, 1997; Möller and Wilson, 1995; Parkhe, 1996; Ring and Van de Ven, 1994; Spekman et al., 2000).

Key management issues at the macro-networks level According to the Industrial Network Approach, 'industries' or fields constitute enmeshed networks of actors connected through direct and indirect ties. There are no 'faceless markets' and



actors pursue their interests through webs of connections with other actors (Håkansson and Snehota, 1990, 1995). This makes industries non-transparent and dynamic. How can managers develop valid views of relevant macro networks and their opportunities? How can they analyse strategic nets and key actors in order to understand network competition? Can firms influence whole networks, and if so, how?

In navigating the network environment, management should identify and understand the value systems and key actors through which the macro network produces value for the end-customers. The more complex and volatile the value system is, including a large share of tacit knowledge (Nonaka and Takeuchi, 1995; Polanyi, 1966), the more challenging the task. In the case of new business concepts, it includes the evaluation of which elements potential customers require from the offering or 'whole product' (Frels et al., 2003; Lambkin and Day, 1989) and how they value them. We label this capability 'network visioning', and argue that it is not covered by traditional environmental scanning that assumes ontologically relatively concrete and transparent markets, processes and actors; nor does the notion of relational capability focusing on dyadic-relationship management paint the complete picture (Dyer and Singh, 1998; Lorenzoni and Lipparini, 1999).

Large corporations may try to shape the development of macro networks by influencing the beliefs, goals and behaviour of other key actors. We call this capability 'orchestration'. This issue of influencing network evolution is not adequately addressed in RBV-driven dynamic capabilities such as alliance formation, mergers and acquisitions, and signalling.

Key management issues at the strategic-nets level The Industrial Network Approach describes business fields or clusters (Porter, 1990) as several overlapping strategic nets, the management of which requires the mobilization and coordination of the value activities of other relevant actors (Axelsson and Easton, 1992; Håkansson and Snehota, 1995). Crucial questions include how a hub company can mobilize and coordinate value-producing nets, and what positions and roles it should take in different and overlapping nets, across various strategic situations. Net strategies may be divided into (i) improving operational efficiency, (ii) improving the leverage of existing capabilities, and (iii) developing new capabilities (Loeser, 1999). These strategies may involve using existing positions, entering existing nets, or establishing new ones (Ford et al., 2002; Johanson and Mattson, 1992). The fact that several goals can be pursued through one complex net, or a set of overlapping nets, further complicates their management. Although there is an increasing number of studies on network governance – addressing issues such as the role of trust in network relationships, sharing and co-producing knowledge in firm relationships, and coordination routines – we are far from producing an articulated theory of net management (Blankenburg-Holm et al., 1999; Dyer and Nobeoka, 2000; Gulati, 1999; Jones et al., 1997; Ramirez, 1999; Ritter, 2000).

Existing studies provide an understanding of relational management, but they

do not adequately cover the issues of mobilizing and coordinating a group of autonomous but interdependent actors, or recognize the complexity in achieving net-level performance (Ford and McDowell, 1999; Gadde and Håkansson, 2001). The net-performance concept suggests that strategic nets, as any goal-pursuing organizations, may vary in terms of their efficiency and effectiveness (Pfeffer and Salancik, 1978). Efficiency in this context refers to the efficacious use of current resources, in other words to getting more out of the resources used. A gain in efficiency results in lower production or transaction costs. Increased efficiency can be achieved by optimising the allocation of value activities between the net partners, and by better linking and coordination. Effectiveness refers to a net's capability to invent and produce solutions that provide markets (customers) with more value than existing offerings. This requires the capability to co-create new knowledge and innovations among the net members.

The task of creating optimally efficient/effective strategic nets encounters severe challenges due to the embedded and reciprocal character of the business relationships that form both macro networks and strategic nets (Ford and McDowell, 1999; Håkansson and Ford, 2002). Most problems are obviously encountered in the mobilization of business nets pursuing the creation of new technologies or businesses. This future-oriented value creation means that there is no market for the a priori assessment of the economic value of the inputs of net members, or for estimating the planned results of the net (Möller and Törrönen, 2003). Moreover, the embedded character of macro networks makes it very difficult to anticipate the influence of new net mobilization on other nets and on their major players, and to gauge their reaction (Alajoutsijärvi et al., 1999; Ford and McDowell, 1999; Jüttner and Schlange, 1996).

Key management issues at the net-portfolio level The management of strategic nets could also be seen as a portfolio problem. In which nets should one operate, and how should one coordinate one's net positions? Determining which activities to carry out in-house and which to channel through different nets is a core strategic issue involving not only the allocation of scarce resources, but also the creation of new ones. Major companies pursuing several, often interrelated, businesses are generally involved in many strategic nets, either in an integrator role (hub firm) or in various partnering roles for other hub firms (e.g. technology partner, component supplier, distributor partner). In short, management faces a complicated optimization challenge concerning which nets to operate and through what kind of roles and strategies. This includes issues such as evaluating the future importance of the strategic net in terms of its business potential, evaluating one's own influence potential, and determining how the nets are inter-related and how a firm should take that into account in coordinating its portfolio of net positions.

For example, entering a certain net could have a positive influence on a firm's position in another net, and simultaneously destroy its chances of being a member of a set of alternative nets. These questions remain basically unaddressed in discussions on strategy and RBV-driven capability, and have only just begun to



be worked on in the Industrial Network Approach (Brennan and Turnbull, 1999; Ford and McDowell, 1999; Gadde and Håkanson, 2001; Jüttner and Schlange, 1996; Zolkiewski and Turnbull, 2000).

Net management – a dynamic-capability perspective

Our discussion on the challenges in the management of strategic nets remains somewhat general. It is obvious from the Network-Capability-Base Framework (NetCap), described in Figure 2, that the type of net has a strong influence. The framework shows, in a simplified manner, how capabilities are linked to value creation in the network context. Before discussing the NetCap framework in detail, we will offer a few thoughts on capabilities.

We use the term capability as Grant (1998) did to refer to a firm's capacity to produce a certain value activity. As such, a capability – such as delivery capability – generally implies a set of resources and knowledge of their usage. The dynamic-capabilities extension to the RBV explores how valuable resources are created and acquired over time in order to achieve or maintain competitive advantage. In that sense, dynamic capabilities describe and explain how 'ordinary' capabilities are developed and renewed. Dynamic capabilities (DCs) are seen to be rooted in a firm's managerial and organizational processes aimed at the creation, coordination, integration, reconfiguration or transformation of its resource position (Amit and Zott, 2001; Eisenhardt and Martin, 2000; Teece et al., 1997). Eisenhardt and Martin (2000) regard DCs as identifiable and specific processes rather than as tacit and idiosyncratic, and give product development, resource-transferring processes, knowledge creation, strategic decision making, and alliance formation as examples.

Zollo and Winter (2002: 340) also emphasize the systematic and persistent character of DCs and offer a definition that we adopt: 'a dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness.' Even more importantly for our purposes, these authors offer insightful suggestions about the learning mechanisms (experience accumulation, knowledge articulation, knowledge codification) that organizations are postulated to utilize in developing their dynamic capabilities; and they argue further that the relative effectiveness of these mechanisms depends on the task in question. We share these views; they support our core proposition that strategic nets having different goals and based on different value systems – in which the nature of knowledge has an important role – require different capabilities. In this sense, our theory-development approach follows the contingency perspective embraced by proponents of critical realism (Easton, 2002; Kwan and Tsang, 2001).

However, contrary to our view, Zollo and Winter argue that the external relationships of organizations do not require any special consideration from the dynamic-capabilities perspective. Their point (2002: 350, endnote 1) is that external relationships with customers, suppliers and other organizations should be



understood as stimuli to 'the initiation of proposals to modify existing routines, rather than as mechanisms directly shaping the development of dynamic capabilities'. This standpoint seems to be based on the rather narrow view Zollo and Winter take of the learning potential of interorganizational relationships, as reflected in their argumentation (2002: 350, endnote 1): 'operating routines typically involve tacit knowledge, hence they are unlikely to be developed or shaped simply by the observation of competitors, suppliers, customers, or other external constituencies.' Given the rapidly accumulating evidence on the relevance of interorganizational learning and network relationships to innovation, this view emphasizing 'observation' seems untenable (Håkansson and Waluszewski, 2002; Kogut et al., 1993; Möller and Svahn, 2002; Powell et al., 1996; Von Krogh and Grand, 2000). We contend that, by developing specific networking capabilities, firms are able not only to transfer complex knowledge, but also co-create new resources through intentional business nets.

Figure 2 shows the capabilities required in network-value production in an approximate order of ascending complexity. This does not imply that those at the left end of the continuum are less important. On the contrary, being able to produce core value through established vertical nets is often a necessary condition for achieving incremental innovations through developmental nets, which may initiate more radical innovations through future-oriented strategic nets.

The capabilities are presented on two rows. The lower row refers to more traditional DCs (with the exception of production and delivery capability that are not generally considered dynamic), and the upper row to those needed in managing strategic interorganizational relationships and business nets. A set of capabilities is generally required to produce any type of value. Broadly speaking, the more complex the value system is, the more multifaceted the required set of capabilities becomes.

If we start from the left and examine the management of an efficient customer-driven supplier net, it is clear that the ability to integrate and coordinate the value activities of net members is essential. A prerequisite is that the hub can mobilize a set of actors willing to form a tightly coordinated supply and channel net. This requires a well-established position in the field, and keen customer demand reflected in strong brands as exemplified by Nike and Dell. A strong demand position is essential for signalling important component vendors and design- and manufacturing-service providers that they can benefit from a tighter value net in terms of larger volumes and more stability. The stronger the position of the hub firm, the more selective it can be in choosing the net actors.

The net-management capability of this kind of vertical value net is manifested in the information and management systems that combine the business processes of each actor and monitor the efficiency of production, logistics, and customer delivery and service. It is essentially a coordinating capability requiring an architectural knowledge of the value system constituting the complete business process of the net. In an advanced case, this would lead to the coordinated management of a complete value system, ranging from customer care to component production, and would require the combination of tools of Supply Chain Management,

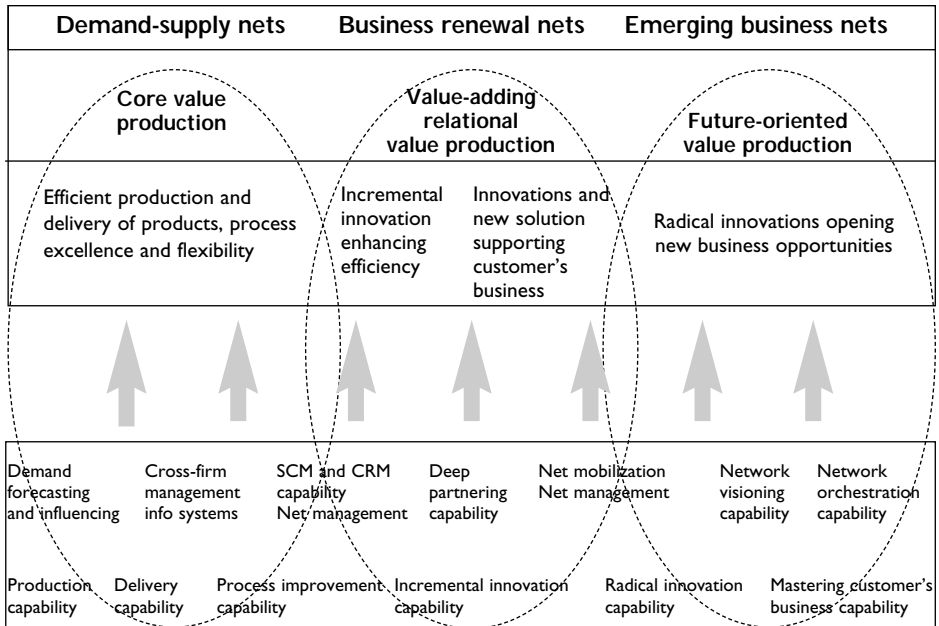


Figure 2
 Value-production and network-capability base

Enterprise Resource Planning, and Customer Relationship Management (see e.g., Means and Schneider, 2000; Lambert and Cooper, 2000).

In terms of knowledge and learning, the mobilization and management of vertical, efficiency-seeking strategic nets emphasize the capability to exploit current actor competencies through effective knowledge transformation and sharing (Boisot, 1998; Dyer and Nobeoka, 2000; Levinthal and March, 1993; March, 1991; Möller and Svahn, 2002). Knowledge codification (see Zollo and Winter, 2002) is an essential part of this process, forming a prerequisite for the coordination of the business processes and logistics of the key net members. At the metaphorical level, one could speak about conducting a symphony orchestra. Each net member has specialized, well-codified knowledge which the conductor can integrate through 'mobilizing' the players to play a composition (the value system) designed by the conductor (the hub firm).

We have emphasized the role of centralized coordination in the management of demand-supply nets. Achieving this in complex vertical nets involving several technological platforms, the intimate knowledge of which is dispersed among different actors at different levels of the net, can be very demanding and costly, or even impossible. The solution lies in the multi-tiered structure of the net; there are several integrating and coordinating actors that possess the necessary knowledge



base for understanding and coordinating their 'value sectors or segments' in the value system. These kinds of actors – such as Intel, Cisco and Flextronix – form the key nodes in the net as they form and hold the theories-in-use or recipes of their value segments (Spender, 1989). Value segments are constituted by communities of practice, which are close enough to share and develop knowledge about their value activities. Nishiguchi and Beaudet (2000) call these 'self-organizing' links in the automotive-supply-chain context. It is a question of a set of inter-linked net organizations orchestrated by guiding recipes provided by the hub firm to the first-tier integrators, which then disseminate these and their own recipes to their suppliers, and so on.

Through this kind of distributed coordination the hub firm can synchronize several complex resource domains involving highly embedded tacit knowledge. However, successful coordination presumes that all the key actors are motivated and capable of learning the recipes.

From a partnering and often smaller firm's perspective, there are a few capabilities that can be identified. An attractive partner should have an efficient and flexible production system and should be able to integrate its processes into the value activities of the net, both of which presume adequate information systems, and it should be able to make rapid production adjustments. These characteristics increase its value as a supply partner in a tightly controlled net.

When a strategic net is used to foster local product, production-technology or business-process innovations – involving the incremental modification of existing routines and capabilities – more intimate and trusting relationships are needed. In this context of joint knowledge creation, net-management capability requires a balanced position between knowledge exploration and exploitation. The ability to bridge different communities of practice – experts in various technologies, software developers, business managers – is essential in creating new specialized knowledge (Araujo, 1998; Dyer and Nobeoka, 2000; Tuomi, 1999; Zollo and Winter, 2002).

This demands an open, trusting culture, characterized by a partnering orientation and personnel who have the strong interaction skills required in multiparty and cross-functional teams (Dyer and Nobeoka, 2000; Lorenzoni and Lipparini, 1999; Nonaka and Teece, 2001). Actors must share privileged organizational knowledge and be able to view value activities and changes in them from each other's perspectives. It is critical to create what Dyer and Nobeoka (2000) call a 'network identity' among the actors. A hub firm should also be able to evaluate these and the innovation capability in its partner candidates, manifested in a track record of improvements. A partner firm should be able to evaluate which available and emerging nets to aim for; i.e. which ones provide it with the best chances of enhancing its own business potential.

The creation of strategic nets to develop novel products and business concepts demands several complex capabilities. Emerging value systems involve complex collaborative learning processes (e.g. the Bluetooth coalition). Uncertainty related to value activities and to actors and their capabilities is an inherent feature. From the perspective of knowledge creation and sharing, the challenges faced by



the actors in emerging value systems are pronouncedly different to those in stable value systems. The sense making of the emerging opportunities (Weick, 1995) and the co-creation of knowledge through exploration (March, 1991) dominates over issues to do with transferring existing explicit knowledge. A hub firm should be able to envisage the development of the business in question in order to identify and evaluate potential net partners and set realistic goals, as evidenced in a record of technological and/or business breakthroughs in one or several fields. One guiding aspect, besides the functional capabilities of the potential net partners, is their current reputations among the potential end-customers (Frels et al., 2003).

The mobilization of a net requires a strong position in the field; the hub firm must have specific resources and knowledge that make it an attractive mobilizer so that it is able to select autonomous partners and manage the resulting strategic net. Net management requires an organization-wide network-player orientation, with the key personnel sharing and supporting the achievement of joint goals. The hub firm must also be able to create an organizational forum for sharing work and responsibilities between the actors, to establish coordination mechanisms for net cooperation, and to instil a network identity (Dyer and Nobeoka, 2000; Gadde and Håkansson, 2001). This includes organizing multilevel and multifunctional contacts and teams in general, involving several actors and supported by an integrated information system. This 'macrocultural' aspect remains quite unexplored (Jones et al., 1997). It is thus clear that net management, especially in innovative nets, involves knowledge management. Actors must be able to foster the learning environments that allow the explication and combination of tacit knowledge, and the sharing of new knowledge (e.g. Nonaka and Takeuchi, 1995).

Finally, network-orchestration capability at the right end of the value-creation continuum refers to an actor's capacity for influencing the evolution of a whole new business network. Orchestration presupposes the capability to vision the emerging business field – which may be very complex as the convergence in the ICT field suggests – and its key actors, and to identify potential trajectories. Being involved in different parts of the emerging network enhances this managerial sense making, as it introduces several learning experiences and new perspectives. However, these experiences can only be turned into visioning capability if top management is able to bring together various organizationally dispersed views in a knowledge-management system.

A major actor could thus develop an agenda for influencing the field in a preferred direction. Agenda setting involves communicating one's beliefs or visions of where developments are and should be leading. Clearly, not every actor can become a network orchestrator. The role requires visioning and strong communication and persuasive skills, coupled with the credibility that can only be achieved through understanding the field and having a strong business position. We should point out that, in this context, orchestration does not refer to conducting a symphony orchestra. It is more like a putting together a jazz band – new talented players can only be attracted if the reputation and tune of the lead player are interesting. When new players with their individual skill sets join the session, a novel melody may emerge through joint improvisation. In other words, the



emphasis is on the exploration and co-creation of innovation based on both codified and tacit knowledge.

Firms with pre-eminent roles in several strategic nets have a good basis for becoming network orchestrators. However, even extensive resources do not guarantee this, as illustrated by IBM's failure to anticipate the emergence of personal computers and the changing role of the operating system owned by Microsoft in the computer industry's value system (Fine, 1998). This top symphony-orchestra conductor did not have adequate visioning capability.

Discussion

We have employed the Industrial Network Approach and the Dynamic Capabilities View, including notions from organizational learning theory, knowledge management, and the market-based-asset approach to identify specific managerial challenges faced by firms operating in a network context.

Theoretical contributions

This research makes several key contributions to the emerging theory of business networks and the study of dynamic capabilities in a network context. First, the article emphasizes the relevance of differentiating between the macro-networks perspective adopted in economic sociology (and embraced by most research into industrial networks) and the strategic nets intentionally formed by a set of organisations.

Second, we contribute a value-system based framework for identifying the characteristics of different types of strategic nets. This theory-driven framework with its three ideal types – core value production via stable and well-established nets, value-added value production via incremental innovation and change, and future value production via radical innovation and emerging nets – extends our knowledge of the various types of business nets. By highlighting the characteristics of each ideal type, the value-system continuum provides an abstract but powerful contingency-view based explication of the managerial challenges faced by firms engaging in different types of business nets.

Making a more detailed point, it is interesting to compare our value-system continuum with the description of 'high-velocity markets' by Eisenhardt and Martin (2000). Nets aiming at creating future value and located in the emerging value-systems space in our framework closely match the characteristics of high velocity. We argue, however, that from a descriptive point of view, it is more valid to refer to and examine these environments as macro networks rather than 'markets' because of the inherent characteristics of their interrelated and reciprocally dependent actors. In a similar way, the value-system – through value-activities and the actors carrying them out – offers an analytical tool for describing the rather generic 'network markets' employed in the emerging market-based-assets approach (Frels et al., 2003; Srivastava et al., 1998).



Third, by elaborating on the work of Möller and Halinen (1999) we further advance understanding of the management of strategic nets by providing a three-level description (macro-networks level, strategic-nets level, net-portfolio level) of the managerial issues and decisions which comprise net management. We contend that this systemic distinction between identifiable but interrelated levels of management domain is important for a number of reasons. It clarifies the layered character of net management to a greater extent than existing views. It suggests how higher-level strategic decisions condition operational moves, and it informs future net-management research on the relevance of making conscious decisions about the level(s) of analysis adopted.

Fourth, this article identifies a set of new network capabilities and relates them explicitly to generic modes of value-production through a network-capability-base model. Through this NetCap model we extend the current state of the art of both network-management literature and the discourse on dynamic capabilities. Based on our analysis, we argue that the more traditional dynamic capabilities, such as relational partnering and alliance management (Eisenhardt and Martin, 2000; Spekman et al., 2000), are not sufficient for creating and managing strategic business nets. The new dynamic net management capabilities proposed – net mobilization, net management, network visioning, and network orchestration capability – are discussed and illustrated using current business examples and are related to a body of previously identified dynamic capabilities.

Eisenhardt and Martin (2000) argue that the resource-based view breaks down in a high-velocity context because the competitive advantage gained by the current resource pool becomes unpredictable, and dynamic capabilities are themselves unstable. Based on our analysis we are more hesitant to impose a clear boundary condition. Although many dynamic capabilities lose part of their relevance, there are signs that firms which have both strong learning and network capabilities are able to learn more quickly and from a larger experience and competence pool that is available from the strategic nets and partnerships they are involved in. This means that they are able not only to survive change, but also to create it and even influence new path dependence through network orchestration. In other words, we argue that learning and network capabilities differentiate firms and nets in their ability to manage and utilize change.

Managerial implications

As the management aspect permeates the article we will here point out only a few of the most prominent implications of the proposed conceptual frameworks. First, our value-system continuum with the business net illustrations demonstrates that no generic management system and capabilities for operating in a network environment exists. The continuum framework encourages managers to identify the types of strategic nets they are involved in, and helps them to understand the fundamental differences between the basic net types and the considerable influence these have on the requirements they pose for companies.

Second, by identifying and explicating levels of net management, we provide



managers with an understanding of the stratified nature of the questions and decisions they face in a network context. The net-portfolio concept suggests that managers should analyse the involvement of their firms in different types of nets holistically, since the roles that each firm holds are interrelated and actions in one net may support or jeopardize actions in other nets.

Finally, the NetCap model and our discussion of the capabilities required in different types of nets provides managers with information about the types of competencies and resources they should develop and employ in order to perform in different types of value nets. Preliminary advice is given about the requirements and contents for net mobilization, net management, network visioning, and network orchestration capabilities.

Limitations

Our conclusions and propositions must be considered in the light of the limitations of this study. This article is primarily conceptual and although we consider it to be based on a reasonably deep literature analysis, many of our more detailed suggestions are based on relatively scant and anecdotal empirical evidence. More empirical evidence is required to support both the validity of the conceptual frameworks and to provide additional in-depth knowledge about the content of the dynamic network capabilities that are proposed, and especially the processes through which they can be created and sustained. To remedy these shortcomings in our knowledge of strategic nets and their management, we conclude with a brief research agenda.

Research agenda

Starting from the most abstract and general level we suggest that it would be important to examine the metatheoretical foundations of different research approaches into business networks and nets. Scholars embracing different research approaches are making either explicit or implicit assumptions about the nature of networks, network actors and their behaviour, and about how networks should be studied. These positions range from the contextual and historical views that are espoused primarily in the economic sociology and the industrial network approach into networks, through the bounded-rationality and contingency driven ideas held by scholars of strategy and dynamic capability, to the more reductionistic and deterministic views adopted in research driven by transaction cost theory and the investigation of market-based assets. By careful analysis of the ontological and epistemological assumptions made in these research approaches into business networks we would be able to identify the core contributions and limitations of each approach. This, we contend, would be important for the future development of theory as it would help to identify the 'white areas' between different schools and enhance informed cross-utilization of close traditions (see Gioia and Pitre: 1990, for a discussion on the possibilities of using paradigmatically different research traditions).



Second, programmatic empirical research is required to deepen and validate our proposition that the effective management of different types of strategic nets is contextually based, and to expand our understanding of the processes through which strategic nets and network capabilities are formed. Here, a careful theory-driven multi-case design involving the identification of business nets which represent our three ideal types as closely as possible, comparison of the capabilities employed in their management, and assessment of the performance of different nets would appear to be a viable strategy. This would present the challenge of developing indicators for assessing the effectiveness or performance of different net types, a challenging research problem in its own right (Gadde and Hakansson, 2001).

Third, in order to expand our knowledge of how strategic nets are formed and network capabilities developed we propose that this research programme should expand the level of analysis from that of an individual organization to what we call strategic nets, and also to the macro networks forming their environment. The problem here is the increasing methodological complexity. It seems evident, however, that strategic nets can both create and master capabilities that are beyond the capacity of any single actor. In this sense, the nets in which a firm operates condition both its internal resources and capabilities and their developmental potential. Both the firm and the net should be regarded as agents (see Hellgren and Löwstedt, 1998) engaged in a simultaneous structurization process; the firm influences the structure and processes of the net, but the net also influences the resources, behaviour and options of the firm. In a similar vein, it would be profitable to examine more systematically how macro networks influence the types of strategic nets that are competitive. To gain a better understanding of these processes we need research based on longitudinal comparative case-analysis. Here, the notions developed by Zollo and Winter (2002) for understanding the development of intraorganizational dynamic capabilities appear to be useful. They should, however, be adapted to the business-net context.

It is quite clear that a host of more-limited but relevant research themes exists. There are three which we consider require urgent attention. The management of a firm's net positions and roles, we contend, should be conceived as a portfolio problem. As this phenomenon is almost unrecognized in the extant literature, one could start with a descriptive analysis of how a few major corporations, being involved in several nets, are handling their net positions. We also need to elaborate the issues involved in portfolio management at the conceptual level. A closely related problem is the identification of an optimal balance between the centralized coordination of the net, seeking efficiency gains, and the renewal of its business processes, all of which require innovation capability from the major net partners. Hakansson and Ford (2002) discuss this tendency as one of their three network paradoxes: 'the more a company achieves this ambition of control (over other actors), the less effective and innovative will the network be.' The point is that in the long run, a tightly controlled net is as intelligent and innovative as the controlling company. The key issue is how to find a balance between current system efficiency, which requires integration and coordination, and innovativeness,



which demands more autonomy and resources for exploration. Finally, a fundamental phenomenon requiring attention is the orchestration activities by which major players try to influence the emergence of new technologies and business fields, such as mobile Internet services. Basic descriptive research about the characteristics and processes through which our future is being contested and shaped is required.

To conclude, we hope that our endeavour to develop a contextual theory of the management of business nets encourages more research efforts in this evolving field.

Notes

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1 The Industrial Network Approach, strategic management, and Dynamic Capabilities View were chosen as the primary foundations since in our opinion they currently provide the deepest insights into the issues of management in network environment. The rapidly developing economics and marketing-driven 'market-based-assets' approach, including the idea of 'networks markets' (see a recent discussion and synthesis by Frels et al., 2003), was also considered. This approach provides valuable insights into the underlying reasons why various networks generate value but it does not include deeper conceptualizations of how networks evolve and especially how they are intentionally created and managed. In brief, we employ the 'market-based-assets' ideas in a supportive role.

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