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Business Nets: Classification and Management Mechanisms

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Abstract

This paper focuses on the type and management of intentionally created business networks called nets. Nets are extensively being used to achieve a variety of benefits over those of a single firm or market transaction. We propose that the effective management of different types of business net is dependent on their underlying value creation logic. Based on notion a value creation framework of three generic net types - "current business nets", "business renewal nets", and "emerging new business nets" – is suggested. We argue that they pose widely different conditions and requirements for net management. The management mechanisms of these basic net types are then identified and discussed. We contend that the proposed contingency framework captures the complexity and variety of the expanding strategic business nets in a more valid way than the extant classifications of network organizations. The paper contributes the emerging theory of network management.

Key Words: Network management, Strategic networks, Business networks; Value creation; Value nets

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Introduction

In his seminal paper on the "Changes in the Theory of Interorganizational Relationships in Marketing: Towards a Network Paradigm" Achrol (Achrol 1997; Achrol and Kotler 1999) suggested that one of the fundamental shifts in the 21st century is from a dyadic perspective of interorganizational exchange relationships towards a network perspective of value creation involving different types of network organizations. This was a perceptive observation as there has been an exceptional growth in corporate collaboration and interorganizational networks (Achrol and Kotler, 1999; Amit and Zott 2001; Frels et al. 2003; Gulati 1998; de Man 2004; Powell et al. 1996; Spekman et al. 2000). Besides the sheer growth in the number of networks, this kind of organizational configuration is also being used to pursue an expanding set of goals. In addition to the traditional buyer-supplier constellations, interorganizational networks can now include distribution channels, brand networks, technological innovation and product development networks; as well as competitive coalitions such as the collaborations that bring competing firms together to establish industry standards or the widely publicized airline coalitions (Amit and Zott 2001; Cartwright and Oliver 2000; Ford et al. 2003; Frels et al. 2003; Gummesson 2002; Möller and Halinen 1999; Srinivasan et al. 2006). In more abstract terms, the network perspective assumes that actors are embedded within networks of interconnected relationships that provide opportunities for and constraints on their actions (Brass et al. 2004).

The rising importance of business networks has attracted an increasing amount of research efforts among several fields. Araujo and Easton (1996) and Grandori and Soda (1995) have, in their reviews of extant network studies identified no less than close to 20 different approaches or schools in interorganizational networks (see also Brass et al. 2004; Ebers 1997; Gulati et al. 2000; Oliver and Ebers 1998 for analysis of literature). This great diversity in network research has produced important new knowledge but has also unfortunately resulted in conceptual confusion of the core phenomenon itself. There are several important issues that either remain unresolved or pose important theoretical or managerial questions.

Of primary importance is the ongoing discussion about the ontological character of business networks. The studies drawing on economic sociology and the social networks tradition (see e.g. Powell et al. 1996) as well as the key authors within the industrial network approach tend to emphasize the historical, evolutionary and embedded character of business networks (Håkansson and Ford 2002; Håkansson and Snehota 1995) and view networks as borderless, self-organizing systems that emerge in a bottoms-up fashion from local interactions. On the other hand, many scholars representing the strategic management perspective and the RBV are suggesting that there are also more intentionally created "strategic networks" or "value nets", which contain a specific set of organizations with agreed roles (see e.g. Branderburger and Nalebuff 1996; Jarillo 1993; Möller and Svahn 2003; Parolini 1999).

There are significant differences between the "networks of organizations" view and the "network organization" view (Achroll 1997) on the assumed role of management and manageability in the network. Researchers adopting the former perspective emphasize the self-organizing aspects of networks and maintain that networks cannot be managed by any single company. In this view, firms and networks of firms are seen as complex adaptive systems, comprising of interacting sets of organizational and social relationships in which each actor is pursuing its own goals (Stacey 1996). From this perspective networks are only weakly manageable, and no single "hub firm" can provide direction or control to any network (Ritter et al. 2004). On the other hand, researchers focusing on network organizations with intentionally created structures, negotiated roles and goals argue that these can, and indeed have to be managed in order to be efficient (Dyer 1996; Dyer and Singh 1998, 2000; Dyer and Nobeoka 2000; Lorenzoni and Lipparini 1999). Agreeing with Ritter, Wilkinson and Johnston (2004), we feel that both of these network views are relevant in understanding how companies behave and try to manage in network contexts. The key issue, we argue, is not whether networks can or cannot be managed but what kind of governance or managerial solutions are most suitable for different types of networks.

In this study, in view of the rapidly increasing utilization of intentional business networks, we focus on these and on their management. To make a difference between networks in general and intentional business networks we will call them nets; also terms value nets and strategic nets will be used. We propose that different types of nets involve and require different types of management in terms of their coordination and control mechanisms. The key question in this proposition is how to classify the

great variety of business nets, as the classification solution would then influence what kind of management mechanisms can be identified or postulated for each net type. Drawing on research on business nets (Hite and Hesterly 2001, Möller et al. 2005; Parolini 1999) and on regional business systems (Ståhle et al. 2003; Pöyhönen and Smedlund, 2004) we suggest that the value creation logic or system, through which the net creates value for, and with, its end customers has a fundamental role in influencing effective mechanisms for governance. In other words our aim is to develop a contingency theory for net management.

This aim is pursued by firstly discussing the ways in which nets and networks have been classified in extant literature. Then a value-system construct, to be deployed in the classification of different net types, will be proposed together with the net typology. The fourth section examines the different management mechanisms that are postulated as being required while operating in the proposed business nets. The paper concludes with a discussion on the theoretical and managerial implications as well as the agenda for future research.

Strategic Business Nets – Extant Classifications

Viewing the rapid proliferation of business networks and nets there are surprisingly few attempts to provide understanding in this field through identifying different forms of network organizations. Notable exceptions are the work by Achrol (1997), Cravens et al. (1994), de Man (2004), Möller et al. (2005), Piercy and Cravens (1995); we are focusing on these, although we certainly feel that more research must be available.

Achrol (1997) distinguishes four network forms, (1) internal market networks, (2) vertical market networks, (3) intermarket networks, and (4) opportunity networks. The prominence of the Achrol and Kotler contribution (Achrol and Kotler 1999) within marketing has led us to use this classification as a discussion platform. We briefly describe each of these network forms (the Internal Market Network has been excluded as it does not represent an interorganizational business network).

Vertical Market Networks (Marketing Channel Networks) refer to a set of direct supply or distribution relationships organized around a focal organization best positioned to monitor and cope with the critical contingencies or value activities in a particular market. Accordingly, a vertical market network is an industry-specific chain of suppliers and distributors often organized around a classic manufacturing company. This focal organization itself may perform only limited manufacturing functions but acts as an integrator often specializing, for example, in the marketing, product technology, or final assembling, outsourcing the rest of its business functions.

Intermarket Networks (Concentric Networks) originated from Japanese keiretsu organizations representing alliances among firms operating in a variety of unrelated industries. These networks have often been organized around one major financial institution, trading company, or manufacturing firm, which in turn represents institutionalized affiliations. These networks are characterized by dense interconnections in resource sharing, strategic decision making, culture and identity, and periodic patterns of collective actions (Gerlach 1992, ref. Achrol 1997, 61).

These patterns of financially centered intermarket networks are largely becoming redundant. The new economy with novel types of enterprises and converging industries as well as the global nature of capital markets has challenged the basic assumption of intermarket networks in the sense that they are not any longer organized around the traditional hubs (banks, trading companies, etc.) but, for example, around organizations which control the key technologies. We believe that the intermarket networks are more or less disappearing or developing towards structures that Achrol terms as opportunity networks.

Opportunity Networks, dynamic networks (cf. Snow et al. 1992), or market exchange companies (Achrol 1991) are temporary alignments usually established around a particular customer project. Often a marketing company can be found at the heart of the network (cf. the hollow and virtual network by Piercy and Cravens 1995). According to Achrol (1997), this marketing company is an organization specializing in collecting and disseminating market information, negotiating and coordinating projects for customers and suppliers, and even regulating product standards and exchange behaviors for the network of participating companies. The strategic core of this company is

a worldwide network of marketing offices and information centers connected together by modern information technology. This system produces real-time intelligence of the needs of potential customers, and it links the company into a worldwide directory of potential suppliers for the products and services. Achrol and Kotler (1999) have labeled these kinds of nets 'business opportunity networks' and see that they are primarily established to provide consumers access to a variety of new types of offerings.

It should be noted that in Achrol's classification all network types are formed around a single, and often powerful, hub company, which acts as an integrator, controlling the key value activities and resources. Moreover, all the three types resemble some kind of vertical integration between the participating companies. However, there are an increasing number of networks that are not organized around a single hub company in a vertical manner. For example, in technology and knowledge intensive industries companies cooperate in order to develop a new technology (e.g. the Bluetooth coalition); or assemble complex offerings for customers. These "value nets" (Srinivasan et al. 2006) are often horizontal networks or diagonal networks" (containing actors from the two-dimensional value space). Horizontal co-operation is also established when competing actors form competitive coalitions like in the case of the global airline alliances, e.g. StarAlliance, SkyTeam (Kleymann and Seristö 2005).

Piercy and Cravens (1995) have launched the concept of hollow network, which seems to be a pure marketing organization that is a hybrid form of Achrol's (1997) vertical networks and opportunity networks. The term 'hollow organization' emphasizes that the core company draws heavily upon other firms' resources to satisfy its customer needs. The hollow network is postulated to be very flexible in shifting to new sources of supply and being able to benefit from emerging opportunities in the market; just as Achrol's opportunity network. However, the short-term commitment and subsequent operations based on opportunistic market behavior raises the question of whether these networks (hollow and opportunity ones) are able to compete against other business networks that are operating with more long-term relationships with a limited number of partners (Håkansson and Ford 2002; Piercy and Cravens 1995).

Piercy and Cravens (1995) present a virtual network that is composed of a group of individual companies that have agreed to co-operate for a temporary period of time in order to exploit some market opportunity. In the virtual network the involved parties bring their own core competencies into the net, and, when a new project is started the needed actors are chosen from the network and the missing resources are searched outside the existing network. This is the 'virtual' part of the network and it is dissolved after the project is completed. The important aspect in the virtual network is that experiences, learning, and ideas remain in the existing network, and the knowledge gathered from the projects can be accumulated and utilized in the future.

The discussed network classifications are primarily based on a conceptual analysis. Drawing on the work of Castells (1996) de Man (2004, 19-36) has suggested a more comprehensive classification based on the goals that networks seek to achieve. His solution involves five categories which are further ordered into three groups:

Quasi-integration networks

- Primarily horizontal networks established to achieve market power and reach and drawing on the complementary resources of a limited set of member organizations and is competition oriented; example networks: airline alliances.

Supply (and demand or customer) oriented

- Vertical networks, between suppliers and producers in consecutive positions within the value chain, aimed at increasing efficiency; drawing on the specialized resources and competences of members; example networks: Dell and Toyota.
- Solution networks, between producers of complementary goods and services aiming to serve a comprehensive customer-specific problem; client activated, can involve both horizontal and diagonal partners; example networks: IT-offerings, Schwab financial services.

Technology oriented

- R&D networks, between companies aiming to share risks, costs and/or competences in the development of new technologies; pre-market competition; project-like cooperation that can

involve both horizontal and diagonal partners; example networks: Microsoft Web TV, Sematech consortium.

- Standardization networks, between horizontal or diagonal partners and often co-opting companies aiming to set dominant technology in a product/service field; market development and competition oriented; example networks: WAP Forum, Symbian.

De Man's (2004) network classification usefully covers the earlier work of Achrol (1997), Cravens et al. (1994), and Snow et al. (1992). One should note that in his solution the supply oriented network types also covers customer or distribution networks "… because these are fundamentally the same" (2004, 19).

Looking at the presented network types and classifications, a number of underlying dimensions can be identified: the structure of the network, whether primarily vertical, horizontal or diagonal; the goal that the network or its key partners try to achieve; whether the network draws value by integrating the specialized resources and competences of its members or seeks benefits by combining similar resources; and whether the network is operating in the pre-market competition or market competition phase of a business field. Although useful, we contend, drawing on work by Möller et al. (2005), that these dimensions – and categorizations - are missing a key aspect in understanding business nets and their management, their value creation logic.

Business Nets as Value Creation Systems

Fundamental Role of Value Creation-System

We argue that ssential to any business net is the underlying system through which it produces value. This value-system construct is based on the notion that each product/service requires a set of value creating activities performed by a number of actors forming a value-creating system, using Parolini's term (1999, p. 59-68). Value system 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), and Porter (1985). Porter (1985) used the value chain concept primarily to refer to the firm-level activities through which a firm produces value for its customers. However, he also conceived industries as interlinked value-chains of individual firms. Normann and Ramirez (1993) criticized Porter's value-chain construct for linearity and for primarily assuming competition driven market exchange relationships between independent firms. Håkansson and Snehota (1995, 24-49), while not using the term value system, provide an articulated conceptual scheme for describing a business network. It consists of interrelated layers of three basic concepts: actors, resources and activities. This conceptualization is similar to Parolini's (1999, 61-66) description of value-creating systems as "a set of activities creating value for customers; …activities are carried out by economic players using sets of human, tangible and intangible resources…" Based primarily on Parolini's scheme we define the value system of a business net as a set of specific activities carried out by the actors constituting the net. We also share the view that these activities are based on the resource constellation controlled by the actors, and that it is the final customers who, through their buying and consuming activities define the value of the offer produced by the net. In fact, as pointed out by Vargo and Lusch (2004) and embraced by the interaction and network perspectives in buyer-supplier research (Håkanson 1982; Möller and Wilson 1995; Norman and Ramirez 1993), customers are always co-producers of value.

Following this reasoning any business net can be described through its underlying value-creating system. How useful is the value system construct as there can obviously be as many value system configurations as there are business nets? We suggest that the key characteristic of the value system from the classification perspective of nets is the level of determination of the system. In other words, how well known are the value activities of the net and the capabilities (resources) of the actors to carry them out, and to what extent can these value activities be explicitly specified? As value activities are essentially based on knowledge, the level of determination is also related to the level of codification of knowledge. The aspect of how well known the capabilities underlying the value activities are is related to how easily the underlying knowledge can be accessed and shared between the actors in the value net. The higher the level of determination of the value system, the less uncertainty there is, and, the less demanding its management. This idea is based on the fundamental notion that the characteristics of information 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). Theoretically, one can conceive of a continuum of value systems extending from those with a high level of determination, to emerging ones with a low level of determination. Identifying the characteristics of the value system underlying a specific business net means it can be positioned on this theoretical continuum.

Business Net Classification

Figure 1 shows a value-system continuum (VSC) with three ideal or generic value systems, which are described in the lower part of the figure. It is argued that not only do they represent significantly different logic of value creation but also require different management mechanisms. The primary types of strategic business nets identified in the previous section are described in the upper portion of the figure along with some example nets. It is important to note that the hub firm has been used to refer to the net that it is part of. A brief description will now be made of the underlying logic of value production, while the next section addresses the management mechanisms pertaining to each basic net type.

The left end of the VSC describes clearly-specified and relatively stable value systems. The actors producing and delivering specific products, and their activities and capabilities, are basically known. As such this value-creation system domain describes well such business nets which have achieved a relative stability and high level of resource and business process specification in their value production. Vertical demand-supply nets (involving both supply and distribution nets) and part of the horizontal market nets are postulated to belong to this domain.

The multi-tiered supply nets in the automobile industry, especially the Toyota supplier net, provide a typical illustration (Dyer 1996). Dell, IKEA and Nike also illustrate well-specified supplier and distribution nets (Gadde and Håkansson 2001; Holweg and Pil 2001; Lipparini and Fratocchi 1999). 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. Another feature is the hierarchically distributed coordination of the net. In terms of value creation and the role of knowledge, the capability of exploiting current actor competencies through effective knowledge transformation and sharing is expected to be essential in these nets (Dyer and Nobeoka 2000; Levinthal and March 1993; March 1991). More specifically, we contend that a high level of knowledge codification and advanced information systems are essential for building an efficient vertical demand-supply net. Without these it is not possible to link the production and logistical processes of the net members (Hoover et al. 2001).

INSERT FIGURE 1 AROUND HERE

Considering horizontal nets, similar value-creation conditions are also valid for such horizontal market nets that have been created for producing combined offerings for their end customers on a continuous basis (versus project or temporal basis). Horizontal market nets are created when competing firms recognize that they have products, channel relationships or customer-service systems that can be combined to achieve a stronger position in global-level competition. Competition alliances, such as the airline alliances “SkyTeam” and “StarAlliance”, represent enduring strategic nets, which are generally based on the combination of partners’ existing resources (routes and airport rights) and on the joint creation of renewed and new processes and resources (reservation system, customer bonus system). Many service providers have also established more loose horizontal market nets by providing complimentary services which produce added value to their customers through various bonus programs. In the U.K. the Nectar reward card system, for example, is soon covering most of the consumption and service need of consumer customers (http://www.nectar.com/NectarHome.nectar).

It should be noted that horizontal nets are seldom purely horizontal. They often contain vertically-positioned supplier and distributor companies. The airline coalitions, for example, expand into complex diagonal multi-field nets through their relationships with hotel chains and car-rental companies.

The middle of the continuum describes value systems which are based on current value-creation systems and as such are relatively well determined, but which are being modified by actors through incremental and local innovation activities targeting to achieve improvements in current value systems. We primarily distinguish between two net categories in this relatively unrecognized value net domain. First, most multi-company R&D projects, which generally involve a hub company and its lead supplier(s), pilot customer(s), and often consultants and specific technology providers, can be regarded as temporal, goal-oriented nets. This can also hold true for other multi-party projects established for business-process improvements. Usually, these nets, which we call business renewal nets, aim at increasing the efficiency of the existing vertical demand-supply nets or horizontal market nets by improving their offerings or specific parts of their business processes (production, logistics, information systems, etc.). Offering improvements can, however bring also gains in market effectiveness

Customer solution nets form the other group of renewal nets. Solution nets are formed by producers with complementary resources and competences who operate mainly in project-based business, e.g. in construction industry, engineering, or software development. They are temporal in the sense that a specific net partner constellation is decided on the basis of the goal of the specific solution project. The goal defines the competences required, which then guide the selection of the net members. In spite of this temporal character, solution nets generally have a hub firm or a set of relatively stable core members around which the projects are organized. This improves their value production effectiveness compared to completely ad hoc project arrangements

From the value-creation and knowledge perspectives, the local renewal nets require a balanced position between knowledge exploitation and exploration. The capability of bridging different communities of practices – experts of various technologies and functional areas, software developers, business managers – is essential in creating new specialized knowledge (Araujo 1998; Brown and Duguid 2001; Dyer and Nobeoka 2000). This social character of knowledge production emphasizes an ability to create trusting partnerships and requires project managers and members who perform well in multi-functional and multi-actor teams (Birkinshaw et al. 2002; Dougherty 1992). In terms of the network structure, renewal nets are generally diagonal, having members from both vertical and horizontal dimensions of the value creation.

The right-hand end of the continuum describes emerging value systems. Through them new technologies, business concepts or even business fields are being created. In this respect, this domain concerns radical, discontinuous and system-wide change as illustrated by the birth of commercial Internet or genetechnology. It is characterized by dispersed and vaguely identifiable ideas about the future involving great uncertainty.

We identify three network/net categories in this relatively unresearched and highly complex domain (for a more extensive discussion on the networked emergence of new technologies and business fields see Geels 2002; Lungren 1995; Möller and Svahn 2005). First, there are innovation networks, which are relatively loose science and technology-based research networks involving universities, research institutions, and research organizations of major corporations. These are characterized by professional and social relationships and are not primarily business networks but are guided by the ethos of scientific discovery. However, large corporations are to a growing extent participating in these networks through their own researchers and by sponsoring university laboratories and other research institutions (Lundgren 1995). They are also harnessing these broad science networks through multi-party research projects having specific application oriented goals. These structures fulfill the characteristics of temporal project nets (Doz et al. 2001).

Second, proactive companies try to create so-called dominant technological designs in the pre-market phase of the business field evolution in order to favor their positions in the field and to accelerate the market construction (Abernathy and Utterback 1978; Anderson and Tushman 1990; Tushman and Rosenkopf 1992). This competition takes place through networking as no single firm can generally achieve a dominant design by itself (Srinivasan et al. 2006). These dominant design nets are diagonal coalitions of partially competing and partially complementing companies, which share similar technological view, exemplified by the Symbian and Bluetooth coalitions within the mobile phoning and services field (http://www.symbian.com; http://www.bluetooth.com). Often there can be several nets competing to establish technological dominance like in the competition of flat panel display solutions (Murtha et al. 2001). It is notable that this networked competition deals not only with companies and

technological actors but also other stakeholders such as regulators and financial institutions through a complex process of agenda setting with the ultimate objective of subtly aligning public opinion with the interest of the dominant design net.

The third net type in this domain is application nets, which are formed to support the race for achieving commercially viable business applications out of the evolving technology. These nets may overlap with dominant design nets but they are generally driven by a hub company and involve a web of complementary component, software, and other technology producers, as well as pilot customers. For example, emerging mobile services are generally created through business nets involving a telecom operator, several "middleware-type" software producers, and content/service providers.

From the perspective of value creation logic, the challenges faced by the actors in the emerging business nets creating new technology and business concepts are pronouncedly different from those faced by the actors in stable business nets. The pervasive uncertainty and tacit nature of beliefs and ideas about technological and commercial opportunities lead to a situation where sense making of the emerging opportunities (Weick 1995) and the co-creation of knowledge through exploration (March 1991) dominate over the issues of transferring existing explicit knowledge. In the early phase it is very much about competition to reduce the perceived uncertainty through agenda setting, and, in the later phases by networked creation of working designs and applications. These activities presume deep collaboration capabilities and joint creation of new solutions.

The proposed value system continuum framework is an abstract theoretical construct. It does not postulate any development phases or path but proposes ideal types of business nets -current business nets, business renewal nets, emerging new business nets - based on the level of determination and the role of knowledge of their underlying value systems. In reality, we will never find purely ideal value systems, in the same way as there is no pure market governance, hierarchical governance, or network governance (Bradach and Eccles 1989; Powell 1990). All net types exhibit hybrid forms of governance mechanism, varying from more pronounced hierarchical coordination to self-organization through mutual adjustments (Adler et al. 1999). Nets may also be interrelated through actors having roles in several nets; and most large corporations hold roles in several nets across the continuum.[1] Finally, the "content" of the continuum, the business nets and their underlying value systems, is in constant evolution. Once nets creating innovative services, such as mobile banking, have been able to specify their offerings and their value-creation systems, they can be reclassified as current business nets. In a similar fashion, when new offerings or business process improvements have been achieved through renewal project nets, they are subsumed into the regular "clock work" functioning of efficient current business nets.

Based on the preceding discussion, we suggest that the issues faced in managing business nets are profoundly influenced by their underlying value-systems. While comparing the learning skills and capabilities required in our three ideal-type nets, the fundamental driver of their differences seems to be the varying character and role of knowledge in their underlying value systems. This ontological dissimilarity is obvious between the well-established and emerging value systems. In the former, knowledge is primarily codifiable and firmly held, whereas in the latter the role of tacit knowledge, widely dispersed, vague and uncertain, is more pronounced. The incremental knowledge creation, the middle position in the value continuum, shares aspects of both extremes, the key issue is the invention of new modifications out of the existing, partly codified and partly tacit, knowledge bases. In brief, we argue that the challenges of management are remarkably different across the continuum.

Management Mechanisms in Business Nets

Drawing on the discussions in the previous sections we suggest that it is useful to examine the management requirements, posed by the different types of strategic nets, by focusing on the following perspectives or dimensions: the role of efficiency versus effectiveness in achieving net goals; the role of knowledge utilization versus the production of new knowledge in achieving net goals; the type of interdependence between actors. These dimensions are related to the underlying value-creation logic of the net and they are expected to exert significant influence on the viable management mechanisms per net type. These are discussed with the help of the framework depicted in Table 1.

INSERT TABLE 1 ABOUT HERE

Management of Current Business Nets

Vertical Demand-Supple Nets (VDNs) are primarily established for competing through efficient production of established customer offerings by "lean manufacturing" (lowering costs, shortening lead time) systems and "assembly on demand" (lowering inventories, matching demand and production) processes. The end offering which the net produces is generally decomposable into smaller subunits requiring specialized resources and value activities from the net actors. This specialization leads into strong serial interdependence between net actors; i.e. the out put of actor A is the input of actor B (Håkansson and Persson 2004; Thompson 1967). This high level of specialization enables actors to reach efficiency gains. The efficient integration of components and the coordination of the related value activities require a high level of knowledge codifiability facilitating its sharing amongst the members of the net (Kogut and Zander 1992). This is required to solve serial interdependence problems such as the scheduling of demand pull-production and logistics, which require reciprocal information exchange and adaptability (for a commentary on serial and reciprocal interdependence, see Håkansson and Persson 2004; Thompson 1967). Drawing on this reasoning we propose that highly integrated demand-supply nets can be constructed and managed effectively only when the underlying value system has reached a high level of codifiability and transparency.

What kinds of management mechanisms are paramount in these nets? Evidently, the specialized components have to be integrated and their production schedules and logistics need to be coordinated through cross-company IT systems (Adler et al. 1999). A prerequisite is that the hub can mobilize a set of actors willing to form a tightly coordinated supply and channel net. Companies with a well-established position in their field, providing sound end customer demand for the net through strong brands, have a high potential to become the integrator firm. A strong demand position is essential in convincing important first-tier component vendors and integrated manufacturers that they can benefit from a closer value net in terms of larger volumes and more stability (Holweg and Pil 2001). The more powerful the position of the hub firm, the more selective it can be in choosing the net actors. In general, there is market pressure influencing the net members; each member has to be able to maintain its relative competitiveness, as otherwise it could be replaced with a more efficient one.

The resource integration capability requires a systemic type of knowledge on the architecture of the value activities underlying the net (Parolini 1999; Sanchez and Mahoney 1996; Seufert et al. 1999). Achieving this in complex vertical nets involving several technological platforms can be very demanding, costly or outright impossible as intimate knowledge is dispersed amongst different actors at different levels of the net. The solution lies in the multi-tiered structure of the net. There are several integrating and coordinating actors who possess the necessary knowledge base for understanding and coordinating their own "value segments" of the value system. One can speak of distributed coordination. Such integrating actors – e.g. Intel or Cisco – form the key nodes in the net, besides the hub firm, as they create and retain the specialized knowledge and theories that are used in their value segments.

Finally, a hub that tries to achieve complete centralized control reduces the very variety and specialization that constitute the source of competitive strength for the net. In learning terms, one-sided emphasis on exploitation destroys the potential for exploration and generative learning (Håkansson and Ford 2002; March 1991; Slater and Narver 1995).

In Horizontal Market Nets (HMNs) members have primarily pooled interdependencies (Thompson 1967) in the sense that they are producing products and/or services that, when put together offer added value for the customers of the net. The Amex and Nectar card companies, for example, are pooling their partners' services as wider service offerings are more attractive to their cardholding customers. In other words, by consuming more the end-customers earn higher bonuses. This makes the net more attractive for new potential service providers as well. Establishing and managing these kinds of net requires developing and sharing operating principles including decisions on revenue sharing, joint branding and marketing communication programs. Companies have also to develop a joint IT system for sharing customer information and enabling the coordination of cross-marketing activities; in other words the net members are also reciprocally interdependent. An attractive integrator

or hub company should also have a large and financially well-off customer base and advanced CRM systems. Compared to the DSV nets HMN net member companies maintain high autonomy and continue to market their services also independently – like Sainsbury, the large U.K. retailer participating in the Nectar reward card net.

Compared to horizontal customer reward nets, airline alliances share more characteristics with the vertical supply nets in the sense that their members share both serial and pooled interdependence. That is, the members of these nets have to create stronger linkages between their business processes. The heavy investments and the strategic nature of issues involved cause these kinds of competitive alliance nets to have formal central committees that may also lead to equity holdings (Kleymann and Seristö 2005; de Man 2004). It may take several years for a partnership to become a co-coordinated net on account of the varying corporate cultures and goal incongruencies characterizing firms participating in the net.

Management of Business Renewal Nets

Business Renewal Nets (BRNs) are established to provide improvements to the existing offerings and business processes of the value-production systems that we have labeled as current business nets. Collective action is required when resources and competencies involved in renewal are dispersed among several net partners due to firm specialization. Renewal nets typically have explicit goals and timetables and are organized as multiparty projects. Complex renewal objectives are often pursued through several interrelated projects. Most product development and business process modification projects, exemplify nets sharing these characteristics as they involve various participants such as pilot customers, lead suppliers (von Hippel 1988), and technology and service providers (Ekstedt et al. 1999). Customer Solution Nets (CSNs) share most of the features of the Business Renewal Nets. In solution nets, a group of companies with complementary resources and competences provide customer-driven solutions on a project basis. A specific partner constellation is decided on the basis of the goal of the specific solution project.

In this kind of targeted project nets the actors are highly interrelated and have to solve serial, pooled, and reciprocal interdependence issues as the output of one phase would correspondingly be the input to the other leading to serial interdependence. Pooled interdependence arises from the scarce qualified personnel that have to be pooled between projects. This pooling requires mutual understanding of the kind of expertise involved in the project and knowledge of the competences and capacity of each net member. The joint-learning and problem solving requires reciprocal communications and the sharing of professional expertise, and hence, leads to reciprocal interdependencies (Dougherty 1992; Tuomi 2002).

Business renewal nets and current business nets are often highly embedded in terms of having many organizations and persons in common. We contend, however, that these nets differ in their value-producing logic. From the knowledge perspective, local development nets require a balanced position between knowledge exploitation and knowledge exploration.

An essential aspect in both business renewal nets (BRNs) and customer solutions nets (CSNs) is the net's ability to not only exploit the specialized knowledge held by each actor but also to expand this knowledge through collaborative learning. The more adjustments and new solutions are required by the project (compared to the current value productions system), the more critical the joint knowledge production. This is a challenging task due to the embeddedness of each net member's special, partly explicit partly tacit, knowledge in people and routines. This social character of knowledge and learning has been underlined by the communities of practice perspective (Brown and Duguid 2001; Tuomi 2002; Lave and Wenger 1993).

The social character of knowledge production puts emphasis on the capability of bridging the borders of both the involved firms and their communities of practice (Mowery et al. 1996; Nonaka and Takeuchi 1995; Simonin 1999). Bridging is not free, however, but requires specific organizational capabilities. Being able to understand specialized knowledge domains as exemplified by experts of product and process technologies, software developers, marketing and business managers (Birkinshaw et al. 2002; Dougherty 1992) presumes an ability to cross their professional languages and sub-cultures.

The role of boundary persons working on cross-organizational teams is central in the business renewal nets. Partner specific experiences, general alliance experience, and relational governance structures and processes support the creation of such interorganizational routines that facilitate effective joint renewal solutions (Kale et al. 2002; Lambe et al. 2002; Mowery et al. 1996; Simonin 1999; Zollo et al. 2002). A key issue is to share the benefits of business renewal in a way that motivates all the net partners. Without members' initiatives much of the learning potential of the net depends on the hub firm's more restricted knowledge base, leading to a kind of "hierarchy trap" (Håkansson and Ford 2002).

The management of renewal nets involves, again, a balancing dilemma. A tightly coupled renewal net with strong unifying culture and coordinated relationships can be very efficient in development projects which directly exploit the current knowledge bases of net members. Without enough autonomy and space, time and resources for exploration tightly coupled systems tend, however, to loose their innovativeness in the long-run (Levinthal and March 1993; Weick 1995).

Management of Emerging New Business Nets

The value systems at the right end of our value continuum (Figure 1) represent the varying stages of emergence. They involve actors aiming at developing new technologies, products or business concepts. This action is future-oriented in the sense that the economic value potential of these nets is generally fully realized only in the future. Uncertainty and ambiguity related to value activities and to actors and their capabilities are inherent features of this landscape, exemplified by the converging information, communication, and e-content fields (Amit and Zott 2001; Eisenhardt and Martin 2000). We distinguish three interrelated but different networks and nets in this broad domain: innovation networks, dominant design nets, and application nets. These are located in different parts of the emergence continuum, as application development already requires relatively specified technological solutions whereas innovation and invention networks operate at the edge of the low level of determination.

Innovation Networks (INs) are relatively loose science and technology-based research networks involving universities, research institutions, and research organizations of major corporations. As we pointed out earlier, these are mainly professional networks, not business networks, and guided primarily by the ethos of scientific discovery. As such, they cannot be managed by any one company or institution alone. However, large corporations are to a growing extent participating in these networks through their own researchers and by sponsoring university laboratories and other research institutions (Lundgren 1995; Doz et al. 2001).

A key managerial challenge in this early phase of emergence is the identification and sense making of widely dispersed and inherently the local nature of technological and breakthrough business ideas (Doz et al. 2001; Lundgren 1995; Murtha et al. 2001). Ideas are often fuzzy, that is, there is ambiguity about the possible cause and effect relationships between existing knowledge and the emergent knowledge. Fuzzy ideas do not yet contain a clear heuristic of how to pursue the idea (Scharmer 2000). The key question is then, how to enhance an actors' sense making ability? It appears that actors located in nodes which connect multiple actors and create different types of new knowledge have a better chance of recognizing emerging technological and business opportunities than actors who are highly specialized (Håkansson et al. 1999; Kogut 2000; Powell et al. 1996). Since they are involved in several interlinked but different networks, major corporations have increased exposure to ideas emerging from other actors. Furthermore, Granovetter's (1973) and Uzzi's (1997) findings suggest that weak ties with many actors form an important source of information about ideas that originate outside of an actor's more-immediate network environment. Weak ties help to expand a firm's network horizon beyond its local network (Alajoutsijärvi et al., 1999; Dubois 1998). This can be indispensable for making sense of the flux in early business field emergence.

Besides this kind of "environmental scanning" for early signals of breakthrough science-driven business ideas, proactive incumbent corporations have also deliberately increased their exposure to emerging technologies by acquiring tens or even hundreds of small high technology firms. This is a costly way of increasing the variety and richness of one's learning environment. Similar results may be achieved by having an extensive alliance network, including R&D projects with interesting SMEs (Hinterhuber 2002; Dyer and Singh 2000). Major companies are also harnessing broad science networks, through multi-party collaborative research projects with universities and research institutions

having more specific and application oriented goals (Doz et al. 2001; Murtha et al. 2001). These structures share many management characteristics with the temporal project nets (BRNs and CSNs) discussed earlier.

Compared to Innovation Networks Dominant Design Nets (DDNs) represent target oriented mobilization of a coalition, or net of actors, aiming to establish a dominant technological design to an emerging business field, as exemplified by the Symbian and Bluetooth coalitions within the field of wireless and mobile communications. We conceive two critical aspects in the DDN mobilization. First, it involves setting and communicating a development agenda for the field, and second, a mobilization and coordination of the activities of a DSN.

Through agenda setting a proactive company can influence the sense-making and selection processes of other actors and thus guide the lock-in investment decisions that lead to a new technological trajectory for commercialized business offerings (Geels 2002). Agenda setting is also a necessary condition for mobilizing a net of actors into trying to develop a dominant design. The basic idea of agenda construction is to reduce the very uncertainty and ambiguity inherent in radical emergence. It is this uncertainty about the technological alternatives, required investments, and business potential in terms of volume and revenue, which impedes business investment decisions.

Through agenda construction a company, or a net, can influence the relevant actors' sense-making processes and consequently the way they frame and interpret the business emergence. This aspect, which Hardy (1996) and Swan and Scarborough (2005) call 'meaning power' and Perrow 1986 'premise control' refers to the extent an actor can influence the meanings through which the emerging business field is seen and constructed by the involved actors. Agenda construction links the sense-making perspective and actors' focusing and decision making processes, thus, making it an essential part of the social construction of new business.

The Bluetooth coalition is a good example of a technological innovation where partially competing and partially complementing wireless technology and service companies joined their forces to develop a technological solution, which became a dominant design for future commercial applications and services (*http://www.bluetooth.com*).

Active mobilization of a DDN presumes a credible design solution and a road map of technology development. If successful, this leads to a lock-in and commitment to a path that the mobilizer is driving. This presumes either a strong company with a good track record (like Ericsson, the initiator of Bluetooth coalition) or a small innovative company with a very attractive technological solution (like Psion in the case of Symbian coalition). The management of a dominant design net generally involves at least two levels. First, the technological development work is carried out through collaborative projects, characterized by the similar issues of management as in the temporal project nets (BRNs and CSNs) discussed earlier. Second, the strategic management of the coalition generally involves the establishment of a formal organization where all the involved net members are represented. The net development is generally carried out through working groups, and the members aim to arrive at shared unidirectional decisions (de Man 2004).

Finally, Application Nets (ANs) refer to the networked development and launch of early commercial applications within the emerging business field. The early mobile phones, Internet portals, or UNIX-based workstations provide some examples. ANs may overlap with dominant design nets but are generally driven by a hub company and involve a web of complementary component, software, and other technology producers as well as pilot customers. Thus, ANs do not generally contain clear market competitors that are relatively typical in DDNs. In terms of their management, ANs are argued to exhibit a hybrid character. The application development work is carried out through similar structures involved in Business Renewal and Customer Solution nets. It contains analogous issues in terms of collaborative, project-based learning, enhancing the importance of boundary persons and the trust-based sharing of knowledge, and efficient project management in general.

In parallel to solving the technological aspects of an application, the net must work on creating an efficient marketing, distribution, and production system for the application. These may involve inviting new members to the network. The management issues of these aspects belong to the domain of Current Business Nets; in a sense a successful application is "moved" to the value creation logic of

either the Vertical Demand-Supply Net or the Horizontal Market Net depending on the business logic and model of the application.

Conclusions

This paper proposes two significant contributions to the emerging theory of management in interorganizational networks and business nets: the classification framework for intentionally developed business nets, and the analysis of the management requirements in different types of net. These contributions are first discussed from a theoretical perspective and a managerial perspective. Next, the limitations of the paper are identified, and finally, suggestions for future research are provided.

Theoretical and Managerial Implications

We started by emphasizing the relevance of differentiating between the evolutionary interorganizational networks perspective adopted in economic sociology and embraced by most research into industrial networks, and the business nets intentionally formed by a set of organizations. A significant implication of this distinction is the question of what kind of nets are being formed and whether one can identify specific conditions related to specific forms of organizing and managing the different nets. Following this reasoning, we have constructed a value system–based framework for identifying the characteristics of different types of business net. This theory-driven framework with its three ideal types – current business nets trying primarily to achieve efficiency gains through demand-supply coordination, business renewal nets looking for local business process improvements by incremental innovation and change, and emerging new business nets seeking to create more effective technological applications and business concepts by means of radical innovation and business system change - extends our knowledge of the various types of business net considerably.

By highlighting the characteristics of each ideal type, our value system continuum provides an abstract but powerful contingency view-based conceptualization of the ontological and epistemic conditions influencing the management in different types of net. We contend that this framework captures the complexity and variety of the expanding strategic business nets in a more valid way than the extant classifications of network organizations (cf. Achrol 1997; Cravens et al. 1994; de Man 2004; Piercy and Cravens 1995; Snow et al. 1992).

Using the value-system framework we identified, through the review of extant literature, eight strategic net forms under our basic typology of three value creation logic domains – Vertical-Demand Supply Nets, Horizontal Market Nets, Business Renewal Nets, Customer Solution Nets, Innovation Networks, Dominant Design Nets, and Application Nets – and discussed their pertaining management issues and mechanisms. This analysis makes a significant contribution to the developing theory of network management.

In essence, we are saying that the ontological distinctions in value systems underlying the postulated net types are forming widely different epistemic conditions influencing their effective management solutions. The level of determination of the value activities is reflected in the specificity of knowledge structures influencing the relevance of different modes of learning and knowledge utilization across the nets. This ontological dissimilarity is obvious between the well-established current business nets and the emerging new business nets. In the former knowledge is primarily codifiable and firmly held, whereas in the latter it is tacit, widely dispersed, causally ambiguous and vaguely held. The incremental knowledge creation, the middle position, shares aspects of both extremes. The key issue is the invention of new modifications out of existing, partly codified and partly tacit knowledge bases.

The majority of studies on management in the network context has primarily focused on identifying conditions for management in general (Håkansson and Ford 2002; Jones et al. 1997; Ritter et al. 2004; Powell et al. 1996). It can also be claimed, that studies examining management in particular nets have not provided a unified theoretical base for identified differences in management (Achrol 1997; Cravens et al. 1994; Piercy and Cravens 1995). Compared to this extant research we contend that our framework makes a significant contribution by proposing a systematic, theory-based conceptualization relating the ontological characteristics of the types of intentional business nets to their knowledge and learning requirements. Our framework also expands the emerging theory of

network management. Based on our analysis, we argue that the more traditional dynamic capabilities such as relational partnering and alliance management (Eisenhardt and Martin 2000; Kale et al. 2002; Spekman et al. 2000) are not sufficient for complex knowledge sharing and co-creation in different types of business net. In brief, our business nets framework offers clear managerial guidance for constructing and managing specific types of net for particular goals.

Our conclusions and propositions must be considered in the light of the limitations of this study. One aspect is the number of different literatures employed. Due to space limitation we have had to present rather brief discussions to many important themes and conceptualizations. We have, however, tried to maintain clarity by using a limited set of key concepts from each relevant field and by providing core references on each central topic.

Suggestions for future research

Programmatic empirical research is required to deepen and validate our proposition of the characteristics of different types of intentional business net and the postulated management mechanisms and requirements. 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 their organizational structures and management mechanisms employed, and assessment of the performance of different nets would appear to be a viable strategy. The examples offered in the paper suggest a few suitable industry contexts. An assembly type of mature consumer and business products, exemplified by PCs and basic models of mobile phones, could be used for examining the current business nets and the business renewal nets. Advanced mobile services and other emerging ICT offerings seem to provide a good milieu for the analysis of the new business nets. We hope that the proposed ideas will support research efforts in this rapidly developing field. Deeper understanding is needed concerning the behavior and management of strategic nets, a pertinent topic in the world of rapidly globalizing networks and nets.

Endnotes

[1] The point that large corporations may hold roles in different types of nets is related to the variety of their goals and activities. Using Nokia and the mobile phone business as an example, Nokia has mobilized a supplier net pursuing high operational efficiency. Simultaneously it has been involved in many technological coalitions like the one behind the Bluetooth technology and has been active in the establishment of the Open Mobile Association (OMA) which can be seen as a net of firms driving the openness and interoperability of future mobile services. These net activities are examples of the "emerging new business nets". These two net types – the current business nets and the emerging new business nets – have different logics and require different managerial mechanisms. This is reflected in the fact that Nokia uses different organizational entities to carry out its role in these different nets.

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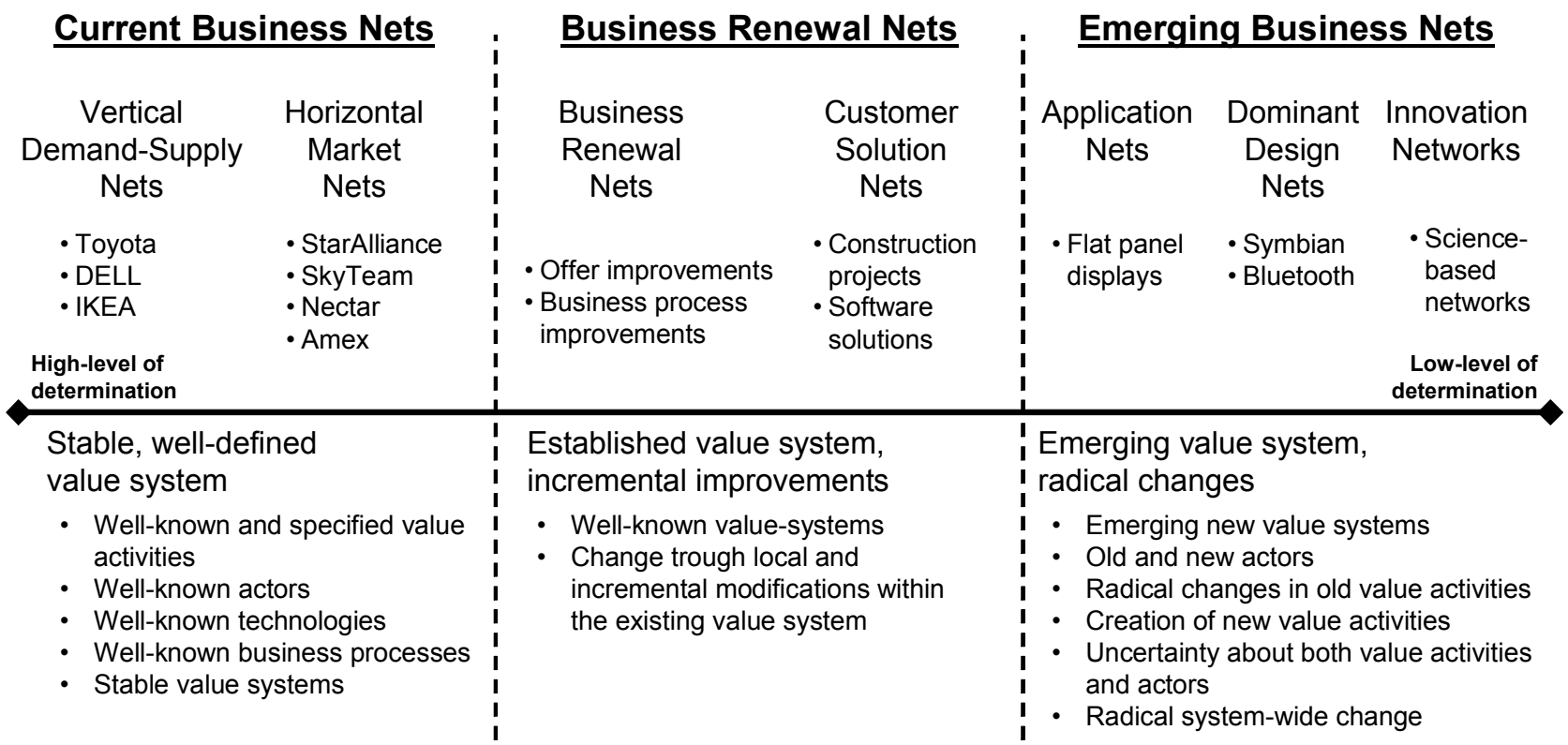

Figure 1. Business Net Classification Framework

Table 1. Business Nets – Their Characteristics and Management Mechanisms

Current Business Nets	Business Renewal Nets	New Business Nets
Ontological Characteristics ▪ Relative stable, multi-tiered structure ▪ Prominent level of codifiability of value activities and knowledge ▪ Relative transparency and level of determination of value activities	**Ontological Characteristics** ▪ Coexistence of stability and incremental change ▪ Specialized knowledge embedded in persons, communities of practice, and routines – partly tacit partly explicit. ▪ Temporary in nature	**Ontological Characteristics** ▪ Radical change involving change of existing value systems and creation of new ones ▪ Uncertainty concerning emerging knowledge structures and value activities ▪ Dispersed vaguely held ideas
Typical Net Goals ▪ To achieve high systemic efficiency through value activity integration and coordination ▪ Provide integrated customer offerings by combining complimentary resources	**Typical Net Goals** ▪ Renewal of existing offerings and business processes ▪ Produce of customer-driven/specified solutions	**Typical Net Goals** ▪ Influencing emerging field ▪ Creating new dominant technology solutions ▪ Creating new commercial applications
Management Mechanisms *Vertical Demand-Supply Nets (VDNs)* ▪ Strong sequential interdependence between actors ▪ Reciprocal information exchange and adaptability ▪ High level of specialization ▪ Controlling efficiency (tight enough integration and coordination of resources, value activities and net members) ▪ Distributed coordination / hierarchy also needed (risk of too high level of control by the hub) *Horizontal Market Nets (HMNs)* ▪ Pooled (or reciprocal) interdependence ▪ High autonomy but shared operating principles (revenue sharing, joint branding & marketing communication) ▪ Joint IT systems for sharing customer & market information ▪ Coordination of cross-marketing activities ▪ Formal central committees, equity holdings, etc.	**Management Mechanisms** *Business Renewal Nets (BRNs)* ▪ Pooled and reciprocal interdependence ▪ Coordination of dispersed resources ▪ Bridging borders of both the involved firms and communities of practice ▪ Coordinated collaboration ▪ Trusting culture, enhancing joint-development ▪ Motivating partners (sharing benefits, IPRs) ▪ Balancing with tight and loose coupling *Customer Solution Nets (CSNs)* ▪ Serial, pooled, and reciprocal interdependence (coordination & scheduling) ▪ Systems for rapid establishment of a net/customer project (constellation of partners) ▪ Advanced project management systems ▪ Advanced systems for sharing benefits ▪ Balancing with tight and loose coupling	**Management Mechanisms** *Innovation Networks (INs)* ▪ Mainly reciprocal interdependence ▪ Self-coordination / informal leadership ▪ Weak ties, loose coupling (trust, norms) ▪ Cannot be managed by one actor alone ▪ Actors holding node positions connect multiple actors *Dominant Design Nets (DDNs)* ▪ Pooled and reciprocal interdependence ▪ Setting & communicating agenda development ▪ Mobilizing and coordinating for activities ▪ Influencing the sense-making process (meaning power / premise control) ▪ Using working groups / alliance teams *Application Nets (ANs)* ▪ Serial, pooled, or reciprocal interdependence ▪ Hub company-driven with hybrid character (similar to BRNs and CSNs) ▪ Collaborative project-based systems (boundary persons / linking-pin roles) ▪ Efficient systems under construction