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Sharing for Understanding and Doing for Learning: An Emerging Learning Business Network

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Abstract: *Changing competitive environments are forcing companies to innovate and to renew their business models in a more value-adding and customer-centric direction. Often, a prerequisite for this is that the companies are willing to combine their knowledge by openly co-operating and by creating long-term strategic networks with each other. We illustrate the importance of a business model in this co-operative arena and use it as a starting point for our discussion. Against this backdrop we are interested in how learning and knowledge sharing develop in an emerging business network. This leads us to develop a framework that combines learning with business models in order to bridge the gap between strategic vision with business processes and ICT-implementation issues in the business network setting.*

Keywords: *business network, knowledge creation, organizational learning, learning organizations, business model, boundary object*

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Sharing for Understanding and Doing for Learning:
An Emerging Learning Business Network

1. Introduction

In the highly competitive environment of the information society companies are constantly renewing their operations. The aim is to be innovative and proactive, not only by reacting quickly to changes in the business environment but also by structuring their own environments (Brown & Duguid 1991). According to field literature innovations are derived, to a large extent, from knowledge exchange and learning between firms (Nooteboom, 2000): competitive advantage is based on relation-specific assets, knowledge exchange and joint learning. Nowadays, the tendency of firms to focus on their core competencies and increased outsourcing have made companies even more dependent on each other's knowledge and capabilities (Soekijad & Andriessen, 2003; Powell, 2000; Dyer & Singh, 1998). As a result, new business ideas are seldom feasible for a single company alone, but require the more in-depth co-operation of multiple firms in strategic business networks.

A prerequisite for innovative co-operation between organizations is that the parties are willing and able to learn and share knowledge. It takes time to build trust and learn to work together and adjust operations within partnerships (Ariño et al, 2001). Thus, the evolution of business relationships over time is an emergent and cyclical process (Van de Ven, 1976; Kumar & Van Dissel, 1996). A number of scholars are currently investigating how to facilitate or manage learning in an inter-organizational context. To name a few, Nooteboom (2000) highlighted the need for partners to reduce cognitive distance in order to better understand each other and Brown & Duguid (1991) argued the importance of communities-of-practice in tacit knowledge sharing. Boland & Tenkasi (1995) presented boundary objects as tools to help sense-making and understanding between partners and to make inter organizational learning possible. Andreau & Ciborra (2001) developed a generic model of knowledge sharing across a firm's boundaries and Andersen & Christensen (2000) pointed out that in dyadic business relationships mutual trust and division of work between partners are shaped during the relationship. They proposed a learning process model in which inter-partner differences (e.g. cultural, organizational or strategic) determine the capabilities to absorb and communicate knowledge, both of which influence mutual trust and division of work in the dyadic relationship (see figure 1).
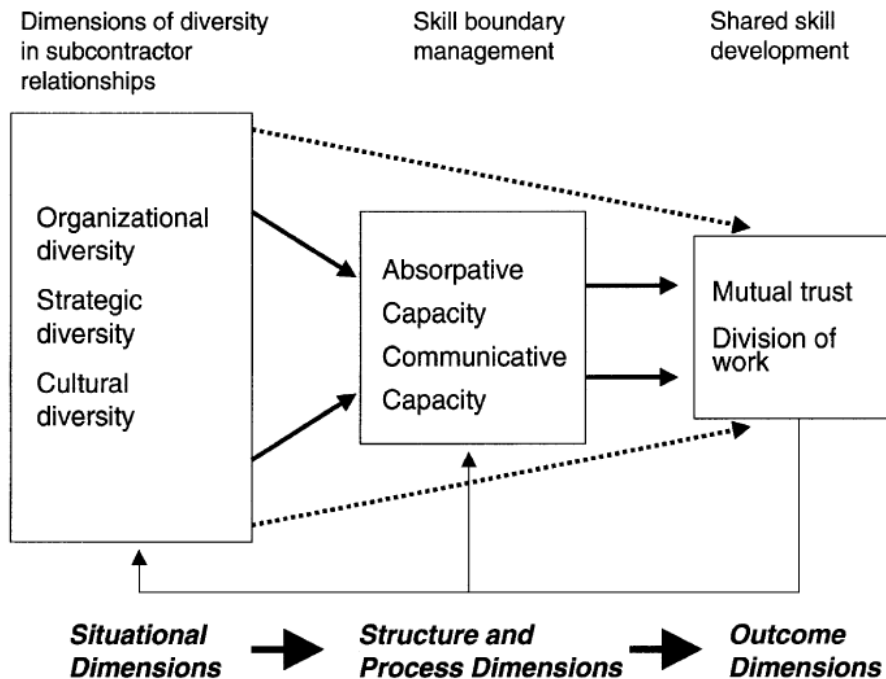
Figure 1. *Model of shared skill development in a dyadic relationship*
(Andersen & Christensen, 2000)

The problem is that many companies remain undecided as to what level of intensity of co-operation to engage in, its consequences for business and how to deal with the integration of information architecture. Our understanding of the situation leads us to call for an articulated business model which can serve as a boundary object or conscription device (Boland & Tenkasi 1995) for learning from other partners in co-operation, identifying the roles of the partners and also communicating the business potential of partners within their own organizations. This leads us to develop a framework that combines learning with business models in order to bridge the gap between strategic vision with business processes and ICT-implementation issues in the business network setting.

This article is organized as follows: The following section describes the empirical case and our research approach in more detail. The third chapter introduces the network business model. The next two chapters provide a summary of literature on organizational learning and networks. Chapter six illustrates the important aspects of learning in business networks. The final chapter reflects upon knowledge creation and sharing within a network and sums up the findings of this article.

2. Case Description & Research Approach

Our motivation for this article originates from an authentic problem scenario. We are participating in a network consisting of three companies operating on a global scale (hereby referred to as A, B and C) and three research and funding partners. Company A supplies manufacturing machinery, company B provides business information systems and services for industrial customers and company C provides telecommunication services for corporations and consumers (see Appendix for detailed descriptions). The aim of the network is to create a joint ICT-supported business model or "service concept" as the three companies call it, thus enabling quicker response to customer needs. The network focuses primarily on the clientele of the two network members (A and B). The customers are heterogeneous and globally dispersed high-tech heavy industry companies.

Our involvement in these topics spans the past two years and the synthesis here is based on a pre-study carried out in 2002 and a research project in 2003-2004. We take actively part as researchers and to some extent also as conciliators and facilitators in the establishment of a business network. The research method resembles action research, i.e. we are involved in the practical activities of the network and thus naturally our actions also have an effect on the decisions made by the companies. Despite the obviously limited generalizability of our results, they may offer a view on the process of business network creation and the role of ICT in supporting it.

Summary of Actions	2002	2003	2004	Total	Documentation method
Workshops	1	4	4	9	Memos
Steering group meetings		2	3	5	Agenda, Meeting notes
Meetings	7	25	7	39	Diary notes
Headquarter meeting		1		1	Diary notes
Interviews		5	11	16	Audiotapes + transcriptions
Researcher meetings		8	5	13	Diary notes
Other (telephone meetings, e-mail discussions, presentations)	3	37	9	49	Diary notes

Table 1. Summary of actions

During the Oct 2002 – Jun 2004 period we have conducted workshops, open discussion steering group meetings, other meetings and theme interviews etc. (see e.g. Newbury 2001 for further information on use of diary notes as a documentation method, as shown in Table 1 above). These network activities were focused on practical creation of a joint business model. In this article we present our interpretation of how a business network *learns*. We present a synthesis from literature on learning within organizations and the learning process we have experienced together with the companies in the network during creation of a joint business model. We endeavoured to ensure the validity of our interpretation by distributing a previous version of this article to the members of the steering group, by presenting it in a workshop and by discussing the ideas with the representatives of the companies in other meetings.

3. Network Business Model

The general targets for business actions are determined by an organization's strategy (Osterwalder & Pigneur, 2002). The business model reflects this organizational strategy in architectural terms. It depicts how the business works and the general logic that creates business value in relation to the organization's architecture. Thereby the business model, as a representation of the corporate strategy, is the starting point for the planning of business processes (e-Factors, 2002). A business model reveals at the contextual level how a business strategy is to be implemented by describing e.g. the product, infrastructure, financials and customers and their relationships (see e.g. Osterwalder & Pigneur, 2000). A more generic definition is "A business model depicts the content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities" (Amit & Zott, 2001). So, how can this sort of business model be depicted for a network of companies i.e., as a *joint business model*?
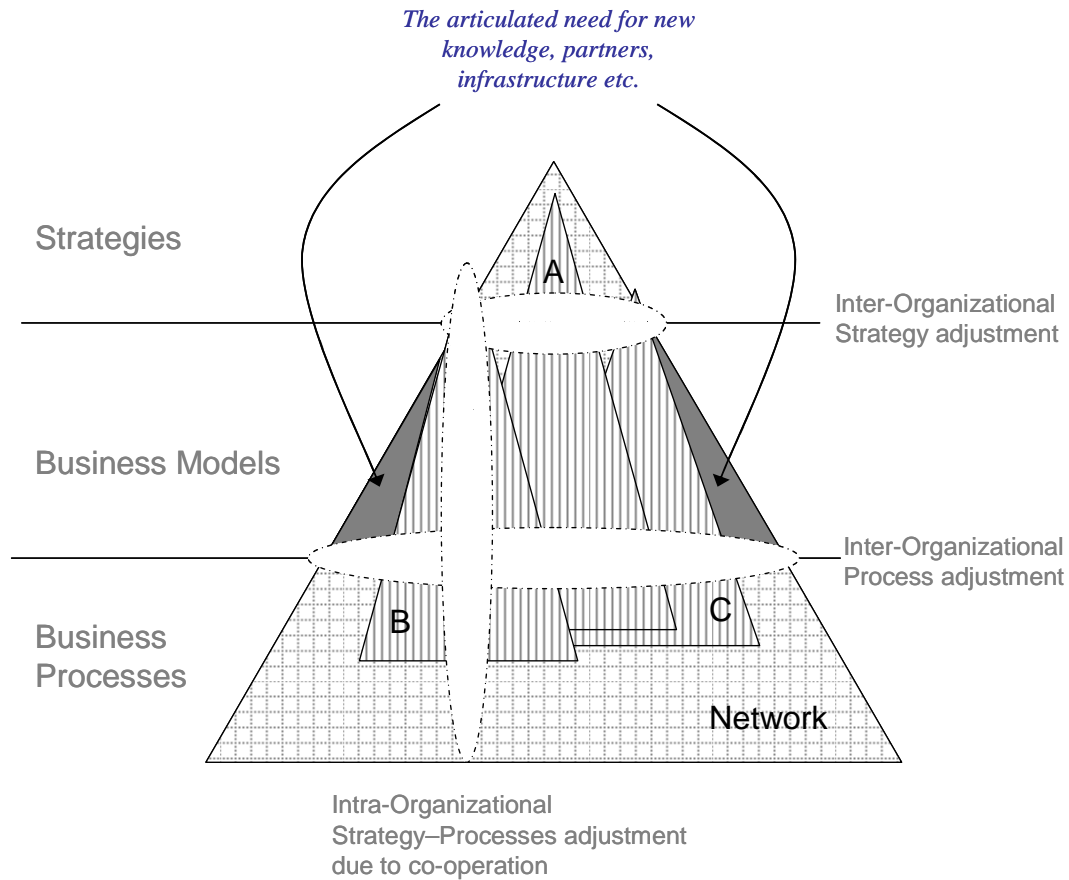
Figure 2. *Joint development of a Network Business Model.*

The creation process of a joint business model is pictured in Figure 2. (Heikkilä et al, 2004): The main underlying triangle represents the network's strategy, business model and processes. It is constructed by adjusting the companies' own business logic triangles A, B and C with the network level model (e.g., Gemünden et al., 1996). We see that the individual business models of the participating companies are to be adjusted in three ways: firstly, horizontally at the *strategy-business model* -interface between the companies (e.g. Powell, 1990), then horizontally at the *processes-business model* -interface between the companies (e.g. Adler, 1990) and finally, they can be used '*vertically' within each company* to align the strategies and processes to meet the challenges of co-operation (e.g. in the sense of Takeishi's internal coordination of inter-firm co-operation, 2001). There is an evident need for a fourth adjustment, namely to identify the uncovered parts of the business model (the grey spaces on the left and right on the business model level).

This means that the participating companies of the network are involved in several simultaneous learning loops. Naturally, they each have their own

business strategies for the present and future. Hence, the network should engage in a process of matching the network's and each companies' strategies (see figure 2, topmost horizontal loop). This means that the parties should agree on the value proposition offered on the market; the target customers and CRM related matters, other infrastructure and logistics issues, timing and the revenue sharing model (to name some of the crucial characteristics of the business model offering and segmentation). This aims at describing the strategy-business model interface in more concrete and systemic terms than a mere strategic description does.

The above aspects of the business model are often uncertain and difficult to estimate in advance. For example, in order to remain on the side of caution partners are unlikely to be willing to invest heavily at the beginning of the co-operation period. Instead, "As the trustworthiness of a potential partner is circumscribed in the beginning, firms do not commit large resources at one go, but engage in tit-for-tat games where trust gradually builds up and a growing proportion of resources are invested in the relationship, forming a set of ties between the firms." (Andersen and Christensen, 2000).

As a consequence, the network emerges incrementally through mutual adjustment, commitment, communication and resource transactions (van de Ven, 1976; Andersen & Christensen, 2000). Moreover, especially in terms of information systems infrastructure, the inter-organizational process adjustment is an adaptive process depending on, for instance, organizations' histories, strategies, practices, hierarchies, cultures and infrastructure (Kumar & van Dissel, 1996). Successful co-operation also requires that the companies are willing to align their internal strategies and processes if this is seen to be essential.

We can conclude that developing a joint business model is a necessary boundary object for a network of companies in order to be able to make sense of inter-firm relationships, capabilities, resources and cultures. We can also infer that the process of creating and implementing the business model is closely connected to learning in order to understand the other partners of the network and provides a basis for learning-by-doing for the companies of the network. The problem is that the subject of the learning appears to be highly complex.

3. Organizational learning

An extensive variety of differing organizational methods have been proposed in organizational and management literature to cope with increasing complexity. Efficiency in managing, gathering and handling information or knowledge is one of the most persistent themes in successful organizational strategy (Galbraith, 1977; Nonaka, 1991, 1994). Within the field of organization science it has been conceptualized as the technical processing of information (in the sense

of Galbraith, 1977) or as a social act of sense-making (in sense of Weick, 1979; 1995). In the former view, organizations act to reduce uncertainty by collecting and processing more information. The latter approach calls for a collective activity in which the focus is on asking questions and engaging in dialogue in order to reduce equivocality or ambiguity in cases of multiple and conflicting interpretations of an organizational situation (Weick, 1979; Daft and Lengel, 1986). "To relieve equivocality members of organizations spend considerable time negotiating among themselves an acceptable version of what is going on" (Weick, 1979, p.6).

Much in line with sense-making approach, a contemporaneous book by Argyris and Schön (1978) introduced a conceptualization of organizational learning. They identified three levels of 'learning loop' within an organization: single-loop learning is a simple behaviour adjustment in a mismatch or error situation, respecting the organization's current principles and rules. At a higher level, i.e. double-loop learning, the organization questions and modifies existing rules and procedures in response to mismatch or error. In other words, the organization tries to make sense of what is going on and what assumptions should be changed in order to achieve better results. March (1991) used term exploration when seeking out and experimenting with new alternatives, which in turn prove uncertain, distant and often negative. The distance and time between learning and realization of returns are greater in exploration than in exploitation. It must also be remembered that this adaptation process may be self-destructive and the returns of fast learning are not all positive. The highest organizational learning loop is deutero-learning. This loop refers to the organizational problem solving capacity and capability to redesign policies, structures and techniques in the situation of constantly changing assumptions about the self and the environment. In other words, deutero learning means understanding single-loop and double-loop learning in order to increment them. Thus the challenge for an organization – or network of organizations - is to provide its members with the necessary conditions for developing its capacity to assimilate knowledge and to solve problems (Cohen & Levinthal, 1990) between the network partners (Doz, 1996; Gemünden et al., 1996).

Gattermann & Hoffmann (2003) suggest that the success of deutero learning and the restructuring of values and rules can be assessed by the level of acceptance of change within organizations. Evidently, in order for that to take place, not only individuals but also organizations and networks must be provided with the conditions necessary for learning. Indeed, knowledge management literature suggests a variety of models and methods for knowledge creation and sharing through interaction (tacit knowledge) or through documents and information systems (explicit knowledge).

4. Learning organizations and knowledge creation

Perhaps the most acknowledged research on the topic of knowledge creation are the works by Nonaka (Nonaka, 1991; 1994; Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998). Whereas the theory by Argyris and Schön (1978) lies in viewing learning as the "detection and correction" of error (c.f. Senge, 2003), i.e. acting and learning due to conflict between what-is and what-was-supposed, Nonaka (1994) proposes that new knowledge can be created by dialogue which brings up conflicting views. He claims that "chaos, or discontinuity can generate new patterns of interaction between individuals and their environment. Individuals recreate their own systems of knowledge to take account of ambiguity, redundancy, noise, or randomness generated from the organization and its environment." (Nonaka, 1994).

 Open discourse and reference models seem to emerge in particular as important enablers for organizational learning and even more vital in the context of learning networks (Nonaka, 1991; 1994; Senge, 1994). They are needed for members with differing backgrounds and history to achieve a shared desired vision for the future. For example, Stata (1996, 318; in Kell, 2003) describes organizational learning thus:

> "First, organizational learning occurs through shared insights, knowledge and mental models. Thus organizations can learn only as fast as the slowest link learns. Change is blocked unless all of the major decision makers learn together, come to share beliefs and goals and are committed to take the actions to change. Second, learning builds on past knowledge and experience – that is, on memory. Organizational memory depends on institutional mechanisms (e.g. policies, strategies and explicit models) used to retain knowledge"

In line with the view of the firm as a 'sense-making system' (Weick, 1979; 1995) Nooteboom (2000) explains the need for shared insights and models by pointing out that information is useless if it is not new, but it is also useless if it is so new that it cannot be understood. He argues that organizations should be able to reduce cognitive distance between its members, i.e. to achieve a sufficient alignment of mental models, to understand each other and achieve a common goal (Nooteboom, 2000). He also indicates the trade-off between need for cognitive distance for the sake of novelty and cognitive proximity and for the sake of efficient absorption. This is precisely the same challenge that Nonaka points out when he suggests that, in addition to creative chaos, the enabling elements for the process of organizational knowledge creation are requisite variety and redundancy of information. This need for variety and at the same time overlapping knowledge domains of individuals is concerned with balancing cognitive distance and cognitive proximity, as mentioned by Nooteboom (2000).

Mental models that are shared and discussed during the learning process can be perceived as boundary objects. Brown and Duguid (1998) describe boundary objects as devices providing "coordinating links among communities, which bring the communities intentionally or unintentionally, into negotiation". The principal idea is that boundary objects are a means for exchanging or communicating the perspectives of co-operating parties. Through them, a community can come to understand the attitudes and practices of another community. Often these boundary objects are not static, but are changed during the course of a communication process. Henderson (1991) also addresses the importance of boundary objects as an intermediary and distributor of tacit knowledge inside and between organizations which are accomplished through the use of visual conventions (such as drawings, CADs or contracts) to construct and negotiate the collective cognition intrinsic to team design work. Henderson (1998) also argues that prototypes serve as tools for eliciting and capturing – conscripting – tacit knowledge. Similarly to paper documents, they can be read simultaneously on several levels as boundary objects (Star 1989; Star and Griesemer 1989, in Henderson 1998).

Also Nonaka (1994), referring to Brown and Duguid's (1991) evolving communities of practice, points out the significance of links between individuals that span boundaries. He explicitly talks of the need for contacts outside the boundaries of the company, seeing knowledge creation as a process that constantly makes extensive use of knowledge in the environment, especially that of customers and suppliers (Nonaka, 1994). Thus, selecting people with the right mix of knowledge and capabilities for the creation process is critical (Nonaka & Konno, 1998). Nonaka promotes the use of cross-departmental or even cross-organizational teams for organizational knowledge creation:

> "Teams play a central role in the knowledge-creating company because they provide a shared context where individuals can interact with each other and engage in the constant dialogue on which effective reflection depends. Team members create new points of view through dialogue and discussion. They pool their information and examine it from various angles. Eventually, they integrate their diverse individual perspectives into a new collective perspective. This dialogue can -- indeed, should -- involve considerable conflict and disagreement. It is precisely such conflict that pushes employees to question existing premises and make sense of their experience in a new way." Nonaka (1991).

As Ciborra & Andreau (2001) highlight, a firm that is entering an alliance with another firm having its own knowledge management system and practices, may find its own internal knowledge management arrangements and resources "too rigid, 'closed' and incompatible". Thus, we also need development of synergistic knowledge networks and explorative knowledge creation (Nielsen 2002). In viewing business networks as arenas for learning and linking capabilities into strategic intention we refer to the cyclic process described by Ciborra & Andreau

(2001). In their learning ladder model for a single firm they illustrate learning with three loops. The lowest loop represents the routinization of knowledge. A second loop represents the transformation of 'abstracts' and 'constructs' capabilities from existing work practices. These capabilities are more abstract than work practices, they are 'skills without a place'. The third strategic loop in turn concerns the selection of core capabilities from the capabilities in the context of the competitive environment and the business mission of the firm. Ciborra and Andreau (2001) carry this further by proposing that there is another source of competitive advantage which stems from the establishment of inter-firm linkages, i.e. the recombination of separate learning ladders. How this is done in an inter-organizational setting remains somewhat open ended in their article, but it resembles the ideas of the cyclical process of learning within an alliance proposed by Doz (1996).

5. Learning business network

In this chapter we draw together our empirical observations and the main viewpoints concerning learning and knowledge creation presented in literature. In particular, we consider their relevance *in the context of business network*s.

First, we should keep in mind that developing a real life business network is an emergent and cyclical process over time (van de Ven, 1976; Kumar & Van Dissel, 1996). It takes time to build trust and learn to work together and adjust operations within the network. In point of fact, one should realize the multiple levels of learning: the network itself is learning (single and double loop) and all of the organizations involved are also expected to be learning, i.e. adjusting or renewing their operations and strategies according to the needs arising from co-operation within the network (single and double loop) and vice versa. Furthermore, in the network setting the companies most probably also have dyadic relationships, which also require learning. Evidently, the learning phenomenon in networks is a multi organizational iterative process consisting of simultaneous learning cycles.

One of the key tasks in partnering network is to facilitate inter-organizational learning. As learning literature points out, the learning capabilities are path dependent. Evidently, the differences in history and cultures are much larger in the business network. Independency of partners makes the task even more uncertain, since the partners have the right to exit the co-operation if they are unsatisfied for instance with the amount of investments required, risks or earning potential.

To study this facilitation we developed a framework for a learning business network combining a network business model and learning loops.
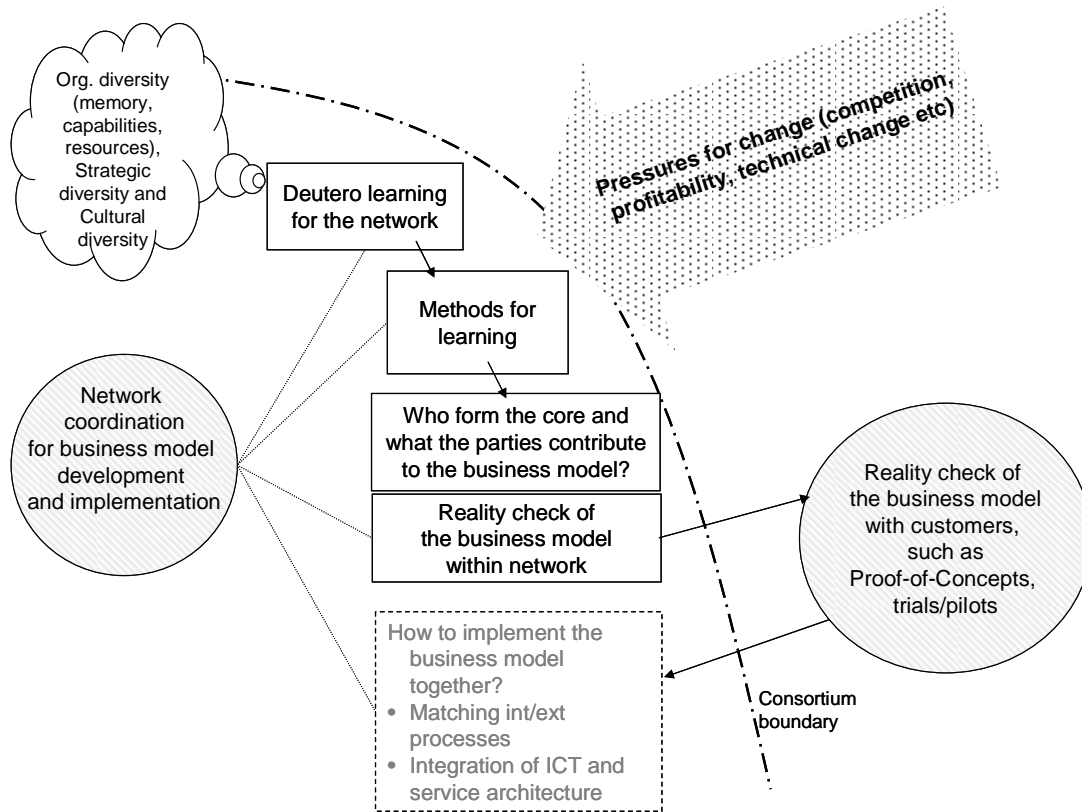
Figure 3. *Framework for a Learning Business Network.*

The starting point for the willingness to co-operate and to begin learning is equivalent to the *situational dimension* of Andersen & Christensen (2000). Different prior experiences of the partners, organizational culture, trust and tendency towards co-opetition instead of competition (Nalebuff & Brandenburger, 1996) are factors characterizing the differences between the network partners. The willingness for learning in co-operation is on one hand a product of past experiences and learning, on the other hand it depends on the external pressures for change (such as competition, technical change, changing requirements of the customers, etc). In our case the organizations have learned to know each other in various circumstances in serving each other, or serving common customers all over the world. They have come to realize that they should co-operate in order to meet the need of the global customer base in a cost-efficient manner. Despite these views there are only a few genuine co-operation projects taking place; this is indicated by little inter-organizational knowledge sharing and few communities spanning organizational boundaries in practice. One of the primary incentives to start learning originates from the tension between vision and reality (Senge 1994). There is an urge to strive to improve, preferably through systematic thinking and learning together.

Our interpretation of the situation is that each party has a certain degree of information about the customers but not enough for successful innovation of new services. The different backgrounds, histories and contexts of the network parties make it impossible to perform simple data aggregation and thus a fundamental rethinking of the meaning of the information in relation to the business model is required.

As a result, the companies see the need to create an environment for learning that the parties can understand and critically evaluate in terms of the potential of co-operation. This would require a major change in attitudes and behaviour that calls for *deutero-learning*. To this end the network develops the structure and assesses the changes caused through implementation of the business model in the companies' internal processes, dyadic relationships and in the network as a whole.

An example of the problems stemming from organizational differences is the case of corporate policies regarding confidentiality of information. The possibility to share information is limited by laws of publicly listed companies and by strict application of non-disclosure agreements and defence of intellectual property rights by the participating companies. In spite of these kinds of regulatory and competitive aspects, there are a number of ways in which the parties would like to develop their learning for purposes of networked co-operation. We define these as *methods for learning,* or conscription devices that aim at articulating the boundary object, i.e., the business model. Examples of such methods are:

Workshops and brainstorming sessions with different set of participants. In some cases these are necessary for *intra-organizational* absorption (e.g. with related projects), in other cases they are needed between two parties to resolve obstacles to co-operation (*dyadic relations*). They are also needed at the level of the whole *network* where moderation by the research party plays a vital role.

Homework. Critical issues raised by the participants for discussion are in some cases assigned as 'homework', i.e., sent to the individual parties for resolution.

Scenarios (e.g., Clemons, 1995; structural scenarios Godet, 2001): the participants want to estimate the business potential via alternative future developments to understand the benefits of co-operation, to assess their roles and the need for adjustment (within their organizations, in dyadic relationships and at network level) in different circumstances. This is done with mini- or quick-and-dirty –scenarios.

Role play (Torvinen & Jalonen, 2000): it often proves necessary to make abstract ideas more concrete by exchanging roles between parties/customers and acting accordingly in a fictive performance.

Benchmarks that serve as analogies (e.g. from related industries) in order to make the business model more understandable and concrete. It has been argued that the role of stories or metaphors facilitate the externalization of tacit

knowledge (Nonaka, 1994). In our case, the metaphors take the form of anecdotes that often introduce a delicate concept or deliver a note on certain pitfalls in thinking[1].

Person-to-person confidential discussions that serve the purposes of trust building via interpersonal trust and commitment (Ariño et al., 2001); also to gain direct feedback.

The variety of methods exceeded our expectations. Evidently they are needed to help form a shared and individual understanding of the situation and to reflect upon the external pressures and the anticipated extent of adaptation in each organization.

The question of *who forms the core of the network?* and *what should the companies' contributions to the business model be?* is an ongoing discussion. The discussion touches on the business model realm, reflecting upon assets, capabilities, customer relationship, finance and the capacity of the parties to meet the needs of the customers.

Proof-of-concept is needed to illustrate whether the business model is viable, at least in principle and to give it a final round of corrections. It also serves as a *reality chec*k for the network and reveals any assumptions held regarding roles and contributions.

The other side of the coin is to identify what the network does *not* cover. As the business model works by mapping means against needs, it also illustrates the need for new resources, capabilities and actors that are not available from the network's set of contributors.

The lowest box in our framework refers to the actual *implementation of the business model.* This includes the effective ways to conduct and develop business processes both within and between parties and the use of communication tools and documents, databases and other content for sharing information between parties. Unfortunately, our project cannot cast any conclusive light on the implementation aspect, although initial observations show some anomalies in ICT-support for network learning.

As an example, our research group installed a groupware for a common shared workspace and document databases for intra-network coordination, to support work activities and to facilitate information sharing over distance. However, the problem we came up against was the need for a much more fine-grained classification of information sharing due to the nature of the network formed by independent, individual companies. At present information sharing is either basically open to everyone, only to group members, or private. Some confidential business information is exchanged only between members in a

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[1] E.g., concerning attempting to enter a market: "Last time we went there with a concept it was like getting prepared for a bear hunt only to be met with a forest full of squirrels".

dyadic relationship, most often using incompatible insecure systems. However, most information and discussions are shared with network members and with trusted parties (sub-contractors, future new partners). But what if one party leaves the network? Will the joint business model become obsolete? What if a new party enters the network? What information is granted to the newcomer? Who actually owns the customer data and how can it be shared? Can it be copied/replicated at all? Aside the normal technical problems of handling documents and permissions of our joint workplace, the conceptual shortcomings for network learning support of the groupware are severe.

As explained earlier, a great deal of information is available but its utilization would require new ways of interpreting and combining the data. This would eventually require some form of metadata development (Yates & Orlikowski, 1992, Päivärinta et al. ,2001) such as domain descriptions, common terms, definitions and functions to facilitate data exchange and process integration, but again, the support from groupware is very limited.

6. Conclusions

The availability of literature on organizational learning and learning organizations is extensive. In this article we concentrate on *learning networks,* as this appears to be a relatively new and unexplored area. For this purpose we have undertaken to monitor a set of companies that are embarking on development of a joint business model to globally serve their customers. We consider a business model to be a necessary boundary object for the emergence of the network.

How do learning networks differ from learning organizations? On the basis of prior research and our observations on the partner network, we identified the following differences: firstly, the parties have different histories. Secondly, they have partially conflicting business goals. Thirdly, the learning takes place on several layers, i.e. on the network, within dyadic relationships and within organizations. Fourthly, the independency of partners increases uncertainty as they can leave the network any time. This in turn increases complexity, because the network should prepare for this in terms of technical solutions (e.g., access mechanisms) and in terms of contracts (e.g., ownership of data, exit rights).

Based on our early experiences of developing the network, we introduce a framework which emphasizes learning in creating a boundary object – the joint business model – for the parties of the network. This serves a crucial task in providing a balance between relational contracting and mere trust by making the roles, investments, costs and revenue sharing understandable to each of the partners. The business model makes it also possible to figure out initial trials of feasibility of the co-operation in certain customer segments.

We were surprised by the number of methods or conscription devices needed to facilitate co-operation. They also differed qualitatively from our initial expectations: in addition to the standard workshops and meetings, the companies favour brainstorming, scenarios, role plays, homework, benchmarks and confidential discussions in figuring out alternatives for the business models and their role in different future situations. These are evidently considered useful in triangulating the strategic adaptation and in anticipating the need for intra-organizational change.

Against this backdrop we consider ICT support to be of little help in this process, as our attempts to implement a groupware support for the network show. It seems that information sharing would require much more delicate mechanisms and schemes for classifying the data and documents between partners than is available in current software.

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Appendix: Description of Companies participating in the network

Company A has become the leading supplier of capital goods in its own worldwide segment and is generally considered the technology leader in its field. It was Company A that initiated the negotiations for establishing this network. During the 90's, their core competence has evolved from manufacturing to the management of complex machinery delivery projects. Next, as stated in their business strategy, they are expected to move towards customer-oriented service. The result of this development might, in an extreme case, be that the operation and maintenance of the customers' equipment are outsourced to an alliance of Company A and its partners. These possibilities emerge along with advances in ICT, remote diagnostics, control and coordination systems and constant pressure to cut costs. This would require a great deal of synchronization with clients', partners' and even with competitors' information systems to meet the needs of profitable, high quality service offerings.

Company B, a software house, has been moving towards a more customer-centric strategy. Up till now it has acquired the needed additional industry-specific knowledge primarily through company acquisitions. Its clientele includes, among others, Company A and C (the dyadic relationships being over 30 years long with the former and around 10-15 years with the latter) and also many customers of Company A. They therefore share the same clientele and are partial competitors in some product groups.

Company C has been serving both A and B plus some of their clients. They primarily search new markets for their value-added infrastructure services, both by expanding the existing clientele and by providing new services to and with the companies of the network.

In order to carry forward their espoused strategies, the companies can no longer operate alone. Firstly, they need each other to complement their services cost-efficiently. It is also likely that they need capabilities, knowledge and innovations from outside their own competence. This development is paced by the growing tendency of the 'end' clients to outsource parts of their business and on the increasing use of networks for creating, storing and accessing knowledge to share and appropriate information that cannot be produced internally. As the companies operate on global markets, the network might need to be expanded so that similar benefits can be gained from local companies. Our network is facing the question of how these kinds of new partnering services can be established and what changes should be made to support these activities.