

## **Hyvä TIMO-ohjelman hakija,**

Oheinen Lappeenrannan teknillisen yliopiston kauppätieteiden tiedekunnan tietojohdamisen ja informaatioverkostojen maisteriohjelman pääsykoeartikkeliksi kirjoittamamme teksti kuvaa kehittymässä olevaa tietoperustaista yrityksen teoriaa. Artikkelissa kuvataan myös tietointensiivistä verkostotaloutta, tiedon erityisluonnetta tuotantohyödykkeenä sekä näkemyksiämme tietointensiivisten organisaatioiden haasteista. Tuomme esiin myös tärkeitä nousevia teemoja ja tutkimustamme. Toivomme, että artikkeli herättää sinussa kiinnostusta perehtyä syvemmin tietojohdamisen ajankohtaiseen ja haastavaan kenttään.

Tietojohdamisen aineessa opiskellaan sitä, miten tiedon ja tietojohdamisen avulla voidaan luoda kilpailuetua. Opintokursseillamme käsitellään mm. yrityksen uudistumiskykyä ja innovatiivisuutta, alliansseja ja verkostoyhteistyötä, sekä luottamusta ja sosiaalista pääomaa tietotaloudessa. Tutkimusryhmissämme tutkitaan läheisessä yhteistyössä alueen johtavien yritysten kanssa mm. verkottunutta innovaatiotoimintaa, luottamuksen roolia tietointensiivisissä yrityksissä sekä yrityksen uudistumiskykyä. Pyrimme yhdistämään opetukseen tietojohdamisen kenttään liittyvää uusinta tutkimustietoa ja soveltamaan teoriaa käytäntöön aikuisopiskelijoidemme esiintuomien käytännön esimerkkien avulla.

Lämpimästi tervetuloa Lappeenrantaan!

Tietojohdamisen professorit Kirsimarja Blomqvist ja Aino Kianto

Lappeenrannassa 23.11.2011

PS. Varoituksen sana ennen lukemista: artikkelin teksti on englanninkielistä ja noudattaa tieteellisen kirjoittamisen tyyliä. Varaudu siihen, että artikkelin lukemiseen ja sisällön sulatteluun menee aikaa. Tieteellisen tekstin omaksumiskyky paranee sitä mukaan kun kokemusta karttuu enemmän. Älä siis ole huolissasi mikäli et heti ensimmäisellä lukukerralla ymmärrä kaikkea – vasta harjoitus tekee mestarin tässäkin asiassa.

## **KNOWLEDGE-BASED VIEW OF THE FIRM – THEORETICAL NOTIONS AND IMPLICATIONS FOR MANAGEMENT**

**Blomqvist Kirsimarja and Kianto Aino<sup>1</sup>**  
**Department of Business Administration and Technology Business Research Center**  
**Lappeenranta University of Technology**

### **1. INTRODUCTION – KNOWLEDGE-BASED NETWORK ECONOMY**

The competitive environment of firms has changed dramatically during the last two decades. The role of the traditional sources for competitive advantage has deteriorated in the process of globalization and technological change. Monopolies have broken down through the deregulation of markets, and the economies of scale seem to bring diminishing returns. The high-technological change creates incentives for innovation and entrepreneurs seeking opportunities. Also, large and established companies need to adapt to the changes in the business environment. In addition to streamlining their structures and processes for increased efficiency, firms need to create new knowledge for increased innovativeness. As James March (1991) notes, firms simultaneously exploit the existing potential, but attempt to adapt to the ongoing changes by exploring new business opportunities. The discontinuities may be turned into opportunities either through proactive innovation and self-renewal (Pöyhönen, 2004), or by co-operating with innovative firms and learning from them. Large companies are building relevant capabilities through acquisitions, partnerships, and collaborative R&D projects. For example, Microsoft, Cisco and Nokia have diversified their capabilities through acquiring start-ups with Internet, software and content capabilities (Blomqvist, 2002).

Foss (2005) describes information and communications technologies (ICT) as the heartbeat that animates the knowledge economy. The major technological developments leading to profound changes in communication have been the Internet, the digitalization of data, and the growth in processing power and available bandwidth. In comparison to earlier technological revolutions like the steam engine and electricity, information and communication technologies are much more pervasive. Their capacity to process, store and transfer information efficiently is changing the fundamentals of business practices and structures. Information and communications technologies, especially the Internet, World Wide Web, the graphical browser and electronic commerce have reduced the costs of outsourcing and inter-firm co-operation (Measuring the ICT Sector, 2001). In addition, the Internet creates a new market place as well as a distribution and communication system without the limitations of reach and wealth (see Evans & Wurster, 2000). The Internet also creates new business opportunities as such, and an environment that substantially lowers the entry barriers for new and innovative players. Its impact on both economic and social processes may be even larger than its impact on technology.

Academics, politicians, and EU bureaucrats alike agree on the significant nature of the recent changes, such as high technological development, hyper-competitive global markets, and increasing the role of knowledge as the most critical factor of production. At the policy level, e.g.,

---

<sup>1</sup> Authors have contributed equally, and names are in alphabetical order.  
Corresponding addresses: [kirsimarja.blomqvist@lut.fi](mailto:kirsimarja.blomqvist@lut.fi), [aino.kianto@lut.fi](mailto:aino.kianto@lut.fi).

OECD (1996) has described the current economy as “an economy based on knowledge.” According to the World Bank ([www.worldbank.org](http://www.worldbank.org)), the knowledge economy is characterized by an educated and well-trained population, an economic and institutional regime that provides incentives for knowledge creation and transfer for growth and welfare, dynamic information and communication infrastructure, and an effective innovation system. The role and effect of knowledge in the contemporary society and organizations is so profound that the change has been compared to the Kuhnian paradigmatic shift (for a discussion on knowledge economy, see Foray, 2004; Foss, 2005).

Even if it may be difficult to trace back to the exact drivers and determinants of the shift towards the knowledge economy, there is plenty of factual evidence that the logic of production and business has indeed changed dramatically. In 2001, the ICT sector represented 10% of the business value added in the OECD area. Its share was the highest in Finland (16%), followed by Ireland (13%). ICT is widely exploited in European enterprises: in 2004 already 89% of firms had Internet access, 52% broadband connection, and 58% had their own websites (Statistics Denmark 2005, 74). The share of knowledge-based “market” services continued to rise and now account for over 20% of the value added in the OECD countries (OECD, 2005).

In the present US economy, human capital overwhelms physical capital in contributing to the value added. Concurrently, the number of knowledge workers has increased three-fold in the last 100 years: from 10% in 1900 to 33% in 1999. The role of the creative class has been upgraded from 1% to 6% in the same period (Foss, 2005). The development of knowledge work has been even faster in Finland, where the share of knowledge workers has grown over three-fold from 12% to 39% in the 12-year period from 1988 to 2000 (Tilastokeskus, 1999). As a sign of the increase in knowledge work, the professional and technical workers represent 25%–35% of the total workforce in most OECD countries (OECD, 2005).

Investments in knowledge (comprising expenditure on R&D, software and higher education) in the OECD area reached some 5.2% of GDP in 2001, compared to around 6.9% for investments in machinery and equipment. Along with this development, protecting and commercializing knowledge has become more important, as more than 442,000 patent applications were filed in Europe and the United States in 2002, compared to around 224,000 a decade earlier.

In the global knowledge-based competition, the role of human capital has become tremendously important. Individuals are no longer mere elements of a production system, but owners and controllers of the most important factor of production – knowledge. Individuals decide how they want to use their skills and intellect, and direct their efforts based on personal motivations. At the same time, knowledge has become the key source for business performance. According to the knowledge-based view of the firm, a firm should be understood as a social community specializing in speed and efficiency in the creation and transfer of knowledge (Kogut & Zander 1996, 503).

Many of the forefront academics propose that the recent large-scale changes associated with the increasing role of knowledge have dramatic consequences for the nature of work (e.g., Drucker, 1999). They also have implications for the authority relations within the firm, organizational structures and processes, and even for the boundaries of firms. In this paper our aim is to characterize and analyze the nature of knowledge and its implications for firms. We also analyze the emerging knowledge-based view of the firm, and its implications for management. Finally, we raise some emerging issues relating to the development of the knowledge-based view.

## 2. THE NATURE OF KNOWLEDGE

The modern business sciences include a multitude of characterizations and classifications of knowledge. A common feature in all of them is that knowledge is understood differently from the traditional western epistemology where the most significant distinction lies between knowledge and mere beliefs or opinions whose truth value has not been proven. The Socratic/Platonic definition of knowledge as a “justified true belief” characterizes knowledge as information whose validity has been established through empirical proof. According to this view, the term *knowledge* should only be applied to information that is objective, universally applicable, and context-independent. It should be sharply separated from opinions, speculations, beliefs, or other types of unproven information (Liebeskind, 1996).

In contrast, in the modern management science, the term *knowledge* does not refer to the truth value of a statement. Here, the significant distinction concerns differences between data, information, and knowledge. For example, Ståhle and Grönroos (1999; 2000) explain that data is a sequence of signs, whereas information is data that is understood. In other words, for an illiterate person written text is mere data, whereas for someone who can read it is information. Knowledge, on the other hand, “is an active concept in the sense that it includes both information and an impact. The impact means that information has turned into human knowledge.” (p. 49.) In a later book, Ståhle and Grönroos (2000, 31) define knowledge as information that “can be utilized and turned into action.” Similarly, Nonaka and Takeuchi (1995, 58) define knowledge as “a dynamic human process of justifying personal belief toward the ‘truth.’” According to Nonaka and Takeuchi, both knowledge and information bear some meaning to the individual, but unlike information, knowledge is anchored in the beliefs and commitment of its holder, and related to action<sup>2</sup>.

These definitions bring the human nature of knowledge to the fore. They emphasize that knowledge does not exist apart from the knowing subject – as universal abstractions floating somewhere out there – but that knowledge is always tied to a particular viewpoint and practical application. In other words, knowledge is essentially related to human action. To summarize, knowledge from a management perspective is a fundamentally human issue: it is a product and vehicle of human activity, bounded by the limitations of human cognitive and other psychological capacities, and by the social and cultural environment of activity. Information technology systems and other related mediating tools can act as vehicles for transferring knowledge, or as repositories for storing knowledge, but in knowledge management the role of these is secondary compared with knowledgeable human actors.

### 2.1 Explicit and tacit knowledge

The knowledge management literature boasts many typologies for different types of knowledge. The most significant of these classifications is the division of knowledge into two dimensions: explicit and tacit (Polanyi, 1966). Explicit knowledge stands for that part of knowledge which can be expressed and codified relatively unproblematically, for example, in the form of verbal accounts, numbers, formulas, and theoretical models. This type of knowledge is rational, formal and systematic in nature, and can be easily transferred from one person to another, and stored in

---

<sup>2</sup> The data–information–knowledge continuum had an important significance for the knowledge management research community in the 1990’s, when the field as a whole was in a formative phase, and it was important that it established its boundaries. In hindsight, it seems that the continuum was especially used to create an identity for knowledge management as a branch of management science and practice, and to differentiate it from information technology-driven approaches, which, following the logic of the continuum, should be called information or data management rather than knowledge management.

libraries, databases, and other non-human repositories of knowledge. However, most of human knowledge is in tacit form; we know more than we possibly can ever articulate. Tacit knowledge stands for that part of knowledge that is personal, context-dependent and based on practice and experience. This knowledge is very hard to formalize and communicate. In fact, it has been argued that tacit knowledge can only be transmitted to others by sharing mutual experiences and active participation in real-time face-to-face interaction (Nonaka & Takeuchi, 1995).

The type of knowledge can be used to explain many organizational outcomes. Explicit and tacit knowledge differ in terms of their transferability, appropriability, and potential for aggregation and storage. For example, tacit and explicit knowledge are related to different problems of transfer (Brown & Duguid, 2001; Szulanski, 2003). Tacit knowledge is “sticky,” i.e., hard to share and transfer. It is embedded in particular practices and experiences, and it is hard to understand and transmit outside the local context. With explicit knowledge, the problem is the opposite. This type of knowledge is “leaky.” Since it is codified, it can easily be transmitted to external contexts, and thereby also captured and imitated by competitors.

Tacit knowledge encompasses two facets: cognitive and technical (Nonaka & Takeuchi, 1995). The cognitive facet of tacit knowledge consists of mental models, schemas, perspectives, and conceptions that underlie and define an individual’s understanding and perception of the world. The technical facet includes all the concrete operational propensities and skills, such as how to dance or ride a bike. Most of tacit knowledge remains subconscious even for the individuals themselves: it is impossible to explain fully what one knows, and even more impossible to articulate how the act of knowing happens. Tacit knowledge is demonstrated in skilled action and unconscious judgments, and it is very hard to separate it from the activity in which it is demonstrated.

## 2.2 Individual and social knowledge

Knowledge also exists on many analytical levels. There is knowledge that is held by individuals, and knowledge that is held on a social level, shared by several people. Spender (1996a; 1996b) has proposed a classification of knowledge types which combines two dimensions, explicit vs. tacit knowledge and individual vs. social levels, to distinguish four types of knowledge. The different types of knowledge according to Spender are shown in Table 1.

**Table 1. The different types of knowledge in organizations** (Spender, 1996a)

	<b>Individual</b>	<b>Social</b>
<b>Explicit</b>	Conscious	Objectified
<b>Tacit</b>	Automatic	Collective

Conscious knowledge consists of facts, concepts, and frameworks that the individual can store in memory and retrieve more or less at will. Automatic knowledge includes perceptions, mental models, values, behavioral tendencies, and kinesthetic and technical skills that are unconscious or semi-conscious and difficult or impossible to access consciously. Objectified knowledge represents the shared corpus of codified knowledge. Collective knowledge consists of the knowledge that is embedded in the forms of social and organizational practice, residing in the tacit experiences and

enactment of the collective. Individual actors may be unconscious of such knowledge, even though it is accessible and sustained through their interaction. (Spender, 1996a; 1996b.)

In a similar vein, Kogut and Zander (1992) have presented a corresponding distinction where knowledge is divided to know-that, which they call information, and know-how. Know-that is associated with information, description, and declarative knowledge, while know-how is associated with procedural knowledge of how something happens or can be done. Further, these knowledge types can be assessed on individual, group, organizational, and network levels (see Table 2). In this classification, the concept of higher-order organizing principles is especially important. Higher-order organizing principles create the context of thought and action in the organization, and govern how work and relationships are carried out.

**Table 2. Knowledge types on individual, group, organizational, and network levels**  
(Kogut & Zander, 1992, 388)

	<b>Individual</b>	<b>Group</b>	<b>Organization</b>	<b>Network</b>
<b>Information</b>	Facts	Who knows what	Profits, accounting data, formal and informal structure	Prices, whom to contact, who has what
<b>Know-how</b>	Skill of how to communicate, problem solving	Recipes of organizing such as Taylorist methods or craft production	Higher-order organizing principles of how to coordinate groups and transfer knowledge	How to co-operate, how to sell and buy

The typologies above underline that knowledge in organizations exists in many forms and locations. Thus, firms can be seen as distributed knowledge systems (Tsoukas, 1996). The notions of collective knowledge and higher-order organizing principles connote that for a firm to be knowledgeable, it is not enough that its individual employees are skilled and educated. The crucial issue is how the employees work together, how their tasks interrelate and how their individual knowledge is integrated to produce value for the company. The scattered, uncoordinated insights of individual organizational members are not enough to produce competitive advantage; in order to produce sustainable value, they must be combined into a synergistic whole. This does not mean a mechanistic aggregation or synthesis of what the individual members of the organization know. The pattern and mechanisms of integration of knowledge cannot be reduced to the level of individual actions, but have to be analyzed in their own right, on the level of shared practices.

So, from a modern management science point of view, knowledge is not something objective, free-floating, abstract, and universal as portrayed by the traditional western epistemology; but neither is it only subjective, residing solely in the minds of individuals as their personal experience. Rather, knowledge is something that is constructed in the social practices of actors embedded in a particular social context. As Spender (1996a, 64) argues, “knowledge is less about truth and reason and more about the practice of intervening knowledgeable and purposefully in the world.” And to intervene in the world one has to be able to communicate with others and understand the particular context of activity. In this sense, knowledge exists essentially between and not within individuals. Individuals are always located in a social context, or as Marx put it, human beings are ‘social animals’ (Eskola, 1982). Even when we are alone our culture and communities influence us both from the outside and inside, as internalized conceptions, mental models, attitudes, and values. This is not to say that knowledge would not exist on the personal level, but that even individually held knowledge has a fundamentally inter-subjective quality to it. Individuals never act in a vacuum;

knowledge is embedded and constructed in shared practices by interacting individuals that combine their efforts while striving towards more or less common goals (e.g., Berger & Luckmann, 1966; Crossan et al., 1999). This also implies that knowledge is fundamentally dynamic in nature: it is the subject of constant negotiations, modifications, and alterations. Further, knowledge is not neutral but it is related to issues of power and conflict (Blackler, 1995).

### **3. FOUNDATIONS OF THE KNOWLEDGE-BASED VIEW OF THE FIRM**

Several theoretical approaches from economics and the organization theory have addressed the theory of the firm. Theories of the firm attempt to conceptualize, model, explain, and predict firm structures and behavior (Grant, 1996b). They are strategic approaches trying to understand firm heterogeneity, and how firms can differentiate themselves from competitors to gain (sustainable) competitive advantage.

Within this field, there is no single theory, but many competing and often complementary approaches. One of the classic and influential approaches is the transaction cost theory which addresses the efficiency of the authority-based organization (hierarchy) vs. contract-based organization (markets) (Coase, 1937; Williamson, 1975). The evolutionary theory of the firm (Nelson & Winter, 1982; Kogut & Zander, 1992) has also been very influential. It views firms as repositories of idiosyncratic and path-dependent routines. The organization theory analyzes the internal structure of the firm and the relationships between its constituent units and departments. Strategic management has used both economic and organizational approaches in an attempt to explain firm performance and the determinants of strategic choice (Grant, 1996b).

The knowledge-based view (KBV) of the firm addresses the issues of the existence, the boundaries, and the internal organization of the multi-person firm (Foss, 1996, 460). The starting point is that knowledge is the key explanatory factor, and the nature of knowledge (tacit, socially constructed etc.) is an important determinant enhancing understanding of firm organization and behaviour (see Foss, 2005, 84).

The essential elements of the KBV can be summarized as follows:

- Knowledge is the most important resource and factor of production.
- Performance differences between firms exist because of differences in firms' stock of knowledge and capabilities in using and developing knowledge.
- Organizations exist to create, transfer, and transform knowledge into competitive advantage.
- Knowledge is related to humans.
- Individuals are intentional and intelligent agents.
- Humans are bounded by cognitive limitations; how much and what they can know have cognitive limits, and therefore they have to specialize.
- Especially in complex issues which cannot be understood by any single individual, there is a need for integration and coordination of knowledge.
- Cognition and action are related: knowledge is both acquired by and demonstrated in action.
- Knowledge is demonstrated in many forms and located on many levels: it is situated in the minds and bodies of individuals, embedded in organizational routines and processes, as well as codified in databases and books etc.
- Some knowledge can be externalized into explicit form, while some knowledge will always remain tacit.
- The form of knowledge influences how it can be leveraged and transferred.

- Shared tacit knowledge, demonstrated for example in capabilities, is the most important type of knowledge from the value creation point of view.
- Knowledge cannot be fully managed in the same sense as other types of resources; its management more resembles the creation of suitable contexts and cultivation.
- Knowledge is dynamic: it is continuously re-interpreted and modified, and related to learning and change.

### 3.1 The KBV versus other recent theories of the firm

In the sense that the KBV views knowledge as the most important firm resource, it is similar to the resource-based view of the firm (RBV) (Penrose, 1959; Wernerfelt, 1985; Conner, 1991; Barney, 1986) which conceptualizes the firm as a unique bundle of idiosyncratic resources and capabilities. The RBV assumes that organizations excel in competition to the extent that they govern valuable, rare, inimitable, and non-substitutable resources<sup>3</sup> (Barney, 1991). Resources are the stock of available factors that are owned or controlled by the firm, which are converted into final products or services (Amit & Schoemaker, 1993). It is widely agreed that nowadays the most important value generating resources are intangible in nature, i.e., related to the skills and knowledge embedded in the organization. Resources create value in combinations, namely, they are “bundled,” and it is hard to discern the relevance of any one resource to the outcomes (Dietrickx & Kool, 1989). Producing a good or service typically requires the application of many types of knowledge resources (Kogut & Zander, 1992; Grant, 1996b; Grant & Baden-Fuller, 2004). This means that in addition to possessing resources with VRIN attributes, the organization also has to be able to manage, integrate, and coordinate the different types of resources (Penrose, 1959; Kogut & Zander, 1992; Grant, 1996b).

In the knowledge-based production, the role of organizational factors is critical. The competitiveness of the firm does not so much depend on its product–market positioning in relation to external competitors, as on its internal characteristics. According to the KBV, performance differences between organizations accrue due to their different stocks of knowledge and their differing capabilities in using and developing knowledge. From this perspective, the firm can be understood as a social community specializing in speed and efficiency in the creation and transfer of knowledge (Kogut and Zander 1996, 503).

The knowledge-based view of the firm is different from other theoretical approaches emphasizing the role of organizational factors in the production of competitive advantage (the RBV and the dynamic capabilities view, DCV) in that it focuses on internal organization, and recognizes the firm as a complex organization encompassing multiple individuals (Grant 1996b, 109). The RBV is mainly interested in identifying the essential productive (knowledge) resources and examining how these resources can be acquired, protected, and valued (Spender, 1996b). It is based on the cognitivist perspective on knowledge that assumes knowledge can be managed with tight procedures, policies, and defined action (Von Krogh, 1998). The KBV, in contrast, is based on the constructionist view of knowledge, which assumes that knowledge cannot be completely controlled but can only be managed by creating enabling conditions (Von Krogh, 1998), and focuses on how knowledge resources are utilized and coordinated (Spender, 1996b).

In comparison with the RBV, the KBV takes a more fine-grained and profound understanding of knowledge as its basis. Especially relevant are two background assumptions of the nature of

---

<sup>3</sup> The so-called VRIN attributes.

organizationally relevant knowledge: the activity-related and inter-subjective nature of such knowledge (Pöyhönen, 2004). First, knowledge is always connected with action: that what is known is demonstrated in knowledgeable activity. Knowledge is created and leveraged in the context of on-going organizational activities (e.g., Dougherty, 1992; Leonard-Barton, 1995; Orlikowski, 2002). The most valuable kind of knowledge is that which is demonstrated in “knowing” and skillful behavior, rather than that which is stored in, for example, databases and patents. Competitive advantage, in fact, flows not from resources themselves but from the firm capabilities to use these resources for productive purposes (e.g., Penrose, 1959; Kogut & Zander, 1992; Grant & Spender, 1996; Grant, 1996b). Furthermore, because knowledge is always based on human action, it cannot be managed in the same way as inhuman resource stocks and flows. Knowledge is intangible, invisible and to a large extent unconscious even to those in whose minds and bodies it is embedded. Tacit knowledge can never be fully externalized and brought to be the subject of rational management control. Thus, the most important way to manage knowledge is by creating contexts where knowledge can grow and flourish. Higher-order organizing principles (Kogut & Zander, 1992) and collective knowledge (Spender, 1996a; 1996b) create the context where organizational activities take place, and therefore have a crucial role in steering any knowledge-based organization.

Second, knowledge is fundamentally inter-subjective: it is embedded and crafted in continuous social interactions among the members of the organization. Rather than residing in the minds of individuals or in databases, the most important type of knowledge is that which is located between people (e.g., Spender, 1996b). Therefore, social psychological concepts such as communication, collaboration and trust are focal elements of the KBV. In addition to examining various features on the level of the firm, the analyses are often conducted on group and business unit levels, and the interaction of multiple levels, such as individual and organizational, is addressed.

In the recent management science literature, the question of knowledge management, coordination and integration has been conceptualized as capabilities or competences. Organizational capabilities refer to “a firm’s capacity to deploy resources, usually in combination, using organizational processes, to effect a desired end. They are information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm’s resources. Unlike resources, capabilities are based on developing, carrying and exchanging information through the firm’s human capital.” (Amit & Schoemaker, 1993, 35.) Likewise, (core) competences have been defined as “the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies” (Prahalad & Hamel, 1990, 82). Essentially, competences and capabilities both are relatively stable collective abilities for relatively stable and organized activities that benefit the organization. They concern the coordination and integration of resources, most of which are intangible.

Capabilities exist on many levels in the organization, and range from individual skills, operational capabilities, and functional capabilities (e.g., R&D capability, marketing capability) to organizational capabilities (Grant, 1996a) and even inter-organizational and network-level capabilities (Blomqvist & Levy, 2006). There are also “meta-level” capabilities that concern abilities for changing the other capabilities, such as learning and learning to learn, dynamic capability, innovation capability, and renewal capability (Collis, 1994; Teece et al., 1997; Zollo & Winter, 2002; Eisenhardt & Martin, 2000; Pöyhönen, 2004). Especially in turbulent and complex operating environments, capabilities that concern mastery of change are essentially important (e.g., Ansoff, 1980; Teece et al., 1997).

Another recent emerging and influential theoretical approach, the dynamic capability view of the firm (DCV) (e.g., Teece et al., 1997; Eisenhardt & Martin, 2000; Zollo & Winter, 2002) also differs

from the KBV. Whereas the KBV conceptualizes knowledge as an emergent and dynamic concept, which is continuously created and modified in the course of social interaction among various parties, the DCV approaches the firm as a black box and treats knowledge uncritically as a “thing” or a commodity, neglecting its fundamentally socially constructed nature (Ferdinand et al., 2004; Pöyhönen, 2004; Hong et al., 2008). Furthermore, the DCV tends to focus solely on the role of top management in building capacities for mastering change, thereby overlooking the underlying micro-level structures and processes (see Pöyhönen, 2004; Hong et al., 2008; Kianto, forthcoming). The KBV, in contrast, is interested in interaction and interagency at different levels of the organization. Correspondingly, evolutionary economics (Nelson & Winter, 1982) is interested in aggregated and firm level concepts, and not so much in the individual agents and their interaction (Foss, 2005, 83).

It should be noted that the KBV is still in an emerging state and is more a set of ideas about the existence and nature of the firm than a unified theory in a formal sense (Grant, 2002). There is still a lot of vagueness and overlap in the key concepts; for example, concepts such as resources, knowledge assets, routines and capabilities have been defined in many ways. Further, the main foci of the KBV are extremely demanding to observe reliably, and even more so to operationalize and measure. Spender and Grant (1996) note that many of the phenomena that are the most interesting from the knowledge-based perspective may in fact be unmeasurable. Connected with this is the lack of a large body of empirical research that would demonstrate the connection of the key knowledge-based variables to firm performance. However, interest in the KBV is increasing all the time and we expect to see much progress in the next years.

### **3.2 Knowledge and value creation**

There exists a widespread agreement that knowledge is the new fundamental basis of competition: it is the most important factor in the creation of economic value and competitive advantage (e.g., Drucker, 1993; Stewart, 1997). As knowledge is the most important source of revenue, it can be looked at as a distinct form of capital. The valuable nature of knowledge is portrayed with the concept of intellectual capital (Edvinsson & Malone, 1997; Sveiby, 1997; Roos et al., 1998). In order to benefit fully from their knowledge and capabilities, firms should adopt a strategic approach to knowledge. Firms need either to align their strategy to what the organization knows, or develop knowledge to support a desired strategy. This can be done by assessing the current knowledge resources and capabilities in the firm, and addressing any gaps in relation to what knowledge is needed both from an internal strategic viewpoint and in comparison to competitors (Zack, 1999).

As a productive resource, knowledge has some distinctive characteristics that set it apart from other types of resources. First, there are economies of scale in knowledge. This means that the replicating costs of knowledge are less than the original discovery or knowledge creation costs. Especially explicit knowledge is economical to reproduce in digital form (Shapiro & Varian, 1998). For tacit knowledge, replication is costly and slow, but even its replication costs are lower than the costs of its creation. There are also economies of scope in knowledge. This means that knowledge is not specific to the production of single product or service, but can also be extended to benefit the production of other outputs (Kogut & Zander 1992, Grant, 1996b). Unlike traditional physical goods that are consumed when they are used, knowledge is subject to increasing returns: the more knowledge is used, the more valuable it becomes (Grant, 1996b; Zack, 1999). In fact, latent knowledge that is not used does not create value. For example, no matter how many patents the organization possesses or how novel ICT systems have been put in place or how high competencies the staff has, these will not help the firm to prosper unless they really are used in the everyday practice of the firm.

Spender's (1996a; 1996b) typology of different types of knowledge can be related to how organizations create value from knowledge. Knowledge that can be imitated or duplicated cannot provide sustainable advantage for the firm, because competition and imitation will erase the rents sooner or later (Wernerfelt, 1984). Objectified knowledge, consisting of the codified knowledge of the firm, can be easily transmitted to external contexts – and thereby captured and imitated by competitors.

Individual types of knowledge also cannot provide a sustainable source of competitive advantage for the firm. Recently, it has become almost normative for companies to declare that the skills and knowledge of their employees constitute the main competitive asset of their organization. However, looking at Spender's typology (1996a), this view can be questioned as too simplified. First, there are problems concerning the appropriability of individual knowledge. Neither type of individual knowledge, conscious or automatic, is possessed by the organization. Rather, they are stored in the individual employees and demonstrated in their activities. The knowledge of individuals cannot provide the basis for sustainable organizational profits, because individuals are transferable between firms; thus this knowledge is in danger of walking out of the company, in the worst case in the welcoming arms of a competing company. In addition, rents generated by the specialized knowledge of individuals are more likely to be appropriated by the individuals than by the company (Grant, 1996a). Second, even if individual members of the organization are willing to pour all their knowledge out to the sole profit of their employer company, it is not self-evident that this is enough to produce the wanted results. Faced with the complex demands of today's businesses, there are few tasks that single individuals can accomplish on their own. Combining one's individual knowledge with that of others has become quintessential. (E.g., Guzzo, 1996; Nemeth, 1997; Leonard & Sensiper, 1998; Miles et al., 2000)

Also, Tsoukas (1996) takes up the issue of the firm's knowledge base being dispersed in separate individuals, and views firms as distributed knowledge systems where no single agent can know in advance what knowledge is needed, nor when or where it is needed. Tsoukas argues that the main problem organizations face is how to use the widely dispersed individual knowledge and how to extend the span of utilization of resources in a way that exceeds the span of control of any one individual mind. This is clearly a question of coordination and patterning of social interaction.

Collective knowledge consists of patterns and modes of knowledge combinations between individuals, groups, units, and organizations. According to Spender (1996a; 1996b), it is this type of knowledge that is strategically most important for the firm. Shared operating methods are inimitable across firms, and therefore they are the main source of sustained competitive advantage. Also, Kogut and Zander (1992) argue that the central competitive dimension of firms is the efficient creation and transfer of knowledge within the organizational context. Thus, the processes by which knowledge is used and created in organizations are at the heart of business performance and value creation.

#### **4. KNOWLEDGE AS THE MOST CRITICAL RESOURCE – IMPLICATIONS FOR ORGANIZING**

Hierarchical structures and modern management were developed for the needs of Fordian mass production, where the less knowledgeable were directed by the more knowledgeable. The famous outburst by Henry Ford at his workers on the car assembly line was "Why is it that when I buy a pair of hands, I always get a human being as well?"

The situation with the today's knowledge work is quite different. Knowledge workers are highly educated employees who apply theoretical and analytical knowledge to developing new products, services, processes, or procedures. Drucker proposes that knowledge differs from all other kinds of resources in that it constantly changes and develops, with the result that "today's advanced knowledge is tomorrow's ignorance" (1997, 23). This is what makes knowledge workers and their ability to analyze, combine and create knowledge so important. In addition, knowledge makes resources mobile: knowledge workers own their means of production, and can take it with them wherever they go – also out of the company.

##### **4.1 The rise of knowledge workers and the changing role of management**

Drucker (1999) has even argued that in the 21<sup>st</sup> century, the main economic challenge will be to increase the productivity of knowledge workers. As the nature of knowledge work differs from other types of work in many respects, the preconditions for the knowledge worker productivity are highly different from the preconditions for the productivity of other kinds of employees (Janz et al, 1997; Drucker, 1999). Knowledge cannot be traded through market transactions, and knowledge workers cannot be directed through authority. In the knowledge-based competition, knowledge workers have a significant role and a related bargaining power. They are by definition highly specialized and more knowledgeable than their managers. Direction by hierarchical status and power loses its meaning when specialized knowledge workers control the most important production factor. Traditional authority and means for governing relationships lose both their efficiency and effectiveness as the enablers of knowledge creation and transfer.

Knowledge work implies that knowledge is dispersed, contextual, and personally embedded. Thus, the locus of knowledge is no longer solely at higher levels of the organization and in specialized functional units (e.g. Adler, 2001). The knowledge-based view of the firm (KBV) is different from bureaucracy, which presupposes that all knowledge necessary for strategizing and organizational design is located at the top of the organization (Spender, 1996b). In contrast, in modern knowledge-based organizations knowledge is perceived to be dispersed and distributed all around the organization. Sometimes the relevant knowledge is in the customer interface or marketing and sales department, sometimes on the shop floor. Each member of the organization is likely to have some important knowledge that no one else in the firm possesses. Front-line employees are often perceived to be in a crucial position, as they directly interact with customers and production processes, and therefore they can continuously develop organizational functioning if empowered to make decisions.

In this sense the KBV can be seen as a more democratic view, in which "organizations are enduring alliances between independent knowledge-creating entities, be they individual, teams or other organizations, and tangible resources are subordinated to the services they provide" (Spender, 1996b, 47). Thus, the role of the firm is seen as a platform or integrator for the tacit knowledge of its employees, who are the key source for competitiveness and economic performance. According

to Spender (1996b, 48), the top management provides the “context in which employees at every level become independent agents, take responsibility, experiment and make mistakes and learn as they strive for continuous improvement in every aspect of the firm’s total transformation process.” Subsequently, according to the KBV, employees are seen as active human beings capable of learning and making decisions based on their local and contextual knowledge.

Authority and hierarchy (e.g., the middle management) is no longer needed to filter information and support vertical communication (see Foss, 2005, 93). Command and a controlling type of management cannot simply cope with knowledge creation and innovation, which are always voluntary and social in nature. Creative work demands time, space and willingness to engage. By nature, knowledge work is also difficult to monitor. Even the traditional social control may be lost when people work increasingly in virtual and temporary teams.

Authority and incentives must be used carefully not to harm the knowledge worker motivation and collaborative knowledge creation. Traditional incentives based on individual achievement may not support the needed fast flow of information. Co-creation of knowledge from specialized and tacit individual knowledge bases demands a new type of management and incentives. Leaders need to learn to influence and enhance knowledge workers’ intrinsic motivation (Amabile, 1998). Foss (2005) refers to the application of “high-performance work practices”, namely, worker involvement in teams, and other co-operative and participative ways, which may prove to be very efficient in complementing traditional performance incentives. At the firm level, collective bonds of performance, e.g., that a unit manager performance is tied to their unit performance and also to the performance of a peer group, may enhance social integration and knowledge creation (Ghoshal & Gratton, 2002).

Central planning, decision and directions may not be fast and flexible enough, but new combinations of local and central authority are needed based on the nature of knowledge (Grant, 1996b). If knowledge is embedded in specialists and the context, the decision-making rights need to be re-allocated and delegated to those with the most relevant knowledge. The more tacit and contextual the knowledge, the more important is the co-location of decision-making and knowledge.

In knowledge-based organizations the authority and direction is no longer based on formal power, but is increasingly derived from knowledge, related expertise, and capability to organize and integrate complementary knowledge through relationships. The collective and tacit nature of valuable knowledge calls for a capability to integrate complementary knowledge, and for this understanding of trust and social capital is needed (see e.g. Nahapiet & Ghoshal, 1998). Based on this reasoning, the managerial job is to establish mechanisms to allow knowledge creation, sharing and integration. Leaders and experts may benefit from the accessible human capital only through social capital, i.e., their capability to leverage networks, and build mutual relationships based on trust and shared norms. Effective leaders will become knowledge brokers, and their ability to build and manage relationships based on social capital is a critical resource mobilizing human capital (see also Brass & Krackhardt, 1999). Both strong and weak network ties (Granovetter, 1973; Burt, 1992) provide access to important resources, but they have different roles in knowledge creation. Weak and non-redundant ties to diverse groups bring new information, whereas strong ties promote change through influence, trust and commitment (see also Brass & Krackhardt, 1999).

**Table 3. Contrasting traditional management with management of knowledge work**

	<b>Traditional management</b>	<b>Management of knowledge work</b>
<b>Managerial role</b>	Control and command type of management: managing and overseeing subordinates	Participating in knowledge work, coaching subordinates, building trust and social capital
<b>Organizing</b>	Organizing hierarchies	Creating and supporting networks and communities
<b>Locus of expertise</b>	Expertise located at the top of the organizational hierarchy and distinct competence centers such as corporate R&D	Knowledge workers are more knowledgeable than managers. Knowledge is dispersed and contextual.
<b>Governance</b>	Price and authority	Trust as focal and complementary to other governance forms
<b>Job descriptions</b>	Clear distinction into thinkers and doers	Overlap of thinking and doing
<b>Orientation</b>	Human and socio-psychological factors marginally important	Climate and culture that support knowledge creation are essential
<b>Performance assessment</b>	Ideal performance easy to define, measure and assess	Optimal performance difficult to assess and especially measure
<b>Improvement activities</b>	Re-engineering and cost-cutting	Re-design of work flows and enabling conditions for knowledge creation
<b>HR</b>	Hiring and firing	Recruiting and holding on to the best employees
<b>Motivating</b>	External motivation: money	Intrinsic motivation and possibilities for self-development
<b>Bureaucracy</b>	Bureaucracy and hierarchies both as a management method and as a goal of effective management	Lean and organic structures, networks and temporary groups

The traditional management practices and authority from hierarchically organized manufacturing organizations may not be valid in the knowledge-intensive firms (Table 3). In fact, managing knowledge and knowledge work requires that most of the traditional assumptions about what effective management consists of must change. If firms are perceived as institutions for integrating knowledge, hierarchies fail. As Davenport (2001, 44) puts it, management in the knowledge economy is “a different game with different rules.”

#### **4.2 Implications for organizing**

Bureaucracies have been proven to be efficient in routine tasks, but encounter enormous difficulties in innovation and knowledge creation (Adler, 2001). Traditional bureaucracies and related organizational processes may be poorly prepared for the needs of innovative new solutions and related system-level changes. Complex knowledge creation and non-routine tasks demand non-redundant information and knowledge from diverse actors across organizational boundaries. Many innovations are systemic in nature, comprising components of broader systems or architectures

(Teece, 1995). Subsequently, innovative products or services may demand changes in the entire system and significant readjustment to other parts of the system. Innovations may also co-evolve, i.e., technology-based product and service innovations emerge simultaneously with organizational innovations, e.g., cross-functional teams, new prioritization of activities, and the creation of call centers (Ramirez & Ruddle, 2005). In similar vein many IT investments, such as enterprise resource planning (ERP) demand process re-engineering for increased productivity.

As pressures for continuous development, learning and innovation increase, new organizational forms to improve knowledge integration and agility through decentralized and empowered decision-making are explored all over the world. Knowledge work is increasingly organized in projects, short-term task forces, and in temporary cross-functional teams. People are working in global virtual teams and communities thanks to the enabling technologies. Complex, specialized and dispersed knowledge located in different areas of the organization can be transferred through different roles allowing sharing and transferring knowledge across the firm. New knowledge worker roles such as translators, knowledge brokers and boundary spanners are emerging (Brown & Duguid, 1998). Organizational boundaries are blurring and new organizational forms and roles are applied both within the firm, and in inter-organizational settings.

New forms of organizing are needed, yet firms are only exploring how, e.g., temporary task forces can be aligned with the present processes and incentives. Local optimization, the lack of resources, and excessive internal competition may hamper flexible cross-organizational collaboration (Ritala et al. 2009). Also the commanding type of management works poorly in cross-organizational collaboration and community building. Cross-boundary collaboration and related networks can rarely use authority; instead, experts need to rely on trust to build collaborative relationships (see e.g. Adler, 2001; Miles et al., 2005). Non-routine, temporary forms of organizing may be more based on inter-personal and informal relationships that are not aligned with formal organizational structures, roles and hierarchies or legal boundaries. A shared vision, intrinsic motivation, and willingness to identify with the firm and other knowledge workers may be better approaches for inspiring commitment in knowledge workers across organizational borders.

#### *Organizing within multinational corporations*

Multinational corporations (MNCs) have been perceived as miniature economies in which business units function as miniature firms (Adler, 2001; Ghoshal et al., 2000). Today, MNCs are increasingly seen as networks of complementary units, such as headquarters, manufacturing or sales subsidiaries, and R&D units. Organizational integration is essential, yet a source of a fundamental tension (Ghoshal & Gratton, 2002).

Knowledge creation and transfer of novel ideas, best practices and innovative solutions have emerged among the primary sources of competitive success for international corporations (e.g., Bartlett & Ghoshal, 2002). According to the knowledge-based view of the firm, a multinational corporation (MNC) can also be understood as a social community specializing in speed and efficiency in the creation and transfer of knowledge (Kogut & Zander 1996; Almeida et al., 2002).

Because of the contextual and tacit nature of much of the valuable knowledge, the MNC's ability to create, adopt, and transfer knowledge between the different units is necessary. Thus, MNCs need global knowledge management to tap into tacit knowledge available in subsidiaries, which has a critical role in influencing the capabilities and innovativeness of the firm (Andersson et al., 2001; Subramaniam & Venkatraman 2001). In order to leverage the local knowledge, they also need to consider carefully the co-location of knowledge and decision-making.

Based on an exploratory study (Lindqvist et al., 2006) it can be proposed that the more locally embedded the subsidiary tacit knowledge (such as customer knowledge), the higher is the need for subsidiary autonomy. It can also be proposed that the efficient transfer of explicit knowledge requires feedback, structures for bi-directional knowledge transfer, and globally integrated knowledge management. However, informal knowledge transfer is also an important source for tacit knowledge and actor satisfaction. In line with Grant (1996b) and Ghoshal and Gratton (2002) Lindqvist et al. 2006 study shows the tension between the perceived roles of subsidiaries and the head-office in knowledge creation and decision-making.

### **4.3 Implications for inter-organizational organizing**

In the knowledge-based competition, where specialized knowledge is the primary source for value and profit, the ability to leverage external knowledge and resources through inter-organizational cooperation and partnerships becomes critical. The ability of an individual or a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends is critical to the firm's innovative capabilities (Hamel, 1991; Pisano, 1990; Miles et al., 2000). This capability, called the firm's absorptive capacity, is largely a function of the firm's level of prior related knowledge (Cohen & Levinthal 1990).

Complementary partnerships are believed to be a key element both in the creation of new technological knowledge and in leveraging the value of this knowledge (see, e.g., Ford, 1998). If similar kinds of organizations join their forces, they may be able to reach a wider scale of customers, but are not likely to come up with innovations. In order to innovate and create new knowledge, the fusion of different kinds of knowledge is needed. Complementary companies are able to focus on their core competencies and simultaneously leverage external knowledge and resources to complement their knowledge and resource base. Potentially, the focus on core competencies promotes a relatively stronger competitiveness (cumulative learning, focused use of critical resources) and the ability to gain synergistic benefits and scale by leveraging different knowledge bases and networks (Blomqvist, 2002). Prior studies have shown that inter-organizational relationships and alliances increase the innovativeness of firms, as measured by patents (Shan et al., 1994). Inter-organizational collaborative relationships have been motivated by learning and used as a means to co-create new knowledge. Especially the informal interaction has been shown to support the development of new ideas for patents and in solving related problems (e.g. Weck and Blomqvist, 2008). However, in the contemporary fast moving business environment alliances are not only used for learning but also for knowledge access, i.e. integrating and utilizing parties' existing knowledge bases (Grant & Baden-Fuller, 2004).

At the global level many large corporations are looking for competence centers and developing relationships to universities, venture capitalists and science parks to leverage potentially valuable knowledge outside their traditional boundaries (Doz et al., 2001; Blomqvist et al., 2004). Although the value of firm-external relationships has been widely recognized, we still know relatively little about the mechanisms of inter-organizational knowledge creation, even though the capacity to create new knowledge may be a more important driver of competitiveness than knowledge appropriability (Grant, 1996b; Spender, 1996b). In order to succeed in inter-firm knowledge creation, firms need to learn to balance informal and formal structures, and related governance modes, such as trust and contracting (Blomqvist et al., 2005).

## 5. EMERGING ISSUES IN KNOWLEDGE-BASED ORGANIZING

Several authors have traced the development of scientific research on the management of knowledge (Ahola et al., 2000; Snowden, 2002; Tuomi, 2002; Hong & Ståhle, 2005) These accounts posit a similar trajectory that can be divided into three generations, the first beginning roughly in the early 1990's, the second in the late 1990's, and the third being in an emergent state at the time of the publication. The first generation of knowledge management was an enthusiastic proponent of the new possibilities opened up by developments in the information and communication technology. The focus was on exploring and fully exploiting the novel ICT systems, and the concept of knowledge itself was not problematized. Knowledge was understood in terms of easily identifiable and measurable codified pieces of data and information. The second generation took a more humane perspective and focused on examining how knowledge is created, shared and transmitted in social interaction. Typologies of different forms of knowledge emerged, and especially the tacit aspects of knowledge attracted research attention, partly as a reaction against the technology-driven approaches of the first generation. Also, collective practices, social learning and communities were popular topics. The third generation of knowledge management is characterized by an interest in the complicated, complex and chaotic nature of knowledge, management of risk and uncertainty, as well as capabilities for the creation of new knowledge and innovations. The key issue is how to navigate successfully in the midst of turbulent and unpredictable environments and to benefit from the diverse and dispersed knowing of various actors, while instilling and maintaining a requisite coherence in the firm activities. In this chapter, we discuss three important research directions which represent the emerging third generation developments of knowledge management: organizational capability for continuous innovation, learning and renewal; collaboration capability; and trust as a governance mechanism.

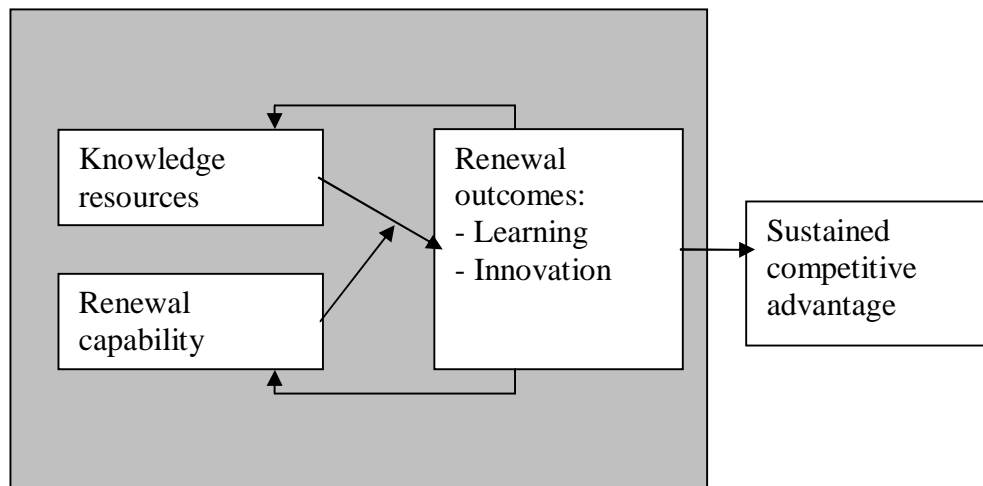
### 5.1 Organizational capability for renewal

As organizations increasingly face world-wide competition in rapidly transforming, unpredictable environments, the ability to generate constantly novel and improved products, services, processes, and mindsets has become quintessential for sustained competitive advantage (e.g., Grant, 1996a; Teece et al., 1997; Eisenhardt & Martin, 2000; Pöyhönen, 2004; Kianto, 2008a; 2008b). Winners in the global marketplace are those firms that can renew themselves by continuously generating new knowledge and capabilities through learning and innovating. Renewal capability does not only mean that the organization is able to respond to today's challenges and to keep up with the changes in its environment, but also that it can act as a forerunner by creating innovation, both at the tactical and strategic levels of operation and thereby change the rules of the market (Hamel & Prahalad, 1994; Hamel, 1998). The demand for constant renewal is not limited to firms: non-profit organizations as well as regions and nations face similar challenges.

However, even though it is widely agreed that the dynamic capability for continuous learning, development and renewal is a major source of sustained competitive advantage, there is no widely shared view on how organizational renewal capability should be defined, and the research field is characterized by a plethora of concepts and definitions. This has led into theoretical pluralism and relatively segregated research strands with little cross-communication (e.g., Van de Ven & Poole, 1995; Dunphy, 1996). Although there is a wide multidisciplinary literature addressing some dimensions of organizational renewal, there are few integrative models that would draw together the most important aspects of a wide array of studies (Damanpour, 1988; Wolfe, 1994).

A recent theoretical model by Kianto (née Pöyhönen) (e.g. Pöyhönen, 2005; Kianto, 2008a) integrates the contributions of various approaches and presents a comprehensive model of

organizational renewal capability. In this model, it is proposed that renewal capability is based on a combination of organizational characteristics that enable the firm to develop and change its resource base to produce learning and innovation outcomes, which in turn produce sustainability in the face of changing market conditions (see Figure 1). The model argues, based on an extensive literature review, that there are six key elements of organizational renewal capability: strategic capability, leadership, exploiting time, connectivity, managing knowledge, and learning orientation.



**Figure 1. Knowledge resources, renewal capability, and the production of sustained competitive advantage** (Pöyhönen, 2005)

Strategic competence represents the connecting visionary element, basic task, identity, and general steering principles of the whole organization. Organizations that are capable of continuous learning and innovation are characterized by the ability to craft pro-active compelling visions and strategies that allow focused development but leave room for emergent development and flexibility (Mintzberg 1987; Brown and Eisenhardt, 1997; 1998; Kanter, 2002).

Connectivity represents the structure and quality of social relationships within and across organizational boundaries. Leveraging and creating intellectual capital is essentially a social activity: knowledge is typically created, enriched, shared, and leveraged in social interaction among several people (e.g., Van de Ven, 1986; Brown & Duguid, 1991; Nonaka & Takeuchi, 1995). Most problem-solving and decision-making occurs in groups, and the social context influences the motivation and actions of individual organizational members to a significant degree (Amabile, 1997). Open-ended and complex tasks require cross-functional and multidisciplinary expertise, and thus collaboration capabilities (Miles et al., 2000) have become increasingly necessary.

Renewing organizations are masters of timing. These firms are able to exploit time consciously as a competitive asset in order to produce new ideas and turn them into successful outputs. The creative process in general has been described as a continuous movement between chaotization and crystallization, and creative skills are related to the ability to sense when to move from divergent to convergent thinking (Gilford, 1979) or from lateral to vertical thinking (De Bono, 1985) and back. Sensitivity to temporal issues in creative process has been conceptualized as bifurcation points to

illustrate how situational awareness and the ability to make timely decisions are essential for innovativeness (Stähle, 1998).

Learning orientation represents the general attitudes of organizational members towards creativity and learning, and the extent to which these activities are supported and allowed by organizational structures and processes. In the ideal situation, knowledge and its development are highly appreciated throughout the organization (Leonard-Barton, 1995). Employees are seen to possess valuable knowledge and development potential, and there is no strict division into thinkers and doers (Boer et al., 2000; Davenport, 2001). Conversely, organizational cultures emphasizing rules, control, efficiency, evaluation, and faultlessness are uncondusive to renewal (Cameron & Quinn, 1999).

In the leadership factor, there are two main dimensions of leader's capabilities for enhancing the continuous learning and innovation of the organization: skills in managing structured and ordered innovation processes; and skills in enhancing creativity and learning through building enabling conditions. These two facets echo the demanding nature of renewal: on the one hand, learning and innovation cannot be fully controlled from the top of the organization, and attempting to do so would inhibit these processes (Von Krogh, 1998). On the other hand, especially incremental innovation and learning can be made more efficient by stable routines and permanent support structures (Eisenhardt & Tabrizi, 1995; Stähle et al., 2003; Pöyhönen, 2004).

Finally, knowledge management represents the organization's systematic practices and tools for information storage and knowledge sharing. Continuously renewing organizations are characterized by their proficiency in dealing with various knowledge assets within the borders and the reach of the organization. Furthermore, the acquired knowledge should be assimilated in the organization via internal communication, and transformed into improved products, services, processes, and mental models throughout the organization (Cohen & Levinthal, 1990; Zahra & George, 2002; Darroch, 2005).

The management of organizational renewal is also hindered by the lack of measures that would allow its reliable assessment and effective development. Even though the importance of renewal capability for organizational success is an uncontested fact in the literature, there are few metrics for this important phenomenon. At the moment, most of the research on renewal capability is based on case studies, and there is a lack of quantitative methods that would allow reliable assessment, internal communication and inter-firm comparison of renewal capability. The theoretical model of renewal capability has been used as a basis for creating a survey instrument, which will be psychometrically validated in a sample of Finnish organizations in the near future. The survey instrument is suitable for both scientific research and practical performance measurement and organizational development purposes.

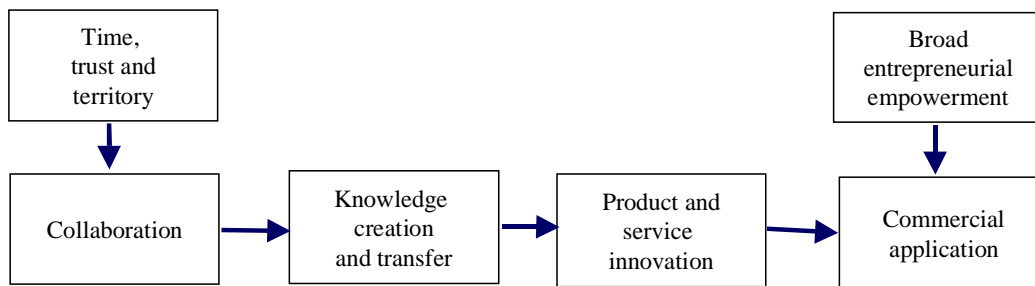
## **5.2 Collaboration capability enables knowledge co-creation**

The role and effect of collaboration capability on performance is suggested to be higher when products and services are complex (Kahn 1996 and 1998) as well as the higher the interdependence and role of tacit knowledge. Organization's ability for collaborative action is also highlighted in uncertain and changing economic periods when fast decisions and actions are needed (Miller and Shamsie 1996). In today's business environment with high business, social and technological uncertainty its role can be seen as fundamental.

Collaboration capability underlines the relational perspective instead of the transactional approach. Thus it is relatively more important in closer relationships with the aim for knowledge and value co-creation. Collaboration capability as a concept is useful for understanding network activities on individual, team-level, intra-firm or inter-firm levels. Yet there has been very little research in which different levels are combined and a more holistic approach is needed if we are to understand the systemic nature of networks, as the different levels of collaboration capability (individual, team, departmental, organizational, dyadic) affect each other and the performance of the knowledge networks.

Sustainable competitive advantage is not possible in knowledge-based competition without continuous innovation. Innovations, by nature, emerge in social interaction in which diverse actors share complementary knowledge. Innovative firms such as Corning, 3M and Toyota are known for their ability to harness collaborative competencies, i.e., human and organizational collaboration in both intra- and inter-organizational networks (Miles et al. 2000). At an anecdotal level management practitioners also consider collaboration a critical issue in a knowledge-based network economy. According to present KONE CEO and former Nokia CEO Pekka Ala-Pietilä: “The only thing that discriminates really successful Nokia managers is their capability to establish relationships both within Nokia and with external parties” (Ala-Pietilä 2001).

Collaboration, not intellectual self-reliance, can be seen as the key driver of knowledge creation and innovation. Collaboration capability is defined as the actor’s ability to build and manage relationships based on trust, communication, and commitment (Blomqvist and Levy 2006). The role of collaboration capability, in other words, the ability to build and manage relationships with other parties on individual, team, departmental, and organizational levels, is paramount in the search for continuous innovation. Miles et al. (2000) illustrated the role of collaboration in the innovation process as follows (Figure 2).



**Figure 2. The Role of Collaboration in the Innovation Process** (Miles et al., 2000)

The model depicts in a simple and logical way the critical and interlinked role of collaboration in knowledge creation, for which time, trust and a shared mental territory are considered prerequisites. Collaboration is a necessary antecedent of knowledge creation and transfer. The former is always social action, and innovations emerge as a synthesis of complementary knowledge among asymmetric actors. Knowledge creation and utilization, in turn, may lead to innovation. Miles et al. (2000, 300) explicitly refer to collaboration as a meta-capability, and emphasize the voluntary aspect of innovation: “innovation cannot be managed hierarchically because it depends on knowledge being offered voluntarily rather than on command.” This is equally important in intra-firm and inter-firm collaboration, since without voice and empowerment

actors with diverse knowledge and ideas are not heard, and only some of the potential knowledge is used. Miles et al. (2000) consequently claim that mutual communication based on trust is critical for knowledge creation and subsequent innovation. Similarly, Nonaka and Takeuchi (1995) stress the importance of common values, goals, and strong relationships in knowledge creation.

### 5.3 Trust in knowledge work and knowledge-based organizing

Trust is increasingly seen as a key mechanism enhancing collaborative communication, commitment and coordination in a knowledge-based network economy (e.g. Miles et al. 2001; Adler, 2001; Adler & Heckscher, 2006). Knowledge work, collaborative innovation and related interaction in the modern society is characterized by complexity, uncertainty and risk. For people to be willing to share their knowledge, and to participate in implementation of other people's ideas, trust matters (Creed & Miles, 1996; Miles et al. 2000, Clegg et al. 2002). Trust correlates with effective communication, commitment, problem solving and risk-taking. It is difficult to think where in the modern working life it would not have a role. Trust is especially critical in e.g. leadership, team work, R&D, selling services of high tech goods, consulting, IT and change management, outsourcing and alliances and investments. By nature all knowledge work and related interaction are characterized by complexity, uncertainty and risk to a varying degree. The higher the risk, the higher the need for trust is.

At its simplest trust can be understood as the actor's willingness to be vulnerable (Mayer et al, 1998), and in business and work life context especially actor's expectation of the other party's competence and goodwill (Blomqvist, 1997). The relevant competence (substance knowledge, skills and know-how) is a necessary antecedent and base for trust in professional relationships, where the complementary knowledge and resources are among the key motives behind cooperation. Signs of *goodwill* (positive intentions toward the other) are also necessary for the trusting party to be able to accept risk and a potentially vulnerable position. Blomqvist (2002) has later added the component of self-reference and suggests that especially in knowledge-intensive context trust is composed of *capability, goodwill and self-reference* (on self-reference, see Luhmann, 1979). Instead of a word competence capability is used to emphasize the timeliness in relevant competences. The word "reference" in the context of self-reference refers to an actor's ability to understand and use others as a reference. Self-reference enables connection and cooperation with diverse and complementary actors. At firm-level strong self-reference is depicted in clear corporate identity: shared understanding of the purpose of the firm, related values and strategy. Capability, self-reference and goodwill are evaluated and experienced through communication and behaviour. They are vital for the evolution of trust as they signal about the trustworthiness of the trustee.

In contemporary organizations trust is simultaneously critical yet paradoxical issue as the levels of trust have been decreasing both in large corporations and institutions (Schoorman et al. 2007, Fukuyama, 1995 and Tyler, 2003). We need trust more than ever, yet it seems that we have less natural opportunities for trust to evolve. In a recent PhD study by Seppänen (2008) trust has been shown to have a critical role in inter-organizational relationships: it increases collaboration benefits and lowers collaboration drawbacks, having a positive effect to the relationship performance. Yet cooperation within and between organizations is increasingly organized in temporary groups and projects among knowledge workers, who may not have a shared past nor will not have a shadow of the future (Meyerson et al. 1996; Axelrod, 1984). In many cases there may not be enough time for repeated interpersonal interaction on which the traditional, slowly evolving trust is based. Trust is argued to be especially critical in a high-risk dynamic environment, and allowing asymmetric actors to connect despite the incomplete information, limited shared context, and related risks (Blomqvist, 2005).

Knowledge-based view of the firm views collective tacit knowledge as a source of competitiveness and firm as a social organization based on voluntary interaction. Organizational integration and new organizational forms within and between organizations support efficient and effective leverage of dispersed knowledge. However, in knowledge-based view of the firm trust is implicit (Nonaka and Takeuchi 1995; Nonaka et al. 2000; von Krogh 2001 and Miles et al. 2000; Kogut & Zander 1992 and Foss 1996; 2005). Trust has been seen as an element in concern and care (von Krogh 1998), BA (Nonaka & Toyama 1995; Miles et al. 2000, Nonaka et al. 2005) and a relational element in social capital supporting value creation from intellectual capital (Nahapiet & Ghoshal 1998). Trust lowers the collaboration related transaction costs and may also increase transaction benefits (Blomqvist et al. 2002; Seppänen 2008). Considering the critical role of trust in enhancing communication, commitment and collaboration, there is also surprisingly little empirical or analytical research focusing on the relationship of trust and knowledge, or trust and innovation (with the few exceptions, see Clegg et al. 2000; Adler, 2000; Ellonen et al. 2008).

Researchers interested in trust see that the nature of trust is changing. Traditional trust based on character and social similarity is not sufficient for innovation demanding diverse perspectives and complementary knowledge. Trust that is not warranted may be dangerous and generalized trust may turn out to be naïve or blind. Trust that creates value should be analytical and reflective. It is also argued that interpersonal trust is too fragile and should be complemented with institutional (impersonal) trust (Blomqvist, 2008). Future research and trust-related practices should look into the nature and dynamics of trust (evolution and decline of trust) as well as proactive mechanisms and strategies for trust building and re-building trust. In knowledge-based network economy trust has become an issue that cannot be neglected.

## **6 SOME FINAL THOUGHTS ABOUT DEVELOPING THE KNOWLEDGE-BASED VIEW OF THE FIRM**

Even if evident and powerful, the knowledge-based view of the firm is still at its embryonic phase. There is much fuzziness in the conceptualizations, obscurity in causal relations, and definitely a lack of managerial tools. However, we dare to propose that those who are courageous enough to walk in the forefront will gain advantages from understanding the ongoing change in the logic of competition, production, and organizing. In a similar vein to Spender and Grant (1996) and Foss (2005), we believe that the rise of the knowledge-based view of the firm is an important paradigmatic change that is critical for both the academic and managers to understand.

When hierarchies collapse and traditional incentives work poorly with knowledge workers, the role of communication and mutual trust become increasingly critical. Collaboration capability becomes a meta-capability at all levels, from the individual knowledge worker to teams, departments, and organizations. Both knowledge workers and their leaders need to learn to work through weak and strong ties and build shared norms of reciprocity and trust. They also need to understand how to master change, both by adapting to it, but also by proactively creating change for themselves and extending this change to the environment.

Academics in various fields such as the strategic management, organization theory, and sociology are eager to understand the key drivers and determinants of the knowledge economy. Comparably, entrepreneurs and management are looking for emerging business opportunities. In times of high technological change and related discontinuities in the techno-economic environment, there are

major opportunities for those who are willing to invest time and effort to understand the new knowledge-based business logic and learn about it.

## REFERENCES

- Adler, P. (2001). Market, hierarchy, and trust: The knowledge economy and the future of capitalism. *Organization Science*, 12, 2, 215-234.
- Adler P.S. and Heckscher C. (2006). Towards Collaborative Community, in *The Firm as a Collaborative Community. Reconstructing Trust in the Knowledge Economy*, edited by Charles Heckscher and Paul S. Adler, 11-101.
- Ala-Pietilä, P. (2003). A key note speech in Conference for Knowledge Management at Helsinki School of Business and Economics, August 21-22.
- Almeida, P., Song, J. & Grant R.M. (2002). Are firms superior to alliances and markets? *Organization Science*, Vol. 13, No. 2, 147-161.
- Ahonen, H., Engeström, Y. & Virkkunen, J. (2000). Knowledge management – The second generation: Creating competencies within and between work communities in the competence laboratory. In Y. Malhotra (Ed.), *Knowledge management and virtual organizations*. London, Idea Group Publishing.
- Amabile, T. (1998). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, 40, 1, 39-58.
- Amabile, T., Conti, R., Coon, H., Lazenby, J. & Herron, M. (1997). Assessing the work environment for creativity. *Academy of Management Journal*, 39, 1154-1184.
- Amit, R. & Schoemaker, P. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14, 1, 33-46.
- Andersson, U., Forsgren, M. & Holm, U. (2001). Subsidiary embeddedness and competence development in MNCs – A multi-level analysis. *Organization Studies*, 22, 6, 1013-1034.
- Ansoff, H. (1980). Strategic issue management. *Strategic Management Journal*, April-June, 132-148.
- Barney, J. (1996). The resource-based theory of the firm. *Organization Science*, 7, 5, 469.
- Barney, J. (1996). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review*, Vol. 11, No. 3, 656-665.
- Berger, P. & Luckmann, T. (1966). *The social construction of reality*. Anchor Books, New York.
- Blackler, F. (1995). Knowledge, knowledge work and organizations: An overview and interpretation. *Organization Studies*, 16, 6, 1021-1046.
- Blom, R., Melin, H. & Pyöriä, P. (2001). *Tietotyö ja työelämän muutos: palkkatyön arki tietoyhteiskunnassa*. Helsinki: Gaudeamus.
- Blomqvist, K. (2005). Trust in a dynamic Environment - Fast trust as a threshold condition for asymmetric technology partnership formation in the ICT Sector. In *Trust in Pressure: Investigations of trust and trust building in uncertain circumstances*. Edward Elgar Publishing, Inc.
- Blomqvist, K. (2002). Partnering in the dynamic environment: The role of trust in asymmetric technology partnership formation. Doctoral dissertation. Acta Universitatis Lappeenrantaensis 122. Lappeenranta University of Technology.
- Blomqvist K., Koivuniemi J., Hara V. & Äijö T. (2004) Towards networked R&D management: the R&D Approach of Sonera Corporation as an Illustration, *R&D Management*, 34, 5.

- Blomqvist K., Hurmelinna P. & Seppänen R. (2005). Playing the Collaboration Game Right – Balancing Trust and Contracting. *Technovation*, 25, 5, 497-504.
- Blomqvist K. & Levy J. (2006). Collaboration Capability – A Focal Concept In Collaborative Knowledge Creation And Innovation In Networks. *International Journal of Management Concepts and Philosophy* (forthcoming).
- Blomqvist K. (2007) The Role of Trust in Knowledge-based Ecosystem – Towards a Multi-level analysis, A paper presented at the 4th Workshop on Trust Within and Between Organizations, Amsterdam, The Netherlands October 25-26, 2007
- Blomqvist K. (2008). Trust in a Knowledge-based organization, a paper presented at the Conference for Organizational Knowledge, Competences and Learning, April 30th - May 1st, Copenhagen, Denmark.
- Brown, J. & Duguid, P. (2001). Knowledge and organization: A social-practical perspective. *Organization Science*, 12, 2, 198-213.
- Brown, J. & Duguid, P. (1991). Organizational learning and communities of practice. *Organization Science*, 2, 1, 40-57.
- Brown, S. & Eisenhardt, K. (1998). Competing on the edge. Strategy as structured chaos. Harvard Business School Press, Boston.
- Brown, S. & Eisenhardt, K. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42, 1, 1-35.
- Burt, R. (1992). Structural holes: The social structure of competition, Cambridge, MA, Harvard University Press.
- Cameron, K. & Quinn, R. (1999). Diagnosing and changing organizational culture. Addison-Wesley, Reading.
- Coase, R. (1937). The nature of the firm. *Economica*, 4, 4, 386-405. Reprinted 1988 in *The firm, the market, and the law*. Ed. Ronald Coase, University of Chicago Press, Chicago.
- Clegg C., Unsworth K., Epitropaki O. and Parker G. (2002). Implicating Trust in the Innovation Process. *Journal of Occupational and Organizational Psychology*, 75, 409-422.
- Cohen, W. & Levinthal, D. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 1, 128-152.
- Collis, D. (1994). Research note: How valuable are organizational capabilities? *Strategic Management Journal*, 15, 143-152.
- Crossan, M., Lane, H. & White, R. (1999). An organizational learning framework: from intuition to institution. *Academy of Management Review*, 24, 3, 522-537.
- Damanpour, F. (1988). Innovation type, radicalness, and the adoption process. *Communication Research*, 15, 545-567.
- Daniel, J. & Krackhardt, D. (1999). The social capital of twenty-first-century leaders in J.G. Hunt and R.L. Phillips (eds). *Out-of-the Box Leadership Challenges for the 21<sup>st</sup> Century Army*. 179-193.
- Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management*, 9, 3, 101-115.
- De Bono, E. (1985). Six thinking hats. Boston, Little, Brown and Company.
- Dietrickx, I. & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35, 12, 1504-1511.

- Dougherty, D. (1992). A practice-centered model of organizational renewal through product innovation. *Strategic Management Journal*, 13, 77-92.
- Doz, Y., Santos, J., & Williamson, P. (2001). *From global to metanational*, New York, Harvard Business School Press.
- Drucker, P. F. (1999). Knowledge-worker productivity: The biggest challenge. *California Management Review*, 41, 2, 79-95.
- Drucker, P. F. (1993). The rise of the knowledge society. *Wilson Quarterly*, 17, 2, 52-70.
- Dunphy, D. (1996). Organizational change in corporate settings. *Human Relations*, 49, 5, 541-552.
- Edvinsson, L. & Malone, M. (1997). *Intellectual capital: realising your company's true value by finding its hidden brainpower*. Harper Collins, New York.
- Eisenhardt, K. & Martin, J. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21, 1105-1121.
- Eisenhardt, K. & Tabrizi, B. (1995). Accelerating adaptive processes: product innovation in the global computer industry. *Administrative Science Quarterly*, 40, 84-110.
- Ellonen R., Blomqvist K. and Puumalainen K. (2008). Trust in Organizational Innovativeness, in *European Journal of Innovation Management*, 11:2, 160-181.
- Eskola, A. (1982). *Vuorovaikutus, muutos, merkitys*. Tammi, Helsinki.
- Evans, P. & Wurster, T. (2000). *Blown to bits: How the new economics of information transforms strategy*. Harvard Business School Press, Boston, Massachusetts.
- Ferdinand, J., Graca, M, Antonacopoulou, E. & Easterby-Smith, M. (2004). Dynamic capability: Tracking the development of a concept. In the proceedings of *Organizational Learning, Knowledge and Capabilities 2004*. 2-3 April, 2004, Innsbruck, Austria.
- Foray, D. (2004). *The economics of knowledge*. MIT Press, Cambridge. Gilford 1979
- Foss, N. (1996). Knowledge-based approaches to the theory of the firm: Some critical comments. *Organization Science*, 7, 5, 470-.
- Foss, N. (2005). *Strategy, economic organization and the knowledge economy, The Coordination of firms and resources*, Oxford University Press, Oxford.
- Fukuyama, F. (1995), *Trust. The Social Virtues and the Creation of Prosperity*, The Free Press, USA.
- Ghoshal, S., Bartlett, C. & Moran, P. (2000). Value creation in *Executive Excellence*, Nov. 10<sup>th</sup>.
- Ghoshal, S. & Gratton, L. (2002). Integrating the enterprise, *MIT Sloan Management Review*, Fall ,31-38.
- Granovetter, M.S. (1973). The Strength of weak ties. *American Journal of Sociology*, 78, 1360-1380.
- Grant, R. (2002). The knowledge-based view of the firm. In N. Bontis & C. Wei Choo (Eds.), *Strategic management of intellectual capital and organizational knowledge*. Oxford University Press, New York.
- Grant, R. (1996a). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, 7, 4, 375-387.
- Grant, R. (1996b). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109-122.
- Grant, R. & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of Management Studies*, 41(1): 61-84.

- Hamdouch, A. & Samuelides, E. (2000). Innovation's dynamics in mobile phone services in France. Papers 2000.26, Paris I - Economie Mathematique et Applications.
- Hamel, G. (1998). Strategy innovation and the quest for value. *Sloan Management Review*, 39, 2, 78-86.
- Hamel, G. & Prahalad, C. (1994). *Competing for the future*. Harvard Business School Press, Boston.
- Hardwig, J. (1991). The Role of trust in knowledge, *The Journal of Philosophy*, Vol. 88, Iss. 12, 693-708.
- Hong, J., Kianto, A. and Kyläheiko, K. (2008). Culture and dynamic capabilities in emerging markets. *Knowledge and Process Management*, Vol. 15, No. 3, pp. 196-202.
- Hong, J. & Stähle, P. (2005). The coevolution of knowledge and competence management. *International Journal of Management Concepts and Philosophy*, 1, 2, 129-145.
- Kahn, K. & Mentzer, J. (1996). Logistics and interdepartmental integration in *International Journal of Physical Distribution & Logistics Management*, Vol. 26, No. 8, 6-14.
- Kahn, K. & Mentzer, J.. (1998). Marketing's integration with other departments in *Journal of Business Research* 42, 53-62.
- Kanter, R. M. (2002). Strategy as improvisational theater. *Sloan Management Review*, Winter, 43, 2, 76-83.
- Kianto, A. (2008a). Assessing organizational renewal capability. *International Journal of Innovation and Regional Development*, Vol. 1, No. 2, pp. 115-129.
- Kianto, A. (2008b). Development and validation of a survey instrument for measuring organizational renewal capability. *International Journal of Technology Management*, Vol. 42, Nos 1/2, pp. 69-88.
- Kianto, A. (forthcoming). Enabling innovation in knowledge worker teams. *International Journal of Learning and Intellectual Capital*.
- Kogut, B. & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3, 3, 383-397.
- Kogut, B. & Zander, U. (1996). What firms do? Coordination, identity and learning. *Organization Science*, 7, 5, 502-518.
- Kosonen M., Blomqvist K. and Ellonen R. (2008). The Impersonal Nature of Trust, a book chapter in *Encyclopedia of Networked and Virtual Organizations*, Idea Group Publishing, forthcoming.
- Leonard-Barton, D. (1995). *Wellsprings of knowledge. Building and sustaining the sources of innovation*. Harvard Business School Press, Boston, MA.
- Liebesskind, J. (1996). Knowledge, strategy and the theory of the firm. *Strategic Management Journal*, 17, 93-107.
- Lindqvist, J., Blomqvist, K. & Saarenketo, S. (2006). The role of sales subsidiary in MNC innovativeness - Explorative study and emerging issues on knowledge transfer. 33rd AIB-UK Conference 6-8 April 2006, Manchester.
- Luhmann, N. (1979), *Trust and power*, John Wiley & Sons, Chichester, England.
- March, J.G. (1991). Exploration and exploitation in organizational learning, in *Organization Science*, Vol. 2, No. 1, 71-87.
- McEvily B., Perrone V. & Zaheer A. (2003). Trust as an organizing principle in *Organization Science*, Vol. 13, No. 1, 91-103.
- Miles, R., Snow, C. & Miles, G. (2005). *Collaborative entrepreneurship. How groups of networked firms use continuous innovation to create economic wealth?* Stanford, Ca: Stanford University Press, Forthcoming.
- Miles, R., Snow, C. & Miles, G. (2000). TheFuture.org in *Long Range Planning*, 33, 300-321.

- Miller, D. & Shamsie, J. (1996). The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965 in *Academy of Management Journal*, Vol. 39, No. 3, 519-544.
- Mintzberg, H. (1987). Strategy concept 1: Five P's for strategy. *California Management Review*, 30, 1, 11-24.
- Nelson, R. & Winter, S. (1982). *An evolutionary theory of economic change*. Harvard University Press, Cambridge.
- Nonaka, I & Takeuchi, H. (1995). *The knowledge-creating company*. Oxford University Press, New York.
- OECD. (2005). *OECD Science, Technology and Industry Scoreboard 2005. Executive Summary* [webdocument]. [Referred 14.2.2006] Available at: <http://www.oecd.org/dataoecd/59/52/35465901.pdf>.
- Orlikowski, W. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science*, 13, 3, 249-273.
- Pearce J., Branyiczki, I. & Bigley, G. (2000). Insufficient Bureaucracy: Trust and Commitment in Particularistic Organizations in *Organization Science*, March/April, Vol. 11, No. 2, 148-162.
- Penrose, E. (1959). *The theory of the growth of the firm*. Oxford University Press, Oxford.
- Polanyi, M. (1966). *The tacit dimension*. Routledge, London.
- Prahalad, C. & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, May-June, 79-91.
- Pöyhönen, A. (2005). Exploring the Dynamic Dimension of Intellectual Capital: Renewal Capability, Knowledge Assets and Production of Sustained Competitive Advantage. A paper presented at the 2005 PMA IC Symposium: Management and Measurement of Intangible Assets and Intellectual Capital: Multidisciplinary Insights. New York, 15-16 December 2005.
- Pöyhönen, A. (2004). *Modeling and Measuring Organizational Renewal Capability*. Doctoral Dissertation. Acta Universitatis Lappeenrantaensis 200. Lappeenranta University of Technology.
- Ritala P., Välimäki K., Blomqvist K. and Henttonen K. (2009) The Role of Intra-Firm Coopetition in Knowledge Creation and Innovation Process, chapter in a book *Co-opetition Strategy: Theory, Experiments and Cases* edited by Giovanni B. Dagnino and Elena Rocco, Routledge Studies in Global Competition.
- Roos, J., Roos, G., Dragonetti, N. C. & Edvinsson, L. (1998). *Intellectual capital: Navigating in the new business landscape*. New York University Press, New York.
- Schoorman, F.D., Mayer, R.C. and James, H.D. (2007), An Integrative Model of Organizational trust: past, present and future, *Academy of Management Review*, 32, 2, 344-354.
- Seppänen R. (2008). *Trust in Inter-organisational Relationships*. Doctoral dissertation. Acta Universitatis Lappeenrantaensis 328. Lappeenranta University of Technology.
- Shan, W., Walker, G. and Kogut, B. (1994). Interfirm cooperation and start-up innovation in the biotechnology industry in *Strategic Management Journal*, 15(5): 387-394.
- Shapiro, C. & Varian, H. (1998). *Information rules: A strategic guide to the network economy*. Harvard Business School Press, Boston.
- Snowden, D. (2002). Complex acts of knowing: Paradox and descriptive self-awareness. *Journal of Knowledge Management*, 6, 2, 100-111.
- Spender, J.-C. (1996a). Organizational knowledge, learning and memory: Three concepts in search of a theory. *Journal of Organizational Change*, 9, 1, 63-78.
- Spender, J.-C. (1996b). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17, 45-62.

- Spender, J.-C. & Grant, R. (1996). Knowledge and the firm: An overview. *Strategic Management Journal*, 17, 5-9.
- Statistics Denmark. (2005). *Nordic Information Society Statistics 2005*. Copenhagen: Statistics Denmark.
- Stähle, P. (1998). Supporting a system's capacity for self-renewal. *Yliopistopaino*, Helsinki.
- Stähle, P., Stähle, S. & Pöyhönen, A. (2003). *Analyzing Dynamic Intellectual Capital: System-Based Theory and Application*. Acta Universitatis Lappeenrantaensis, 152. Lappeenranta University of Technology.
- Stähle, P. & Grönroos, M. (1999). Knowledge management – Tietopääoma yrityksen kilpailutekijänä. WSOY, Porvoo.
- Stähle, P. & Grönroos, M. (2000). *Dynamic intellectual capital. Knowledge management in theory and practice*. WSOY, Porvoo.
- Subramaniam, M. and Venkatraman, N. (2001). Determinants of transnational new product development capability: Testing the influence of transferring and deploying tacit overseas knowledge. *Strategic Management Journal*, Vol. 22, Iss. 4, 359-379.
- Sveiby, K. E. (1997). *The new organizational wealth: Managing and measuring knowledge-based assets*. Berrett-Koehler, San Francisco.
- Szulanski, G. (2003). *Sticky knowledge: Barriers to knowing in the firm*. Sage, London.
- Teece, D., Pisano, G. & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18, 509-533.
- Tilastokeskus. (1999). *Tiedolla tietoyhteiskuntaan II*. Helsinki: Tilastokeskus.
- Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. *Strategic Management Journal*, 17, 11-25.
- Tuomi, I. (2002). The future of knowledge management. *Lifelong Learning in Europe*, 2/2002, 69-79.
- Tyler, B. (2001). The Complementarity of Cooperative and Technological Competencies. A Resource-based Perspective in *Journal of English Technology Management*, 18, 1-27.
- Tyler T. (2003) Trust within organizations, in *Personnel Review* Vol. 32, No. 5, 556-568.
- Van de Ven, A. (1986). Central problems in the management of innovation. *Management Science*, 32, 5, 590-607.
- Van de Ven, A. & Poole, M. (1995). Explaining development and change in organizations. *Academy of Management Review*, 20, 3, 510-540.
- Von Krogh, G. (1998). Care in knowledge creation. *California Management Review*, 40, 3, 133-153.
- Weck M. and Blomqvist K. (2008) The role of inter-organizational relationships in the development of patents: a knowledge-based approach in *Research Policy* Vol 37, 8, 1329-1336.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.
- Williamson, O. (1975). *Markets and hierarchies: Analysis and antitrust implications. A study in the economics of internal organization*. Free Press, New York.
- Wolfe, R. (1994). Organizational innovation: Review, critique and suggested research directions. *Journal of Management Studies*, 31, 3, 405-431.
- World Bank, [www.worldbank.org](http://www.worldbank.org).
- Zack, M. (1999). Developing a knowledge strategy. *California Management Review*, 41, 3, 125-145.

Zahra, S. & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, 27, 2, 185-203.

Zollo, M & Winter, S. (2002). Deliberate Learning and the Evolution of Dynamic Capabilities. *Organization Science*, 13, 3, 339-351.