CO-EVOLUTION OF KNOWLEDGE AND COMPETENCE MANAGEMENT AND ITS STRATEGIC IMPLICATIONS

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Abstract

This paper reviews and identifies the distinct perspectives on knowledge management as well as the key conceptual views on competence and competence management. It introduces the perceivable co-evolution of knowledge management and competence management in recent research and practice, and shows the movement towards an integrated and systemic view where the overall challenge for both is the management of the whole system towards a self-generative and self-renewable organization. Strategic implications of this review and comparative analysis are suggested and discussed.

Keywords: competence management, knowledge management, strategic implication.

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This paper reviews and identifies the distinct perspectives on knowledge management as well as the key conceptual views on competence and competence management. It introduces the perceivable co-evolution of knowledge management and competence management in recent research and practice, and shows the movement towards an integrated and systemic view where the overall challenge for both is the management of the whole system towards a self-generative and self-renewable organization. Strategic implications of this review and comparative analysis are suggested and discussed.

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Introduction

Recent research points to the inseparable and mutual supporting relation between knowledge and competence and its significant implications for strategic management (Grant, 1996; Sanchez, 2001; von Krogh & Roos, 1995). This paper introduces the perceivable co-evolution of knowledge management and competence management in recent research and practice, and shows the movement towards an integrated and systemic view where the overall challenge for both is the management of the whole system towards a self-generative and self-renewable organization.

The strategy literature of the past 30 years argues that there are two essential sources of competitive advantage – that from market position and that from core capabilities or distinctive resources. These respectively form two distinct perspectives "outside in" and

"inside out" (see reviews by Miller et al, 2002; Nonaka & Takeuchi, 1995; Teece et al, 1997; von Krogh & Roos, 1995). The "outside in" perspective (e.g., *the competitive forces approach* proposed by Porter and his followers) focuses on seizing market opportunities and creating positioning advantage; while the "inside out" perspective (e.g., *the resource-based view*) concentrates on the valuable resources (competence, knowledge and skill assets) needed to sustain competitive advantage. This is of particular concern in our paper, for the existent literature shows that, firstly, there is a changing landscape toward a more "inside out" approach that particularly emphasizes a firm's valuable resources, and secondly, we have seen increasing attempts to explore the intersection and dynamics of the two perspectives.

The paper first compares the concepts of knowledge and competence, and then critically reviews and identifies the distinct perspectives on knowledge management as well as the key conceptual views on competence management. It then explores differences, overlaps and synergies between knowledge and competence management. Strategic implications of this comparative analysis will be suggested and discussed at the end of the paper.

Knowledge and Competence

In recent business and organizational literature, the interdependent relation between knowledge and competence has been particularly emphasized. von Krogh and Roos (1995) construe knowledge as the underlying basis for forming competences. They define competence as both knowledge specific and task specific. Grant (1996) develops a knowledge-based theory of organizational capability, in which knowledge is the pre-eminent resource of the firm, and organizational capability involves the integration of multiple knowledge bases. On the basis of this, organizational competence can be seen as knowledge integration. For Sanchez (2001), to create and use knowledge is to develop competence, and knowledge plays a central role in building, leveraging and maintaining organizational competences.

Despite the intimate relation between knowledge and competence, both concepts have different intellectual roots from which they developed. *Knowledge* is a broader and more abstract term, and has been discussed by philosophers for ages. Prusak (2001) reviews the intellectual antecedents of knowledge also in economics (learning by doing and knowledge acquisition), sociology (organizational structure, networks and

communities; and the importance of social facts or circumstances in knowledge management), and psychology (cognitive processes, will and motivation in knowledge work). *Competence* is a more specific term which has in its earlier forms been associated with the conceptual establishment of the so-called *scientific management* introduced by Taylor in the early 20th century (Taylor, 1911), and later on with the psychological studies of an individual's characteristics in terms of work performance (e.g., McClelland, 1973; Boyatzis, 1982). Furthermore, the focuses of knowledge and competence are different. It seems that knowledge has been treated as something that is more concerned with the firm's potential for success; and competence more with actual and successful performance, but to a large extent the distinction of the two concepts is relative. In many cases, they refer to the same thing and therefore are often interexchangeable.

Different Perspectives on Knowledge Management

During the past decade knowledge management has become increasingly popular both in scientific writings and organizational practices. This is understandable particularly for today's knowledge-intensive organizations and rapidly changing business. Knowledge management (KM) is an extremely wide concept and it is rooted in various disciplines and areas of practice with different focuses. Ståhle (2003) indicates that during its short history, KM has been approached from four different perspectives: philosophic perspective ("what is knowledge?"), perspective of organizational development ("how to create and master knowledge together?"), business perspective ("how to extract value from knowledge?") as well as technological perspective (the efficient and effective tools for storing, delivering and mining knowledge) (see Figure 1). From all these perspectives KM has been defined and analyzed differently, which can also be seen in the following views.

Wiig (1997) approaches from a managerial perspective and discerns four different areas of emphasis related to KM activities in companies: 1) Top-down monitoring and facilitation of knowledge-related activities, 2) creation and maintenance of the knowledge infrastructure, 3) renewing, organizing and transforming knowledge assets, and 4) leveraging (using) knowledge assets to realize their value.

In their recent paper Zorn and Taylor (2003) have identified four major uses of the KM label: First, and most typically, KM is used to describe a relatively comprehensive program or strategy intended to manage an organization's intellectual capital or

expertise. A second prominent meaning for KM is specific software applications that are marketed as KM solutions. The third use of KM is to reference relatively small scale initiatives that manage information in some way. And finally, the fourth use of the term is in reference to what knowledge workers do, often without labelling it as KM.

Zorn and Taylor's classification covers several essential aspects of KM such as knowledge identification, codification and exploitation. The last use of the term concerning "what knowledge workers do" may also imply another important KM aspect as knowledge creation – it is therefore a clear and comprehensive category though it is much simplified. The analysis as such is also more directed at KM practices, and focuses mainly on the interactive relation between knowledge management and organizational communication.
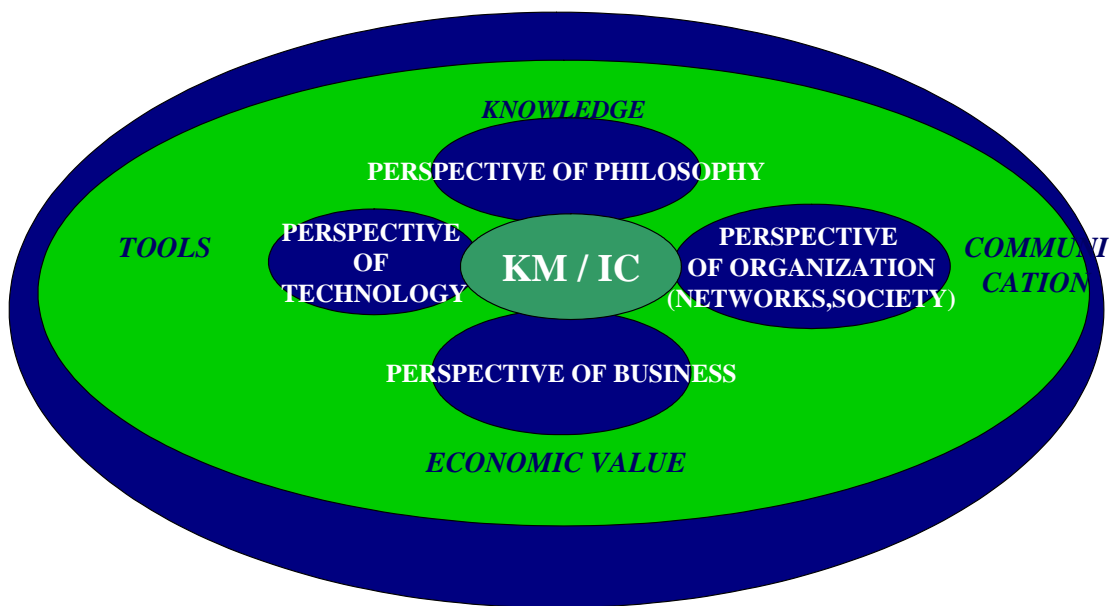

Fig. 1. Perspectives of Knowledge Management (Ståhle, 2003)

Another way to approach the heterogeneity of KM perspectives is to make differentiation among distinctive and most influential KM models. Kakabadse et al (2003) have identified five KM models which they consider either receiving growing attention or emerging. They include 1) The philosophy-based model of KM, which is concerned most with the epistemology of knowledge or what constitutes knowledge. Interesting questions posed in relation to this model include "What do we not know that we know?" or "What do we know that we don't know?". 2) The cognitive model of KM, deeply embedded in positivistic science as the tool for understanding a mechanical universe driven by single cause-effective relationships. For this model, knowledge is an asset; it is something that needs to be accounted for, and a number of efforts are being made to develop procedures for measuring it. 3) The network model of KM, which focuses on awareness of ideas that exist outside focal organizations that can be adapted for a vantage position. In this model, knowledge managing is perceived as collaboration that requires special collaborative and networking skills, with less emphasis on individual achievement and more on teamwork. 4) The community of practice model of KM, which builds on the sociological and historical perspective. The term "community of practice" was coined in the context of studies of traditional apprenticeship, and knowledge has traditionally passed from old-timers to newcomers in this way. Storytelling and metaphors are perhaps the best-known techniques for conveying complicated meanings in a simplified format to handle complex situations. 5) The quantum model of KM, which builds on the work of quantum physics, emergent quantum technology and consequential economy. This model emphasizes meaningful knowledge that is not fact-driven, but scenario-driven.

Similar type of work on identifying different KM models can be found in the work of others. For instance, Wiig (1997) has clarified three KM notions or approaches: KM from the information technology perspective, management of "intellectual capital" in forms of structural capital and human capital, and a comprehensive KM approach focusing on knowledge-related practices and activities. In addition to intellectual capital models, McAdam and McCreedy (1999) add in their classification other two but different KM models: knowledge category models (e.g., Nonaka's KM model and Boisot's model based on information theory) and socially constructed models (e.g., Demerest's KM model adapted from Clark and Staunton's innovation studies and communities of practice models).

Without going deep into the jungle of various perspectives or definitions of KM we summarize: *KM means transformation of ideas to knowledge as well as transformation of knowledge to added value* (Ståhle, 2003). In general, one can say that *knowledge management refers to every practice where knowledge is central and when knowledge is consciously changed, created, distributed and stored*. The purpose of these practices is to bring the right knowledge to the right place when it is needed and useful. KM is to help people and organisations to 1). find, share and use information, 2). enhance knowledge creation, and 3). master renewal and innovativeness (Ståhle, 2003; Ståhle & Grönroos, 2003). What is ultimately meant by KM is dependent on context, strategy view and finally basic conception of the world.

Conceptual Views of Competence and Competence Management

We identify from previous literature the following conceptual views of organizational competence and its related management perspectives that seem to form the major stream of competence management. They are: Individual Competence Profile, Core competence, Competence-based Management, Capabilities-based Competition, Dynamic Capabilities, Absorptive Capacity and Network / Relationship Competence.

Individual Competence Profile has much to do with conventional and contemporary competence management in most companies. It started from the studies of psychological characteristics of competent managers or employees in relation to their job performance (e.g., Boyatzis, 1982; McClelland, 1973). It then extends to its applications in a wide range of competence management practices, such as making individual competence profiles visible via the company's intranet, identifying the gaps between present and required competences, as well as setting up training and development programs for improving employee competences.

Since the concept of *core competence* was introduced by Prahalad and Hamel (1990), competence management began a new track in which corporate-wide strategic competence became the focus. In their article, Prahalad and Hamel (1990) define core competence as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies" (p.82). Examples of core competences are, for instance, Canon's personal copiers, desktop laser printers, Yamaha's digital Piano; Sonny's 8mm camcorder; Philips's optical media and laser competence etc.

According to Prahalad & Hamel, there are three fundamental properties as regards core competences: First, a core competence provides potential access to a wide variety of markets. Second, a core competence should make a significant contribution to the perceived customer benefits of the end product. Finally, a core competence should be difficult for competitors to imitate. From the examples above and their distinct properties, we can see that the concept of core competence deals much with the firm's technical competences, that is, the corporate-wide technologies and production skills, where human knowledge and competence are embedded.

We summarize the significant contributions of core competence as follows: 1) differing from the view that focuses on employees' individual competences, the concept of core competence turns the entire focus on the firm's competences; 2) it forms a kind of a resource-based view (RBV) that sees competence as the key source of sustainable competitive advantage for the growth of the firm. Particularly concerning the first contribution, some other concepts have been developed along the same lines as core competence. The most influential ones in today's competence management are *competence-based management* (Sanchez & Heene, 1997), *capabilities-based competition* (Stalk et al, 1992), *dynamic capabilities* (Teece, 2003; Teece, Pisano, & Shuen, 1997; Winter, 2003; Zollo and Winter, 2002), and *absorptive capacity* (Cohen & Levinthal, 1990).

Competence-based management is one of the cornerstones of competence-based competition theory, which refers to *dynamic, systemic, cognitive,* and *holistic* concepts of competence, organizations, and their competence-based interactions (Sanchez & Heene, 1997). Another group of RBV proponents (represented by Stalk et al, 1992) claims that competing on capabilities should constitute the new rules of corporate strategy. They indicate a fundamental shift
in the logic of competition - competition is becoming less like chess and more like an interactive video game:

> When the economy was relatively static, strategy could afford to be static. In s
> world characterized by durable products, stable customer needs, well-defined
> national and regional markets, and clearly identified competitors, competition was
> a "war of position" in which companies occupied competitive space like squares on

a chessboard, building and defending market share in clearly defined product or market segments …

Competition is now a "war of movement" in which success depends on anticipation of market trends and quick response to changing customer needs. Successful competitors move quickly in and out of products, markets, and sometimes even entire businesses – a process more akin to an interactive video game than to chess. In such an environment, the essence of strategy is *not* the structure of a company's products and markets but the dynamics of its behaviour. And the goal is to identify and develop the hard-to-imitate organizational capabilities that distinguish a company from its competitors in the eyes of customers (Stalk et al, 1992: 62).

Capabilities-based competition takes a broader view of the skill base and focuses on business processes rather than products and markets, which encompass the entire value chain, in defining capabilities. Take Honda as an example: In explaining Honda's success, the innovative designs of its products or the way they were manufactured are not the only factors, instead, its expertise in the "dealer management process" (the company's ability to train and support its dealer network with operating procedures and policies for merchandising, selling, and service management) plays an equally important role.

Dynamic capabilities refer to the firm's ability to integrate, build and reconfigure internal and external competencies in order to address rapidly changing environments. They reflect an organization's ability to achieve new and innovative forms of competitive advantage given path-dependencies and market positions. The dynamic capabilities approach seeks to provide a coherent framework which can both integrate existing conceptual and empirical knowledge and facilitate prescription. In comparison to RBV, dynamic capabilities emphasize *processes, positions & path* rather than resources, and their focal concerns have more to do with with *asset accumulation; replicability and inimitability* than asset fungibility (Teece, Pisano, & Shuen, 1997).

More recently, special attention has been given to coordination, entrepreneurship and asset selection, which form the basic sources of developing a firm's dynamic capabilities (Teece, 2003). This means, firstly, that routine processes are an essential element of dynamic capabilities. Examples include product development routines,

quality control routines, and technology and knowledge transfer routines which support the firm's innovation activity. Secondly, a far more important source of dynamic capabilities – the ability to not just sense changing market and technological opportunities, but to seize them through effectuating "new combinations." According to Teece, this is where entrepreneurial aspects of management come into play and where the distinctive transactional competence of the firm meets knowledge/skill competences. Thirdly, the asset selection capabilities are not macro or cross industry in nature. They are "situational." For instance, a management's decision to invest in complementary assets typically involves decisions as to whether to invest to a greater or lesser degree, i.e., they don't implicate the choice of industry. The asset selection component of managerial decisions is also where real option considerations come into play. The value of an asset is not just its current cash flow, but also its option value.

Even though Teece has highlighted the issue of basic *sources* for developing the firm's dynamic capabilities, there is still no explanation on how they evolve in time. Zollo and Winter (2002, 344) propose that dynamic capabilities emerge from the co-evolution of tacit experience accumulation processes with explicit knowledge articulation and codification activities. They define dynamic capability as "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." (340) They have emphasized the point that dynamic capabilities are structured and persistent, routine-using organizational activities. Thus, it takes time and money for dynamic capabilities to evolve. According to Winter (2003), dynamic capabilities typically involve long-term commitments to specialized routines. The more pervasive and detailed the patterning of the activity involved, the higher the costs of the commitments tend to be.

Absorptive capability is the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends. This ability is critical to its innovative capabilities, and is largely a function of the firm's level of prior related knowledge. A firm wishing to acquire and use knowledge that is unrelated to its ongoing activity need particularly to invest on absorptive capacity (Cohen & Levinthal, 1990).

Absorptive capability, according to Cohen and Levinthal, refers not only to the acquisition or assimilation of information by an organization but also to the organizations' ability to exploit it. Therefore, an organization's absorptive capability

does not simply depend on the organization's direct interface with the external environment. It also depends on transfers of knowledge across and within subunits that may be quite removed from the original point of entry. To understand the sources of a firm's absorptive capability, the authors focus on the structure of communication between the external environment and the organization, as well as among the subunits of the organization, and also on the character and distribution of expertise within the organization. Concerning the adoption and diffusion of innovation, Cohen and Levinthal assume that the ease of learning, and thus technology adoption, is affected by the degree to which an innovation is related to the pre-existing knowledge base of prospective users.

To date, two lines of competence research and practice seem to be emerging. One is *team or project collaborative competence.* A competent team is invariably made up of incompetent individuals, to varying degrees. Team or project collaborative competence is a group's ability to work together towards a common goal. This includes the group's ability to solve problems together, interpersonal competence to work together with different individuals, knowledge and repertoire of procedures shared by a team or a project in their work context (Vartiainen et al, 2003). A project-based working model is common particularly in knowledge-intensive organizations (Hong, Pöyhonen & Stahle, 2003), and virtual teaming becomes a new challenge in organizational communication and collaboration.

Another emerging line of competence management is related to the so-called network competence by Ritter et al (2002) or partnering competence in Toiviainen's (2003) term. In a broad sense, this line of competence management refers to a management practice where a set of concepts such as relation competence, alliance capability, and customer competence play a significant role (Alajoutsijärvi & Tikkanen, 1998; Draulans et al, 2003; Heimeriks, 2002; Prahalad & Ramaswamy, 2000).

To sum up, the dominant forms of current competence management are individual competence management and corporate-wide strategic competence management. Competence management that focuses either on teams or on networks is emerging and receives growing attention. At the moment, competence development practices in organizations that integrate different-level competences are few and far between.

Co-evolution of Competence and Knowledge Management

Going beyond the Resource-based View?

As introduced at the beginning of the paper, the core of success in business can be focused either on a company's market selection and positioning – the so-called "outside-in" perspective, or the success can be seen to be based on internal capability and resources of the company (management of internal change) – the so-called "inside-out" perspective.

In strategic / organizational research, the competence perspective receives more and more attention. As Sanchez (2002) writes, "while understanding *industry structure* was perhaps the primary concern of strategic management theory in the 1970s … and while characterizing firms as unique *bundles of resources* became an important perspective in the 1980s, conceptualizing and analyzing the *competences* of organizations became a key focus of management thinking in the 1990s" (Italics from the original text). The shift from the competitive forces approach to the resource-based view in the 1990s is evident, and even more interesting is the fact that Porter himself later on emphasizes the need for firms and countries to broaden and upgrade their internal advantages in order to sustain and extend competitive advantage (Grant, 1996).

Good examples of this shift towards the resource-based view or "inside out" perspective are "building capability-creating organizations" in competence management (Miller et al, 2002), and "knowledge-creating company" in knowledge management (Nonaka & Takeuchi, 1995). The shift reflected in such literature points to the increasingly important role of the firm's self-renewing capability in the rapidly changing business world. While Nonaka and Takeuchi's (1995) approach lays emphasis on that competitive advantage in business comes from the internal capability of an organization to create new knowledge, that is, to create something new and unique which will set them apart from the competition (Magalhães, 1998); Miller et al (2002) accentuate that a continual and intimate connection with the market environment is vital to this "inside out approach." This shows an emergent interest or need to explore the middle ground of "inside out" and "outside in" perspectives.

From our reviewed conceptual views of competence, it can be seen that they all go along with the "inside out" perspective although some views, such as absorptive

capacity and dynamic capabilities approaches, tend to lay emphasis on absorbing external information and acquiring knowledge from focal organizations. This implies the influence from the "outside-in" perspective, and shows a tendency within the "inside-out" perspective to go, to some extent, beyond the original premise of the resource-based view.

Three Generations of Knowledge and Competence Management

Knowledge and competence management are in transition. The first theories of knowledge management used the knowledge-carrying individual as the unit of analysis and defined knowledge and competence in terms of discrete skills that can be codified and measured. The first generation practices include standard implementations of knowledge management such as various techniques of knowledge and competence mapping and creation of large company-wide databases or knowledge repositories. Information technology plays a major role in early KM development. The general practices also refer to attempts to codify and measure the overall knowledge assets of a company, to be included in a "balanced scorecard" or other such framework of accounting for the "intellectual capital" of the firm (Edvinsson & Malone, 1997; Steward, 1997; Sveiby, 1997). According to Ahonen et al (2000), typical characteristics of the first generation are: a) using the knowledge-carrying individual as the unit for mapping and enhancing knowledge; b) defining knowledge as discrete skills or assets that exist, or are required, in the company and can be identified, codified and measured; and c) using an external, outsider's "objective" point of view in analyzing knowledge and competence.

The second generation focuses more on networking, communication and collective practices rather than the things people apparently know and the information they possess. The key idea of the second-generation theories is that knowledge is embedded in and becomes constructed in collective practices. This has been related to the recent development of several practice-based ideas and theorizing such as *communities of practices* (Lave and Wenger, 1991), *community of knowing* (Boland & Tenkasi, 1995), *informal networks of expertise and user innovation* (von Hippel, 1988; 1998), *communication-intensive organizations* (Blackler, 1995), and the concept of *ba* (Nonaka & Konno, 1998). This generation focuses on social learning, flexibility and ability to develop and be prepared for future challenges.

The transition towards the third generation of KM indicates the emerging features of a systems approach in which self-organizing capability of knowledge and creating new knowledge and competences are critical. The basic views of the three KM generations form a logically unified view on the transition that has happened and is happening within KM at the moment (Ahonen et al, 2000; Snowden, 2002; Tuomi, 2002; von Krogh, 1999). The three KM generations proposed by the same researchers are shown in Table 1.

Table 1. The Three Generations of Knowledge and Competence Management (Ståhle 2003)

	1. generation	*2. generation*	*3. generation*
Snowden (2002)	information provision	Nonaka's SECI	self-organizing capability
Ahonen et al (2000)	knowledge as discrete, measurable and codifiable skills, skills needed at present	knowledge embedded in collective practices, preparing for the challenges of the near future	capacity to create new knowledge and innovations
von Krogh (1999)	locating and capturing knowledge	sharing and transferring knowledge	generating new knowledge
Tuomi (2002)	information systems, IC counting	social learning, communities of practice	mastering chaos, risk, uncertainty with efficient production

An Emerging Interpretative Approach

In understanding what constitutes competence at work, Sandberg (2000) indicates a major shift from the prevalent rationalistic approaches to an emerging interpretative approach, that is, "a shift from attributes to workers' conceptions of their work" (p.13). The rationalistic approaches regard human competence at work as a specific set of attributes such as the knowledge and skills used in performing particular work; while the interpretative approach sees it as the meaning work takes on for workers in the experience of it.

More specifically, the results of Sandberg's study (2000) in the department of engine optimization at the Volvo Car Corporation demonstrates that a particular way of conceiving of work delimits certain attributes as essential and organizes them into a distinctive structure of competence at work.

Sandberg argues that conceptions, rather than attributes, should be the point of departure both for efforts to identify and describe competence and for efforts to develop competence in various jobs and professions. Sandberg's study therefore suggests change in conceptions of work as a more basic form of competence development. This differs from the rationalistic approaches, in which competence development is regarded as attribute acquisition.

In knowledge management work, Blackler (1995) reveals a similar shift occurring away from the approach of heavy emphasis on training and qualifications (emphasis on embedded, embodied and embrained knowledge and skills) towards the approach of emphasizing creative problem solving, and further to the emphasis on encultured knowledge and collective understanding. For Blackler, encultured knowledge refers to the process of achieving shared understandings. Cultural meaning systems are intimately related to the processes of socialization and acculturation. Active communication, creative dialogue, and sense making processes, thus, play an important role in this emerging approach.

In discussing complex acts of knowing, Snowden suggests a kind of sense-making model, which utilizes self-organizing capabilities of the informal communities and identifies a natural flow model of knowledge creation, disruption and utilization. This is based on his observation and argumentation that we are reaching the end of the second generation of knowledge management that focuses on tacit-explicit knowledge conversion (e.g., that suggested by Nonaka).

The emerging interpretative approach challenges the orthodox of scientific management. For instance, Snowden (2002) argues that the dogma of scientific management, hypothesis based consulting and the generalization of best practice from multi-client or multi project studies are inhibiting factors in progressing to the new level of conceptual understanding required in the modern world. Knowledge is paradoxically seen both a thing and a flow requiring diverse management approaches.

An Integrated Approach of Worker and Work

Worker-oriented core competences in HR practices include those related to job design, staffing issues, training and development and rewards systems (e.g., Hagan, 1996). The concept of work-oriented competences is able to aggregate single competences across individuals, and it makes sense to speak of types of competences that an organization needs for its operations, such as those that are task- or firm-specific (e.g., Nordhaug, 1998).

Sandberg (2000) identifies three main rationalistic approaches to competence: the worker-oriented, the work-oriented, and the multimethod-oriented. Within the worker-oriented approach, competence is primarily seen as constituted of attributes possessed by workers, typically represented as knowledge, skills, abilities (KSAs) and personal traits required for effective work performance (e.g., motive, skill, or aspect of one's self-image or social role). The worker-oriented approach has been criticized for producing descriptions of competence that are too general and abstract. For instance, different managerial jobs may require different competencies.

In the work-oriented approach, competence is also regarded as a specific set of attributes. The difference is that advocates of the work-oriented approach take the work as the point of departure. More specifically, they first identify activities that are central for accomplishing specific work and then transform those activities into personal attributes. By doing so, they are able to generate more concrete and detailed descriptions of what constitutes competence, and thus, largely overcome the problem of generating descriptions of competence that are too general. One basic criticism of the work-oriented approach is that a list of work activities does not sufficiently indicate the attributes required to accomplish those activities efficiently.

To avoid the criticism raised against the worker- and work-oriented approach, the multimethod-oriented approach drawing on both of the above approaches tend to be applied more often. For instance, Veres et al (1990) adopt a multimethod-oriented approach to identify competence in the work of police lieutenants. Their description consists of 46 worker attributes expressed in the form of KSAs that correspond to 23 policy activities. The work activities and the attributes are then quantified in percentage terms relating to police work.

Similarly, in knowledge development work, knowledge is defined and examined in the context of work and activities. For instance, in Scribner's work (1999), knowledge is defined as an integral component of activities, along with technologies (tools and sign systems) and functional skills systems. It seems that we are more and more moving towards a systems approach that integrates people and work into the same analytic framework.

Towards a Structural Approach

There seems to be a transition from functional approach toward structural approach in competence management. Drejer (2000) has argued that the literature on core competences and competence-based strategy is limited to a functional view that concerns only questions like "what are the effects caused by a competence?" (e.g., core competences defined in terms of their functional characteristics, for instance, offer superior value to the customers of the firm). The author seeks a structural approach which focuses and deals with the question "what are the elements of a competence and their relations?" (e.g., Drejer defines a competence as consisting of four elements and their relations – technology, people, organizational structure, and organizational culture).

In knowledge management literature, we can see similar path of development. Petty and Guthrie (2000) suggest a two-stage development from practice to theory: First stage work is primarily concerned with consciousness raising and creating mass awareness of the relevance of intellectual capital / knowledge management (e.g., "intellectual capital is something significant and should be measured and reported"); the second stage of the development is to investigate ideas relating to the influence of micro-level (i.e., organization-specific) conceptualizations of the value of intellectual capital and knowledge management on the behavior of the capital and labor markets. In a way, this tendency reflects the progress and advance of knowledge in both studied areas or disciplines.

Table 2 summarizes the previous sub-sections concerning the co-evolution of knowledge and competence management with our immediate comments and possible strategic implications we would suggest in this connection.

Table 2: Co-evolution of Knowledge and Competence Management

	Knowledge Management	Competence Management	Comments and some strategic Implications
"Outside-in" Perspective - > "Inside- out" Perspective	- > "Knowledge-creating company" (Nonaka & Takeuche, 1995)	the competitive forces approach (Porter et al, 1980s) - > the resource-based approach (core competence by Prahalad & Hamel, 1990; Porter et al, 1990s) "Building capability-creating organization" (Miller et al, 2002)	the shift points to the increasingly important role of the firm's self-renewing capability in today's dynamic business world
Individual as competence and knowledge carrier - > The focus on networking, communication and collective practices - > self-renewing work systems	knowledge as codified and measurable skills (individual based) - > knowledge embedded in collective practices - > capacity to create knowledge and innovation(Ahonen et al, 2000; Ståhle, 2003)	Individual competence -> Core competence (Prahalad & Hamel, 1990), Capability-based competition (Stalk et al, 1992), and network / relationship competences (Ritter et al, 2002; Alajoutsijärvi & Tikkanen, 1998)	Moving towards a systems approach that self-organizing capability of knowledge and the creation of new knowledge and competence is critical
rationalistic approach - > interpretative approach	Emphasis on embedded, embodied and embrained knowledge and skills - > emphais on enculturaed knowledge and collective understanding (Blackler, 1995); Information provision – > knowledge conversion - > sense-making model and self-organizing capability (Snowden, 2002)	shift from the rationalistic approach to the interpretative approach (Sandberg, 2000)	The emerging interpretative approach challenges the orthodox of scientific management, and diverse management approaches are thus required.
worker-oriented – > work-oriented - > an integrated approach	- > knowledge as an integral component of activities, along with technologies (tools and sign systems) and functional skills systems (Scribner, 1999)	Worker-oriented -> work-oriented - > multimethod-oriented / integrated approach (Sandberg, 2000); human competence - > business-driven competence	Moving towards a systems approach that integrates people and work into the same analytic framework
functional approach - > structural approach	from practice to theory: First stage work is primarily concerned with consciousness raising and creating mass awareness of the relevance of intellectual capital / knowledge management; the second stage of the development is to investigate ideas relating to the influence of micro-level (i.e., organization-specific) conceptualizations of the value of IC & KM on the behavior of the capital and labor markets (Petty and Guthrie, 2000).	functional view focuses on the question such as "what are the effects caused by a competence?"; structural approach on the question "what are the elements of a competence and their relations?" (Drejer, 2000)	Implying the advance of knowledge in both study fields of knowledge management and competence management

Strategic Implications

Drawing on our review and analysis, we conclude that successful organizations may need both knowledge and competence management due to their interdependent and mutually supporting relation. This can be called competence-based knowledge management or knowledge-based competence development (Hong & Stähle, 2003). Competence management may bring in a particular consideration on the firm's tasks and performance, and makes the object-related issues visible, which has been neglected in many common knowledge management approaches and practices. On the other hand, knowledge management may have a broader and more far-sighted view for the competence perspective due to its more general nature and architectural type of functioning.

In future research and practice, different agendas of knowledge and competence management could be identified and proposed regarding the unique features and different focuses of each perspective (see Table 3):

Table 3: Different Features and Focuses of Knowledge and Competence Management

Knowledge Management	Competence Management
- content not specified, concern over antecedents and conditions for knowledge sharing and creation	- clearly defined and specified by content (individual level, technical level, product level)
- concern over potential for competitive advantage in the future which is particularly applicable in turbulent and un-predictable circumstances	- concern over efficiency and performance which is particularly applicable in predicted circumstances
- social and IT systems as enablers for knowledge creation	- competence as manageable benefits

Table 3 is based on our previous work (Hong & Ståhle, 2003), which is at the moment staying at a more theoretical or hypothetic level. Thus, it calls for further and particularly empirical investigation and examination.

By suggesting and applying competence-based knowledge management, the key strategic issue is to explore the dynamics of synchronizing different-level competence development and to integrate different knowledge management perspectives. As our analyses show, both competence and knowledge management are moving towards an integrated and systemic view where the overall development challenge for both is the management of the whole system towards a self-generative and self-renewable

organization. The challenge is not so much to have them all separately, but to integrate them and produce systemic efficiency according to the pursued strategy.

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