

6 Knowledge Management

Prevention of computer crime and protection of corporate reputation require knowledge management. Knowledge management is a systematic and integrative process of coordinating organization-wide knowledge sharing and knowledge development to reach organizational goals such as improved corporate reputation. Knowledge management encompasses the managerial efforts in facilitating activities of acquiring, creating, storing, sharing, diffusing, developing, and deploying knowledge by individuals and groups. Knowledge management practices need to fit with organizational context in order to make a difference. Practices of knowledge management are context-specific, and they can influence organizational effectiveness (Zheng et al., 2010).

Zheng et al. (2010) studied the possible mediating role of knowledge management in the relationship between organizational culture, structure, strategy, and organizational effectiveness. Their results suggest that knowledge management fully mediates the impact of organizational culture on organizational effectiveness, and partially mediates the impact of organizational structure and strategy on organizational effectiveness.

Hinduja (2007) suggests that leveraging knowledge from the past to address the future will improve computer crime investigations. Cyber crime is requiring law enforcement departments in general and criminal investigators in particular to tailor a significant amount of their efforts toward successfully identifying, apprehending, and assisting in the successful investigation and prosecution of perpetrators.

6.1 Knowledge Organization

Knowledge is considered an important resource in most firms. The resource-based view of the firm posits that firm competitiveness comes from unique bundles of tangible and intangible assets that are valuable, rare, imperfectly imitable, non-substitutable, combinable and sustainable (Zheng et al., 2010).

Knowledge organization has emerged as the dominant structure of both public and private organizations in the transition from an industrial to a knowledge society (Lassen et al., 2006). Knowledge organization in the management sciences is concerned with structures within which knowledge workers solve knowledge problems (Bennet, 2005a, 2005b; Bergström et al., 2009; Lassen et al., 2006; Smith, 2003; Uretsky, 2001).

There are many definitions of knowledge. Nonaka et al. (2000) describe it as justified true belief. Definitions of organizational knowledge range from a complex, accumulated expertise that resides in individuals and is partly or largely inexpressible to a much more structured and explicit content. There are also several classifications of knowledge, e.g. far, explicit, embodied, encoded, embedded, event, procedural, and common. Knowledge has long been recognized as a valuable resource for the organizational growth and sustained competitive advantage, especially for organizations competing in uncertain environments. Recently, some researchers have argued that knowledge is an organization's most valuable resource because it represents intangible assets, operational routines, and creative processes that are hard to imitate (Wasko and Faraj, 2005). However, the effective management of knowledge is fundamental to the organization's ability to create and sustain competitive advantage.

Knowledge management research has described organizational knowledge flows in terms of the knowledge circulation process, consisting of five components: knowledge creation, accumulation, sharing, utilization and internalization. Of these five parts, the knowledge sharing process is what this book focuses on. Knowledge sharing within and between organizations is not a one-way activity, but a process of trial and error, feedback, and mutual adjustment of both the source and the recipient of knowledge. This mutuality in the knowledge sharing suggests that the process can be constructed as a sequence of collective actions in which the source and the recipient are involved. There are many different knowledge-sharing mechanisms: it can be informal and personal as well as formal and impersonal. Informal mechanisms include talk, unscheduled meetings, electronic bulletin boards, and discussion databases. More formal knowledge sharing channels include video conferencing, training sessions, organizational intranets, and databases.

Bennet and Bennet (2005a) define knowledge organizations as complex adaptive systems composed of a large number of self-organizing components that seek to maximize their own goals but operate according to rules in the context of relationships with other components. In an intelligent complex adaptive system the agents are people. The systems (organizations) are frequently composed of hierarchical levels of self-organizing agents (or knowledge workers), which can take the forms of teams, divisions or other structures that have common bonds. Thus while the components (knowledge workers) are self-organizing, they are not independent from the system they comprise (the professional organization).

Knowledge is often referred to as information combined with interpretation, reflection, and context. In cybernetics, knowledge is defined as a reducer of complexity or as a relation to predict and to select those actions that are necessary in establishing a competitive advantage for organizational survival. That is, knowledge is the capability to draw distinctions, within a domain of actions (Laise et al., 2005). According to the knowledge-based view of the organization, the uniqueness of an organization's knowledge plays a fundamental role in its sustained ability to perform and succeed (Turner and Makhija, 2006).

According to the knowledge-based theory of the firm, knowledge is the main resource for a firm's competitive advantage. Knowledge is the primary driver of a firm's value. Performance differences across firms can be attributed to the variance in the firms' strategic knowledge. Strategic knowledge is characterized by being valuable, unique, rare, non-imitable, non-substitutable, non-transferable, combinable, and exploitable. Unlike other inert organizational resources, the application of existing knowledge has the potential to generate new knowledge (Garud and Kumaraswamy, 2005).

Inherently, however, knowledge resides within individuals and, more specifically in the employees who create, recognize, archive, access, and apply knowledge in carrying out their tasks (Liu and Chen, 2005). Consequently, the movement of knowledge across individual and organizational boundaries is dependent on employees' knowledge-sharing behaviors (Liebowitz, 2004). Bock et al. (2005) found that extensive knowledge sharing within organizations still appears to be the exception rather than the rule.

The knowledge organization is very different from the bureaucratic organization. For example, the knowledge organization's focus on flexibility and customer response is very different from the bureaucracy's focus on organizational stability and the accuracy and repetitiveness of internal processes. In the knowledge organization, current practices emphasize using the ideas and capabilities of employees to improve decision-making and organizational effectiveness. In contrast, bureaucracies utilize autocratic decision-making by senior leadership with unquestioned execution by the workforce (Bennet and Bennet, 2005b).



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In knowledge organizations, transformational and charismatic leadership is an influential mode of leadership that is associated with high levels of individual and organizational performance. Leadership effectiveness is critically contingent on, and often defined in terms of, leaders' ability to motivate followers toward collective goals or a collective mission or vision. (Kark and Dijk, 2007).

In the knowledge society, knowledge organizations are expected to play a vital role in local economic development. For example, knowledge institutions such as universities are expected to stimulate regional and local economic development. Knowledge transfer units in universities such as Oxford in the UK and Grenoble in France are responsible for local and regional innovations (Smith, 2003).

Uretsky (2001) argues that the real knowledge organization is the learning organization. A learning organization is one that changes as a result of its experiences. Under the best of circumstances, these changes result in performance improvements. The phrases knowledge organization and learning organization are usually (but not necessarily) used to describe service organizations. This is because most, if not all, of the value of these organizations comes from how well their professionals learn from the environment, diagnose problems, and then work with clients or customers to improve their situations. The problems with which they work are frequently ambiguous and unstructured. The information, skills, and experience needed to address these problems vary with work cases. A typical example is detectives in police investigations of white-collar crime.

Similarly, Bennet and Bennet (2005b) argue that learning and knowledge will have become two of the three most important emergent characteristics of the future world-class organization. Learning will be continuous and widespread, utilizing mentoring, classroom, and distance learning and will likely be self-managed with strong infrastructure support. The creation, storage, transfer, and application of knowledge will have been refined and developed such that it becomes a major resource of the organization as it satisfies customers and adapts to environmental competitive forces and opportunities.

The third characteristic of future knowledge organizations will be that of organizational intelligence. Organizational intelligence is the ability of an organization to perceive, interpret and respond to its environment in a manner that meets its goals while satisfying multiple stakeholders. Intelligent behavior may be defined as being well prepared, providing excellent outcome oriented thinking, choosing appropriate postures, and making outstanding decisions. Intelligent behavior includes acquiring knowledge continuously from all available resources and building it into an integrated picture, bringing together seemingly unrelated information to create new and unusual perspectives and to understand the surrounding world (Bennet and Bennet, 2005b).

In the context of policing and law enforcement, 'intelligence' has another meaning as well. Brown (2007: 340) define intelligence in this context as follows:

Intelligence is information, which is significant or potentially significant for an enquiry or potential enquiry.

What establishes information as intelligence is that it is a subset of information defined by the special quality of being significant and relevant. If information is significant, it has value and it has relevance. Analysis does not create intelligence; it merely discovers, attributes and refines it.

According to Bennet and Bennet (2005a), designing the knowledge organization of the future implies development of an intelligent complex adaptive system. In response to an environment of rapid change, increasing complexity and great uncertainty, the organization of the future must become an adaptive organic business. The intelligent complex adaptive system will enter into a symbiotic relationship with its cooperative enterprise, virtual alliances and external environment, while simultaneously retaining unity of purpose and effective identification and selection of incoming threats and opportunities.

In the knowledge organization, innovation and creativity are of critical importance. The literature on creativity provides a view of organizing for innovation by focusing on how individuals and teams come to shape knowledge in unique ways. Innovation consists of the creative generation of a new idea and the implementation of the idea into a valuable product, and thus creativity feeds innovation and is particularly critical in complex and interdependent work. Taylor and Greve (2006) argue that creativity can be viewed as the first stage of the overall innovation process.

Innovative solutions in the knowledge organization arise from diverse knowledge, processes that allow for creativity, and tasks directed toward creative solutions. Creativity requires application of deep knowledge because knowledge workers must understand the knowledge domain to push its boundaries. Team creativity likewise relies on tapping into the diverse knowledge of a team's members (Taylor and Greve, 2006).

Within knowledge organizations, we often find communities of practice. Brown and Duguid (2001) argue that for a variety of reasons, communities of practice seem a useful organizational subset for examining organizational knowledge as well as identity. First, such communities are privileged sites for a tight, effective loop of insight, problem identification, learning, and knowledge production. Second, they are significant repositories for the development, maintenance, and reproduction of knowledge. Third, community knowledge is more than the sum of its parts. Fourth, organizational ability to adapt to environmental change is often determined by communities of practice.

6.2 Business Intelligence

While data are numbers and letters without meaning, information is data in a context that makes sense. Information combined with interpretation, reflection and context is knowledge, while knowledge accumulated over time as learning is wisdom. In this hierarchical structure we find intelligence as more than information, while less than knowledge. Intelligence is analyzed information. In police work, intelligence can provide the basis for opening a new criminal case, it can be applied to the investigation of existing criminal cases, it can be used to reallocate investigative resources based on new crime patterns and actors, and it can be used for preventive measures.

In the private sector, a term called “business intelligence” has received substantial attention in recent years. Although different from police intelligence, business intelligence has some interesting perspectives for police intelligence as well (Laudon and Laudon, 2010; Williams and Williams, 2003).

Business intelligence is a process of taking large amounts of data, analyzing that data, and presenting a high-level set of reports that condense the essence of that data into the basis of business actions, enabling management to gain new insights and thereby contributing to their business decisions. Business intelligence is an interactive process that starts by assembling the data into a format conducive to analysis. Once the data are organized in a database, they must be checked and cleaned to correct errors and flaws. Once the information is retrieved to establish patterns or make predictions, models and hypotheses are tested and validated.

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A series of tools enables users to analyze data to see new patterns, relationships, and structures that are useful for guiding investigations and decision-making. Such tools for consolidating, analyzing, and providing access to vast amounts of data to help users improve business performance are referred to as business intelligence.

Business intelligence (BI) is an application of information technology (IT) that is used to extract critical business information for a growing number of functions. IT is used to process and analyze large amounts of data. IT is used for collection, treatment and diffusion of information that serves a purpose. Principle tools for business intelligence include software for database query and reporting, tools for multidimensional data analysis, and data mining.

Data have to be captured and organized before they are available for analysis. Data redundancy in terms of the presence of duplicate data should be avoided. Data inconsistency, where the same attribute may have different values, should be avoided as well. Rather than having traditional files where data are stored, it is much better to have data in databases, data warehouses, and data marts. Database technology cuts through many of the problems of traditional file organization. A database is a collection of data organized to serve many applications efficiently by centralizing the data and controlling redundant data (Laudon and Laudon, 2010: 240):

Rather than storing data in separate files for each application, data are stored so as to appear to users as being stored in only one location. A single database services multiple applications.

A data warehouse is a database that stores current and historical data of potential interest to decision makers throughout the organization. The data originate in many core operational transaction systems, such as systems for sales, customer accounts, and manufacturing, and may include data from web site transactions. The data warehouse consolidates and standardizes information from different operational databases so that the information can be used across the enterprise for management analysis and decision making (Laudon and Laudon, 2010).

A data mart is a subset of a data warehouse in which a summarized or highly focused portion of the organization's data is placed in a separate database for a specific population of users. A data mart typically focuses on a single subject area or line of business, so it usually can be constructed more rapidly and at lower cost than an enterprise-wide data warehouse (Laudon and Laudon, 2010).

The following components constitute IT for BI:

- OLAP – On Line Analytical Processing. It refers to IT tools that allow for navigation in databases for hierarchies, relationships, developments and other perspectives. OLAP provides multidimensional and summarized views of business data and is used for modeling, analysis, reporting and planning of business activities. OLAP enables users to obtain online answers to ad hoc questions.
- Data Mining. This component takes advantage of statistical analysis techniques such as correlation analysis and regression analysis. Data mining is more discovery-driven than OLAP.
- Performance Management. For example, a balanced score card collects and exhibits performance in key areas such as finance, personnel, production, and market.

Similar to police intelligence, business intelligence is concerned with the identification of critical information for business performance. Business intelligence applications and their underlying critical information concepts support the needs of the business provided they are tightly integrated to both business environment and information technology infrastructure (Williams and Williams, 2003).

In the hierarchical structure of data-information-knowledge-wisdom we find intelligence as more than information and as less than knowledge. Intelligence is analyzed information, as illustrated in Figure 1. Here we use police investigation as an example.

Information and to a similar extent intelligence then consists of facts and other data which is organized to characterize or profile a particular situation, incident, or crime and the individual or group of individuals presumed to be involved. This organizing of the data to meaningful information of necessity involves some level of interpretation of the facts as presented. However, the role of interpretation here in information is relatively minor in comparison to its role in terms of knowledge construction. In this regard, the role of interpretation in intelligence is greater and more explicit than in information, but not as full blown as in the making of knowledge.

Knowledge Continuum in Policing

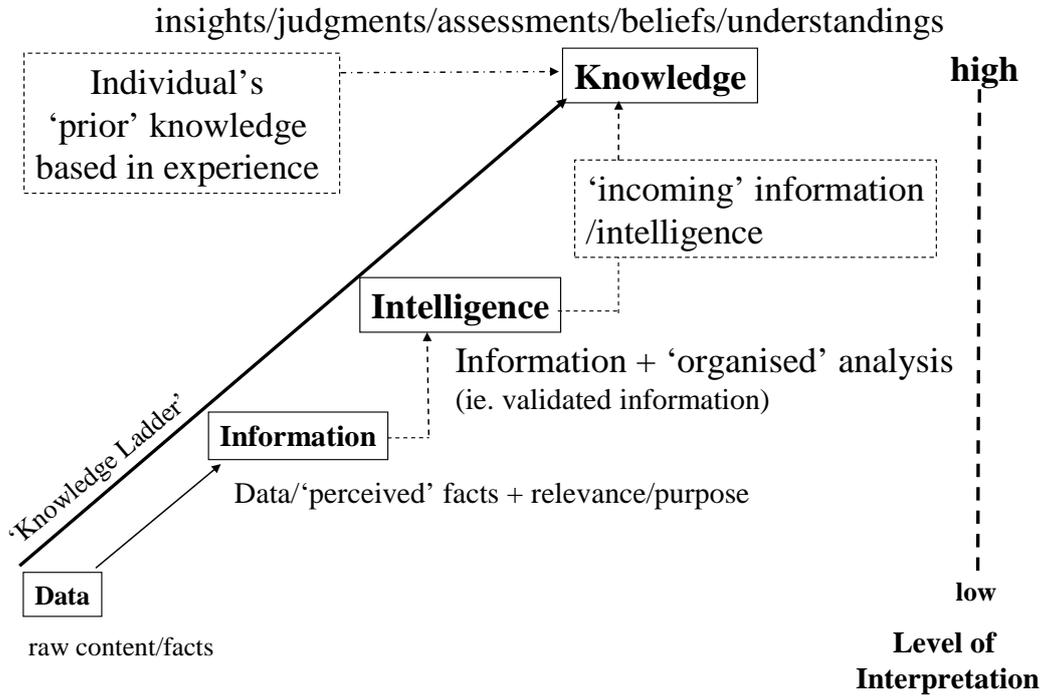


Figure 1. Hierarchy of police investigation insight expressed as a continuum



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Knowledge helps develop relevant meaning to information in intelligence work (Innes and Sheptycki, 2004: 6):

The distinction between information and intelligence is well established, but can be difficult to grasp. Information consists of bits of data that, when combined and viewed together with relevant background knowledge, may be used to produce intelligence, which informs the actions and decisions of policing organizations.

Knowledge as implied operates at a higher level of abstraction and consists of judgments and assessments based in personal beliefs, truths, and expectations about the information received and how it should be analyzed, evaluated and synthesized – in short interpreted – so that it can be used and implemented into some form of action.

6.3 Stages of Growth

A knowledge organization is defined as an organization where the end product of work processes in the organization is knowledge or a service. If the end product of an organization is not a knowledge-based service while most or all work processes require advanced knowledge, such an organization is defined as a knowledge-intensive organization. While a knowledge-intensive organization might deliver goods such as food and transportation, a knowledge organization delivers a service, which is an intangible product.

A typical example of a knowledge organization is a law firm. A law firm is an organization specialized in the application of legal knowledge to client problems. The client may want to prevent a problem or solve a problem. In law firm work of prevention and solution, lawyers in the firm apply a variety of knowledge categories such as declarative knowledge and procedural knowledge. Many law firms have transformed themselves from a professional model to a corporate business model. Knowledge is perceived as the resource on which the business is based. Unique, non-imitable, combinable and exploitable knowledge provides competitive advantage. Thus, their primary resources stem from the human capital and social capital of the individuals employed within them.

'Business model' is an expression that has gained ground considerably in the last decade. This concept is applied both in private business and in public administration. For a service firm, the process of developing a business model to improve performance will typically involve three steps (Sheehan and Stabell, 2007):

- *Step 1. Identifying the type of knowledge organization:* Key value creating activities as a problem-solving organization; reputation capital that attracts cases to the organization; and governance of independence from police as well as interoperability with the police.
- *Step 2. Mapping the organization:* Opportunities and threats to police oversight; and strengths and weaknesses of the police oversight agency.
- *Step 3. Generating new business model:* New value creating activities; new assets; and new governance structure.

Stages of growth models have been used widely in both organizational research and information technology management research. According to King and Teo (1997), these models describe a wide variety of phenomena – the organizational life cycle, product life cycle, biological growth, and so forth. These models assume that predictable patterns (conceptualized in terms of stages) exist in the growth of organizations, the sales levels of products, the diffusion of information technology, and the growth of living organisms. These stages are (1) sequential in nature, (2) occur as a hierarchical progression that is not easily reversed, and (3) involve a broad range of organizational activities and structures. This is the core idea of the concept of growth models.

Figure 2 illustrates a potential stage model for knowledge organizations:

- Stage 1. *Activity Organization*. Tasks are performed and completed in workflows according to specifications, rules and regulations. It is important to avoid mistakes and delays in the workflows. Activity repetition and completion is measured and monitored. Management is concerned with resource allocation and utilization according to tasks to be completed. The organization structure is broken down into work groups according to division of labor.
- Stage 2. *Problem Organization*. Each new assignment is perceived more as a problem to be solved than as a task to be completed. Problems are interpreted and solved by application of relevant knowledge. The quality of problem solution is more important than workflow performance or resource utilization. Management is concerned with quality control so that the solution really solves the problem. Interoperability is important at this stage in terms of technical as well as semantic interoperability, where technical interoperability among knowledge workers ensures access to each other and semantic interoperability ensures shared understanding.

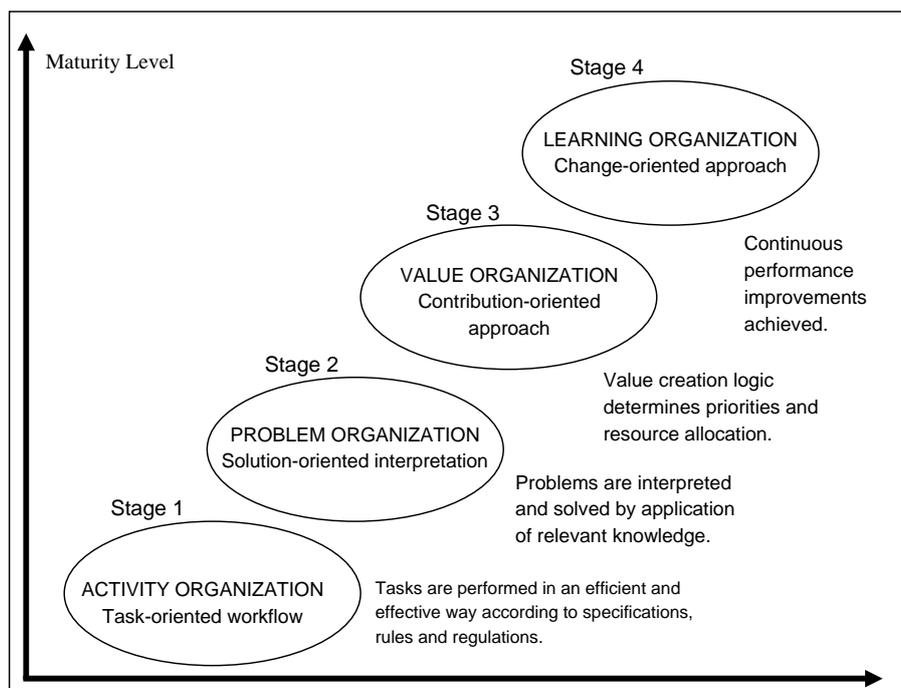


Figure 2. Stages of growth in knowledge organizations

- Stage 3. *Value Organization*. Value creation logic determines priorities and resource allocation. The value that might be created by working on and solving a problem determines how each problem is perceived and understood. A value organization makes strategic decisions about the role of the organization as it relates to the specter of problems with which is confronted. Performance goals are important at this stage, where goal setting is part of the strategy process, while goal achievement is part of the management process.
- Stage 4. *Learning Organization*. Continuous improvements are to be achieved based on experience. Change in resources, activities and approaches occur in the organization on a continuous basis. Communication channels are expanded internally (intra-organization) as well as externally (inter-organization). An organizational culture of sharing, transparency and contribution is stimulated. At this stage, supply-side knowledge management is replaced by demand-side knowledge management. Here knowledge sources are familiar to everyone and knowledge sharing occurs on demand for that knowledge.

In knowledge organizations at Stage 4, transformational and charismatic leadership is an influential mode of leadership that is associated with high levels of individual and organizational performance. Leadership effectiveness is critically contingent on, and often defined in terms of, leaders' ability to motivate followers toward collective goals or a collective mission or vision (Kark and Dijk, 2007).



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6.4 Knowledge Resources

Knowledge is a renewable, reusable and accumulating resource of value to the organization when applied in the production of products and services. Knowledge cannot as such be stored in computers; it can only be stored in the human brain. Knowledge is what a knower knows; there is no knowledge without someone knowing it.

The need for a knower in knowledge existence raises the question as to how knowledge can exist outside the heads of individuals. Although knowledge cannot originate outside the heads of individuals, it can be argued that knowledge can be represented in and often embedded in organizational processes, routines, and networks, and sometimes in document repositories. However, knowledge is seldom complete outside of an individual.

In this book, knowledge is defined as information combined with experience, context, interpretation, reflection, intuition and creativity. Information becomes knowledge once it is processed in the mind of an individual. This knowledge then becomes information again once it is articulated or communicated to others in the form of text, computer output, spoken, or written words or other means. Six characteristics of knowledge can distinguish it from information: knowledge is a human act, knowledge is the residue of thinking, knowledge is created in the present moment, knowledge belongs to communities, knowledge circulates through communities in many ways, and new knowledge is created at the boundaries of old. This definition and these characteristics of knowledge are based on current research (e.g., Poston and Speier, 2005, Wasko and Faraj, 2005).

Today, any discussion of knowledge quickly leads to the issue of how knowledge is defined. A pragmatic definition defines the topic as the most valuable form of content in a continuum starting at data, encompassing information, and ending at knowledge.

Typically, data is classified, summarized, transferred or corrected in order to add value, and become information within a certain context. This conversion is relatively mechanical and has long been facilitated by storage, processing, and communication technologies. These technologies add place, time, and form utility to the data. In doing so, the information serves to inform or reduce uncertainty within the problem domain. Therefore, information is united with the context, that is, it only has utility within the context.

Knowledge has the highest value, the most human contribution, the greatest relevance to decisions and actions, and the greatest dependence on a specific situation or context. It is also the most difficult of content types to manage, because it originates and is applied in the minds of human beings. People who are knowledgeable not only have information, but also have the ability to integrate and frame the information within the context of their experience, expertise, and judgment. In doing so, they can create new information that expands the state of possibilities, and in turn allows for further interaction with experience, expertise and judgment. Therefore, in an organizational context, all new knowledge stems from people. Some knowledge is incorporated in organizational artifacts like processes, structures, and technology. However, institutionalized knowledge often inhibits competition in a dynamic context, unless adaptability of people and processes (higher order learning) is built into the institutional mechanisms themselves.

Our concern with distinctions between information and knowledge is based on real differences as well as technology implications. Real differences between information and knowledge do exist, although for most practical purposes these differences are of no interest at all. Information technology implications are concerned with the argument that computers can only manipulate electronic information, not electronic knowledge. Business systems are loaded with information, but without knowledge.

Some have defined knowledge as a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of a knower. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. Distinctions are often made between data, information, knowledge and wisdom:

Data are letters and numbers without meaning. Data are independent, isolated measurements, characters, numerical characters and symbols.

Information is data that are included in a context that makes sense. For example, 40 degrees can have different meaning depending on the context. There can be a medical, geographical or technical context. If a person has 40 degrees Celsius in fever, that is quite serious. If a city is located 40 degrees north, we know that it is far south of Norway. If an angle is 40 degrees, we know what it looks like. Information is data that make sense, because it can be understood correctly. People turn data into information by organizing it into some unit of analysis, e.g., dollars, dates, or customers. Information is data endowed with relevance and purpose.

Knowledge is information combined with experience, context, interpretation and reflection. Knowledge is a renewable resource that can be used over and over, and that accumulates in an organization through use and combination with employees' experience. Humans have knowledge; knowledge cannot exist outside the heads of individuals in the company. Information becomes knowledge when it enters the human brain. This knowledge transforms into information again when it is articulated and communicated to others. Information is an explicit representation of knowledge; it is in itself no knowledge. Knowledge can both be truths and lies, perspectives and concepts, judgments and expectations. Knowledge is used to receive information by analyzing, understanding and evaluating; by combining, prioritizing and decision making; and by planning, implementing and controlling.

Wisdom is knowledge combined with learning, insights and judgmental abilities. Wisdom is more difficult to explain than knowledge, since the levels of context become even more personal, and thus the higher-level nature of wisdom renders it more obscure than knowledge. While knowledge is mainly sufficiently generalized solutions, wisdom is best thought of as sufficiently generalized approaches and values that can be applied in numerous and varied situations. Wisdom cannot be created like data and information, and it cannot be shared with others like knowledge. Because the context is so personal, it becomes almost exclusive to our own minds and incompatible with the minds of others without extensive transaction. This transaction requires not only a base of knowledge and opportunities for experiences that help create wisdom, but also the processes of introspection, retrospection, interpretation and contemplation. We can value wisdom in others, but we can only create it ourselves.



The image shows the BI Norwegian Business School logo, which is a central blue square with 'BI' in white, surrounded by a colorful, multi-colored sunburst of lines. The lines are labeled with various business programs: Business, Strategic Marketing Management, International Business, Leadership & Organisational Psychology, Shipping Management, and Financial Economics.

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It has been argued that expert systems using artificial intelligence are able to do knowledge work. The chess-playing computer called Deep Blue by IBM is frequently cited as an example. Deep Blue can compete with the best human players because chess, though complex, is a closed system of unchanging and rules that are codified. The size of the board never varies, the rules are unambiguous, the moves of the pieces are clearly defined, and there is absolute agreement about what it means to win or lose. Deep Blue is no knowledge worker; the computer does only perform a series of computations at extremely high speed.

While knowledge workers develop knowledge, organizations learn. Therefore, the learning organization has become a term frequently used. The learning organization is similar to knowledge development. While knowledge development is taking place at the individual level, organizational learning is taking place at the firm level. Organizational learning occurs when the firm is able to exploit individual competence in new and innovative ways. Organizational learning also occurs when the collective memory – including local language, common history and routines – expands. Organizational learning causes growth in the intellectual capital. Learning is a continuous, never-ending process of knowledge creation. A learning organization is a place where people are constantly driven to discover what has caused the current situation, and how they can change the present. To maintain competitive advantage, an organization's investment decisions related to knowledge creation are likely to be strategic in nature.

Our perspective of knowledge applied in this chapter is derived from the resource-based theory of the firm, as introduced in Chapter 1. According to the resource-based theory of the firm, performance differences across firms can be attributed to the variance in the firms' resources and capabilities. In this chapter, we focus on knowledge. Knowledge that is valuable, unique, difficult to imitate, combinable, difficult to substitute and exploitable can provide the basis for firms' competitive advantages. The essence of the resource-based theory of the firm lies in its emphasis on the internal resources – here knowledge – available to the firm, rather than on the external opportunities and threats dictated by industry conditions and market change.

6.5 Core Competence

According to Prahalad and Hamel (1990), core competencies are the collective learning in the organization, especially how to coordinate diverse service skills and integrate multiple streams of technologies. Since core competence is about harmonizing streams of technology, it is also about the organization of work and the delivery of value. Core competence does not diminish with use. Unlike physical assets, which do deteriorate over time, competencies are enhanced as they are applied and shared.

But competencies still need to be nurtured and protected; knowledge fades if it is not used. Competencies are the glue that binds existing business and coordinate service innovation. They are also the engines for new business development. At least three tests can be applied to identify core competencies in a company. 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.

The tangible link between identified core competencies and end products is what Prahalad and Hamel (1990) call core products – the embodiments of one or more core competencies. Core products are the components or subassemblies that actually contribute to the value of the end products. Core competencies are sometimes called firm-specific competencies, resource deployments, invisible assets, and distinctive competencies.

Quinn (1999) argues that core competencies are not products or “those things we do relatively well”. They are those activities, usually intellectually based service activities or systems that the company performs better than any other enterprise. They are the sets of skills and systems that a company does at best-in-the-world levels and through which a company creates uniquely high value for customers. Developing best-in-the-world capabilities is crucial in designing a core competency strategy. Unless the company is best in the world at an activity it is someone else’s core competency. The company gives up competitive edge by not buying that skill from a best-in-the-world source.

Competence and capability are terms often used interchangeably (Madhavaram and Hunt, 2008). However, competence represents implicit and invisible assets, while capability represents an explicit knowledge set. Leonard-Barton (1992) adopted a knowledge-based view of the firm and defined core capability as the knowledge set that distinguishes and provides competitive advantage. There are four dimensions to this knowledge set. Its content is embodied in (1) employee knowledge and skills and embedded in (2) technical systems. The processes of knowledge creation and control are guided by (3) managerial systems. The fourth dimension is (4) the values and norms associated with the various types of embodied and embedded knowledge and with the processes of knowledge creation and control.

Harreld et al. (2007) suggest that capabilities build on the notion of competencies but focuses on the role of management in building and adapting these competencies to address rapidly changing environments. Dynamic capabilities help enterprises to identify opportunities and mobilize competencies by reallocating resources. The ability to adapt and extend existing competencies is a key characteristic of dynamic capabilities. This ability places responsibility for entrepreneurship on executive management, as they must be able to accurately sense changes and opportunities. They must also act on these opportunities to be able to seize them by reconfiguring both tangible and intangible assets to meet new challenges.

Similar to core competencies, capabilities are considered core if they differentiate a company strategically. The concept is not new. Their strategic significance has been discussed for decades, stimulated by research discovery that of nine diversification strategies, the two that were built on an existing skill or resource base in the firm were associated with the highest performance. The observation that industry-specific capabilities increased the likelihood a firm could exploit a new technology within that industry, has confirmed the early work.

Therefore some authors suggest that effective competition is based less on strategic leaps than on incremental innovation that exploits carefully developed capabilities. On the other hand, institutionalized capabilities may lead to incumbent inertia in the face of environmental changes. Technological discontinuities can enhance or destroy existing competencies within an industry. Such shifts in the external environment resonate within the organization, so that even seemingly minor innovations can undermine the usefulness of deeply embedded knowledge. All innovation necessarily requires some degree of creative destruction.

A capability is defined as dynamic if, in a rapidly changing environment, it enables the firm to modify itself so as to continue to produce, efficiently and/or effectively, market offerings for some market segments (Madhavaram and Hunt, 2008).

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6.6 Entrepreneurship Capabilities

Corporate entrepreneurship is crucial in the acquisition of dynamic organizational capabilities (Zahra et al., 1999). Scholars have identified entrepreneurship as the core process by which companies have attempted to redefine, renew, and remake themselves.

An entrepreneurship perspective on the nature of the firm rests on two fundamental assumptions about the nature of business activity: profit-seeking individuals and asymmetrically dispersed knowledge across economic actors. The quest for profit, wealth and power plays an important motivational role in the entrepreneur's pursuit of new business opportunities. Asymmetrically dispersed knowledge implies differentiated sets of knowledge held by decision makers, which in the business context causes variation in the ability to identify and assimilate new information and events. Individual decision makers tend to notice new information that relates to and can be combined with knowledge they already have (Zander, 2007).

An entrepreneur is a person who operates a new enterprise or venture or revitalizes an existing enterprise and assumes some accountability for the inherent risk. The newly and modern view on the entrepreneurial talent is a person who takes the risks involved to undertake a business venture. Entrepreneurship is often difficult and tricky, as many new ventures fail. In the context of the creation of for-profit enterprises, entrepreneur is often synonymous with founder. Most commonly, the term entrepreneur applies to someone who creates value by offering a product or service in order to obtain certain profit.

Entrepreneurship is thus the practice of starting new organizations or revitalizing mature organizations, particularly new businesses generally in response to identified opportunities. Entrepreneurship is sometimes labeled entrepreneurialism. Entrepreneurship is often a difficult undertaking, as a vast majority of new businesses fail. Entrepreneurial activity is substantially different from operational activity as it is mainly concerned with creativity and innovation. Entrepreneurship ranges from small individual initiatives to major undertakings creating many job opportunities.

The majority of recent theories in the business and managerial economic literature assume that the economic performance of small and medium-sized firms depends largely on the entrepreneurs' (or team's) capacities. Even so, economists still do not fully understand the relationship between entrepreneurs and firm performance. The entrepreneurial process is the result of a complex interaction between individual, social and environmental factors. Taken separately, neither the personality of the entrepreneur nor the structural characteristics of the environment can, on its own, determine an organization's performance (Thomas and Mancino, 2007).

In order to provide an example of the relationship between entrepreneurs' subjective characteristics/traits and organizational performance, Thomas and Mancino (2007) carried out an empirical study. The study aimed to explain how the presence of entrepreneurs' specific subjective characteristics can influence an organization's strategic orientation and, as a consequence, local development. By analyzing several subjective characteristics taken from a sample of 101 successful entrepreneurs from southern Italy, certain issues emerged regarding the link between the economic performance of the ventures launched in this area and the weak level of growth. Successful entrepreneurs' behavior and decisions seemed heavily influenced by family support. The entrepreneurial culture of the family also tends to substitute the protective role played by public institutions. The entrepreneurial decisions of local entrepreneurs are triggered both by their need to rid themselves of poverty and their feeling that they are destined to continue the family business, the majority of them being the children of entrepreneurs. Most of the interviewees were classified as necessity rather than opportunity entrepreneurs.

An entrepreneur might be driven by a compulsive need to find new ways of allocating resources. He or she might be searching for profit-making opportunities and engineer incremental changes in products and processes. While strongly innovative entrepreneurs tend to champion radical changes in resource allocation by making new service markets and pioneering new processes, weakly innovative entrepreneurs tend to seek small changes in resource allocation to explore profit-making opportunities between already established activities (Markovski and Hall, 2007).

Founders of new legal firms tend to be experienced professionals who pursue opportunities closely related to their previous employment. Entrepreneurs often have several years of work experience in the same industry as their own start-up enterprises. This suggests that entrepreneurs do not come from out of the blue, but build their human intellectual capital through work experience in established firms. Similarly, criminal entrepreneurs might be experienced professionals before establishing their own criminal business enterprise.

Jacobides and Winter (2007) phrased the question: How do entrepreneurs choose their boundaries of their own ventures? To answer this question, they started from the premise that while entrepreneurs believe themselves to have superior ideas in one or multiple parts of value creation arenas, they are characteristically short of cash, and of the ability to convince others to provide it. This premise motivates a simple model in which the entrepreneur has a value-adding set of ideas for parts of a value creation arena. Assuming that the entrepreneur's objective is to maximize wealth, it might be observed that initial scope depends on available cash, but also on how much value the entrepreneur's ideas add to each participant in the enterprise. Entrepreneurs will focus on the areas that provide the maximum profit and minimum risk per available cash in service innovation.

6.7 A Case of Dynamic Capabilities

So far in this chapter, we have explained the definitions and relationships of knowledge, skills, capabilities, organizational capabilities and core competencies as they relate to the resource-based and knowledge-based theory of the firm. Next, we will exemplify the concepts of dynamic capabilities exhibited by agile organizations, as they relate to dynamic knowledge management and the practice of excellent strategy execution.

Harreld et al. (2007) present the case of dynamic capabilities at IBM. They argue that dynamic capabilities are driving strategy into action in the firm. They studied the rise, fall, and transformation of IBM during a 20-year period. IBM's dynamic capabilities transformed IBM from a set of conventional silos (e.g., hardware, software, and services) to an integrated structure oriented to provide solutions for customer needs. To make this new approach work, the entire role of the corporate strategy group at IBM needed to change.

Dynamic capabilities enable the sensing of changes in competitive environment as well as the seizure of opportunities. To ensure that the strategy process at IBM provides the insight necessary to sense opportunities and the execution required to seize them, a set of complementary mechanisms have evolved. Strategic leadership forums and other initiatives help explore into new spaces, while metrics and structure help exploit existing capabilities and processes.



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Sensing new opportunities to gain strategic insight is conducted in a number of processes at IBM (Harreld et al., 2007):

- The Technology Team meets monthly and assesses the market readiness and the potential of emerging technologies.
- The Strategy Team meets monthly to examine the market results of existing unit strategies as well as to explore new growth areas.
- The Integration and Value Team meets quarterly to support company-wide initiatives.
- Deep Dive processes are initiated when confronting a performance or opportunity gap to scrutinize a topic in great detail.

Each of these processes help ensure steady surveillance and intelligence of the competitive environment. Intelligence is the systematic approach to collecting information with the purpose of tracking and predicting change to improve business performance. Intelligence analysts investigate who are the actors, how, when, where and why. They provide recommendations on how to react to market changes and opportunities. As part of this, analysts may produce profiles of market problems and targets, and produce both strategic (overall, long-term) and tactical (specific, short-term) assessments within the confines set by the business and the industry.

Seizing new opportunities for strategic execution is conducted in a number of processes at IBM (Harreld et al., 2007):

- Emerging Business Opportunities are an integrated set of processes, incentives, and structures designed explicitly to enable IBM to address new business opportunities and drive revenue growth.
- Strategic Leadership Forums are several days of team-based workshops built around specific performance or opportunity gaps that bring extended teams together for intensive work on problems or opportunities.
- Corporate Investment Funds are a way of providing funding for new initiatives identified by the Integration and Value Teams.

Harreld et al. (2007) argue that unlike other piecemeal approaches to strategy, the IBM process is one driven by line management based on the realities of the marketplace as seen in performance or opportunities gaps, not a staff exercise or slide deck. This has moved the strategy-making process from an annual ritual to a continual process, from an emphasis on planning to one on action, from a staff function to one that line managers own, and from a concern with strategy only to a focus on both strategy and execution.

6.8 Knowledge Driven Innovation

Knowledge resources, core competences and dynamic capabilities are key drivers of service innovation in firms. Based on such drivers, a variety of modes of innovation emerge in knowledge-intensive business services. For example, Corrocher et al. (2009) identified the interactive innovation mode, the techno-organizational mode, the conservative mode, and the product innovation mode for knowledge-intensive business services:

- The interactive innovation mode occurs in the interaction with other firms and customers.
- The techno-organizational mode occurs when technology adoption is not an isolated and passive strategy, but is closely intertwined with changes associated with the way in which services are provided and organized.
- The conservative mode occurs when a firm does not carry out any relevant innovation activity.
- The product innovation mode occurs when innovative ideas are linked to manufacturing.

Corrocher et al. (2009) found that the attention paid to the innovative activities of service sectors has significantly increased over the last decade. Simultaneity of production and consumption and the intangible nature of the service make long distance trade more difficult than for goods and give a local flavor to competition, even when considering the more sophisticated services. This is particularly evident in advanced regions, where competitiveness depends on knowledge content, provided by highly specialized experts.

Therefore, knowledge production is increasingly directed at business services. The emphasis is laid in the role of business services in innovative networks as carriers of knowledge and intermediates between science (knowledge creator) and their customers (knowledge users). An empirical analysis by Hipp (1999) shows that knowledge-intensive business services are able to make existing knowledge useful for their customers, improving the customer's performance and productivity and contributing to technological and structural change.

In this context, knowledge-intensive business services are defined in terms of service characteristics and knowledge characteristics. Among service characteristics we find close interaction between service provider and customer and highly intangible content of service products and processes. Among knowledge characteristics we find ability to receive information from outside the firm and to transform this information together with firm-specific knowledge into useful services for their customers (Hipp, 1999).

Madhavaram and Hunt (2008) argue there is a service-dominant logic in resource management. They apply resource-advantage theory to suggest marketing's evolution toward a new dominant logic that requires the focus of marketing to be on the intangible, dynamic, operant resources that are the heart of competitive advantage and performance.

Drawing from the resources, competences, resource-advantage theory, capabilities, and dynamic capabilities literature, Madhavaram and Hunt (2008) extend and elaborate on the service-dominant logic's notion of operant resources by proposing a hierarchy of operant resources. Starting from the seven basic resource categories (financial, physical, legal, human, organizational, informational, and relational), they propose basic, composite, and interconnected operant resources as the hierarchy.

Innovation in services very often includes creative application of information technology found in the technological dimension of innovation. However, as pointed out by Gallouj and Savona (2009), innovation in services is becoming an increasingly complex issue, in which the adoption of information and communication technology is just one of many possible facilitators.

A number of important concepts have been introduced in this chapter, including knowledge, knowledge management, core competencies, and dynamic capabilities. These concepts represent perspectives to gain insights into barriers and enablers of service innovation. At the center of these concepts we find knowledge as a resource to be explored and exploited for the benefit of innovation in services.



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