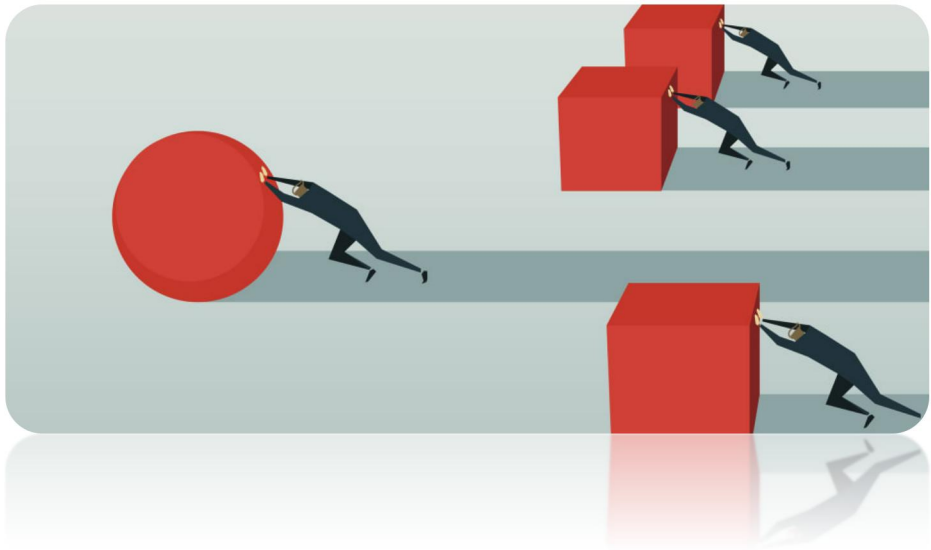


CONSULTING IN KNOWLEDGEMANAGEMENT

Economic Consulting Group

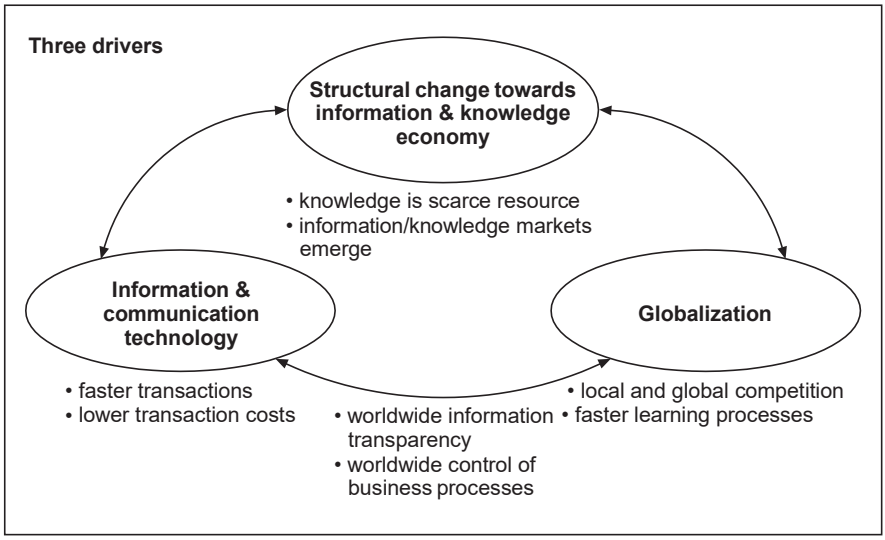
Managing in the knowledge economy

The competitive position of economies in particular of the highly industrialized countries – is already or will be determined by their capacity to create value through knowledge. This structural change is reflected in theories of endogenous growth, which stress that development of know-how and technological changeare the driving forces behind lasting growth. Knowledge is increasingly recognized as the principal source of value generation. The most recent economic growth comes not just from general advances in knowledge and the state of technology, but also from intangible financial products, entertainment, and computer software. Quah calls this "the weightless economy", which he defines as not just more and better technology, but a reduction of distance betweenknowledge production and consumers, removing the intermediaries of traditional intellectual property protection and manufacturing. With fast interactions across countries, international learning processes become faster, and new competitors enter traditional businesses. The newest technologies – computers, the Internet also allow consumers to get closer to knowledge production. The traditional trade- off between reach and richness of interactions between producer and consumer seems to be no longer valid. The newest technologies produce new weightless goods – software, video entertainment, and health and financial consulting services – that can be considered as if they were knowledge. Little sits in the chain between knowledge production and final consumption. As information and communication technologies are the main drivers of this new economy, authorstalk about the digital or information economy.

Despite the preponderant contributions of intellect and services in creating value and growth of modern companies, current management control systems, economic models and social measurement devices focus on

physical assets and physical or physically measurable outputs. It is only recently that organizations have started to become aware of their intellectual capital such as the competencies and capabilities of employees, the company's relationship with customers and

Knowledge: a key resource of the post-industrial area



suppliers, patents, licences, systems for leveraging the company's innovative strength and ability to create value.

Traditional organizations, however, often encounter difficulties in activatingtheir knowledge and in learning from others. Do any of the following problems sound familiar?

- Your company has been asked to tender for a major project. Collating the necessary information – from the organization's relevant track record to an individual consultant's experience – becomes a project in itself. You meet the deadline but the tender document is not as good as it could or should have been. You lose the pitch.
- You are faced with a serious, but unusual, failure in your plant, threatening

to bring your operations to a standstill. Somebody remembers that the same situation arose a couple of years before, but there is no record of the methodology used to solve the problem the previous time, or of who was involved.

- The internal telephone directory is out of date the moment it is printed. It gives names and formal titles, but has very little information about the people or what they are good at. In no sense does it provide an effective toolfor finding people with specific expertise or experience.
- A senior professional leaves the organization to join a competitor. Soon, her whole team has left to follow her. Only untrained juniors are left behind and there are no records of the team's know-how.
- There are large discrepancies between the performance of different divisions carrying out essentially the same task. You are conscious that bestpractices are not captured and shared. You are frustrated by the lack of formal processes that allow such sharing.

These examples highlight knowledge problems in organizations. Readers can probably identify similar problems in their own or their client organizations. The examples also demonstrate the potential benefits of consulting in knowledge management (KM), which often concentrates on the following objectives:

1. **Enhance operational effectiveness:** avoid double work, improve quality, make better use of time by capturing and sharing knowledge.
2. **Improve responsiveness to internal and external clients:** provide high- quality services, give consistent and timely answers to queries taking into account all relevant information, speed up roll-out of new products and processes by improving access to knowledge sources.
3. **Develop competence:** develop the core competencies of the firm, align

individual competence development, create the necessary enabling conditions (values, human resource policies, incentives).

4. **Foster innovation:** combine experiences, project ideas within and across sectors, and provide spaces and processes to transform ideas into new services, programmes and projects.

Knowledge-based value creation

Knowledge in organizations takes many forms. It includes the competencies and capabilities of employees, knowledge about customers and suppliers, the know-how to deliver specific processes, codified and protected knowledge in the form of patents, licences and copyrights, systems for leveraging the company's innovative strength and so on. Knowledge is the product of individual and collective learning, which is embodied in products, services and systems. Knowledge is related to the experiences of people in organizations and society.

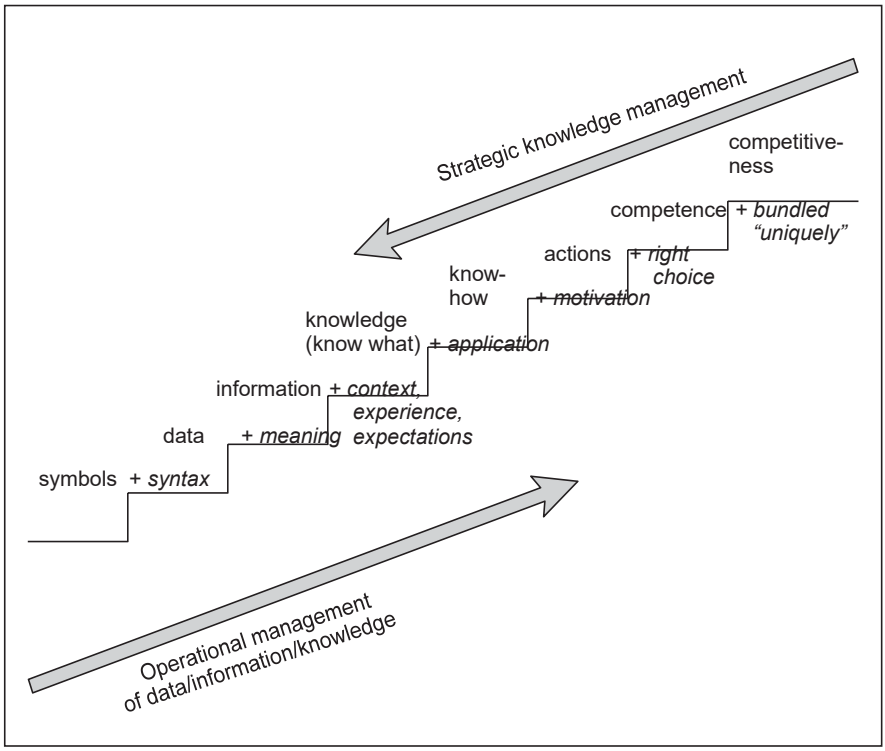
Understanding knowledge: information – knowledge –competence

For firms, knowledge is a resource and an intangible asset and forms part of the so-called intellectual capital of an organization. In order to understand how knowledge-based value creation works, management has to understand what knowledge is and how it is related to the competitiveness of a firm. In the following the underlying terminology of value-based knowledge creation is explained by means of the so-called competence ladder.

Let us start at the bottom of the competence ladder. People communicate by means of symbols – letters, numbers or signs. These symbols can only be interpreted if there are clear rules of understanding. These rules are called syntax: symbols plus syntax become data. For example, combining the digits

1, 3 and 5 and the symbols for degree Celsius plus a full stop to 13.5 °C transforms symbols into data. These data can only be interpreted if they are given an exact

The competence ladder



meaning. They become information if we add to the data that it refers to air temperature, and give the precise time and place of that temperature. This information will be interpreted differently according to the context, and the experience and expectations of people. While information is organized data, knowledge refers to the tacit or explicit understanding of people about relation- ships among phenomena. It is embodied in routines for the performance of activities, in organizational structures and processes and in embedded beliefs and behaviour. Knowledge implies an ability to relate inputs to outputs, to observe regularities in information, to codify, explain and ultimately to predict.

In the development of knowledge different levels can be distinguished. The first, "know what", is a result of internalizing information. This will create value for an organization only if a person is able to apply the information, that is to transform "know what" into "know-how" by means of application. This transfer can be difficult – consider the many people, for example, who read the operating instructions of a mobile phone and want to apply the information to program specific functions. If the mental models of those who have written theinstructions are different from those of the people who need to apply them, the users may not be able to interpret the instructions correctly.

The ability to apply knowledge is based on specific motivations ("know why"). People will only act if they are motivated. Therefore, an important management task to enhance knowledge-based value creation is to ensure the right motivational set-up so that workers develop, share and apply their knowledge in line with the objectives of the enterprise. Value is created when the right knowledge is applied at the right moment to solve a specific problem or to exploit a new business opportunity. The right choice of knowledge at theright moment is *competence* or expertise. With Roos and von Krogh, "we view competence as an event, rather than an asset; this simply means that competencies do not exist in the way a car does, they exist only when the knowledge (and skill) meets the task.

The interaction of an actor with an audience, the way a successful sales-person sells or the adaptation of strategies to the client's needs of the moment by an experienced consultant reflect competence. If the competencies of persons or organizations are bundled in a way that is not matched by other organizations, this gives *competitiveness*.

This description of the competence ladder shows that knowledge in organizations is only in a small part explicit. Using the metaphor of an iceberg, the small part visible above the water is *explicit knowledge* and the larger invisible part under the water is *tacit knowledge*. According to Polanyi, tacit knowledge is personal, context-specific, and often unconscious, and is therefore hard to formalize and communicate. Explicit or codified knowledge refers to knowledge that is transmissible in formal, systematic language. Polanyi points out that "we can know more that we can tell". The transformation of explicit to tacit knowledge and vice versa is an important process in knowledge creation and distribution, as discussed further below.

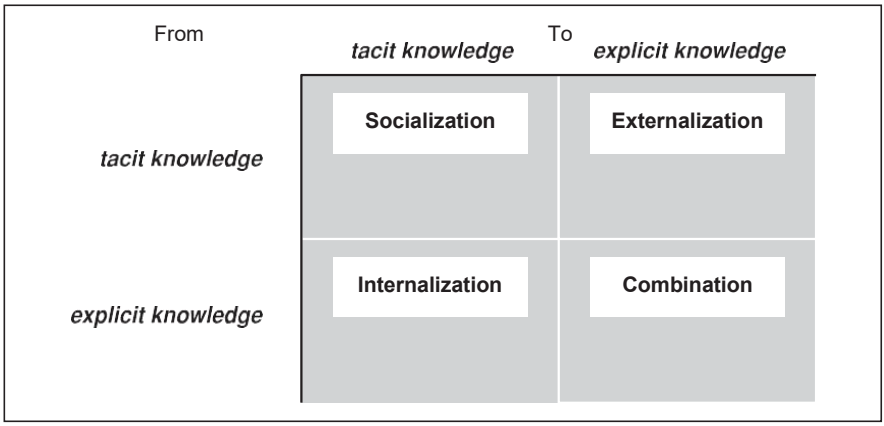
Coming back to the competence ladder, the objective of *knowledge-based management* can be formulated as the transformation of information into knowledge and competence in order to create measurable value in a sustainable manner. This requires each step of the competence ladder to be built. As with areal staircase, it is not possible to say that the top stair is more important than the bottom one all steps have to be built. The bottom-up view reflects the operational processes of information and knowledge management, whereas the top-down view reflects the strategic approach of defining the competencies of an organization and its members that will probably lead to competitiveness.

Transforming knowledge: processes of knowledge creationand distribution

Nonaka and Takeuchi postulate that knowledge is created through the interactions between tacit and explicit knowledge in four different modes. These four ways of converting and creating knowledge are the basis for value creation. The transfer of tacit knowledge to tacit knowledge is called *socialization*. It is a process of sharing experiences and thereby creating new

tacit knowledge such as shared mental models and technical skills. Socialization takes place when an apprentice observes a master, or when a newly hired consultant is integrated into a project group and learns through observation, imitation and practice. Sharing experience is the key to socialization and value

Four modes of knowledge transformation



creation in knowledge-based organizations. The mere transfer of information will often make little sense if it is abstracted from the associated emotions and specific contexts in which shared experiences are embedded.

Externalization is the process of articulating tacit knowledge into explicit concepts. Externalization happens when a manufacturing process is described for the purposes of an ISO 9000 certification. In management consulting, externalization takes place when the project profile is written in order to provide specific information on project development and on lessons learnt as a basis for future similar projects. Many firms have a database of

lessons learnt. As externalization will reveal only part of the tacit knowledge, it is better not to rely exclusively on written statements, but to enable for example consultants who have to plan a new project to have personal contact with those who have carried out similar projects before. Similarly a real process will always differ from the formal project description. Externalization is the basis for reflecting experiences, for formalizing learning processes and ultimately for standardization and process improvement.

Combination refers to the transfer of explicit knowledge to explicit knowledge. Individuals exchange and combine knowledge through documents, meetings, and communication networks. They reconfigure existing information by sorting, adding, combining and categorizing explicit knowledge which may lead to new information. In consulting, for example, different presentations may be combined and reconfigured for a sales presentation to a new client.

Internalization is the process of embodying explicit knowledge into tacit knowledge. It is closely related to learning by doing. A great part of our formalized learning processes happens by internalization.

According to Nonaka and Takeuchi's model, knowledge creation is a continuous and dynamic interaction between tacit and explicit knowledge which happens at the level of the individual, the group, and the organization, and between organizations. It is therefore an important management task to create opportunities for interactions between these levels so that knowledge conversion can happen. Enabling conditions include:

- **Intention:** The most critical element of corporate strategy is to conceptualize a vision about what kind of knowledge should be developed and to operationalize it into a management system for implementation.
- **Autonomy:** At the individual level, all members of an organization should be allowed to act autonomously as far as circumstances permit. This may increase the chance of introducing unexpected ideas.
- **Fluctuation and creative chaos:** This means to adopt an open attitude towards environmental signals, to exploit the ambiguity of those signals, and to use fluctuation in order to break routines, habits or cognitive frameworks.
- **Redundancy:** In business organizations, redundancy refers to intentional overlapping of information about business activities, management responsibilities and the company as a whole. Sharing redundant information promotes the sharing of tacit knowledge and thus speeds up the knowledgecreation process.
- **Requisite variety:** In order to deal with challenges posed by the environment, an organization's internal diversity must match the variety andcomplexity of that environment. Everyone in the organization should have the fastest possible access to the information and knowledge they need. When information differentials exist within the organization, individual members cannot interact on equal terms, which hinder the search for different interpretations of information.

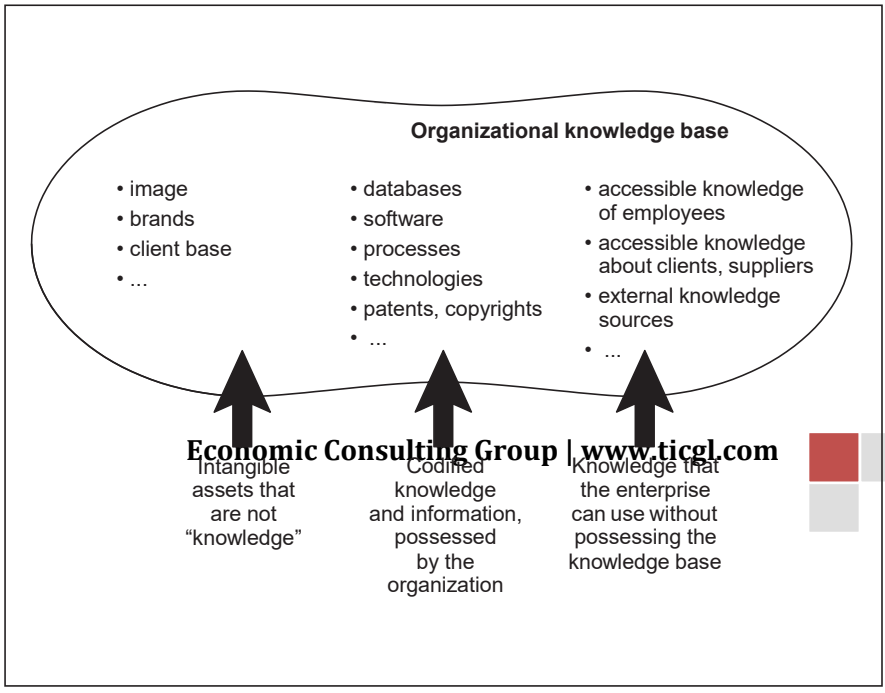
Valuing knowledge: intellectual capital and its measurement

As knowledge has come to be seen as a valuable resource in organizations, attempts have been made to structure the knowledge base and attribute value to these assets. There are basically two types of approach to valuing

intangible assets in enterprises. The first type builds on the difference between the market value and the book value of a company. This difference, traditionally called goodwill, is in this first approach declared as the value of intangible assets. While this approach may give an indication of the extent to which intangible assets influence the market value of a company, it cannot give more detailed insights into the structure of the intellectual capital. The second type of analytical approach structures intellectual capital into elements and tries to quantify these assets or evaluate them in qualitative terms. Shows the different categories of intangible assets that an organization may possess or have access to.

A widely publicized approach has been developed by the Scandia Insurance Company in Sweden, which structures intellectual capital into human, organizational and customer capital. Stewart proposes an *intellectual capital navigator* using similar categories.

Components of intellectual capital



is based on relationships, innovation, human and infrastructure capital. For each of these elements indicators are developed and can be aggregated to an intellectual capital index which is then plotted against time. Sveiby, together with the Swedish enterprise Celemi, has developed a so-called *intangible assets monitor*, which structures intangible assets into external structure, internal structure and competence of employees, each category being viewed under three criteria: growth/renewal, efficiency and stability.

Each of these approaches has its particular difficulties in defining clear-cut indicators for intangible assets. In addition, it is debatable whether a company should develop an evaluation procedure for its intangible assets that is not integrated into its overall strategic planning and accounting systems.

For these reasons, a number of organizations have started to use the *balanced scorecard* developed by Kaplan and Norton[10] to integrate the different assets ofa company. The balanced scorecard usually considers four perspectives: a financial perspective, a customer perspective, a process perspective and a learning and growth perspective. The advantage of the balanced scorecard is that it allows different perspectives of the enterprise to be integrated and "balances the financial and tangible aspects and the intangible aspects of managing an enterprise". It also demonstrates how the knowledge base contributes to value creation, in terms of customers, finances and processes.

Managing knowledge: knowledge technology versusknowledge ecology (culture)
Can knowledge be managed like finances or other physical assets? As described above, knowledge is linked to people and based on individual experiences,

beliefs and expectations. It is to a great extent implicit and unconscious. If this is the case, knowledge cannot be managed by deterministic management models. While consultants and IT vendors may attempt to sell hardware and software solutions under the heading of knowledge management, clients increasingly understand that knowledge does not equal information and usually cannot easily be measured, classified and stored in databases. The technocratic view of knowledge management, which deals mainly with capture and storage of knowledge in data systems, is increasingly giving way to a *knowledge ecology* or *knowledge culture* approach.

This approach holds that it is not possible to manage knowledge but it is possible to create enabling conditions for creating and sharing knowledge. Like a plant, which will grow in the right conditions, employees need the right ecology or organizational culture to produce knowledge and to share it with their colleagues. Managing therefore means creating an environment of trust and openness, and developing incentives that align individual interests with the interests of the company and foster boundary-free behaviour. This is, however,a much more long-term and difficult task than implementing an IT tool, which is why consultants are often tempted to sell such tools without creating the environment in which they can produce results. IT applications aimed at capturing explicit, codified information also have their place in a knowledge ecology. Furthermore, good information management is a basis for knowledge management. Consultants should therefore ensure that all the steps of the competence ladder are built, from document and information management up to building a knowledge ecology in the enterprise.

The knowledge management strategy of a company also depends on its

business. Is value creation based on the reuse of codified knowledge or on channelling individual expertise to provide creative new solutions to problems? Hansen et al.[11] compare what they call a codification and a personalization strategy (see figure 19.5). A *codification strategy* is based on reuse of knowledge and relies on codification. It draws heavily on explicit knowledge and uses IT as a tool to store and share knowledge. This approach is not able to transport implicit knowledge and is rather suited for standard solutions. A *personalization strategy* capitalizes on so-called expert economics. It relies on networks of people sharing particular tacit knowledge. A consultant who has to propose a knowledge management solution for a client should therefore first look into the type of business in order to decide how much codification and howmuch personalization is needed.

Both codification and personalization are also means of protecting the organization against losses of knowledge. Firms should ensure that a person'sknowledge is passed on before he or she leaves the organization and that there are several people with similar levels of competence in order to avoid dependence on single experts (personalization). The storage of information in databases and the protection of sensitive knowledge by specific rights of access and firewalls (codification) is another means of protecting knowledge. A third way of protecting against imitation is through legal measures such as patents, trademarks, copyright, licences and non-competing agreements with employees who leave the firm.

A great number of knowledge management models and concepts have beendeveloped by researchers, enterprises and consultants, based on either the technocratic or the ecology/culture approach. Most models cover both process and the enabling environment. Increasingly, the metaphor of

knowledge markets

– the interaction of knowledge sellers and knowledge buyers – is used as a basis.

Developing a knowledge organization

The organization as a knowledge market

In organizations, new knowledge is created continuously as people learn and gain experiences. On the other hand, people are continuously seeking information and knowledge in order to solve specific problems. Knowledge moves through organizations, is exchanged, bought, forgotten, lost, found, generated and applied to work. We can therefore describe organizations as knowledge markets, which can help us to understand the driving forces and barriers to managing knowledge, and to develop effective enabling conditions and marketmechanisms for generating and exchanging knowledge.

The task of consulting in knowledge management or developing knowledge management in a professional service firm is therefore to develop a knowledge market. Following this metaphor, in any organization there are knowledge sellers, knowledge buyers, intermediaries such as knowledge brokers, and media throughwhich sellers and buyers interact. In order to create knowledge markets and makethem work, enabling conditions, principles and rules have to be defined and the supporting knowledge media and infrastructure have to be developed.

Enabling conditions for knowledge markets

The knowledge ecology approach holds that knowledge cannot be managed but that conditions that enhance knowledge flows can be created in organizations.Apart from the physical and IT infrastructures, these enabling conditions include “soft” factors such as strategic vision, values, attitudes,

relationships, objectives and incentives. A corporate strategic vision should formulate clearly the contribution of knowledge and people to sustained corporate competitive- ness. Values that create the right spirit for knowledge creation and exchange include trust, openness to change, professionalism, a passion for excellence, and the self-confidence to empower others in a boundary-free fashion.

A corporate vision and values are easily proclaimed but it is difficult to live up to them in daily business. As values are manifest in behaviour, it is advisable to describe the desired behaviour of managers and professionals in an organization. Performance appraisal and personal development should be based on evaluation of behaviour. In many cases, changing behaviour is the major challenge in developing a knowledge-based organization. Consultants can contribute to this by proposing careful change management and organizational development support.

Vision and values are operationalized through business objectives. Organizations should formulate objectives that relate not just to market penetration and financial indicators but also to knowledge and learning. Business objectives should refer to the competencies needed for business development and the ways to acquire them. The balanced scorecard provides a good framework for developing qualitative and people-related business objectives and measures to implement them.

To reinforce the right behaviour across a company, incentive and compensation systems need to be appropriately adapted so as to align the interests of individuals, groups and the company. Compensation schemes that put total company performance before individual profit centres,

subsidiaries or units, as well as non-monetary incentives, gain importance in a knowledge organization. A reputation as an expert in a specific field, opportunities to learn, efficient equipment, good relations with clients, free time or interesting work are often more esteemed rewards than mere monetary incentives.

Knowledge managers have an important role to play in this context. Some firms have created positions of "chief knowledge officers" or similar to act as market makers and knowledge brokers. These officers usually have four main roles:

- they are entrepreneurs who launch and support new and often risky initiatives for creating and sharing knowledge;
- they act as consultants and change agents to harmonize new ideas and long- term visions with the day-to-day business;
- they are technologists, familiar with the newest developments in informationand communication technology and applications for enhancing informationand knowledge flows;
- they are ecologists who can create enabling conditions for knowledge creation and sharing.

Principles and rules for knowledge markets

Knowledge markets will only work if some basic rules and guiding principles are respected.

- *The common interest principle:* People will cooperate in sharing knowledge only if they have a common interest. The common interest principle comes into play when a company sets up an experience exchange group, when a "com- munity of practice" (see below) is formed, or when best practices are shared.

- *The lighthouse principle:* The lighthouse is a metaphor for leading expertise and orientation. Knowledge markets will not function without lighthouses, which may be determined by benchmarking, by friendly competition, or by peer rating (in the case of experts). For example, in an international manufacturing network, lighthouse factories are those that use the best available technology, have the most efficient process, and so on. Many organizations have created so-called centres of excellence, where they bring together their leading expertise, making them responsible for the further development of competencies. In consultancy we quite often find so-called "practice centres", which systematize expertise in a specific topic, such as organization development. The lighthouse principle can also be applied in comparing subsidiaries of a company. For example, a firm may seek to optimize processes through a "best in class" programme: in a friendly competition, subsidiaries throughout the world compare their productivity and quality data, the best subsidiaries explain what they do in a quarterly newsletter, and there is periodic interchange betweensubsidiaries with a view to learning from the best.
- *The push–pull principle:* Relevant information should be "pushed" out to all interested people in order to create pressure for change. At the same time, knowledge media should allow knowledge buyers to "pull" the knowledge that is relevant for the solution of their problems, and to determine with whom they want to collaborate. A study by the American Productivity and Quality Center concluded that a combination of push and pull is required: push approaches are characterized by the desire to store knowledge centrally and distribute it throughout the organization whereas pull approaches expect people to look for the knowledge they

need. Neither approach seems to work alone.

- *The give and take principle:* Knowledge will only flow in an organization if people adopt a philosophy of give and take. Davenport and Prusak call this reciprocity. Reciprocity may be achieved less directly than by getting knowledge back from others as payment for providing it to them. Knowledge-sharing that improves profitability will return a benefit to the sharer now and in the future. Whether or not a knowledge seller expects to be paid with equally valuable knowledge from the buyer, he/she may believe that being known for sharing knowledge will make others in the company more willing to share with him/her. To promote the give and take principle, a number of companies have established "miles for knowledge" programmes. In such programmes, staff get a number of credit points which they can distribute to colleagues who have helped them to solve problems or have provided valuable knowledge for a project, etc. These accumulated points can be used later on to ask for credits for participating in seminars, getting more sophisticated equipment, or similar. As a rule, these programmes have a limited life span and are used to sensitize peopleto knowledge networking.

Knowledge media

There is a great number of media through which knowledge in organizations is identified, transferred, shared and generated. Some of them are listed below. Companies tend to hire consultants to implement these media. They should not, however, implement them in an isolated manner, but should give particular attention to the necessary enabling conditions for these media to work in the knowledge market.

- *Yellow pages.* "Who knows what" can be identified by so-called yellow pages where people are listed by area of competence. Yellow pages allow

people who have expertise in a specific topic to be quickly identified.

- *Knowledge maps and skill profiles* describe in more detail what people or groups of people know. This information is useful for staffing projects, for assessing current competencies as a basis for staff development, and to increase the employability of staff. Increasingly professionals are compiling their own individual competence portfolios. To establish skill profiles, the roles of people in the organization are defined and competencies described for each role.
- *The collective memory* of an organization includes databases and group-ware applications, as well as the capture-and-retrieval system for relevant knowledge, codified and described in electronic handbooks, manuals, process descriptions, project profiles, sales presentations and so on. It is important to have a concise taxonomy for storage and retrieval of pieces of knowledge. Some consulting firms employ so-called knowledge stewards or journalists to write project profiles, prepare stories[14] or provide advice on preparing documents in standard formats and to act as guides through the information system. The use of collective memory depends on ease of retrieving information and high-quality content. Help functions for users are essential. Moreover, collective memory and workflow have to be integrated. In preparing an offer, for example, a consultant should be able to obtain a listing of similar projects by typing the project title into the system. The collective memory needs constant marketing to encourage people to make use of it and to provide information for it.
- *Communities of practice* are groups of people informally bound together by shared expertise and an interest in joint enterprise, such as consultants who specialize in a particular topic, e.g. strategic marketing, frontline managers in charge of cheque processing at a bank, service engineers and

so on. Some communities of practice meet regularly, others are connected primarily by email networks. People in communities of practice share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems. The communities complement existing organizational structures, and are a vehicle for learning close to real problem situations. Communities of practice help drive strategy, start new lines of business, solve problems quickly, transfer best practices, develop professional skills and recruit and retrain talent.

- *Centres of excellence* are organizational units (practice centres, etc.) recognized for their leading-edge strategically valuable knowledge. They are mandated to make that knowledge available throughout the firm. Unlike communities of practice, where people participate in a personal, informal and voluntary basis and do so outside their work role, centres of excellence usually have at least some full-time staff and an official mandate. In many consultancy firms, centres of excellence or practice centres have been developed to leverage products and processes across countries and regions. Centres of excellence often run a rapid response network, guaranteeing consultants a quick answer to queries. With the emerging popularity of communities of practice the borders between centres of excellence and communities of practice tend to be blurred.

Apart from these permanent organizational features a number of *events* can be created by knowledge organizations to enhance networking and knowledge- sharing, including regular project reviews and debriefings, consultant conferences, open-space meetings or problem-solving workouts, which were pioneered and made popular by General Electric. Electronic newsletters, chat groups, topical discussions, knowledge-mapping, creativity

sessions, etc. are further media and techniques to enhance knowledge creation and sharing. Consultants can act as organizers and facilitators of such activities, bringing together sometimes several thousand people.

Knowledge infrastructure

Knowledge media are often supported by, or based on, IT infrastructure and applications. Information and communication technology is used to store and exchange information and is thus an important enabler for knowledge management. Based on intranet and Web-based infrastructures, which provide the roads on which pieces of information can travel and the parking lots where they can be stored, a number of specific applications are sold by consultants as "knowledge management solutions". The most common are as follows:

- **Data warehousing.** The warehouse takes transactional data, and groups information to reflect relationships between customers, products, processes, geography, time, finance, logistics, etc.
- **Intelligent agents.** These tools allow information searches to be customized. The agent learns with the type of information downloaded by the user, reviews journals and presents periodic updates on desired topics. A consultant mightthus receive relevant headlines on new developments in business process improvement without having to read many journals.
- **Document management, content management, groupware and work- flow management.** There has been an evolution from solutions and technologies focused on managing scanned paper to those capable of managing documents and parts of documents (content management) in a variety of electronic formats. In addition the document that "thinks" for itself has come of age. A document can now decide when it should make itself visible and have to be acted upon, and then

automatically get itself sent to the next person in the workflow.

- **Data mining.** These tools reveal and allow the analysis of previously unknown relationships and facts within a database. They can show patterns of client behaviour and are often used in customer relationship management.

Apart from the above tools, communications software such as chat rooms, videoconferencing and other advanced technologies can assist networking of people in large organizations. The knowledge infrastructure not only comprises information and communication systems but also the physical infrastructure. The physical infrastructure of offices and spaces for social contact also influence the communication behaviour of people. Open office layouts, meetingzones or lounges help to create a collaborative environment.

Implementation paths of knowledge management

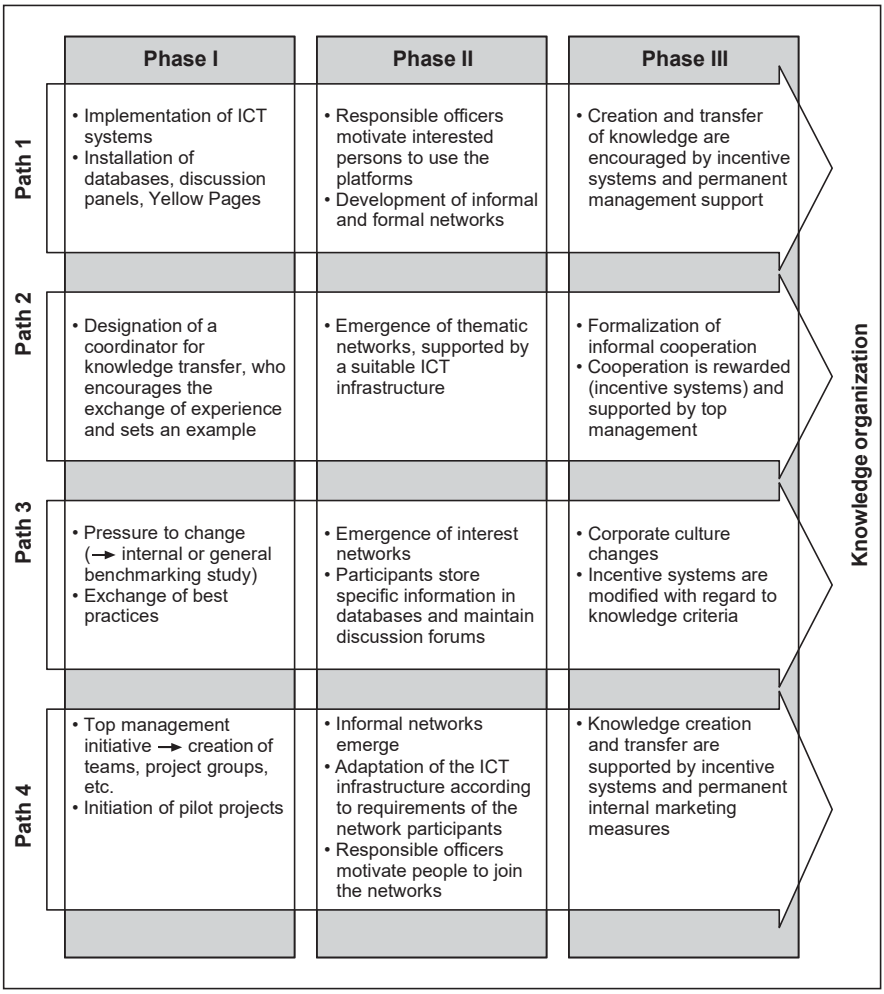
Based on the above considerations, organizations supported by consultants will have to decide how to implement knowledge management initiatives. Frequently asked questions include: should we designate a knowledge manager to encourage knowledge creation and transfer from a central position, or should we support decentralized initiatives? Should we improve information management before dealing with knowledge management? Should we follow a personalization or a codification strategy? Which measures should we consider to align behaviour and encourage knowledge-sharing?

How and with what intensity an individual company deals with the subject will depend on its specific conditions, tasks, and objectives and on its environment. A traditional chemical company will follow different paths

than a new software firm. Based on a study of knowledge management initiatives, North and Papp have derived four implementation paths, which are shown the most common.

Path 1: From information management to knowledge management. Firms start by implementing IT systems and specific applications such as databases, yellow pages and discussion panels, and subsequently recognize the need to create a support structure to ensure consistency of content in databases. This implementation path relies heavily on a knowledge codification strategy, but often lacks adequate procedures to select relevant knowledge and ensure efficient storage and availability of information. In the second phase, those responsible for knowledge management actively promote the use of the above instruments. Networks of people such as communities of practice are supported and competence centres are created. Incentives for knowledge-sharing are

Implementation paths for knowledge management



developed in a third phase. The danger of the IT-centred path is that the needs of users are not adequately reflected and systems do not effectively support the workflow. Relevant knowledge resides in the heads of people and is not accessible via databases.

Path 2: Knowledge managers as change agents. This path starts with the appointment of a knowledge manager to be responsible for knowledge creation and transfer, and who coordinates and guides the evolution of networks of people. This strategy is heavily dependent on the personality of the knowledge manager and his or her ability to structure a consistent knowledge management programme.

Path 3: The problem-oriented path. Knowledge management initiatives arise from internal and external competition, which makes efficient and continuous sharing of knowledge indispensable and results in the emergence of networks of people with common interests, who face common pressures. Pilot initiatives are started to exchange best practices, improve specific processes or use synergies in projects. Project leaders of initiatives develop individual knowledge management solutions. The challenge of this path is to integrate the many knowledge management initiatives into an overall concept, deploy a common IT infrastructure and apply consistent incentive systems.

Path 4: The top-down approach. In this case, knowledge management is initiated directly by corporate management. Points of departure are visions or strategic goals. Following these strategic objectives a corporate knowledge management framework and a number of pilot projects are usually created. Projects encourage cooperation and creation of networks as well as the development of new forms of incentive systems. The IT and communication infrastructure is adapted accordingly.

The Siemens Business Services knowledge managementframework

Background

Siemens Business Services (SBS) was established in 1995, emerging from unitsof the former Siemens Nixdorf Information system AG. The merging units had already successfully pursued an extensive process of culture change, so that a receptive climate for knowledge management existed. Furthermore, there was a belief that knowledge management solutions should not just be tool-oriented. Therefore a knowledge management framework based on the knowledge market concept was developed (see figure opposite). It was based on the business strategy to manage knowledge as a corporate asset. Core competencies were described and individual knowledge management initiatives, designed to add value to the relevant business areas, were supported.

The second element in the framework was the creation of a knowledge culture and organization. Concrete measures included time allocations for employees to take part in knowledge-sharing or knowledge-creation activities. Contribution to the corporate knowledge base and personal development were evaluated in the annual staff dialogue. The networking of employees has given rise to communitiesof practice of various degrees of maturity. Knowledge exchange is guided by the market principle which required to make the knowledge of sellers transparent. In order to better connect knowledge buyers and sellers, knowledge brokers were instituted; they can be seen as human search engines who are accessible to anyone in the organization with a question about a specialist area. Knowledge brokers are responsible for classifying, categorizing, storing and managing the relevant information, coordinating specific research, and monitoring the results of expert forums. They also act as change agents for further cultural development and contribute to the introduction of new platforms or functions. The knowledge marketplace is built on explicit

knowledge such as documents, processes, methods, and business patterns, and furthermore allows access via yellow pages to people who have knowledge in specific areas.

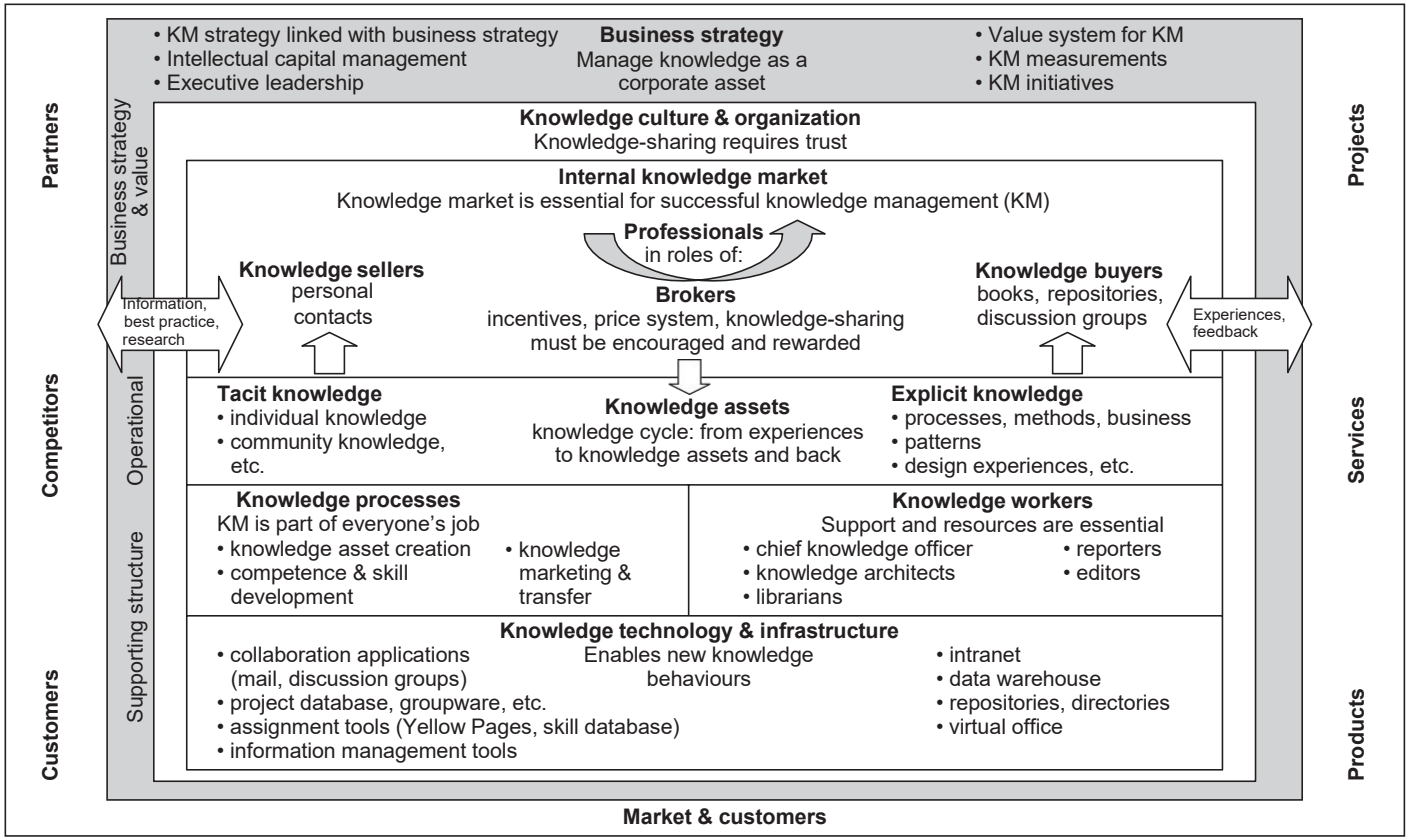
Key propositions

As part of its project planning, SBS determined a number of critical factors for successful knowledge management, which were then confirmed in external consulting projects:

1. Knowledge management requires problem-based trading. It should not start with a solution-based model, but with an in-depth examination of the initial situation in the unit, or the entire company, in order to develop solutions for specific problems (e.g. cultural barriers).
2. Knowledge management requires support and clear communication of the objectives by management, as well as active staff approval.
3. The kind of knowledge that is critical, and its origin, must be identified and knowledge management must be defined as an integral part of the business process. For example, the SBS unit identified project delivery as its core business process, and project experience as its most valuable knowledge.
4. Process owners must be identified and given clearly defined roles and specificresponsibilities for output.
5. Best practices for capturing knowledge must be defined, as well as for achieving and retaining the required quality (filter processes).
6. The economic value of knowledge does not lie in possessing it, but in using it. When the knowledge management reaches a certain stage of maturity, actually having information is no longer the decisive factor for success, but rather how it is interpreted and applied.
7. It is necessary to look at and implement knowledge management in its

entirety.

8. Knowledge management topics should not run in parallel with other projects, but should be integrated into them. In many groups within a company there are highly knowledge-intensive projects, such as e-business topics, the success of which can be increased by looking at them from a knowledge management point of view.
9. Knowledge management programmes must be aligned to corporate goals. Knowledge management cannot be run as an end in itself, but must be clearly aligned to the strategic objectives of the company. At Siemens, for example, these objectives involve supporting the paradigm shift from a product company to a solution- and service-driven company.
10. A technical platform must be provided based on existing architectures. Knowledge management must not appear simply as a "new" tool to the employees involved. Existing information and communication architectures should be part of knowledge management project planning.


• KM strategy linked with business strategy
• Intellectual capital management
• Executive leadership
Business strategy
Manage knowledge as a corporate asset
• Value system for KM
• KM measurements
• KM initiatives
Partners
Competitors
Customers
Business strategy & value
Knowledge culture & organization
Knowledge-sharing requires trust
Internal knowledge market
Knowledge market is essential for successful knowledge management (KM)
Professionals in roles of:
Brokers
incentives, price system, knowledge-sharing must be encouraged and rewarded
Knowledge sellers
personal contacts
Knowledge buyers
books, repositories, discussion groups
Information, best practice, research
Experiences, feedback
Operational
Tacit knowledge
• individual knowledge
• community knowledge, etc.
Knowledge assets
knowledge cycle: from experiences to knowledge assets and back
Explicit knowledge
• processes, methods, business
• patterns
• design experiences, etc.
Supporting structure
Knowledge processes
KM is part of everyone's job
• knowledge asset creation
• competence & skill development
• knowledge marketing & transfer
Knowledge workers
Support and resources are essential
• chief knowledge officer
• knowledge architects
• librarians
• reporters
• editors
Knowledge technology & infrastructure
Enables new knowledge behaviours
• collaboration applications (mail, discussion groups)
• project database, groupware, etc.
• assignment tools (Yellow Pages, skill database)
• information management tools
• intranet
• data warehouse
• repositories, directories
• virtual office
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