Knowledge in Organisations

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A learning organisation is an organisation skilled at creating, acquiring and transferring knowledge and at modifying its behaviour to reflect new knowledge and insights
David A. Garvin

Learning Outcomes
After completing this chapter
➖ You will know the difference between information, knowledge and competence,
➖ You will be able to apply the SECI-model of explicit/tacit knowledge conversion to real organisations;
➖ You will be able to explain competitive advantage by the resource based view using the «VRIN»-concept and the construct of «dynamic capabilities»;
➖ You will learn approaches to structuring organisational knowledge and assessing the value of knowledge resources;
➖ You will be able to run an idea competition.

2.1   Knowledge Based Value Creation

2.1.1 The «Knowledge Ladder»: Information, Knowledge and Competence

Knowledge in organisations takes many forms. It includes the competencies and capabilities of employees, a company's knowledge about customers and suppliers, know-how to deliver specific processes, intellectual property 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 and is embodied in products, services and systems. Knowledge is related to experiences of people in organisations and in the society, but only a small part of knowledge is made explicit. Tacit knowledge largely determines how people behave and act.

For firms knowledge is a resource, an intangible asset and forms a part of the so-called intellectual capital of an organisation. In order to enable knowledge-based value creation, management has to understand what knowledge is and how knowledge is related to competitiveness. In the following we will explain the underlying terminology of knowledge-based value creation first through a short case study and subsequently by systematising the relationship by means of the knowledge ladder (◼ Fig. 2.1).

Case Study

Transfer of Best Practice (Electronic Manufacturing Services)

In the morning, the factory manager, Janya Gupta clicked the inbox on the computer screen. A newsflash showed her that the results of the periodical benchmarking round the 50 electronic manufacturing units of the concern had been directly entered in the best practice database. She clicked on the news and got an overview of the graphically formatted **information**. In the benchmarking comparison, her factory was placed in the upper half. Through voicemail, she requested the best practice team of her factory to analyse the information and study the

possibility to adopt the «best practices» of other factories in order to increase productivity and thus compensate for the steady price fall of electronic components. She met the best practice team in the afternoon and yet again verified the **data** of her factory that was reported to the best practice database. Everything was OK. The best practice team developed **knowledge** about the differences by establishing a relation between the benchmarking information of their own factory and that of the comparable factories. Over a video conference that was arranged at short notice with the members of the best practice teams of two «sister factories» they learned and received the **know-how.** The team received tips on how to change the configuration for assembly in their factory. The insights **motivated** them **to act.** Results were measurable just 3 days later. The best practice team of the electronic manufacturing services had demonstrated its collective problem-solving **competence**. Factory manager Janya Gupta is satisfied and stresses that in her view, the capability to learn faster than the competition is a lasting **competitive advantage**.
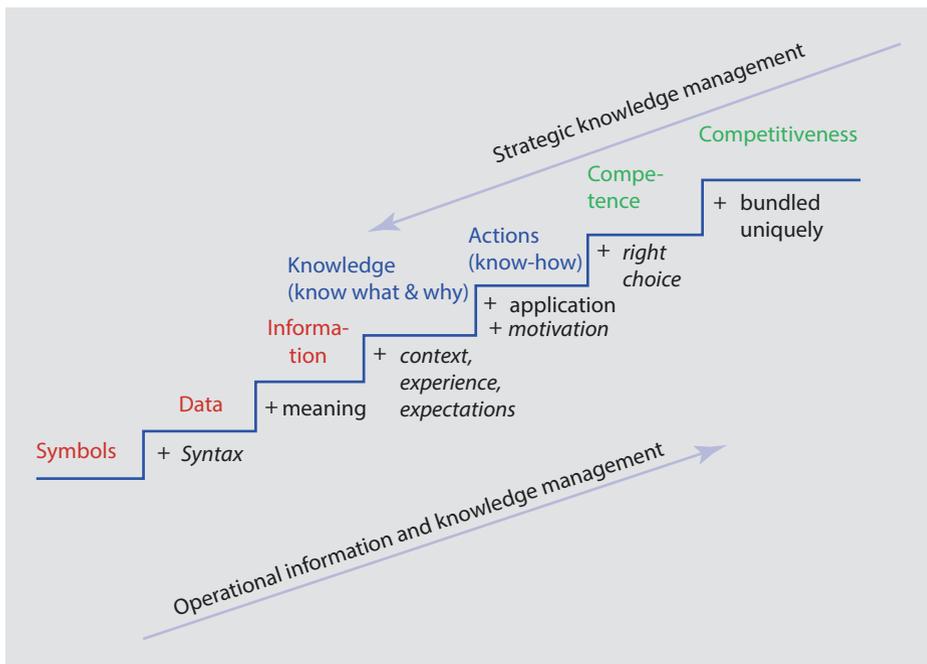
◘ **Fig. 2.1**   The knowledge ladder

Data and Information: Raw Material for Value Creation   Let us start at the bottom of the competence ladder. People communicate by means of symbols; these may be letters, numbers or signs. These symbols can be interpreted only if there are clear rules of understanding. These rules are called syntax. Symbols plus syntax become data. Combining the numbers 1, 3, 5 and the unit symbols for degree Celsius plus a point to 13.5 °C transforms symbols into data. This data can only be interpreted if it is given an exact meaning. It becomes information if we add to the data whether we talk about air temperature, the precise time and place of that temperature.

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> **Definition**
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> Information is organised data adding meaning to a message. This information is inter-preted differently depending on context, experience and the expectations of people.

Knowledge: Creating an Understanding as a Basis to Act   In the development of knowl-edge we distinguish between different levels. The first, «**know what**»**,** is a result of interioris-ing information. For example reading a book which only creates value for an organisation if a person is able to apply this information i.e., the «know what», is transformed into «**know-how**» by means of application. How difficult this transfer from «know what» to «know-how» can be is experienced by many people who read the operating instructions of a mobile phone for instance and want to apply the information to program specific functions. As the mental models of those who have written the operating instructions and those who apply the operating instructions are different, the user may not be able to interpret the instructions correctly. A solution could be to have potential users write the operating instructions.

> **Definition**
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> **Knowledge** refers to the tacit or explicit understanding of people about relationships among phenomena. It is embodied in routines for the performance of activities, in organisational 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 (Carnegie Bosch Institute [CBI] 1995).

Knowledge in organisations is only to a small extent explicit. Using the metaphor of the iceberg we can say that only the small part visible above the water is explicit knowledge and the big part hidden under the water is tacit knowledge. According to Polanyi (1966) tacit knowledge is personal, context-specific, often unconscious and therefore hard to formalise and communicate. Explicit or codified knowledge refers to knowledge that is transmittable in formal, systematic language. Polanyi says «that we can know more that we can tell». We shall see below how the transformation of explicit knowledge into tacit knowledge and vice versa is an important process of knowledge creation and distribution.

> **Case Study**
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> **Thought Experiment: Is Knowledge «Justified True Belief»?**
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> Philosophy professor Edmund Gettier called into question the theory of knowledge that had been dominant among philosophers for thousands of years when he defined knowl-edge as «justified true belief».
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> According to Gettier, there are certain circumstances in which one does not have knowledge, even when all of the above conditions are met. Gettier proposed two thought experiments, which have come to be known as «Gettier cases,» as counter-examples to the classical account of knowledge. One of the cases involves two men, Smith and Jones, who are awaiting the results of their applications for the same job. Each man has ten coins in his

pocket. Smith has excellent reasons to **believe** that Jones will get the job and, furthermore, **knows** that Jones has ten coins in his pocket (he recently counted them). From this Smith infers, «the man who will get the job has ten coins in his pocket.» However, Smith is **unaware** that he also has ten coins in his own pocket. Furthermore, Smith, not Jones, is going to get the job. While Smith has **strong evidence to believe** that Jones will get the job, he is wrong. Smith has a **justified true belief** that a man with ten coins in his pocket will get the job; however, according to Gettier, Smith does not **know** that a man with ten coins in his pocket will get the job, because Smith's belief is «…true by virtue of the number of coins in *Jones's* pocket, while Smith does not know how many coins are in Smith's pocket, and bases his belief…on a count of the coins in Jones's pocket, whom he falsely believes to be the man who will get the job.» (see Gettier 1963, p. 122.) These cases fail to be knowledge because the subject's belief is justified, but only happens to be true by virtue of luck. In other words, he made the correct choice (in this case predicting an outcome) for the wrong reasons. This example is similar to those often given when discussing belief and truth, wherein a person's belief of what will happen can coincidentally be correct without his or her having the actual knowledge to base it on.
Source: Gettier (1963, p. 122) cited according to ► http://en.wikipedia.org/wiki/Epistemology

Competence: The Right Action at the Right Time   The ability to apply knowledge is based on specific motives **(«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 knowledge workers develop, share and apply their knowledge in line with the objective 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 the right moment is termed competence. With von Krogh and Roos (1996) «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) meet the task.»

> **Definition**
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> The term **competence (or competency)** of a person or a group describes the relationship between the tasks assigned to or assumed by the person or the group and their capability and potential to deliver a desired performance. People mobilise knowledge, skills and behaviours to «do the right thing at the right moment.»

The interaction of an actor with an audience, the sales skill of a successful salesman or the adaptation of strategies by an experience consultant in order to meet the client's needs of the moment reflect competence which is often also called expertise (For a more detailed discussion see ► Sect. 4.3).

Competitiveness: Bundle Competencies for Uniqueness   If we bundle the competencies of people or organisations uniquely so that these are not matched by other organisations, then we talk about competitiveness. *Core competencies* of an organisation are considered particularly relevant for competition.

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> **Definition**
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> **Core competencies** (Hamel and Prahalad 1994; Rumelt 1994) are a combination of skills and technologies that deliver value to the customer. This combination is based on explicit and hidden knowledge and is characterised by temporal stability and influence on the products. Core competencies:
> 1. Provide potential access to a wide variety of markets.
> 2. Make a significant contribution to the perceived customer benefits of the end product.
> 3. Are difficult to imitate by competitors.

They are in synergy with other competencies and make the company unique and better than others. In this view, core competencies represent the basis for *competitiveness*. We shall elaborate on this aspect of competitive virtues of knowledge in detail in ▶ Sect. 2.3 where we also discuss the concept of «dynamic capabilities».

Coming back to the knowledge ladder we can formulate the **objective of knowledge based management** as the transformation of information into knowledge and competence in order to create measurable value in a sustainable manner.

For this, we need to build each step of the knowledge ladder. As in a real staircase you cannot say that the top stair is more important than the bottom stair, you have to build all of them. The bottom-up view reflects the operational processes of information and knowledge management whereas the top-down view reflects the strategic view of defining the competencies of an organisation and its members that will eventually lead to competitiveness.

2.1.2 Fields of Action of Knowledge Management

Knowledge management of an organisation means organising all the stages of the knowledge ladder. If a certain step of the ladder is not constructed (e.g. lack of data compatibility, incomplete availability of information, lack of motivation for actions), one «*stumbles*» while climbing up and down the ladder. The implementation of business strategies or the operative business is hampered. Three fields of action of «information and knowledge management» are deduced from the knowledge ladder:

- *Strategic knowledge management* passes through the knowledge ladder from top to bottom to answer questions as to «*which competencies are required to be competitive*», thus deducing which knowledge and know-how is necessary. Knowledge goals should be deduced from the company goals. Furthermore, strategic knowledge management should develop a company model that conceptualises the motivational and organisational structures and processes that make the company fit for knowledge-based competition.
- *Operative knowledge management* particularly involves interconnecting information to knowledge, know-how and actions. The manner of organising the process of *transferring individual knowledge into collective knowledge and vice versa* is decisive

for the success of knowledge-based management. Here the conversion of tacit knowledge into explicit knowledge and vice versa is of vital importance. However, this process does not take place without effective incentives. Thus operative knowledge management also entails establishing enabling conditions that serve as stimulants for creation, distribution and use of knowledge.

━ *Information and data management (Digitalization)* is the basis for knowledge management. If we have a look at the knowledge ladder, we notice that the supply, storage and distribution of information are prerequisites for creating and transferring knowledge. From surveys, we could find that many companies begin to step towards knowledge management with information and data management measures, but eventually realise that information and communication technology cannot be used optimally without appropriate organisational and motivational conditions.

2.1.3 KM Maturity Asessment

Organisations vary in the degree of maturity of their knowledge-based management (see ◼ Fig. 2.2). Awareness about the importance to manage knowledge resources is a
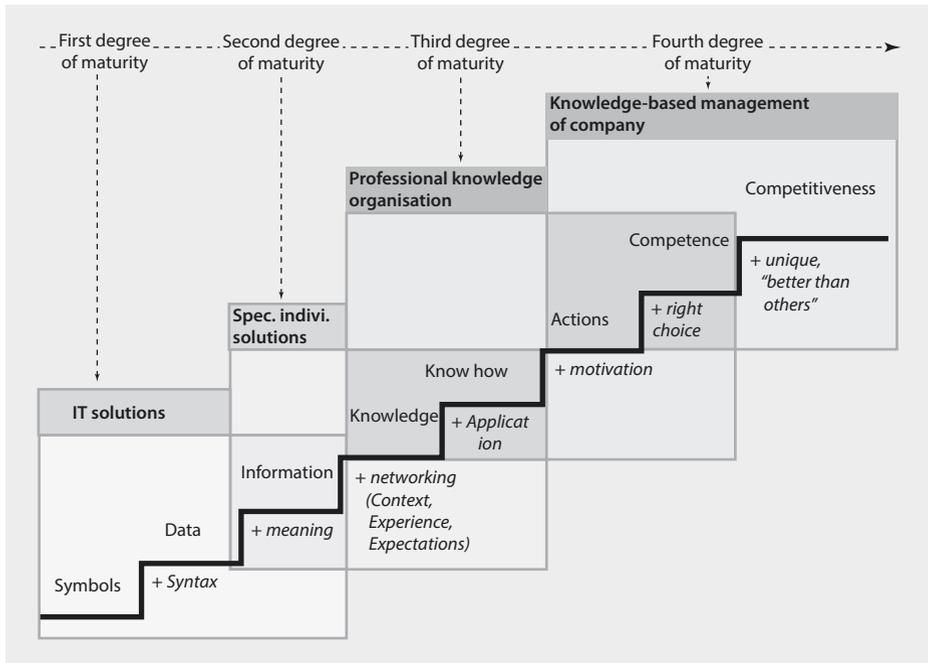
◼ **Fig. 2.2** Degree of maturity of knowledge-based management of a company

learning process and depends on the «maturity» of organisations. The change towards an «intelligent» knowledge-based organisation is a progressive endeavour involving some «trial and error».

To assess the current state of development and provide guidance for further evolvement towards a knowledge based organisation a number of maturity models have been developed. In general, a maturity model describes the development of an entity over time.

A knowledge management maturity model can be considered as a structured approach to knowledge management implementation. A maturity model can also provide a common understanding of the terminologies involved in knowledge management implementation to various stakeholders.[1]

Based on empirical studies we have identified four levels of maturity in the way organisations manage their knowledge (North and Schmidt 2004):

The First Level: Information Management

Companies at the *first stage of maturity* concentrate on information management. They implement an information and communication infrastructure to enable specific access to databases and documents. Accompanying organisational measures for promoting exchange of knowledge are not yet established or are established only to a certain extent. Efforts are concentrated on information and communication technology. At this level of maturity, organisations achieve an increase in process transparency and speed, avoid double work and shorten training periods for new entrants, which result in an overall increase in the quality of products and services. Examples of first level KM systems: Implementation of an intranet, development of community platforms.

The Second Level: «Island» Solutions

Organisations that intentionally implement knowledge management initiatives in specific areas or business units represent the *second stage of maturity*. They have realised that information and communication technology alone is not enough for knowledge-based management. Instead they have understood that a «business case» is needed to demonstrate that knowledge management yields clear benefits. Accordingly, specific solutions in specific areas are developed, e.g. service knowledge, personnel knowledge and customer knowledge. KM solutions contribute to process accelerations (fast response, for example, to customer enquiries), increase in reuse of internal knowledge (the wheel is not always reinvented) as well as improved teamwork and increase in quality. Even this approach may lead to quick wins where «KM islands» are created which might be difficult to integrate in a later comprehensive KM strategy.

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1   A good overview over current KM maturity models is found at Kuriakose et al. (2010). See also Vanini and Bochert 2014 and ▶ http://www.kmmm.org/, ▶ http://wisdomsource.com/K3MOverview.pdf

Examples of second level KM systems are the establishment of Customer Relationship Management Systems integrated into sales management or a portal with «tips and tricks» for service technicians to which service technicians contribute actively.

The Third Level: Professional Knowledge Organisation

Organisations in the *third stage of maturity* are those that have implemented a professional knowledge organisation across departments and business units and exhibit the following characteristic features:

- Information and communication infrastructure guarantees easy availability of relevant information.
- Employees are motivated and rewarded for sharing knowledge.
- Integration of knowledge management in business goals, processes and project organisation.
- Exchange of knowledge is supported through Communities of Practice (CoPs) and competence centres.
- Benefits of knowledge management are measured.

A balanced distribution of benefits resulting in improved processes, higher employee motivation and customer satisfaction is a typical feature of the professional knowledge organisation.

Examples of third level KM systems are the establishment of KM roles and responsibilities at centralised/decentralised levels of an organisation. Employees are regularly trained how to use KM-tools.

At this third level KM is seen as a set of rules and tools to enhance performance. It is, however, not yet fully integrated into the minds and behaviour of people.

The Fourth Level: Knowledge Culture

The *fourth level of maturity* represents an ideal condition that has been achieved only by a few organisations until now. This level of maturity is characterised by deeply shared values, teamwork, active exchange of knowledge beyond the boundaries of departments and beyond the firm, active search for innovation as well as an open and trustworthy culture that is filled with and lived by management and employees consistently. An important component of this culture is learning from the outside (e.g. markets, technologies, rivals, suppliers, customers etc.) and from the inside. The company culture is supported by a mature information and communication system and media such as CoPs, competence centres and work-outs. Collaboration, knowledge sharing and continuous search for innovation is part of such a knowledge culture. Shared values, not tools, drive knowledge creation, transfer and protection.

Such firms achieve overall levels of excellence. They would be on level 5 of the KM self-assessment as proposed by Collison and Parcell (2004) in their practical guide «Learning to fly».

KM Self-Assessment

	KM strategy	Leadership behaviours	Networking	Learning before, during and after	Capturing knowledge
Level 5	Clearly identified intellectual assets. KM strategy is embedded in the business strategy. Framework and tools enable learning before, during and after.	Leaders recognise the link between KM and performance. The right attitudes exist to share and use others' know-how. Leaders reinforce the right behaviour and act as role models.	Clearly defined roles and responsibilities. Networks and CoPs have a clear purpose, some have clear deliverables other develop capability in the organisation. Networks meet annually.	Prompts for learning built into business processes. People routinely find out who knows and talk with them. Common language, templates and guidelines lead to effective sharing.	Knowledge is easy to get to, easy to retrieve. Relevant knowledge is pushed to you. It is constantly refreshed and distilled. Networks act as guardians of the knowledge.
Level 4	Discussions ongoing about organisation's intellectual assets. A KM strategy exists but is not linked to business results. A clear framework and set of tools for learning is widely communicated and understood.	KM is everyone's responsibility; a few jobs are dedicated to managing knowledge. «Knowledge sharing is power.» Leaders set expectations by «asking the right questions», and rewarding the right behaviours.	Networks are organised around business needs. Networks have a clear governance document. Supportive technology is in place and is well used.	Learning before, during and after is the way we do things around here. «Customers» and partners participate in review sessions.	Just-in-time-knowledge is current and easily accessible. One individual distils and refreshes it, though many contribute. That individual acts as the owner.
Level 3	There is no framework or articulated KM strategy. Some job descriptions include knowledge capture, sharing and distillation. People are using a number of tools to help with learning and sharing.	KM is viewed as the responsibility of a specialist team. Some leaders talk the talk, but don't always walk the walk!	People are networking to get results. Networks are created	People can easily find out what the company knows. Examples of sharing and using are recognised. Peers are helping peers across organisational boundaries.	Networks take responsibility for the knowledge, collects their subjects knowledge in one place in a common format. Searching before doing is encouraged. Little or no distillation.
Level 2	Most people say sharing know-how is important to the organisations success. People are using some tools to help with learning and sharing	Some managers give people the time to share and learn, but there is little visible support from the top.	Ad hoc networking to help individuals who know each other.	People learn before doing and programme review sessions. They capture what they learn for others to access. In practice few do access it.	Teams capture lessons learned after a project. Teams look for knowledge before starting a project. Access to lots of knowledge, though not summarised.
Level 1	A few people express that know-how is important to the organisation. Isolated people with a passion for KM begin to talk and share how difficult it is.	KM viewed as a management fad. Leaders are sceptical as to the benefits. Leaders think networking leads to lack of accountability. «knowledge is power»	Knowledge hoarders seem to get rewarded.	People are conscious of the need to learn from what they do but rarely get the time. Sharing is for the benefit of the team.	Some individuals take the time to capture their lessons in any number of cupboards and databases. They are rarely refreshed, few contribute, even fewer search.

Source: Collision and Parcell (2004)

Evolvement of Knowledge Management at Eureka Forbes Ltd.

The case of Eureka Forbes Ltd., a USD 250 million multi-product, multi-channel corporation and a leader in domestic and industrial water purification systems, vacuum cleaning and air purification solutions in India, demonstrates how a phased approach helps in eventually gaining competitive advantage. It is a pioneer in direct selling in India and is Asia's largest direct sales organisation. Its 7000 strong direct sales force touches about 1.5 million Indian homes, adding 1500 customers daily. It has operations in over 135 cities and 500 towns across India. «A formal KM function has been in existence in the company for over seven years and has gone through different phases. Knowledge Management has evolved from being seen as additional work, to being recognised as providing a strategic advantage, significantly impacting both the top-line and bottom-line» says Shubha Ashraf, Knowledge Manager at Eureka. The first phase was the initial period of setting up **structural intellec-tual capital** as the KM function and processes to facilitate people to know about and be able to appreciate that it helps an individual to perform faster and better. The next phase was the «value add» to **structural capital** by setting up of a portal enabling different channels and features for attracting people to it. The focus shifted from being a contact platform to being an enabling platform for the internal customers thereby improving **human intellectual capital**. The third phase focuses on improving **social intellectual capital** by leveraging knowledge gathered to improve market responsiveness, customer and employee happiness.

The success is primarily attributed to the focus being on linking Knowledge Management directly to business results, thereby providing the organisation with a distinct competitive edge. Eureka Forbes Ltd. has won the MAKE award and in January 2010 it was recognised and distinguished by three UNESCO-Water Digest Awards for Best R&D and Technological breakthrough for a new product.

2.2 Dimensions of Knowledge

In order to «manage» knowledge in organisations we need to understand what type of «species» we are dealing with. We, therefore, will take a closer look at the following three dimensions of the term «knowledge».

- «*Nature*» of knowledge: What is knowledge? Is it considered to be an object, a result that can be shared, duplicated and transported like «frozen food» or is it an individual process that is difficult to control?
- «*Availability*» of knowledge: In which forms does knowledge become available and accessible in and across organisations? Here, we shall deal particularly with the difference between individual versus collective knowledge and tacit versus explicit knowledge.
- «*Value*» of knowledge: What is the value of knowledge? Often, knowledge is also identified as component of intangible assets or as «*Intellectual Capital*». Knowledge is capital. The question is how can knowledge be measured?

2.2.1 Nature of Knowledge

Von Krogh and Roos (1996, p. 334) contrast three epistemologies with three knowledge perspectives in a company:
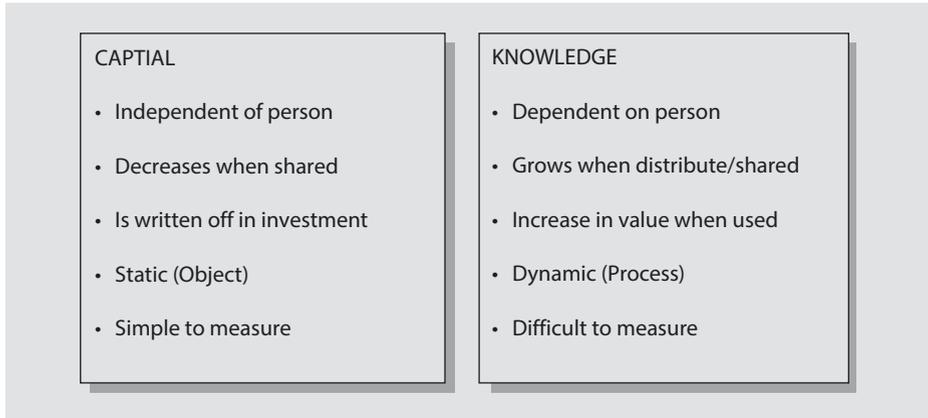
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- The *information processing epistemology* assumes that knowledge and information are roughly the same. In this case it is but natural to invest in the speed of information processing. From this perspective, the increase in the capacity to process information leads to an increase in the development of knowledge in the company as well. Organisations which focus on this epistemology will invest in information and communication systems such as relaunching or optimising their intranet.
- The *network epistemology* assumes that knowledge is a result of interaction of people in networks. Thus, the firm should invest to bring the employees of the organisation together. Consequently, the higher the number of opportunities for the people to meet and exchange, the greater will be the development of knowledge. Organisations which focus on this epistemology will promote communities of practice and other social networks, create meeting zones and opportunities for people to meet (e.g. brown bag lunch).
- The *self-referential epistemology* assumes that knowledge is a private *history-dependent* process within each of us. Knowledge of one person is a mere raw data for another. Each person shares organisational knowledge with another. Hence, it is necessary to find a context that stimulates continuous dialogue in the organisation. Firms which focus on this epistemology will promote small teams and task forces, create «work-out-type» problem-solving groups and provide experts with stimulating environments (see for example the design and layout of the Google Zurich office).

Von Krogh and Roos prefer the last perspective of knowledge creation. However, they emphasise that every organisation works according to all the three epistemologies at different points of time and for different functions. Therefore, knowledge can belong to both the extreme position viz. «*knowledge is object*» and «*knowledge is process*» depending on the situation. For instance, if the sales employees know the number of its A-class clients, this is information with the characteristics of an object. However, knowledge exhibits more characteristics of a process if the available information about the customer is to be used in a better way for concluding business. Gardner (1995) has described these different aspects with the terms «know-what», «know-how», «know-why», «know-where» and «know-when». Polanyi (1966) emphasised the process perspective with the following statement:

» Knowledge is an activity best described as a process of knowing.

The extreme perspective of «*knowledge is object*» and «*knowledge is process*» are perhaps best clear if we break up the new word «*knowledge capital*» into its two components, viz. *knowledge* and *capital* and find out the difference between these two terms (refer to ◘ Fig. 2.3). Sveiby (1997) argues that the analogy between knowledge and capital does not help in the creation and transfer of knowledge because it leads to a false understanding of knowledge (see ◘ Fig. 2.3).

For creating a knowledge-based organisation – a process perspective of knowledge should be adopted. Consequently, it is necessary to develop enabling conditions that encourage the creation and transfer of knowledge.

CAPTIAL	KNOWLEDGE
• Independent of person	• Dependent on person
• Decreases when shared	• Grows when distribute/shared
• Is written off in investment	• Increase in value when used
• Static (Object)	• Dynamic (Process)
• Simple to measure	• Difficult to measure

◘ **Fig. 2.3** Differences between capital and knowledge (Source: Based on Sveiby 1997)

Apart from these different perspectives – «*knowledge is object*» and «*knowledge is process*» – the nature of knowledge is determined by two features. Knowledge can be private and individual for one and public and collective for others. Furthermore, knowledge can be present in tacit and explicit forms. These aspects determine the availability of knowledge.

Case Study

Integration of Knowledge: Taking Over a Foreign Company

■ **The Problem:**
A German enterprise takes over a French company with approximately 500 employees in order to get additional know-how quickly. On the German side, the takeover negotiations are conducted by the «Mergers and Acquisitions» department (M&A). After concluding the contract, an operative business unit takes the task of integrating the new French subsidiary in the concern without having prior experience. Though M&A knows the French company, it is only involved informally in further integration once the contract is concluded.

The French experts oppose the merger. Value of the acquisition would be reduced due to attrition. Knowledge is documented rudimentarily. The German buyer has only a few French-speaking employees who can bridge the gap towards the new subsidiary or could integrate the French employees in their teams. There is a lot of difference between the culture of the German enterprise and the medium-sized French company. The new German parent company sends a high-level management team to take over management of the French subsidiary. That's when the problems begin.

■ **Solution Elements:**
How can the integration process be arranged more effectively? The value of the acquisition is decided by the know-how of the employees. Therefore, it is useful not only to alert the Mergers and Acquisitions at an early stage but also to take actions that build faith, e.g. encouraging the employees of both the companies get to know each other, identifying the important knowledge bearers and/or teams and positively influence their attitude towards the merger. After concluding the negotiations, experienced specialists of the M&A department should start coaching the integration process. Furthermore, continuous structuring of

an M&A process and the integration process is helpful. In order to ensure success, it is fundamental that knowledge and knowledge bearers are not regarded as objects that can be used freely by signing a purchase contract.

Assignment: Identify cross border or cross regional mergers. What were the reasons for failure or success?

2.2.2 Availability and Conversion of Knowledge: SEICI-Model

The «*availability*» of knowledge is affected by form, time and place. Form not only involves the «*individual* versus *collective knowledge*» aspect but also includes the «*tacit* versus *explicit knowledge*» aspect. Both these aspects are closely interlocked (Hedlund and Nonaka 1993; Nonaka and Takeuchi 1995).

The manner of organising the transfer of individual knowledge into collective knowledge and vice versa is decisive for the success of knowledge-based management. «*A company is a place wherein individual knowledge and individual intelligence converge to form a collective and creative intelligence that can be put to entrepreneurial use*» (Morin, 1997, personal communication).

There are two types of knowledge to describe this process: *explicit knowledge* and *tacit knowledge*.

Tacit knowledge represents the personal knowledge of an individual. It is based on education, ideals, values and feelings of the individual person. Subjective insights and intuition embody tacit knowledge that is deeply rooted in the actions and experiences of the particular person. The term «tacit knowledge» was first introduced into philosophy by Michael Polanyi observing that «we can know more than we can tell» (Polanyi 1966, p. 4). This form of knowledge is very difficult to formulate and to pass on because it is embodied in individuals. Tacit knowledge is imparted, among other things, during our upbringing wherein we take on the behaviour patterns of parents unknowingly.

Unlike tacit knowledge, ***explicit knowledge*** is methodical and systematic and is present in an articulated form. It is stored in the media outside the brain (disembodied knowledge) of an individual and can be transferred and stored by means of information and communication technology. Examples of explicit knowledge are detailed descriptions of processes, patents, organisation trees, quality documents, etc.

Nonaka and Takeuchi have expressed that the *conversion of tacit knowledge into explicit knowledge* is the basic problem of knowledge management. The reason being that knowledge is useful for a company and can be used by individuals or groups only if it is present in an explicit form. Thus, from this point of view, it is the task of the knowledge management to arrange and direct a process of generating organisational knowledge. Nonaka and Takeuchi formulated this as follows: «By organisational knowledge creation we mean the capability of a company as a whole to create new knowledge, distributed throughout the organisation and embodied in products, services and systems» (Generation of organisational knowledge means the ability of a company to generate completely new knowledge, distribute it within the organisation and incorporate it into products, services and systems) (Nonaka and Takeuchi 1995, S. VIII; von Krogh et al. 2000).
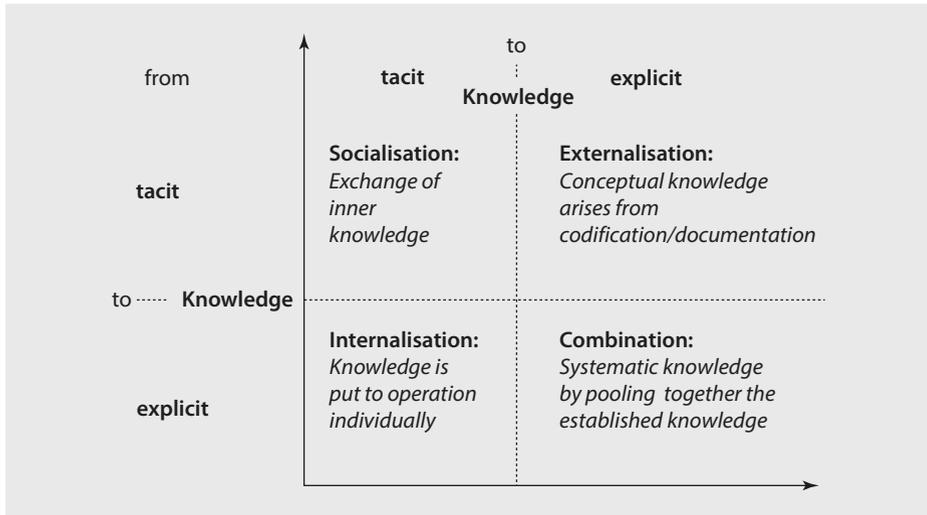
■ **Fig. 2.4**   Four ways to create and transform knowledge (Source: Nonaka and Takeuchi 1995, p. 72)

Nonaka and Takeuchi (1995) assume that knowledge is created through the interaction between tacit and explicit knowledge by four different modes of conversion as shown in ■ Fig. 2.4. We will explain all four ways of knowledge conversion as they are the basis for value creation.

Socialisation: From Tacit to Tacit Knowledge   The conversion from tacit knowledge of one person to tacit knowledge of another person is called socialisation. It is a process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills. Socialisation takes place when an apprentice observes a master, when a newly hired consultant is integrated into a project group and learns through observation, imitation and practice. Shared experience is the key of socialisation and of value creation in knowledge based organisations. 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.

Externalisation: From Tacit to Explicit   Externalisation is the process of articulating tacit knowledge into explicit concepts. Externalisation happens when we describe a manufacturing process for the purpose of an ISO 9000 certification. In management consulting for example, externalisation takes place when a project profile is written in order to provide specific information on project development and lessons learned as a basis for future similar projects. Many firms have these type of lessons learnt on databases. Since externalisation reveals only a part of the tacit knowledge, it is good not to rely exclusively on these written statements but enable e.g. consultants who have to plan a new project to get a personal contact with those who have carried out

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similar projects before. Similarly, a real process will always differ from the formal project description. Externalisation is the basis for reflecting experiences, for formalised learning processes and ultimately for standardisation and process improvement.

Combination: From Explicit to Explicit Knowledge   Combination refers to the conversion from explicit knowledge to explicit knowledge. Individuals exchange and combine knowledge through documents, meetings, communication networks. They reconfigure existing information through sorting, adding, combining and categorising of explicit knowledge which may lead to new information. In consulting, for example, different presentations are combined and reconfigured for the purpose of a sales presentation to a new client. The combination of explicit knowledge to explicit knowledge often follows an economics of reuse and is also the basis for a cumulative innovative strategy the products and processes are improved incrementally.

Internalisation: From Explicit to Tacit Knowledge   Internalisation is the process of embodying explicit knowledge in tacit knowledge. It is closely related to learning by doing. A service engineer, for instance, reads an operating manual in order to program electronic equipment. A great part of our formalised learning processes happens by internalisation. 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, of the group, of the organisation, and between organisations.

It is therefore an important management task to create opportunities of interactions between these levels so that knowledge conversion can happen. According to Nonaka and Takeuchi the enabling conditions are
- **Intention** The most critical element of corporate strategy is to conceptualise a vision about what kind of knowledge should be developed and to make it operational in a management system for implementation.
- **Autonomy** At the individual level, all members of an organisation should be allowed to act autonomously as far as circumstances permit. This may increase the chance of introducing unexpected ideas and tacit opportunities.
- **Fluctuation and creative chaos** This means to adopt an open attitude towards environmental signals, to exploit those signals ambiguity, redundancy and to use fluctuation in order to break routines, habits or cognitive frameworks.
- **Redundancy** In business organisations, 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 knowledge creation process.
- **Requisite variety** Based on the assumption, that an organisation's internal diversity must match the variety and complexity of the environment in order to deal with challenges posed by the environment, everyone in the organisation should be assured of quick access to necessary information and knowledge. When information differentials exist within the organisation, organisational members cannot interact on equal terms; this hinders the search for different interpretation of new information.
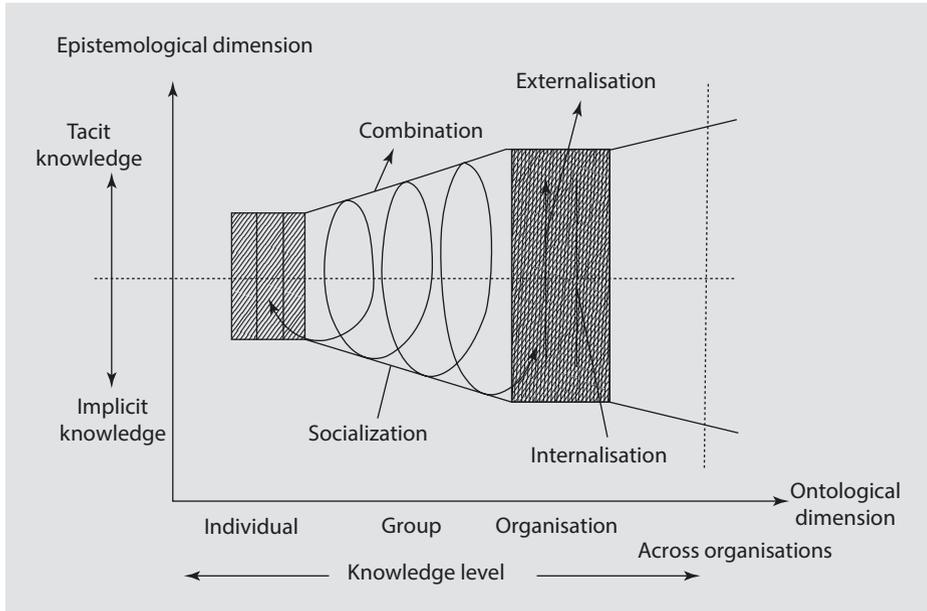
◘ Fig. 2.5 The spiral of creation and transfer of organisational knowledge (Source: Nonaka and Takeuchi 1995, S. 73)

Nonaka and Takeuchi have assumed a «knowledge spiral» model for transforming tacit knowledge to explicit knowledge and for transferring knowledge from an individual to a group or an organisation. The starting point of the spiral is the individual employee and his/her capability to create knowledge. While communicating with the employees in a group, the individual employee gives away his own knowledge (externalisation) and transfers it to others. On the other hand, the individual internalises the experience background of the entire group (internalisation). The continuous knowledge externalisation and internalisation among employees, and teams within the organisation and beyond the organisation leads to supply of knowledge at these various levels as well as results in growth of the knowledge of the organisation. Personal communication among the employees and use of information and communication technology is a prerequisite for this entire process. The knowledge spiral runs through four phases as shown in ◘ Fig. 2.5.

- In the *socialisation* phase (exchange of tacit knowledge), the inner knowledge, e.g. mental model or technical skills are generated.
- The *externalisation* phase of knowledge (from tacit to explicit) produces the conceptual and new knowledge.
- The *combination* phase (combination of explicit knowledge) develops systematic knowledge that is manifested in prototypes, new methods or new business ideas.
- The *internalisation* phase of knowledge (from explicit to tacit) generates operative knowledge.

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The following case study, «The best bread in Osaka», explains the above phases individually.

> ### Case Study
>
> **The Best Bread in Osaka**
>
> In 1985, the product developers of the Matsushita Electric Company in Osaka pondered over the construction of a bread-making machine for home use. But the prototype could not knead the dough properly and bake it thoroughly. Despite all efforts, the outer crust burnt while the bread remained raw inside. That's when software developer, Ikuko Tanaka, came up with a brilliant idea. The Osaka International Hotel basked in the glory of making the best bread in Osaka. Tanaka thought of using this to the company's advantage. She went to the master baker of the hotel to watch his kneading technique and saw how the master baker stretched the dough in a particular way. After a year of experimenting in close collaboration with the project engineers, Tanaka finally changed the construction features of the machine (by adding special ribs inside the case) in such a way that the device effectively imitated the kneading technique of the baker and baked the dough the way Tanaka had learnt in the hotel. The result was Matsushita's unique «kneading method» and a product that broke all sales records for new baking devices in the first year alone. Thus, Tanaka had converted the tacit knowledge of the baker into explicit knowledge in form of clear specification for the bread-making machine. Ikuko Tanaka first acquired the inner knowledge of the hotel's master baker (socialisation). She then converted these secrets into explicit knowledge that she could pass on to her team members and others at Matsushita (externalisation). Thereafter, the team standardised this knowledge, merged it into a guidebook and an instruction manual and let the product shape accordingly (combination). Finally, the experiences of Tanaka and the team members while constructing the new product enhanced their own tacit knowledge base (internalisation).
> Source: The case study follows the description in Nonaka 1991 p. 98–99.

However, the above mentioned model describing the conversion of knowledge from private to collective and implicit to explicit does not consider ***uneven distribution of knowledge*** in the company that is caused by structural or motivational barriers in the organisation. On the other side, the existing knowledge is not available at the desired place at the desired time.

Knowledge management therefore should not just be restricted to the individual and organisational learning process as such but should also remove obstacles in information and communication. To put it positively, management should create conditions that promote knowledge sharing, guarantee the interaction of individual and organisational learning processes. von Hipple (1994) and Szulanski (1966) use the term «***stickiness***» to describe the fact that knowledge is freely available only up to a certain limit. Knowledge has a tendency to «*stick*». It must be set afloat by suitable organisational design measures. We will take a closer look at this topic in the sections on knowledge transfer and knowledge market (cf. ► Chap. 7).

The availability of knowledge is linked to the ***time and place*** factor. Professionals are not available round the clock worldwide, especially in companies that operate globally. A software problem that appears in a subsidiary in Europe can at times not be resolved because the specialist in India is not available or because she is on vacation. In an indus-

try that is dependent on rapid responses, e.g. consulting firms, McKinsey has set up a rapid response network within its practice centre. The «*on-call-consultants*» in this network guarantee a qualified answer within 24 h to a field-specific question from one of the approximately 60 offices in 28 countries (Peters 1994, p. 169–171). In Eureka Forbes, the salesman in the field requires a quick response to his queries. He uses his mobile phone to connect and get his answers from the on-call consultants who have access to the knowledge repository.

Decision-making requires a full set of up-to-date information and knowledge. Today, in many companies, there is a considerable time lag in making updated information available and thus today's decisions for tomorrow's actions are based on obsolete knowledge. Company-wide availability of up-to-date knowledge and information is of vital importance particularly for companies that are surrounded by a fast-changing market environment.

Furthermore, the availability of knowledge is affected by the place where the knowledge originates or where an individual looks for knowledge. Despite electronic media, knowing people personally and the resulting trust are necessary for exchange of knowledge. It is difficult to build such trust over huge geographical distances without meeting the people regularly in person. Apart from these more motivational aspects, the creation of local and global knowledge centres and their interconnection is an important strategic task of international companies (Bartlett and Ghoshal 1989; Doz 1997). We will have a closer look at this task in ► Chap. 5.

2.2.3 The Value Dimension of Knowledge

The 1980s witnessed the beginning of a thought process based on the observation that the market value of companies was rising in relation to their book value. The experts wondered how this gap – called «goodwill» – could be explained and concluded that the difference between market value and book value can be attributed to the value of intangible assets, which is defined in the International Accounting Standard (IAS 38) as follows (► http://www.iasplus.com/en/standards/standard38):

Definition

An **intangible asset** is an identifiable non-monetary asset without physical substance. An asset is a resource that is controlled by the entity as a result of past events (for example, purchase or self-creation) and from which future economic benefits (inflows of cash or other assets) are expected. [IAS 38.8] Thus, the three critical attributes of an intangible asset are identifiability, control (power to obtain benefits from the asset) and future economic benefits (such as revenues or reduced future costs).

The Swedish insurance company Skandia and the Canadian Imperial Bank of Commerce were the first companies that developed a new structure of company capital. In their approach, the finance capital was complemented by «*intellectual capital*».

2

Definition

Intellectual capital is defined as knowledge that can be converted into value (Edvinsson and Sullivan 1996, p. 358; Edvinsson and Malone 1997) or as resource utilised in future value creation without a physical embodyment (OECD 2008).


Knowledge is considered to be part of intangible assets. This integrates knowledge management in the present logic of management of financial and physical resources and helps to structure and measure the kind of «knowledge» available in organisations (see a more detailed discussion in ▶ Chap. 6).

The «*knowledge is capital*» analogy is intriguing. However, it tends to ignore the character of knowledge as a process as we have already discussed under «*Nature of knowledge*».

The term «intangible assets» covers further resources for value creation which are not in the core «intellectual capital». Thus, the customer base, the image of a company or the value of the brands is only to some extent «*knowledge converted into value*». Yet these elements can be added to the value of the intangible assets.

The knowledge of and about customers that is accessible to the company as well as employee knowledge about customers, processes, technologies etc. are a part of the intellectual capital. Employees and customers do not belong to the company the way tangible assets do – the control is restricted. That is why the value of employees is not accounted for in the balance sheet (see ◻ Fig. 2.6).

How can knowledge be structured from the viewpoint of intellectual capital and which factors determine the value of knowledge?
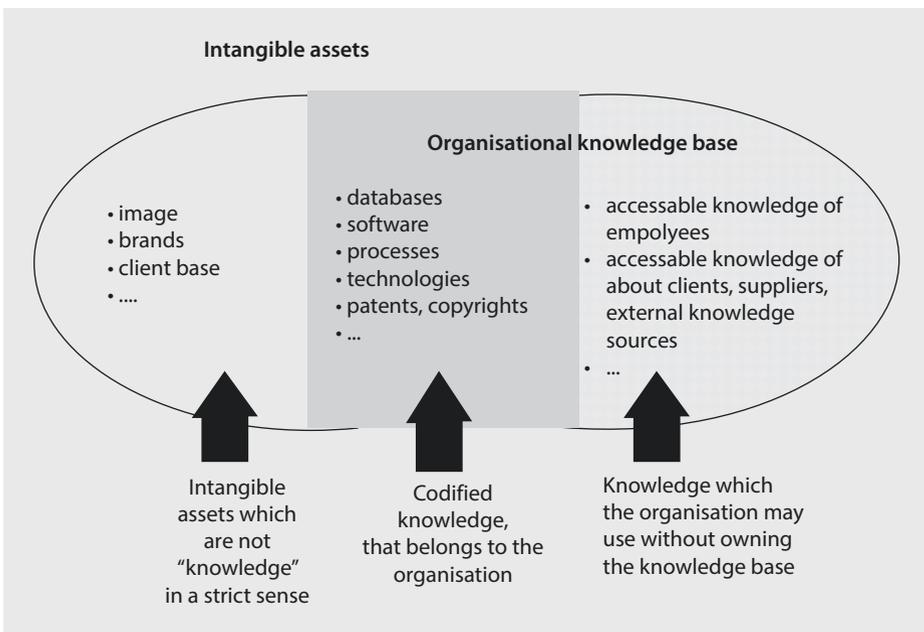
◻ **Fig. 2.6**   Organisational knowledge base is part of intangible assets

Following the footsteps of Skandia, while structuring the company capital, the market value of a company is described by the financial capital and the intellectual capital (Skandia 1998). The intellectual capital in turn is divided into human capital, customer capital and organisational capital.

Human capital is comprised of the competencies of the workforce, their motivation as well as relations and values. In short we might say: Human capital = competence × motivation.

Customer capital represents the value of the company's relationship with the customer. Saint-Onge defines customer capital as the depth (penetration), width (coverage) and the attachment (loyalty) of the customer base (Bontis 1996). The examples of customer capital are patients of a doctor, client base of a mail order company, branch networks of a bank and their customer relationships. Sveiby emphasised that supplier and distributor relationships must also be included in this category of capital (Sveiby 1997).

The third category of intellectual capital is **organisational or structural capital**. Skandia divided the organisational capital into innovation capital, process capital and culture. The combined value of the value-creating processes is recorded under process capital. This includes for example the value of the client order process or the value of the procurement process. The value of procurement process is based on the knowledge of employees of the purchasing department about supply markets, their ability to negotiate with the suppliers, in structuring the process cycle from a purchase requests up to finding a supplier and managing supplier relations. Knowledge is linked to the databases, software as well as values and goal-setting of the employees of the purchasing department.

It is often said that structural capital is the capital «*that remains when the employees go home*». We have to note, however, that this capital comes to life and has a value only with the employees. Though information codified in the databases, software and process ensures daily operations it is valueless to a great extent if there is a massive brain drain.

Innovation capital, the second pillar of structural capital, is defined by Skandia as the renewal strength of a company and is evident in the protected intellectual property like patents, licences or brand names and intangible virtues that enable future cash flows. This contains, for instance, valuation of creativity. The structure of Skandia's organisational capital is illustrated in ▣ Fig. 2.7 (See also ► Chap. 9 for further detail).
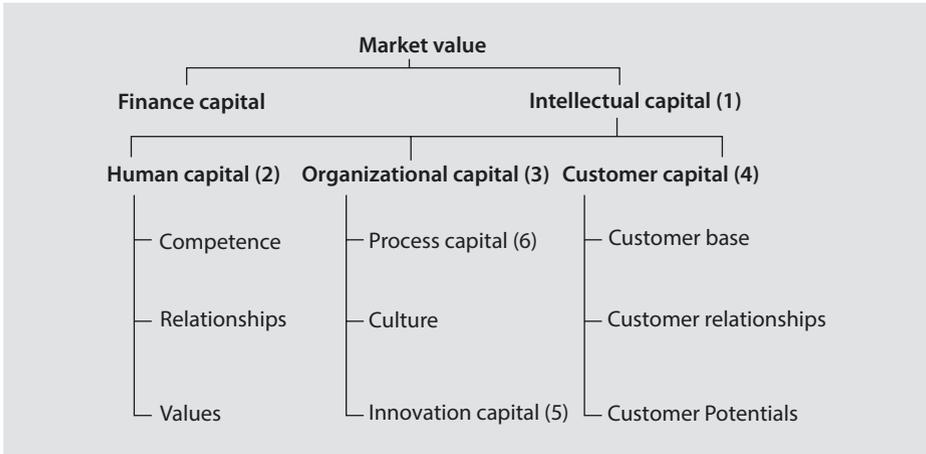
Criteria to Assess the Value of Knowledge

Above we have explained how to break down knowledge into components that can be assigned a value under certain conditions.

In the following we will deal with the question of how a value can be assigned to knowledge and which criteria influences this.

The value of knowledge is measured mainly on the basis of the *scarcity* **and the value-creating potential** of this resource. It is often difficult for both – the «seller» and the «buyer» to assess the value-creating potential of knowledge (e.g. what is the value of a patent?, What am I willing to pay for a technology consultant?)

While evaluating knowledge, the knowledge «seller» might take as a first orientation the efforts involved in acquiring the knowledge. «*I have invested so much time and money in acquiring this knowledge. Now, I want to sell it at a higher value if possible.*»

2


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                              Market value
           ┌──────────────────────┴──────────────────────┐
    Finance capital                          Intellectual capital (1)
           ┌──────────────────────┬──────────────────────┐
  Human capital (2)    Organizational capital (3)   Customer capital (4)

      ├─ Competence        ├─ Process capital (6)       ├─ Customer base

      ├─ Relationships     ├─ Culture                   ├─ Customer relationships

      └─ Values            └─ Innovation capital (5)   └─ Customer Potentials
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◼ **Fig. 2.7**   Skandia's structuring of organisational capital (Source: According to Skandia 1998)

The internal ***sunk costs*** that are incurred on, for example, the training of employees or building a team operative in software development are meaningful only to a certain extent while determining the value of knowledge resource. This is because, firstly, the expenditure incurred by the company cannot always be ascertained in terms of cost. Secondly, the expenditure could have increased because of inefficient training and advanced training measures, or the knowledge obtained can no longer be of any value because of fast changes in the market. From this viewpoint, the valuation of knowledge resources based on expenditure is inadequate. On the other hand, the knowledge «buyer» is not sure of the potential value that can be added by the transferred knowledge. This is a basic problem of the consultancy firms because the client – particularly in case of process-oriented consulting – buys learning processes without an assured result.

A better orientation might be to consider ***the replacement cost of an intellectual asset***: What will it cost me to build an effective research team» and relate this to the value creation potential of the team. In ▶ Chap. 9 we discuss «Tobin's q» which relates market value of an asset to its replacement cost.

Case Study

The Value of Knowledge

The tractor of a farmer stopped working. All the efforts of the farmer and his friends to repair the tractor were in vain. Finally, the farmer made up his mind to fetch a mechanic. The mechanic had a look at the tractor, activated the starter, lifted the engine bonnet and checked every detail. Finally, the mechanic took his hammer. With a single blow of the hammer at a particular place the tractor started functioning again. The engine functioned as though it had never broken down. As the mechanic handed over an invoice to the farmer, the farmer was completely shocked and angry and said, «What? You want fifty Toman for one strike of a hammer!» The mechanic said, «My dear friend, I charge only one Toman for the hammer strike. But I have to charge forty-nine Toman for knowing where to strike.»

The following key questions introduce knowledge «sellers», knowledge «buyers» and investors to the valuation of knowledge:

- Knowledge users: For which purpose do I use the knowledge and what is the «value adding potential» related to this knowledge?
- Knowledge «sellers»: What was my cost for acquiring this knowledge and how can I make this knowledge valuable in the market? Investor: How will the knowledge of this company contribute to its success in the market? What is the relation between market value and replacement cost?

The knowledge sellers, knowledge buyers and investors will assess the knowledge implicitly by means of a range of criteria which we will discuss in the following:

Specificity   We assume that the more specific the knowledge, the higher its value. Users value ready made and tailored solutions of their problems. Knowledge contributing to this will be higher valued than general principles. This leads, for example, to a strategic discussion in consultancy companies about the value of standard methodologies versus individualised advice.

The validity of knowledge can be seen from a content perspective and a time perspective. The content perspective refers to the way in which knowledge is created and validated.

- Scientifically accepted knowledge that has universal validity under precisely defined conditions
- Judgements and evaluations that can be traced objectively
- Individual or collective experiences and acting potential derived from such experiences.

There is an argument that the cost of acquiring knowledge – and in certain respect, the value – is lowest for the accepted knowledge and highest for the potential knowledge. Researchers in pharmaceutics might buy accepted knowledge in the form of a scientific database at a relatively low price, but the cost of molecular modelling or acquiring advice from experienced experts will be much higher. Therefore, the value of a research team or a strategic alliance with a laboratory should be estimated as significantly higher than the accumulation of accepted knowledge.

The **temporal validity** of knowledge refers to its «expiry date». A general technological knowledge base has a longer validity than market knowledge that can drop to zero value just within days or weeks.

Yet another criterion of valuating knowledge is its uniqueness or its **scarcity** value. However, there should be a corresponding demand when knowledge is to be evaluated this way. An expert might be the only person with knowledge about a specific subject without there being any demand for his knowledge. Equally important is the speed at which this knowledge can be imitated or substituted.

All these perspectives are considered while valuating knowledge.

2

2.3   Knowledge as Competitive Factor

2.3.1   Knowledge-Based Theory of the Firm

Morin recognises the company as a place where individual knowledge and individual intelligence converge to form a collective and creative intelligence that can be put to entrepreneurial use. From this viewpoint, companies exist because they are in the position to convert individual knowledge into collective knowledge and employ it for an entrepreneurial purpose. Accordingly, the business is successful:

- If individuals make their relevant knowledge and experience available for the operation of the firm and
- If there is an effective knowledge transformation process from individual to collective level and
- If activities are aligned in an entrepreneurial spirit to achieve the objectives of the firm.

However, this description of a company from the knowledge point of view does not explain the existence of the company. Individuals could get together in order to share their knowledge, to create collective knowledge and thus to transact business (Spender 1996; Grant 1996; Tsoukas 1996; Kogut and Zander 1992). According to Grant (Grant 1996, p. 112), the existence of a company is a result of the restricted capacity of a human brain to acquire, store and to process knowledge. This gives rise to individual specialisation in several fields of knowledge. However, offering complex solutions to problems requires coordinated efforts of various specialists. Markets alone are incapable of taking up the role of this coordination because they cannot mobilise tacit knowledge and cannot answer the risk of theft of intellectual property (in case of explicit knowledge) by a potential knowledge buyer. Thus, companies exist because they are capable of creating conditions that favour the production of goods and services and enable individuals to integrate their specialised knowledge. Hence, an important task of the knowledge-based management of a company is to establish conditions so that employees with specific knowledge are in a position to create collective knowledge and to implement it to ensure business success.

2.3.2   Knowledge as Strategic Competitive Factor

But how to ensure business success in a competitive environment? In this respect, knowledge is increasingly being considered as a *strategic competitive factor*. This has formed complementary viewpoints – the market based view (Porter 1985) and the resource-based view (Penrose 1959; Hamel and Heene 1994) further developed by the theory of «dynamic capabilities» (Teece 2009, see also Teece 2007; Teece et al. 1997, 2000).

The *environment related or market-based view* (Porter 1985) assumes that competitive advantage arises out of uneven distribution of information and knowledge between companies and the resulting positioning of firms in their sector. Since individual companies are ahead of competitors in terms of information and knowledge,

they recognise market opportunities earlier than the competition. Since they have the corresponding competencies, they convert these opportunities into business. From this perspective, entrepreneurship involves detecting relevant differences in information and knowledge as well as conversion of this difference into business. But this results in a dynamic competition wherein the actions of the successful company are imitated and thus competitive advantages are continuously lost and it becomes necessary to identify new developments in information and knowledge as well as implement them in entrepreneurial activities. Hence, this type of competition requires a company to be faster than its competitors while it is difficult to build lasting competitive advantage.

In the *resource-based view* (Penrose 1959; Nelson and Winter 1982), companies achieve competitive advantages by being and acting differently than its competitors. As opposed to the environment-oriented approach, this approach enables continuous differentiation between companies. These differentiations are difficult to imitate.[2] Considering the potential of the resources to achieve continuous competitive advantage, Barney (1992) reviewed them in four criteria which are often abbreviated as «VRIN»:

- **V**aluable (for the customer)
- **R**are as compared to the rivals
- **I**mperfectly imitable due to unique historical conditions, causal ambiguity and social complexity
- **N**on-substitutable

The last two criteria are seen as particularly relevant for achieving continuous competitive advantages. *Obstacles in imitation* arise firstly because knowledge is codified but legally protected, e.g. brands or patents. Secondly, because knowledge exists in tacit form and through facts that even explicit knowledge is related to persons and groups of persons. The obstacles in imitation are linked directly or indirectly to the knowledge or the development of knowledge. Furthermore, it is argued that intangible assets are the real source of competitive strength and key factors in the adaptability of the company because of the following three reasons: Intangible assets are difficult to accumulate, they can be used a number of times simultaneously and they are both inputs and outputs of business activities (Itami and Roehl 1987, p.13/14).

Does this hold also for fast moving business environments open to global competition, and characterised by dispersion in the geographical and organisational sources of innovation and manufacturing? Teece (2009, p. 4) argues that *sustainable* advantage requires more than the ownership of difficult-to-replicate (knowledge) assets. According to Teece this also requires unique and difficult-to-replicate so-called «dynamic capabilities». These capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base.

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2   Barney (1992), see also ► http://www.valuebasedmanagement.net/methods_barney_resource_based_view_firm.html

2

> **Definition**
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> **Dynamic capabilities** are the ability to reconfigure, redirect, transform, and appropriately shape and integrate existing core competences with external resources and strategic and complementary assets to meet the challenges of a time-pressured, rapidly changing Schumpeterian world of competition and imitation (Teece et al. 2000, p. 339).

» For analytical purposes, dynamic capabilities can be disaggregated into the capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and when necessary, reconfiguring the business enterprise's intangible and tangible assets. Dynamic capabilities include difficult-to-replicate enterprise capabilities required to adapt to changing customer and technological opportunities. They also embrace the enterprise's capacity to shape the ecosystem it occupies, develop new products and processes, and design and implement viable business models. (Teece 2009, p. 4)

How are these competitive advantages developed out of production factors that can be bought on the market? Let us consider the following example:

A laboratory recruits graduates (***production factor***) on the labour market and integrate them into a team of experienced R&D staff in order to develop an innovative, specialised group of developers. The team becomes a ***resource*** which is difficult to imitate due to shared values and tacit understanding. The lab has established ***routines*** and processes of technology and project management over the years through which the individual ***skills and competences*** of R&D teams are organised to deliver unique and difficult to imitate development services. Content and type of development work are continuously reflected in a strategic dialogue with leading research institutes and customers. Based on this new areas of knowledge are integrated and thus an enrichment and of existing core competences is ensured. ***Dynamic capabilities*** are developed to sustain uniqueness.

It is clear from this chapter that compared to the physical resources, knowledge is a more difficult to imitate and rarer company resource that offers a very high potential for generation of value. Knowledge is increasingly being considered as «a justification of existence»; as a determining factor for existence and size of a company.

» The analysis of what organisations are should be grounded in the understanding of what they know how to do. (Kogut and Zander 1992, p. 383)

2.3.3   Impact of Knowledge Management Practices on Performance

«What are the benefits of Knowledge Management?» is an often asked questions by management.

A number of studies relating KM processes, practices and business cases to organizational performance provide the answer. Studies which provide an overview of these relationships have been published by Zack et al. 2009, Andreeva and Kianto 2012, Inkinen 2016).

Empirical evidence on the association between KM and firm performance is based on three avenues of research. Inkinen (2016) describes the first two: First, studies investigating how *knowledge processes* (acquisition, sharing and utilization) which typically take place in firms even without systematic managerial intervention, are related with various firm performance outcomes. Secondly, studies focus on the impact of conscious organizational and managerial practices, with an intention to achieve organizational goals through efficient and effective management of the firm's knowledge resources (Andreeva and Kianto 2012). A third type of studies looks into concrete business cases and establishes a relationship between intervention and outcome (North and Hornung 2003; North et al. 2004).

The impact of KM processes, practices, business cases and organizational performance are well summarized by Andreeva and Kianto (2012, p.619). While it is argued that KM can bring direct economic benefits to the firm through saving or earning money, a more usual view seems to be that the impact on financial performance of the firm is indirect. Zack et al. (2009) found that KM practices are directly related to various intermediate results of strategic organizational performance and that those intermediate results are associated with financial performance. KM delivers economic benefits to the firm by such various manners as accelerating innovation and structural agility; reducing cycle time in production and program failures; creating a healthy and knowledge-friendly culture; attracting and maintaining high-quality knowledge workforce; and by improving re-use levels of knowledge and corporate memory. KM has also been connected with product leadership, customer intimacy and operational excellence, innovation, organizational creativity.

> **Definition**
>
> **KM practices** are the conscious organizational and managerial practices intended to achieve organizational goals through efficient and effective management of the firm's knowledge resources. (Inkinen 2016, p. 232 based on Andreeva and Kianto (2012).

Let us now analyze which KM practices yield which results regarding firm performance. In the following we summarize major findings of Inkinen's (2016) literature review.

- *Knowledge-based human resource management practices* The literature strongly suggests that HRM practices are highly associated with innovation. Some studies point out that the utilization of HRM practices increases the knowledge processes, such as acquisition, sharing and creation, which have an impact on innovation capability. In addition, HRM practices seem to increase innovations and improve innovativeness by having a positive influence on the affective commitment of employees and impersonal trust.
- *Knowledge management leadership practices* Top-management support is associated with an increase in knowledge processes, which result in higher organizational learning and the capability to develop new products or services, predict business or risks and cope with new information regarding markets. Knowledge-oriented leadership, in terms of empowering employees and promoting trust and learning, increases the effect that knowledge exploration and exploitation practices have on innovations. A transformational mode of leadership including idealized influence, intellectual stimulation, inspirational motivation and individualized consideration, increases the firm's relative performance compared to its competitors through improved knowledge acquisition and financial performance through learning and innovation.

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- *Technology-oriented knowledge management practices* IT support for collaboration, communication, information search, real-time learning, simulation and prediction is associated with a firm's innovativeness. Researchers also note that IT support is a main facilitator of knowledge acquisition, creation and sharing, which pushes firms to improved performance through innovations and organizational agility.
- *Organization-oriented knowledge management practices* One study found that the establishment of a special unit in charge of KM, is significantly associated with firm performance in a learning and growth perspective, an internal process perspective and a customer perspective.
- *Management process-oriented knowledge management practices* Generally speaking, the firms were found to perform better if all the necessary strategic KM elements existed, e.g. the concept of KM for top management, a breadth of knowledge strategy objectives and KM tools and implementation support elements, such as cultural principles, leadership and HR practices. Strategic KM practices are especially associated with innovations. Based on an extensive national survey in Germany Pawlowsky and Schmidt (2012) confirm a strong positive relationship between KM and innovation.

Analysis of Business Cases

To deepen the understanding of the relationship between performance and KM initiatives, applications of 48 German enterprises for the award «Knowledge Manager of the year 2002 and 2003» were evaluated. 240 impact statements were grouped according to the dimensions of the Balanced Scorecard (North and Hornung 2003; North et al. 2004). Enterprises harvested mainly benefits related to process improvement and to employee performance. Relatively few statements referred to the impact of KM initiatives on financial results and Innovation. In the **process dimension,** benefits have been realized mainly in the area of process acceleration, the reduction of double-work and the re-use of internal knowledge. Having a look at company size, it turns out that small companies focused particularly on the re-use of internal available knowledge and the reduction of errors and the big players rank «time savings» and «process transparency» as top benefits in this category. Related to **employees,** dominant arguments are: increase of motivation, enhancement of personal knowledge base and shorter on-boarding time for new employees.

For small companies, competence development represents a significant benefit, while big firms mention improved teamwork as key benefit in this dimension. In relation to **customers,** firms argue that KM activities have led to an increase in quality of products and services. This applies irrespective from company size. Benefits in the area of «**financial results**» refer to an increase in turnover, an improved risk management and reduced administration costs. Some firms presented calculations how a better availability of information reduces search times and what the related cost savings potential is. Effects of KM initiatives on **innovation** were the creation of new products & services, followed by –mainly mentioned by big companies - the application of new technologies. Based on the findings ◨ Fig. 2.8 provides an overview which impact on operational performance firms can expect from KM business cases.
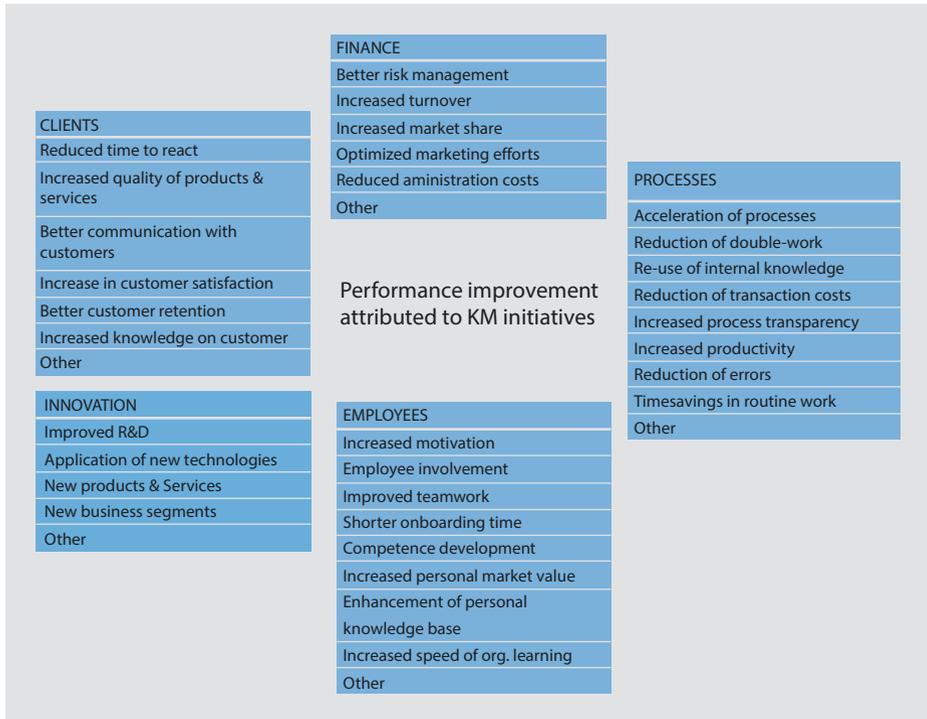
◨ Fig. 2.8 Performance improvement attributed to KM initiatives (240 impact statements by 48 German firms, North et al. 2004)

2.4   **Key Insights of Chapter 2**

- Knowledge in an organisation can be classified in different ways and can be evaluated. The handling of information is affected by the perspective «What is knowledge and how important is it for our organisation.»
- The knowledge ladder describe value creation linking information, knowledge, competence and competitiveness
- There are at least three knowledge epistemologies. Depending on the situation, knowledge can be viewed as an object or a process. The process perspective of knowledge is explained in this book.
- The SEICI model describes the transformation of knowledge from individual to collective and from tacit to explicit.
- Knowledge is viewed as a component of intangible assets or «intellectual capital». The value of knowledge is based on its scarcity and potential to add value.
- Knowledge is considered as a factor of production, a strategic competitive factor and basis of the existence of a company. Knowledge can be imitated and substituted – these two aspects of knowledge are the decisive criteria for sustainable competitive advantage.

2

2.5   **Questions**

1. Explain the difference between information and knowledge and knowledge and competence.
2. What is the difference of tacit and explicit knowledge? Is explicit knowledge only «information»?
3. How would you interpret Knowledge Maturity in an organisation?
4. Assess the value of a five person research and development team. Which criteria would you use?
5. What are criteria to evaluate core competencies?

2.6   **Assignments**

1. **Transferring successful sales practices**
   In your company several of the experienced sales representatives are close to retirement. A number of new sales reps. have been recruited.
   You are asked to propose how to structure an effective knowledge transfer between old and new sales reps. You remember the SEICI model of Nonaka and Takeuchi and think that this might be a good basis for developing a proposal.
2. **Core competence analysis**
   Apple is often cited as a successful and innovative company. Analyse the core competencies of Apple.

2.7   **KM-Tool: Idea Competition**

❓ **What is an idea competition?**
   Leveraging employees' creative imagination in conjunction with the thrill of competition is a powerful way to source compelling, well-articulated ideas.
   An idea competition is a well focused way to access innovative ideas and solutions from employees, users, potential clients. **The quality of ideas increases exponentially when participants' are given a clear and focused challenge question.**
   Idea competitions build on the nature of competition as a means to encourage participation in an open innovation process, to inspire their creativity, and to increase the quality and focus of submissions. When the contest ends, submissions are evaluated by an expert panel. Those whose submissions score highest usually receive a bonus or an award.

❓ **Why use idea competitions?**
   1. In many organisations suggestion schemes do or work well. People do not submit their ideas because of bureaucratic procedures. Idea competitions open a change for a focused, timely and simple collection of ideas.
   2. Tapping ideas from «the crowd» of users or other people outside the organisation has a huge value creation potential
   3. Idea competitions create a spirit of interaction and challenge current practices and wisdom

❓ How to organise idea competitions?

Prepare a clear and transparent process:

Idea competitions involve multiple participants including sponsors, administrators, contestants and judges. The responsibilities of administrators include:

1. **Design:** Prior to launching a competition it is important to set the rules, design the structure, select prizes and incentives and determine the timeline.
2. **Planning:** It is essential to carefully plan, anticipate the number of submissions and define the various roles and responsibilities during the various stages of the process.
3. **Prioritisation:** If hundreds of ideas are submitted, it is important to efficiently sift through the submissions to quickly identify the best ideas.
4. **Providing a delightful experience:** Each participant must feel energised to participate and feel the competition process is fun and easy to engage in.
5. **Transparency:** Respond to participants in a timely fashion and make information accessible to reduce administrative bottlenecks and make them feel important.
6. **Fair evaluation:** Uniform judging is critical to fair competition. Judges should be provided with a scorecard and evaluation criteria to fairly rate each concept plan/idea.
7. **Managing scale:** Due to the viral nature of online competitions, administrators must be prepared to handle hundreds or perhaps thousands of entries. Using a robust and proven web-based system will prevent the administration from being burdened.

Ensure participation and prepare for high quality results.

How can an employee-driven idea competition process be designed to deliver better ideas? A few important guidelines are as follows:

1. **Executive-level sponsorship:** Have a senior executive sponsor the competition, play a role in defining the strategic focus, and communicate the importance of the effort in supporting corporate strategy.
2. **Participant section:** Recruit creative, passionate participants with complementary skill sets and perspectives (marketing, consumer insights, R&D, channel sales, production, etc.) and assemble them into teams. Involving key stakeholders in the innovation process fosters conversations that lead to higher quality ideas. It also creates the ownership that accelerates the decision-making process and builds the buy-in necessary for implementation.
3. **Participant preparation:** Treat idea competitions (and *any* innovation effort) as a process – not as an event. Expecting participants to innovate without any meaningful preparation, context or inspiration typically leads to irrelevant «ideas in a vacuum».
4. **Consumer Insight:** Ensure that participants have insight into consumer needs – both articulated and unarticulated. Go beyond historical consumer data and usage patterns, and seek to understand the voice, heart and mind of consumers. At a bare minimum increase participants' awareness of known issues that consumers have with current products, services and solutions, but for better results build in a «consumer experience» module (such as a field trip) that has participants observe consumers using the current product or service.

5. **Industry Foresight:** Create an orientation towards future-oriented thinking. Help participants identify *emerging* trends along several dimensions, for example: «bleeding edge» technologies, anticipated shifts in the competitive landscape, unusual business models, hypotheses about societal trends, anticipated regulatory shifts, emerging sales channels, new manufacturing practices, etc. Be aware that focusing on historical data and *established* trends is easy to do but typically limits the output to closer-in, incremental ideas such as line extensions. Most companies are familiar with historical trend data but are uncomfortable thinking about «emerging trends» – and yet it is critical.

6. **Strategic, imaginative thinking:** Push participants to break out of traditional thinking modes and challenge their own assumptions. Have them look for lessons and analogs from other industries. At a minimum, introduce interactive stimuli (videos, advertisements, «user scenarios», customer testimonials, etc.). Old habits and thinking patterns are hard to break – stretching participants' thinking to entirely new levels calls for a radically different approach.

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