Research Core of Knowledge Management

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Enterprises functioning in a market economy have to implement changes in their systems of organization and the management they use. In economic practice, making a decision in an enterprise is conditioned by competitors' actions and changing environmental factors, e.g., technical progress and the results of research efforts. Added value for a company can be determined as knowledge, employees' skills and abilities, social relations, know-how, and, particularly, effective investment in intellectual capital. Enterprises that invest in human capital and systems of work achieve a competitive advantage because of their workers' readiness to learn and achieve and also thanks to effective information and communication transfers (Edvinsson and Malone 1997).

Knowledge management is promoted as an important and necessary factor for organizational survival and maintenance of competitive strength. To remain at the forefront, organizations need a good capacity to retain, develop, organize, and utilize their employees' capabilities.

It has long been recognized that "the increase in the stock of useful knowledge and the extension of its application are the essence of modern economic growth" (Kuznets 1966; Ackoff 1974). Poland is an example of a country that is transforming itself into a knowledge-based economy. This process of change comes as a response to the country's developmental progress on the basis of export-led growth and the input of multinational companies.

At present, the advantage of any company is determined by the effectiveness and extent of the knowledge that its workers possess combined with their level of involvement within the company. The role of intellectual-capital management mainly consists of striving to increase the share of non-material resources (at the cost of material ones) in the generated products, services, and the total market value of an organization (Król and Ludwiczyński 2007). Knowledge, based on information and supported by cultural values, has become an independent force and the single most decisive factor in social, economic, technological, and cultural transformation. Enterprises that invest in knowledge, innovation, and systems of work often achieve a competitive advantage as a result of their workers' readiness to

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learn and achieve. Additionally, such competitive advantages are often formed as a consequence of effective information and communication transfers.

A number of potential benefits and challenges with implementing knowledge management in companies are outlined in this part of the monograph. The key research questions include the following:

- What is a knowledge-based economy and why has this topic become an issue?
- What are the known models of organizational structures in knowledge-oriented companies?
- What are the development trends of knowledge-oriented companies?
- Why should companies adopt models of organizational structures of knowledge-oriented companies?

2.1 Essence of Knowledge Management

2.1.1 Defining the Knowledge-Based Economy

According to the Organisation for Economic Co-operation and Development (OECD), a knowledge-based economy signifies one directly based on the production, distribution, and use of knowledge and information (OECD 1996). At the OECD conference on employment and growth in the knowledge-based economy, Foray and Lundvall joined forces, arguing that the "economy is more strongly and more directly rooted in the production, distribution and use of knowledge than ever before" (Foray and Lundvall 1996). According to other authors, however, the concept of a knowledge-based economy is rather a rhetorical term, a metaphor "often used in a superficial and uncritical way" (Smith and Barfield 1996; Smith 2002).

The knowledge-based economy has allowed a rapid integration of enormous intellectual resources of economies in transition into the European intellectual pool, stimulating the development of those countries. All countries can benefit from developing a knowledge-based economy toward becoming a more equal participant in the global development process. The four pillars of the knowledge-based economy are defined as:

- An economic and industrial regime
- An educated and skilled population
- A dynamic information infrastructure
- An effective innovation system

Concepts for a knowledge-based economy do not fall into a single, universally accepted definition. What follows is a brief review of selected approaches that may be used toward forming a definition.

Drucker stated that a knowledge-based economy is "an economic order in which knowledge, not labor, raw materials or capital, is a key resource, a social order, for which inequality based on knowledge is a major challenge and the system in which the government cannot solve social and economic problems" (Drucker 1994).

According to a report prepared jointly by the OECD and the World Bank in 2000, a knowledge-based economy is one in which "knowledge is created, absorbed

and utilized more effectively by enterprises, organizations, individuals and communities, promoting rapid economic development" (Dahlman and Andersson 2000).

Koźmiński defines a knowledge-based economy as one in which there are many businesses based on knowledge and an understanding of their respective competitive advantages (Koźmiński 2002).

In the government document entitled "e-Poland—An Agenda for the Information Society in Poland in 2001–2006," a knowledge-based economy is defined as "an economy in which knowledge is a major factor in productivity and economic growth (before labor and capital, raw materials and energy), a key role in knowledge-based economy is played by information, education and technology, especially information and communication technologies" (The Ministry of Economy 2001).

To illustrate the Polish position as compared with that of other countries in creating conditions for the development of a knowledge-based economy, it is appropriate to present the index value of the knowledge economy in the European Union (EU) and the United States (Fig. 2.1). This is done in accordance with the Knowledge Assessment Methodology (KAM)—an interactive method of diagnosing the state of a knowledge-based economy developed by the World Bank.

The relatively low value of the index for Poland compelled me to undertake research in the field of managing company knowledge.

2.1.2 Companies in a Knowledge-Based Economy

The aforementioned organizational structures provide a forum for representatives of science, modern industry, and all aspects of entrepreneurship. The main purpose of these structures is to bring research results (and research scientists) and innovative solutions closer to the social and economic practices of enterprises. The activities of such organizations are aimed at developing new technologies and upgrading existing ones and finding solutions to synthetic, technological, and analytical problems encountered by various active companies.

Nevertheless, the range and speed of innovation enterprises is restricted compared with that of large enterprises, which typically have their own research and development infrastructure and the financial means to allow extensive research (Amit and Zott 2001). "Innovation is not a guarantee of success, it is a chance . . . leading companies develop the wallet of innovation, which others can take from in order to sustain their own growth" (Davila et al. 2006).

For knowledge and expertise to be useful to an organization, they must be applicable to those organizational strategic objectives that add the most value, such as customer service, market leadership, and operational effectiveness (Zack 1999). In this context, the term "intellectual capital" (or intellectual resources) is often used to represent knowledge that can be converted into profit and other forms of value (Stewart 1998).

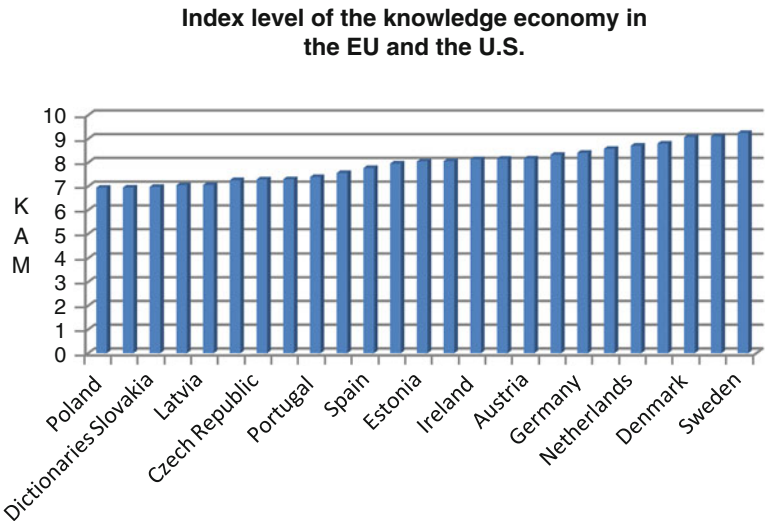

Fig. 2.1 Index level of the knowledge economy in the EU and the United States in 2006 (Source: Żelazny 2006)

In the knowledge economy, it is necessary to take into account innovation, education, information, communication, and knowledge management at a level that are appropriate for the organization. Such knowledge management should also take into account aspects of the institutional and business environment and any regional policy features that may have an effect on the enterprise (Grudzewski and Hejduk 2004). In this light, I define the determinants of the company in the knowledge economy as indicated in Fig. 2.2.

Based on previous these findings, it can be determined that the task of policy innovation is to use any appropriate innovative methods of analysis, innovation, and decision making and then become the main force of the creative organization. As such, these methods should be regarded as assets under its management system and company culture. In the literature (Drucker 1994; Pisano and Wheelwright 1995), an innovative enterprise is characteristically defined as one that has high competence, an ability to generalize and innovate, apply policies, is customer-oriented, possesses all appropriate information, and is flexible in a changing market environment.

Action in terms of an enterprise's development and the integration of knowledge and innovation are important factors in developing a competitive advantage (Pisano and Wheelwright 1995). The literature is distinguished by a number of definitions of the concept of innovation, such as the following. "Innovation refers to goods, services or ideas that are perceived as new. The idea may have long been, but it represents an innovation for the person who sees it as the new" (Kotler 1994). "Innovation is all that is perceived by humans as new, independent of objective news" (Rogers 1995). According to the theories of Drucker, "A source of

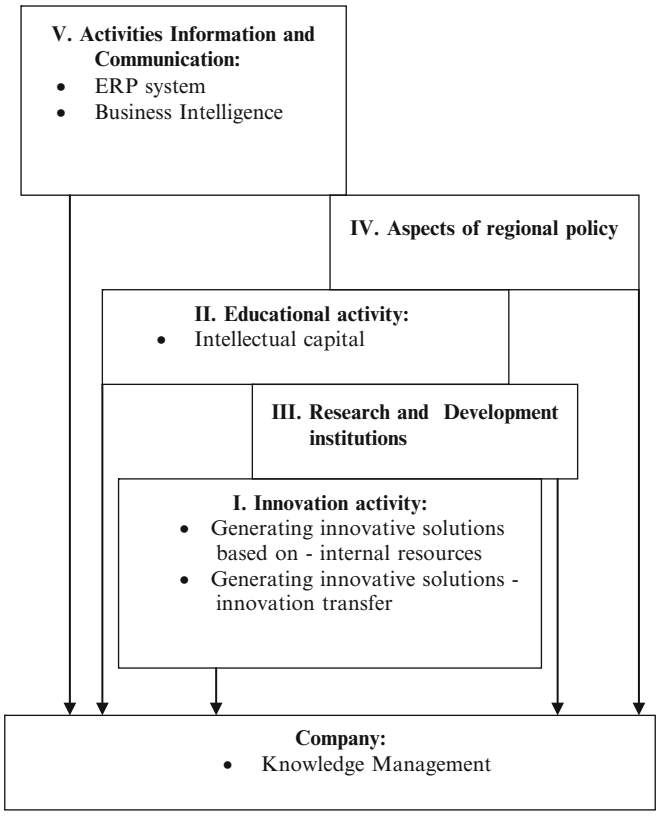

Fig. 2.2 Determinants of the company in the knowledge economy

innovation is the observation of market processes and the implementation of innovation which allows the company to gain a competitive advantage in the market" (Drucker 1994).

For a company to achieve sustainable competitiveness, it should seek to obtain support from research institutions with the aim of acquiring knowledge and innovation as "drivers of growth" (according to the document "Working together for growth and jobs-A new start for the Lisbon Strategy"). Companies should develop themselves as attractive business partners through the thoughtful use of patents, technology, location, quality products, and low-cost purchases. A competitive advantage can determine the competitiveness of a company. Competitiveness is a concept that has a high degree of theoretical abstraction.

Thus, there is a clear set of dominant competitive strategies:

- Cost leadership
- Creation of uniqueness for the client
- Being competitive with regard to deadlines
- Developing key competences

- Gaining an advantage through collaboration
- Competing for the future

There are also sub-competitive strategies:

- Potential competitiveness-the full range of the organization's resources
- Competitive advantage-understood to be the corollary result of the appropriate use of corporate resources
- Competitive instruments-measures aimed at achieving the organization's competitive position
- The competitive position—a leading position of the organization in its field of industry

In the literature, innovation is commonly defined as the ability and incentive to explore and commercially exploit any scientific research, new concepts, or ideas that could improve the competitive position of a company (Prahalad and Hamel 1990). It is clearly noted, however, that most companies do not have the power and resources necessary to build a truly innovative company owing to their limited structure and size. Hence it seems logical that companies should collaborate with R&D institutions to become innovative. This cooperation will allow the creation of joint projects and new technical knowledge in the companies' area of expertise. Innovative companies should lead to a system of general creation that diffuses into the economy (OECD 1996).

Highly innovative companies, however, are not necessarily guaranteed continued economic growth. There remains a constant risk of failure as a result of putting resources into activities that may lead to innovation. Among other factors, financial resources-or a lack thereof-usually represent the main obstacle to growth. Today, however, in Europe at least, financial barriers are no longer such a key factor inhibiting the growth of a company because there are possibilities of obtaining funding from the EU.

2.1.3 Competitive Advantage in the Knowledge Economy

Building competitive advantage through dynamic capability requires constant knowledge flow within and outside the organization and a continuously updated knowledge repository. To be competitive in the knowledge-based economy, companies need to base their activities on cooperation with R&D centers, universities, and networks of firms. By highlighting the trends in the organizational structures of enterprises and using a defined network economy as a base, the following organizational solutions can be identified (Teece 2002; Stabryła 2009):

- A local, international, and global network
- A virtual organization
- Teleworking
- The individual inventor and stand-alone laboratory
- Highly flexible Silicon Valley-type firms
- Conglomerates
- Alliances

2.1.3.1 Local, International, and Global Networks

This organizational structure is based on the mutual relations of the unrelated business capital of a cooperative. These entities are related to IT technologies. Such networks may be characterized as follows (Butra et al. 1999):

- Combination potential-the ability to achieve various objectives in different conditions of business
- Activation of a network-the distribution of powers to induce new forms of cooperation. The composition of the network can be modified in line with a particular strategy. In this regard, we can distinguish the following types of network activation-controlled, monitored, and distributed
- A consistency network-determining the density of ties among network members There are four basic types of networks:
- Stars-consisting of leading companies
- Connection hubs-where all parties are equal
- Temporary networks-weak and formal
- Regional-usually an expression of territorial cooperation Furthermore, it is even possible to categorize the scope of the networks:
- Local-between a home country and its adjoining neighbors
- International-among several countries
- Global-operators in almost all countries of the world

Local networks are formed between companies or between companies and the business environment.

2.1.3.2 Virtual Organization

Virtual organizations have the capacity to be very creative and to excel at early-stage innovation activities. If they do indeed establish a strong alliance with a competent manufacturer, they may also have the capacity to be the first to market, despite their lack of the requisite internal capabilities.

In the literature, there are many definitions of virtual organizations. Such definitions include a temporary network of independent companies-suppliers, customers, competitors, and the combined IT skills to share costs and gain access to new possibilities (Byrne et al. 1993). Virtual organizations are also defined as an artificial creation that, through the maximum usefulness to the customer, is based on an individual competence base and focuses on pursuing the integration of independent enterprises in chain-making processes (Schulz 1996). Virtual organizations are described by Mowshowitz (1997) as having the following characteristics:

- Analyzing abstract needs or requirements
- Needing an analysis and determination of methods for their implementation
- Adopting the dynamic adaptation of methods to deal with their needs
- Researching and analyzing the methods adopted for implementation in conjunction with the needs of participants and customers in their network of operations

For enterprises to gain a competitive advantage through a virtual organizational structure, they must meet the following conditions (Zimniewicz 2000):

- Be competent

- Be able to cooperate with other actors
- Have modern communications and IT

In designing a modern innovative network, the following questions need to be answered:

- What will be the added value for users?
- What form of network should be adopted?
- What communication technologies does the network offer?
- What entities should be co-regulated under contracts?
- Should cooperation be based on mutual trust rather than formal cooperation?
- What organizational structures will the network management unit possess?
- What role should R&D institutes have?
- What will be the financial arrangements in cooperating through a network?
- What will be the form, structure, and content of the datasets in the network?
- What will be the form, structure, and content of the database results from the participation?

Enterprises have limited access to collaboration with R&D that aims at identifying, implementing, and disseminating innovation. Virtual enterprises, however, may provide opportunities for innovation. Via network connections, virtual enterprises have access to other companies and can base their production capacity on the knowledge that different firms possess and the innovations they want to share. This provides a powerful combination of the effects of several cooperating companies and is related to the breaking down of barriers to a lack of resources: capital, technical and technological bases; human resources, knowledge, and experience.

2.1.3.3 Teleworking

Teleworking is a form of providing work outside company offices where the worker maintains contact with supervisors and colleagues via telecommunications (Nilles 1998). It constitutes a form of employment by the employer, and its main goal is to create opportunities for reducing costs associated with the work of both the employer and employee. The advantages of teleworking from the standpoint of the employer are:

- Reduced expenses associated with the work
- Increased group employee productivity
- No need for constant upgrading of skills
- No need for strict planning and analysis of the use of working time
- Optimization of staffing
- Reductions in organizational conflict

The advantages of teleworking from the perspective of the employee are:

- Reduced expenditure in commuting
- Independence and flexibility with working hours
- The possibility for the individual to determine their own scope plus the type and pace of work
- Fewer conflicts with colleagues

Thus, teleworking may provide a convenient form of employment for firms. However, it is not without its obvious drawbacks, including:

- No direct supervisory manager
- The need for continuous upgrading of skills
- Irregular working rhythms
- Limited career advancement opportunities
- The difficulty in separating time off from work time
- A sense of alienation
- A potential lack of loyalty

2.1.3.4 Individual Inventor and the Stand-Alone Laboratory

When property rights are weak (the normal case), the inventor's ability to capture value is dramatically circumscribed (Teece 2002). In a case where the individual inventor has a patent but little else, the patent owner's options include the following: licensing the technology to incumbent firms who already have the necessary complementary assets in place; using intellectual property as collateral to raise funds to establish an organization to exploit the technology; or exchanging the intellectual property for cash or equity in an established firm.

The stand-alone research laboratory faces many of the same challenges as the individual inventor. The main difference is that the laboratory can bring multiple organizational skills to bear on the R&D process. Furthermore, the probability of fusing multiple technologies is enhanced by the bringing together of multiple research disciplines.

2.1.3.5 Highly Flexible Silicon Valley–Type Firms

These companies typically have shallow hierarchies and significant local autonomy. Such firms tend to resist the hierarchical accoutrements of seniority and rank found in the above categories, and they resist the functional specialization that restricts following up on ideas and may destroy the sense of commonality of purpose.

2.1.3.6 Conglomerates

In terms of access to capital and diversity of activities, one would not expect a conglomerate to look very different from a stand-alone firm with respect to innovative capacity (Williamson 1975).

2.1.3.7 Alliances

An alliance is a union of several companies that are competitors and operate in the same market; it usually has a long-term nature and the aim is to implement a joint venture. The integral component of an alliance is the sharing of the partners' knowledge and funds for the mutual benefit of all parties involved. This association must have a clearly defined goal, and its chances for survival depend on the balance between the partners. Strategic alliances are typically characterized by three basic features:

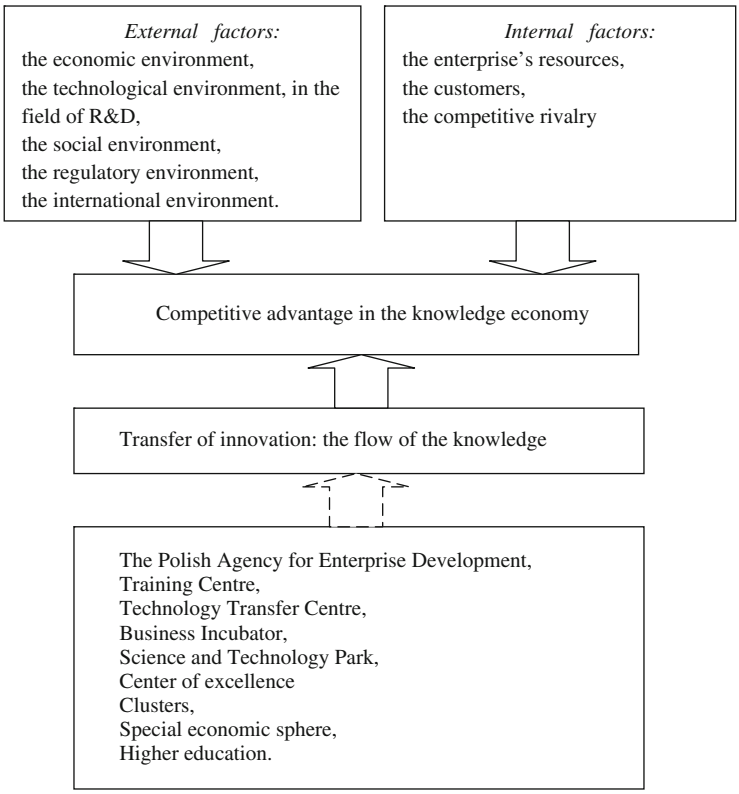

Fig. 2.3 Determinants of competitive advantage in the knowledge economy

- Fragmentation-alliances relate to only a fraction of the participants' contractual duties. Enterprises entering into an alliance may operate individually and outside the bounds of the agreement
- Transfer of assets within the coalition-the partners are committed to providing both material input (including capital and infrastructure) and intangible assets (including knowledge, skills, and abilities) to achieve joint projects
- Integrity-the revision of certain elements of a cooperation agreement cause the amendment of behavior patterns (Kraciuk 2005)

Therefore, on the basis of such descriptions, the following external factors shape the competitive advantage for a company in the knowledge economy (Fig. 2.3):

- Technological development on a global scale
- The possibility of adopting new technologies in the home country
- The overall level of economic development
- Innovation policy in the home country

And there are internal factors (Fig. 2.3):

- Personality factors arising from the business (organizational skills, creativity, desire to stand out, openness to innovation)

- Factors associated with the experience of the entrepreneur
- Factors relating to company personnel
- Factors relating to the close environment
- Factors arising from the company's location (e.g., the possibility of contact with R&D)
- The company's results (sales growth, earnings, liquidity) and any legal considerations relating to the company

A company's functioning in the knowledge economy involves rethinking how the organization creates value from a knowledge-centric perspective and redesigning and orchestrating the role of intellectual assets in the firm's strategy. To manage its knowledge more systematically, the enterprise must devise an agenda for transforming itself from an organization that simply comprises knowledgeable individuals to a knowledge-focused organization. Such an organization stewards the creation and sharing of knowledge within and across internal business functions and orchestrates the flow of know-how to and from external firms.

2.2 Knowledge Management and Managing Intellectual Capital

2.2.1 Essence of Knowledge Management in Organizations

Knowledge can be understood in many ways. The following taxonomy may be useful (Teece 2002):

- Codified/tacit
  Tacit knowledge is that which is difficult to transfer in a meaningful and complete manner. It is slow and costly to transmit.
- Positive/negative knowledge
  A discovery (positive knowledge) can focus research on promising areas of inquiry, thereby avoiding blind alleys.
- Autonomous/systemic knowledge
  Autonomous knowledge is that which yields value without major modifications of the system into which it is adopted.
- Intangible assets, tangible assets, and intellectual property

Knowledge assets are simply one class of intangible assets; they differ from tangible assets in several important respects (Table 2.1).

Knowledge can be regarded as a resource for the company owing to its characteristics (Jarugowa and Fijałkowska 2002): continuity, simultaneity, nonlinearity, dominant character, and immateriality.

Knowledge is a broad concept, embracing both formalized knowledge (explicit) and non-formal knowledge (hidden). From the relationship among data, information, information management, and knowledge, the latter should be regarded as a strategic resource for a company (Fig. 2.4) (Senn 1990). The application of information systems that support knowledge management in a company may offer guarantees of a constant competitive advantage in the market.

Table 2.1 Differences between intangible and tangible assets

	Knowledge (intangible) assets	Physical (tangible) assets
Publicness	Use by one party need not prevent use by another	Use by one party prevents simultaneous use by another
Depreciation	Does not "wear out", but usually depreciates rapidly	Wear out, may depreciate quickly or slowly
Transfer cost	Hard to calibrate	Easier to calibrate
Property rights	Limited	Generally comprehensive and clearer, at least
Enforcement of property rights	Relatively difficult	Relatively easy

Source: (Teece 2002)

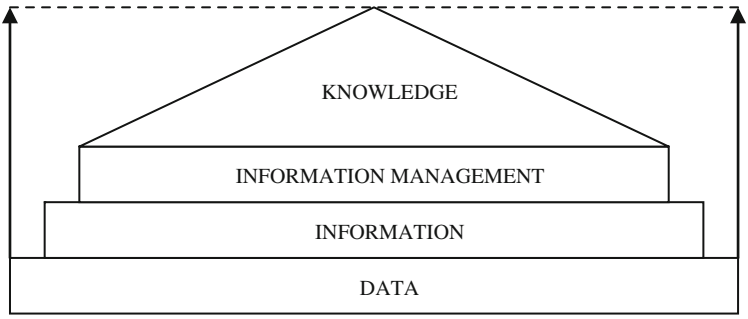

Fig. 2.4 Relationship among data, information, information management, and knowledge (Source: Senn 1990)

The process of knowledge management is defined as follows:

- Building a dynamic work environment and learning to foster the continuous generation, collection, and use of individual and collective knowledge to discover new values for the company (Evans 2005)
- A strictly defined system for identifying, generating, analyzing, addressing, processing, and using information (Kotarba and Kotarba 2003)

> Managing knowledge is the emerging model of business with all aspects of knowledge, including knowledge creation, codification, knowledge sharing and using these activities to promote learning and innovation. (Gupta et al. 2004)
>
> Knowledge management is a specially designed process system, and even the art of identifying, generating, analyzing, addressing, processing and the use of information and knowledge in order to make faster, smarter and better decisions in turning knowledge into value for customers. (Ives et al. 1998)
>
> Knowledge management is a logical continuation of the trend in the development of science in organization and management. (Kisielnicki 2004)
>
> Knowledge management is ensuring that knowledge is available to those who need it, in the place, at the time and the form they wish, so that the organization can function effectively in not only in economic terms, but also socially. (Ives et al. 1998)

> Knowledge management is the use of resources that the organization probably already has-well-functioning solutions for its information systems management, organizational change and human resources. (Davenport and Prusak 1998)
>
> All of the processes and operations associated with creating, acquiring, extracting, sharing and using knowledge, wherever they would be, in order to increase the efficiency, effectiveness and learning organization. (Swan et al. 1999)
>
> The deliberate and systematic management of knowledge and fundamental processes of its creation, accumulation, arrangement, dissemination and use in achieving the objectives of the organization. (Davenport and Prusak 1998)
>
> All the methods, instruments and tools that assist in the comprehensive terms of the key processes in the sphere of knowledge. (Mertins et al. 2000)
>
> Ways of improving the knowledge mobilization of resources by organizations operating in a turbulent environment in order to continuously follow-on innovation. (Nowell et al. 1996)
>
> Knowledge management is primarily concerned with people and its aim is to achieve such a level of interaction of people that will neutralize the weaknesses and maximize the talents and strengths of the participants in the organization. (Drucker 1994)

Based on the chosen definition of knowledge management, I assume that the process of knowledge management is essentially the process of supporting decision making in an enterprise based on collected data, information, and transferred knowledge.

In the literature there are three approaches in knowledge management: the Japanese approach, the process-based approach, and the resource-based approach.

The Japanese approach (Nonaka and Takeuchi 1995); (Table 2.2): The creation and expansion of knowledge takes place through social interaction between explicit knowledge (knowledge that can be passed on in the form of words, formulas, rules, and symbols) and tacit knowledge (knowledge that is difficult to provide in the form of words, formulas, rules, and symbols).

The Japanese approach assumes that knowledge is acquired by all employees in an organization and that the interactions between employees and the culture of the organization are of particular importance.

The process-based approach: The concept was developed by Davenport and Prusak (Davenport and Prusak 2000). The knowledge-management model is based on three pillars: knowledge expansion, knowledge codification, and transfer of knowledge. According to the model of Davenport and Prusak, knowledge expansion includes four basic steps (Davenport and Prusak 2000):

- Release of resources (consisting of creating R&D centers, whose task is to manage knowledge and acquire new knowledge)
- Acquisition of knowledge (involving the hiring of new employees)
- Internal mergers (involving the linking of individual people or departments, leading to creative solutions)
- Networking (involving the creation of communities and professional networks linking experts from different organizations)

Davenport and Prusak also distinguished two knowledge-management planes: (1) operational, which involves the practical aspects of using knowledge to implement the goals of the business and its operations; (2) strategic, whose mission is to

Table 2.2 The creation and expansion of knowledge

	Tacit knowledge	Explicit knowledge
Tacit knowledge	Socialisation	Externalisation
Explicit knowledge	Internalisation	Combination

Source: (Nonaka and Takeuchi 1995)

build the company as a knowledge-based organization, supporting both obtaining and motivating employees to share and develop knowledge.

The resource-based approach (Leonard-Barton 1995): This approach to knowledge management is based on a model of effective knowledge management known as "sources of knowledge." These elements are as follows: (1) the core competences, consisting of skills and knowledge workers, organizational norms and values, system solutions management and labor, collective problem solving, implementation and integration of new tools and technologies; and (2) experimentation and development to deal with future problems, which involves looking for areas of possible improvement, and importing knowledge from the environment and other organizations. This approach will be examined in greater detail in Sect. 4.1.1.

Knowledge management covers any intentional, systematic process or practice of creating, acquiring, capturing, sharing, and using productive knowledge, wherever it resides, to enhance learning and performance in organizations (Foray 2002). Knowledge management is promoted as being necessary for organizational survival and maintaining competitive strength. To remain at the forefront, organizations need a good capacity to retain, develop, organize, and utilize their employees' capabilities. In an organization, knowledge management relates to the formulation of a strategy in the following sense: deepening knowledge of the organization's mission, developing a power-oriented organizational culture of knowledge, selecting the objectives of knowledge and knowledge strategies to achieve those goals, identifying knowledge gaps and barriers, assessing the knowledge created in the enterprise, implementing knowledge strategies-design tasks, roles, processes, information infrastructure, and computer technology.

With regard to a defined set of knowledge-management elements, the following combination allows a knowledge-management process to be built and implemented in a company:

- Collection of knowledge
- Networks of relationships
- Methods of knowledge transfer
- Information systems
- Information networks
- Semantic systems
- Culture of the organization

The following instruments have been identified as ones that distinguish enterprise knowledge management (Maier et al. 2005; Gimeno 2004; Hambrick and Cannella 2004; Lee and Yang 2000; Lindgren et al. 2004; Lu and Beamish 2004; Picot et al. 1996):

- Maps of knowledge sources
- Competency management
- Individual experience
- Achieved experience
- Good practice
- Managing semantic content

An important part of the methodical knowledge of an organization involves providing a model that integrates knowledge management to ensure the quality of management and the expansion of intellectual capital in that organization. Based on Kotarba and Kotarba (2003), an original model formulated in terms of knowledge-management strategy formulation and implementation in the enterprise appears in Fig. 2.5.

The implementation of this model of knowledge management (Fig. 2.5) in a company requires consistency and understanding the use of two management areas-strategy and knowledge. Knowledge management should be considered another approach to management. Its role is to support strategic management and also to innovate management. Knowledge management in a company always refers to a specific category of management: management functions, level of management, stage of management, and area of management.

2.2.2 Essence of Intellectual Capital Management

With regard to research, the status of knowledge includes methods of intellectual capital assessment based on investment in the staff's knowledge development. Human resource capacity building within a company includes the development of employees with desired characteristics and skills. Such employees can lead to creating increased business performance (value added) and establishing a competitive advantage. Investing in intellectual capital can be more clearly understood in the context of the impact of the educational system on employees (gaining the desired qualifications). The staff resources of enterprises are still seen in terms of costs, rather than as capital.

The value of companies has traditionally been judged on the basis of their financial assets, property, or other tangible assets. Today, competitive advantage is viewed as being based on the knowledge of workers. Such intangibles as brand names, patents, copyrights, and spending on R&D are now a significant part of the assets of many companies.

According to the laws of accounting, intangible assets should include the "rights of property suitable for commercial use, any expected economic life that exceeds one year and the intention of use by the company", in particular:

- Copyrights, related rights, licenses, concessions, rights to inventions, patents
- Trademarks in terms of utility and ornamental appearance
- "Know-how" (Accounting Act)

Intangible assets should also include goodwill and any acquired R&D costs.

In the literature, there are various definitions of intellectual capital (IC).

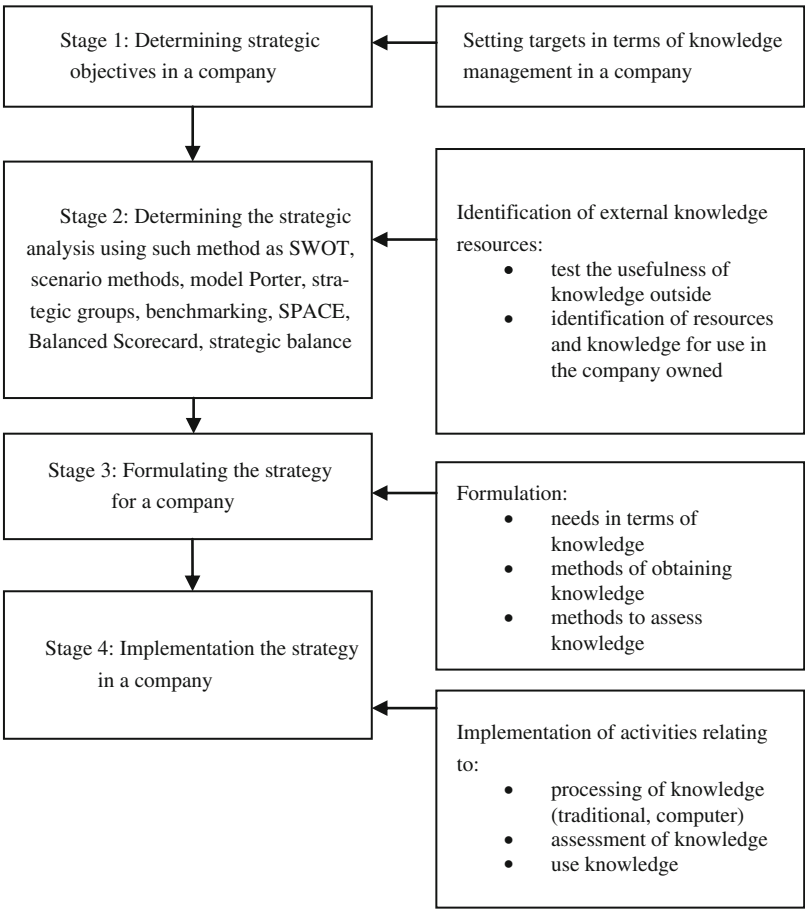

Fig. 2.5 Model of knowledge management in a company related to strategy

> Intellectual capital is knowledge, experience, organizational technology, customer relations and professional skills, which give . . . a competitive advantage in the market. (Edvinsson and Malone 1997)
>
> It is knowledge that can be converted. (Jarugowa and Fijałkowska 2002)

Human capital can be said to consist of a collection of the following factors:

- Employee characteristics: intelligence, commitment, energy, positive attitude, integrity, honesty
- The ability of the staff to learn: receptivity, imagination, the ability for analytical thinking, creativity
- Employee motivation in sharing information and knowledge: a team spirit and striving to achieve objectives (Sokołowska 2005)

Structural capital (also known as organizational capital) consists of intellectual property rights, including patents, licenses, trademarks, and copyrights. It is also the

organizational capacity of a company and includes any physical systems used to transmit and store intellectual material. This involves such factors as the quality and range of information systems, the reputation of the company, the concept of the organization, and its related documentation.

According to Edvinsson and Malone, "Intellectual capital takes three basic forms: human capital, structural capital, and customer capital. Human capital includes knowledge, skills, and abilities of employees. Structural capital is everything in an organization that supports employees (human capital) in their work. Customer capital is the strength and loyalty of customer relations" (Edvinsson and Malone 1997).

According to the Skandia Navigator, the IC of an enterprise may be regarded in terms of at least one of three aspects: its employees, its structure, and its customers. Thus, IC includes human capital, structural capital, and customer capital. And although each of these three types of capital is intangible and reflects the assets belonging to the knowledge of the enterprise, each of them can be assessed and evaluated in terms of investment opportunities (Cascio 2010).

According to Kurowski and Fazlagić, IC consists of:

- Human resources-the overall ability of company employees who provide know-how, a resource that takes into account the collective experience, specialist skills, general skills, and knowledge of employees
- Intellectual assets-descriptions of specific knowledge that the company possesses (the property is not guaranteed or guaranteed by law) and thus can be traded in the form of intangible assets
- Intellectual property-intellectual assets that can be protected (licenses, patents, copyrights, brands, and trade secrets) (Fazlagic and Kurowski 1999)

It is also acknowledged that intellectual assets are a component of IC. Brooking (1996) distinguishes four aspects of IC: market resources (such as brands, customers, distribution channels, customer orders); competence (the ability to solve problems); intellectual property (such as patents, trademarks, copyrights), and infrastructure (such as culture, processes, databases, communication systems). Bonits believes that IC should not include intellectual property (such as patents or copyrights) since it is a component of ordinary assets (Bonits 1998).

Concepts of IC based on an analysis of the literature are presented in Table 2.3.

With regard to common trends among the definitions, it is evident that most of them are divided into the following components of IC:

- Human capital
- Structural capital (organizational)
- Customer capital

An analysis of the definition allows the identification of several common points for describing IC and related concepts:

- IC is based on knowledge
- IC consists of a combination of intangible assets
- IC fills the gap between market value and accounting

I cannot accurately determine the value of IC using the traditional accounting model owing to the nature of IC. The appropriate use of IC can create a solid basis

Table 2.3 Concepts of intellectual capital

Concept of intellectual capital	Source
Monitor intangible assets Intellectual capital: *internal structure + external structure + personal competencies*	Sveiby
Balanced scorecard Intellectual capital: *learning and development perspectives + customers perspectives + financial perspectives*	Kaplan, Norton
Schematic of "Skandia" Intellectual capital: *human capital + structural capital (organizational)*	Edvinsson
Platform values Intellectual capital: *human capital + structural capital (organizational) + customer capital*	Petrash, Edvinsson, Onge, Armstrong, Bukowitz, Williams
Identification of the components of intellectual capital: Intellectual capital: *marketable assets + assets related to the human factor + infrastructure assets + market value*	Brooking
Identification of the components of intellectual capital Intellectual capital: *human capital + structural capital (organizational) + customer capital*	Stewart
Measurements of a company's intellectual capital Intellectual capital: *human capital + structural capital (organizational)*	Ross
Elements of intellectual capital Intellectual capital: *human capital + intellectual assets + intellectual property*	Sullivan

for competitive advantage in the market, but management of IC generally depends on the specific activities of the company and the size of the industry in which it operates.

The relationship between the types of IC is a strategic reflection of the current value of the company. Understanding the nature of intangible assets changes the way business is conducted. Based on reviewed opinions—Table 2.3 concerning the definition of IC, its components can be defined as follows:

1. Human capital:
   - Traits added by an employee-intelligence, involvement, energy, positive attitude, reliability, honesty.
   - The employee's ability to learn-the power to absorb information, imagination, analytical thinking, creativity, employee's motivation in sharing information and knowledge, the ability to work in a team and engage in self-motivation to pursue and achieve goals
2. Structural (organizational) capital-intellectual copyrights, including patents, licenses, trademarks, and copyrights. This also comprises organizational ability, including physical systems used to send and store intellectual materials. The following factors are included here: the quality and range of information systems, the enterprise's reputation, organizational concepts, and documentation.

3. External relations capital-contact with external entities (suppliers and clients), which is of vital importance for the effectiveness of the enterprise.

Currently, there exists a growing gap between the market value and the carrying companies.

One concept of the new company's balance sheet (Dobija 2003). The overall rate allows the effectiveness of the IC of an enterprise to be measured is the relationship between value added and human capital and property damage. If the actual rate of return on tangible assets and human resources exceeds the limit, it is assumed that the assets of the company are its IC. The value of the IC will be positive if it reaches the rate of return that exceeds the risk premiums, which is taken to be 8 %. A new form of balance is preferred among other business sectors, such as engineering, consulting, and auditing. However, it is important to note the weaknesses of this form of balance sheet-no formula for the calculation of IC in an organization that adopts a threshold bonus of 8 % (Table 2.4).

There are no unequivocal means of assessing the value of IC in an enterprise. According to the literature, it is not possible to ascribe to individual employees the streams of future influences of an organization; this is because such influences typically appear as a result of the interaction between human work and tangible and intangible assets (organizational and management [Król and Ludwiczyński 2007]).

Figure 2.6 presents the total value of a company, consisting of tangible assets (tangible and financial assets recorded in the balance sheet minus liabilities) and intangible assets (the excess market value of constituents resulting from its operations).

Intellectual capital can be presented in a nonfinancial fashion by descriptions, diagrams, and this form does not indicate measured values of IC, but it is a deeper reflection of it. The measures must be tailored to suit specific businesses. The most popular measures of quality include the following:

- Danish Project of IC measurement
- Skandia Navigator
- Intangible Assets Monitor (IAM)
- IC-rating™ Model
- Value Chain Scoreboard (VCS™)
- Balanced Scorecard
- Value Explorer™ model
- Saratoga Institute Report
- Human Capital Index

The following quantitative measures of valuating IC have been indicated:

- Market value/Book value (MV/MB) indicator
- Calculated Intangible Value (CIV) indicator
- Knowledge Capital Earnings (KCE) indicator
- Value Added Intellectual Coefficient (VAIC^{tm}) method
- Economic Value Added
- Intangible Assets Valuation (IAV) model
- Strassmann's method
- Investor Assigned Market Value (IAMV^{tm}) model
- Broker's Technology

Table 2.4 Form of a balance sheet that takes IC into account

Tangible and intangible assets	Foreign capital
Intellectual assets	Equity (accounting)
	Intellectual capital

Source: (Dobija 2003)

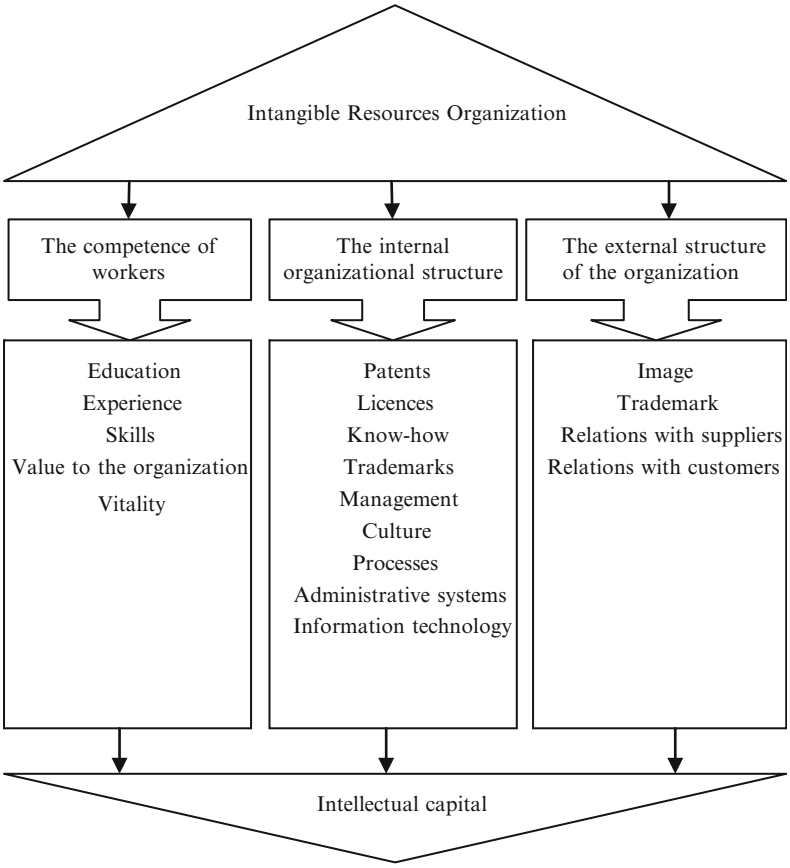

Fig. 2.6 Classification of intangible resources (Source: Sveiby 1997)

In the present study, I focus on theoretical aspects that explain the role of various categories of IC. I attempt to answer the question as to whether it is possible to speak of intangible assets as a whole, homogeneous group. Is it possible to develop a theoretical foundation and framework of guidance that would treat all categories or ingredients and components of IC equally?

2.2.3 Methods of Measuring Intellectual Capital

In both management theory and economic practice, there are many possible ways of measuring IC. Many of the suggested concepts tend to lead to ambiguous methods for assessing the value of IC in enterprises. However, the following qualitative measurements of IC have been distinguished (Mikuła 2002; Edvinsson and Malone 1997; Kasiewicz et al. 2006; Dudycz and Wrzosek 2003):

1. Danish Project of IC Measurement
   Intellectual capital is assessed based on four criteria: human resources, clients, technology, and business processes by means of indicators in three areas:
   - Statistical information (e.g., employment size and structure, training costs, number of clients, IT costs, costs of R&D activity)
   - Key internal indicators (e.g., number of training days per employee, timing when introducing a new product or service to market)
   - Indicators depicting the results (e.g., sales income, employee satisfaction).
2. Skandia Navigator
   The Skandia Navigator is based on the assumption that the true value of a company signifies its ability to generate constant value in the process of introducing a vision and strategy. The metaphor of this model is a house, and it has the following areas of focus: financial focus, customer focus, human focus, process focus, and renewal and development focus. The value of IC is the sum of the following indicators:
   1. Income from the activity of new units
   2. Investment in developing new markets (customers and programs)
   3. Investment in building the industry
   4. Investment in developing new distribution channels
   5. Investment in IT for sales, service, and support
   6. Investment in IT for administration needs
   7. Change in IT resources
   8. Investment in supporting relations with customers
   9. Investment in servicing products purchased by customers
   10. Investment in customer service training
   11. Expenditure on customers not directly connected with products
   12. Investment made to increase the quality of employee qualifications
   13. Investment in employee training
   14. Special education for employees not located in the enterprise
   15. Investment in specialist training, communication, and support for full-time employees
   16. Specialist training programs for temporary full-time employees
   17. Specialist training programs for temporary part-time employees
   18. Investment in developing alliances or joint ventures
   19. Updating systems of electronic data exchange and electronic network systems
   20. Investment in building the value of the trademark (logo and brand name)
   21. Investment in new patents and copyrights

Additionally, it is necessary to calculate the value of the indicators of IC efficiency:"I": $i = (W_{i1} + W_{i2} + \ldots + W_{i9})/9$,

where

W_{i1}—market share
W_{i2}—index of satisfied customers
W_{i3}—leadership index
W_{i4}—motivation index
W_{i5}—index of resources used for R&D goals in relation to total resources
W_{i6}—index of training hours
W_{i7}—index of achieved quality relative to planned quality
W_{i8}—employee retention
W_{i9}—administrative efficiency/incomes

3. Intangible Assets Monitor

With the IAM model (Table 2.5), it is possible to choose indicators that reflect knowledge changes and inflow into the company.

4. IC-Rating^{TM} Model

The IC-Rating^{TM} Model is based on data received from internal and external groups of 25–35 people connected with the company. The information is gathered during interviews, in which 220–240 questions are answered. The questions concern the following areas: business politics, human resources, organizational structural capital, and relational structural capital. The respondents are chosen based on their knowledge of the company and its competitors. The results of the IC-Rating^{TM} Model are presented in the form of three perspectives:

- IC efficiency
- Efforts made to renew and develop IC
- Risk of decreased effectiveness of IC

Each perspective is assessed on a scale of 0–100 or by means of a 10° letter scale, where AAA indicate the best value and D the worst (AAA, AA, A, BBB, BB, B, CCC, CC, C, and D).

5. Value Chain Scoreboard (VCS^{TM})

With this method, constructing the value of IC consists of the following stages:

1. Discovering and learning-finding new ideas for products, services, and processes. The ideas may be created in an internal innovation process in R&D and involve sharing information and aspects relating to employee experience. Ideas may also come from outside the organization.
2. Implementation—the development and assessment of the profitability of a new product or service. At the first stage, the implementation process requires a business to receive intellectual copyrights. Next, the patented product must undergo numerous examinations and tests. The final effect consists of conducting an economic assessment of the effectiveness of the investment project.
3. Commercialization—marketing activities for a newly developed product or service. Client-directed marketing activities are employed to help the company attain positive financial results.

Table 2.5 Intangible assets monitor

	Intangible assets		
	External structure	Internal structure	Individual abilities
Increase	The value of the organic increase (measures to what degree the market accepts the company's concepts and ideas)	IT investment	Tenure
		Investment in internal structures (new systems and methods)	Level of education
			Abilities Index (level of education × achievements in the profession × tenure years in the company)
			Rotation of the abilities of newly recruited employees
Modernisation/ innovativeness	Number of clients strengthening the image of the company	Number of clients strengthening the organisation	Number of clients strengthening abilities
	Sale shares for new clients	New products and services sale share	Variety of employees
	Sale shares for new markets	Number of newly introduced processes	Training and coaching costs
Efficiency	Client profitability	Participation of "support employees" (employees who make the internal structure)	Participation of professionals
	Value of sales per one client		Added value per employee
	Win/lose index (the relation of the number of offers which attracted clients to the declined offers)		Added value per professional
			Employee or professional profitability
Stability	Client satisfaction index	Values or attitudes index (employee attitudes towards work, clients and superiors)	Age of the employees
	Significant clients' share	The age of the enterprise	Tenure in the company
	Client loyalty indicator	Rotation of "support employees"	Salary discrepancy
	Age structure of the relation with clients	Number of employees with tenure shorter than 2 years	Rotation of professionals
	Regular customer share		
	Frequency of repeated orders		

The appropriate selection of indicators does not guarantee a good assessment. To adequately assess the quality of the IC, the indicators need to be interpreted.

6. Balanced Scorecard

This concept was created by Kaplan and Norton (1996). They suggested assessing activity effectiveness by analyzing four key perspectives: financial

Table 2.6 Balanced scorecard

The financial perspective	
Goals	Measurements
Survival	Cash flow
Reaching income goals	Increase of the quarterly sale
	Quarterly sale increase and operational profit of the independent budget units
Profitability	Increase in the market share
	ROE increase
	Free cash flow
The customer's perspective	
Goals	**Measurements**
New products	Percentage share of the income from the sale of new products
	Percentage share of the products covered by patent rights in the income from sales
Term deliveries (fast reaction)	On time deliveries expected by clients
Preferred supplier	Share of deliveries financed by a credit supplier
Client participation	Number of joint ventures in the area of designing new products
The perspective of internal business processes	
Goals	**Measurements**
Increase the efficiency of business processes	Value of the efficiency of each defined business processes
The perspective of innovation and the ability to learn	
Goals	**Measurements**
Technological leadership	Time necessary to prepare the next product generation
Acquiring production skills	Time necessary to reach product maturity
Concentration on profitable products	Percent of products which give 80 % or more in sales
Time of delivering a product to the market	Time necessary to introduce a new product to the market in comparison with competitors

perspective, customer's perspective, internal business processes, and innovation and learning (Table 2.6).

The Balanced Scorecard is a complex measurement and management system in an enterprise. The model is based on the assumption that innovative undertakings are equally important in terms of investment and asset management.

7. Value Explorer™ Model

This model was designed by Andriessen and Tissen (2000). It is based on the core competences of enterprises, which include knowledge, skills, processes, and cultural aspects. The value of each of the core competences is calculated by means of the following variables: gross income, sustainability, potential, impact forces and capital cost:

$$Vcc = R \times \sum_{t=1}^{s} \frac{GP \times (1+P)^t}{(1+i)^t}$$

where
Vcc—core competence value,
R—robustness (as a percentage),
s—sustainability (in years),
GP—gross profit,
P—potential (as a percentage), and
i—capital cost.

It is assumed that the capital cost is the same for each core competence. The values of the other variables can be assessed using the scorecard. Sustainability signifies the length of time over which the enterprises can maintain a competitive advantage. Potential describes any new possibilities in the market that the company may use. Robustness indicates how deep the core competences are rooted in the company, and it is their chance of influencing the company's financial results over a longer period.

8. Saratoga Institute Report

This method is based on indicators adjusted according to an organization's area of specialization. For example, in the area of an organization's effectiveness, the following indicators are identified: income factors, cost factors, human resources, end value factors, and the profitability of investment in human resources.

9. Human Capital Index

This concept assumes that human management quality is positively correlated to the increase in the organization's market value. In research assumptions, the total return from investments by the shareholders and Q-Tobin indicator provide economic measurements for the investment in human capital.

The Q-Tobin indicator is used to interpret different phenomena in the company: outcomes of investment, relations between assets and the company's value, and relations between opportunities resulting from investment and financial policy.

$$\text{The Q-Tobin indicator} = \text{market value}/\text{replacement value attached to the shares}$$

The Q-Tobin indicator is based on the assumption that in the long term, its value will become close to 1. However, in practice, the value may differ greatly from 1; for example, some companies in the computer software industry note an indicator value higher than 7, while for other capital-consuming companies it is much lower than 1.

Additionally, the following methods of valuation of IC have been indicated:

1. Market value/Book value (MV/MB) indicator

This indicator was suggested by T. Stewart (1998). With this indicator, IC is the difference between the market value and book value of the company.

$$\text{MV}/\text{BV} = \text{market value}/\text{book value}$$

The market value is the product of the market price of a share and the number of shares. If the company is not quoted on the stock exchange, the value of shares can be determined based on valuation using a comparative method, taking into account the value of other stock exchange-listed companies. The most common method for estimating the book value is net valuation, which is the sum of the book value of all assets of the company divided by the book value of the external capital:

$$\mathrm{MV/BV} = (1 \text{ share price} \times \text{shares number})/(\text{assets} - \text{external capital})$$

2. Calculated Intangible Value (CIV) Indicator

The initial data used in the CIV method derive from the company's financial reports over the previous 3–5 years of operation. They are also based on data from the capital market concerning the average value of the rate of return on assets (ROA). The IC value appears when the ROA for the company is higher than the ROA for the sector; otherwise, the CIV method shows a negative value. A discount rate is used if the method is estimated directly by the company or accepted as an average capital cost in the given sector.

The IC value is determined in accordance with the following stages:

Stage 1. Calculating the average profits before tax from the last 3 or 5 years of the company's activity.

Stage 2. Estimating the average value of assets for the last 3 or 5 years.

Stage 3. Dividing the average profits calculated in the first stage by the average value of assets, resulting in the average ROA.

Stage 4. Calculating the average ROA indicator for the whole sector for the last 3 or 5 years.

Stage 5. Calculating any excess by subtracting the product of the average ROA for the whole sector and the average value of the company's assets from the average profits before taxation.

Stage 6. Calculating the average taxation rate for the last 3 years, multiplying it by the excess calculated in stage 5, and then subtracting the result from the excess amount. The received amount is a premium, which falls into the category of intangible assets ("intellectual premium").

Stage 7. Calculating the current premium value by dividing the premium calculated in stage 6 by the appropriate discount rate, e.g., the capital cost for the enterprise. The calculated amount refers to the value of the intangible assets not included in the balance of the company.

The "intellectual premium" shows how much an enterprise can earn thanks to its available IC compared with an average company in the industry. The current

premium value describes the value of the IC, assuming a stable economic and financial situation for the organization itself. In a comparatively simple way, the CIV method allows an estimation of the value of IC and a comparison of values among enterprises based on data from financial reports.

3. Knowledge Capital Earnings (KCE) Indicator

The KCE method is a development of the CIV method.

$$\text{Economical result} = \alpha \times \text{tangible assets} + \beta \times \text{financial assets} + \delta \times \text{intangible assets}$$

The KCE method can be presented as a four-stage process:

Stage 1. Estimating the values of annual normalized profits of an enterprise. This encompasses the profits from the last 3 or 5 years and their prognosis for upcoming years. Estimating the average profits for the coming 3 to 5 years is carried out to eliminate any short-term fluctuations. A normalized profit is a net profit corrected by the value of the result from special and fortuitous events.

Stage 2. Estimating α and β, i.e., the return rate of the tangible and financial assets. Based on research and analysis of a group of global companies, Lev (2001) estimated tangible assets to be 7 % and financial assets to be 4.5 %. The return rates may be freely modified depending on the market and the condition of enterprises so that they closely reflect real economic conditions. The next step is to calculate the profit that falls on tangible and financial assets by multiplying the return rate of these assets by their value.

Stage 3. Calculating knowledge capital. The profits from tangible and financial assets received in stage 2 are subtracted from the normalized profit calculated in stage 1. Lev (2001) believed that the received difference was the profit resulting from the use of knowledge in an enterprise.

Stage 4. Calculating the total value of the knowledge capital for the whole company. To do so, the profit from intellectual knowledge calculated in stage 3 is divided by the return rate from the knowledge capital. Based on analyses of three sectors—pharmaceuticals, computer software, and biotechnology—Lev estimated this to be at the level of 10.5 %

The KCE method shows the value of IC in a company. The indicators used in the method allow an analysis of the effectiveness of IC compared with that in other competitive companies or the average for the whole sector. Knowledge capital = (normalized profit−profit from tangible and financial assets*)/discount rate of knowledge capital**

where

*—expected returns after taxation are accepted,

**—10.5 % after taxation

4. Value Added Intellectual Coefficient (VAIC^{TM}) Method

The VAIC^{TM} Method allows the value of IC to be estimated, and it can do so for companies that are not publicly traded. Furthermore, it allows the monitoring of current operational activities conducted by employees. Thus, managers can decide to what extent human capital contributes added value.

This method involves the following stages:

Stage 1. Calculating added value as the difference between the output and input of the enterprise. The results are incomes from sales of all products and services of the enterprise, whereas input constitutes all expenses except for those connected with human capital. Pulic (2000) states, "Because of the active role of the employees in creating value, expenses connected with them should not be treated as expenses."

Stage 2. Calculating the effectiveness of using traditional financial capital in creating added value. According to Pulic, three elements decide the creation of added value: the capital employed, human capital, and structural capital. The capital employed is understood as the net value of any book assets (i.e., the difference between general assets and general liabilities). The value-added capital coefficient is calculated using the relation presented in the following formula—VA/CE = VACA, where VA–value added, CE–capital employed, and VACA–value-added capital coefficient.

Stage 3. Calculating the human capital coefficient. Pulic assumes that the value of human capital may be determined as a sum of all expenses on employees—VA/HC = VAHU, where *VA*–value added, *HC*–human capital, *VAHU*–human capital coefficient.

Stage 4. Calculating the structural capital coefficient (STVA) as a relation of structural capital to value added:

SC/VA = STVA; where SC–structural capital, *VA*–value added, *STVA*, structural capital coefficient

Similar to Edvinsson, Pulic assumes that structural capital (SC) is the difference between intellectual capital and human capital, and that value of SC corresponds to value added, diminished by the value of human capital—SC = VA−HC, where SC–structural capital, *VA*–value added, *HC*–human capital.

The above formula differs from earlier effectiveness-measuring instruments since human capital and SC are in inverse proportions. We can see that if the share of human capital increases in creating value added, the share of SC decreases.

Stage 5. Summing up the indicators calculated in stages 2, 3, and 4. The received result is the value-added intellectual capital based on the enterprise's tangible and intangible assets coefficient—VAIC = VACA + VAHU + STVA, where *VAIC*–value-added intellectual capital, *VACA*–value-added capital coefficient, VAHU–human capital coefficient, and STVA–structural capital coefficient

The above method allows the measuring, monitoring and comparison of the efficiency of LED... business activity with other organizational units or other companies. The VAIC^{TM} method is objective since it is based on data taken directly from financial reports.

5. Economic Value Added

This model is based on the assumption that added value appears when the return rate of the capital is higher than the cost of capital. The method shows the sources of values from defined periods as a difference between the received capital return and its cost multiplied by the value of invested capital from each prognosis period:

$$\text{Economic value added} = \text{invested capital} \times (\text{ROIC} - \text{WACC})$$

$$\text{ROIC} = \frac{\text{net}''\text{operational}''\text{profit} - \text{corrected\_taxationl}''\text{costsl}''}{\text{investedl}''\text{capitall}''},$$

where *ROIC*–return on invested capital, *WACC*–weighted average cost of capital

6. Intangible Assets Valuation (IAV) Model

This model is based on the assumption that innovative intangible assets not only generate profit for the company, but they also develop its reputation, increase customer loyalty, and may even create an entry barrier. Innovative intangible assets and human capital constitute IC. The valuation of an enterprise operating in the market or one created through a fusion or takeover can be carried out in the following way:

VM = VTA + NPV of profits from intangible asset innovation + NPV of profits from complementary business assets + NPV of structural capital,

where *VM*–company's market value, *VTA*–accounting value of tangible assets.

7. Strassmann's Method

The formula for calculating IC according to this method is as follows: knowledge capital = value added by information/capital employed cost, while value added by information = net profit−(financial tangible assets × credit cost)

Strassman also offers a different method of calculating knowledge capital. He assumes that the company's market value added (MVA) is an effect of the owned IC, so: knowledge capital = MVA/capital cost,

where *MVA*–market value added.

8. Investor Assigned Market Value (IAMV^{TM}) Model

The model was proposed by Standfield (2002), who based it on the assumption that the difference between the market value and accounting value of an enterprise indicates the extent of its IC. In its most general form, IC is measured as the difference between market capital and accounting value. It is the most common means of measurement in the literature:

$$\text{market value} = \text{accounting value} + \text{IC materialized value}.$$

Standfield introduced two additional terms: market value, which is estimated by an investor and attainable from the enterprise's market value, and IC erosion, which

is the difference between the values. It is important for managers to note that IC erosion will be limited if a company concentrates on knowledge commercialization and manages its IC.

$$\text{attainable enterprise}'\text{s market value} = \text{visible capital} + (\text{IC materialized value} + \text{IC erosion})$$

9. Broker's Technology

This IC audit provides adequate knowledge on intangible assets and makes the company more sensitive to the competitive market. This method is also resistant and successful.

Stage 1. Conduct a test in the form of 20 questions.

Stage 2. IC audit. Each element of IC is thoroughly analyzed by means of special audit questionnaires, encompassing 178 questions in total.

Stage 3. The presentation of identified IC components and their assessment using the value methods: cost, market, or income.

As a result, a cash value for the enterprise's IC is obtained.

Knowledge and IC have emerged as key drivers of the competitive advantage in a developed organization. So are knowledge workers the key to achieving market success? Firms should invest in their employees, especially their knowledge workers, or pay to license the patents of others. I will attempt to explain the role of the knowledge worker in relation to increasing innovation in a company in the following section.

2.2.4 Knowledge Workers or Innovative Workers?

In a company, knowledge workers need to acquire a variety of knowledge (information) about their tasks (Drucker 1988). Knowledge management in a company includes the following (Morawski 2006): (1) human resource issues: selection, development, motivation, and evaluation of knowledge workers; (2) structural and organizational issues: the selection of appropriate solutions in the level of flexibility in the structure, the degree of formalization and centralization to the effective flow of knowledge and information; (3) organizational culture issues: behavior in knowledge sharing; and (4) strategy issues: more efficient locating and acquiring knowledge from the environment.

I will discuss here human resource issues, especially the selection of knowledge workers in a company. Knowledge workers are competent, specialized in their field, well informed, and aware of their own values and role (Morawski 2005). The literature highlights the following specializations of knowledge workers (Lord and Farrington 2006): engineers, economists, people in managerial positions in

business, planners, specialists in R&D, marketing specialists, specialists in selling, logisticians, analysts, IT professionals, people involved in the acquisition of human resources, those responsible for cooperation with other companies.

The term "knowledge worker" seems to have become common after 1973, when Peter Drucker (1973) first presented it. However, a clear definition has not yet been established. Thomas H. Davenport's definition (2005) is "knowledge workers have high degrees of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge." Thus, describing knowledge workers as strategic-knowledge resources in a company is motivated by the following: the concept of effective management of resources in an organization (Sirmon and Hitt 2003); an enterprise's unique potential in the form of knowledge and experience (Barney 1995); and the concept of competence management (Hamel and Prahalad 1994). A strategic-knowledge resource in a company represents the knowledge, skills, and capabilities of the individuals who make up that company's workforce. Such resources are usually reflected by a person's education, experience, and specific identifiable skills (Hitt et al. 2001). Yet, how can resources—knowledge workers-be managed to create added value for enterprises?

Knowledge workers attempt to locate the appropriate knowledge from various sources, i.e., other people, the literature, and knowledge databases. Among knowledge workers, those with good knowledge can create the innovations necessary for businesses. Innovation is defined as the introduction of new, improved ways of doing things at work (Freeman and Perez 1988). In that sense, it may be appropriate to note that creating an innovative company depends on transforming as many knowledge workers as possible into innovation workers. The next section describes an innovative company and innovation workers.

I will attempt to explain that the knowledge workers in a company can enhance its innovation level. And I will show that it is possible to create a set of innovation workers as a subset of the knowledge workers in a company using the proposed Sknowinnov model (see Chap. 5).

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