Elements of Knowledge Management Systems of Enterprises

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Abstract	*Knowledge is becoming the main driver of competitive advantage of enterprises operating in today's economic reality, hence the important role of knowledge management as a business process. Companies are faced with the challenge of learning how to operate in the knowledge economy. Knowledge is not another factor of production, supplementing the traditional factors of land, labor, and capital; it is the only important factor of production for modern enterprises. Knowledge has become the primary, not the auxiliary, means of production, and brings a completely new, unique character to society. A knowledge worker is one who works with what they have learned during their systematic education, as opposed to an employee who works with physical strength or manual skills. The aim of this paper is to present the basic aspects of knowledge management in the enterprise. The author of this work presents the benefits of skillful and efficient knowledge management in various organizations.*
Key words	Market, knowledge management, information, intellectual capital

1. Introduction

Knowledge and information are becoming the basic factors of production in enterprises, farms, public offices and non-governmental organizations. The fast pace of globalization of the world economy, including agriculture; the ever broader dissemination of information technologies; and modern means of communication, determine to a large extent the competitiveness of many sectors of the economy on a global scale.

The knowledge-based economy focuses on the utilization of intellectual capital, which results from combining the knowledge and commitment of employees with modern technologies for the generation, development and exploitation of innovation, improving the quality of life of people and gaining a competitive advantage.

In agriculture, for example, because of specialization and intensification of agricultural production, modern farms are becoming economic organizations with growing organizational and technological complexity. One of the changes occurring in the management of agricultural production is that of convergence, where the management methods and techniques used in agriculture are becoming very similar to those used in industrial production. The propulsion of this convergence is the increased importance of knowledge in creating economic value and the development of information technology.

Intensive development of network technology, increased awareness within corporations, strong saturation of knowledge products and services, the enormous and ever-increasing pace of change, a large turnover of employees, have all caused knowledge management to become very popular over the last couple of years. Intense competition and rapid technological advances force companies to be more active in the acquisition, development and use of knowledge for innovation. Knowledge, technological advances, the qualifications of personnel of the company, and the results of applying them for the development of innovation, are now becoming a source of long-term competitive advantage in the market, as well as an indicator of economic success in times of globalization and the new knowledge-based economy.

2. Methodology of research

The dynamics of the development of the knowledge-based economy and steady growth in the digital sector in many countries has stimulated a great need for theoretical and empirical research in this area.

The aim of this work is to present various elements of the knowledge management process within the enterprise. Attention was drawn to the main aspects of knowledge management in terms of managing knowledge about customers. The tools used for the utilization of consumer knowledge within the Internet environment are shown. In addition, the possibility for practical application of consumer knowledge to create new solutions (ideas) and generate innovation is also discussed.

In this work, the methods used were the study of literature and reference material in electronic form, the method of observation, and the analysis of case studies. The results of research carried out among enterprises in Poland in 2009 are also presented. The research was carried out by researcher at the Warsaw School of Economics.

In the work, the method used was descriptive analysis on the basis of extensive literature study of the subject. Theoretical output in both Polish and foreign, mostly English, language literature was used, on the subject of governance in the knowledge-based economy. The use of foreign literature was necessary due to the dearth of Polish studies. This enriched the arguments and discussion of new aspects, and allowed to show the research problem in a broader perspective.

Categories of knowledge in the enterprise

In the resource approach to knowledge management, the main problem that is stressed is the use of existing knowledge to create new knowledge. Three types of knowledge should be mentioned when adapting knowledge resources to an enterprise's strategy:

- fundamental knowledge,
- advanced knowledge,
- innovative knowledge.

The main source of organizational knowledge is personalized knowledge, which consists of: explicit knowledge, implicit knowledge, and hidden knowledge, known as the core of personalized knowledge. Explicit knowledge is characterized by clarification and systemization, and is presented formally, while hidden knowledge is not formalized and is the collection of individual skills and experience of employees. The difference between explicit and implicit knowledge is that explicit knowledge is the subject of communication, while implicit knowledge is not communicated.

The core of personalized knowledge is the explicit and implicit knowledge of a person, which allows one to act on the basis of received data, information and general experience. The organization also has codified and well established knowledge, which is formed as a result of the use and development of personalized knowledge in the processes taking place within the organization.

In the knowledge management system, a key role is played by the following categories:

- knowledge of customers
- knowledge of products and services,
- knowledge of people,
- knowledge of operational mechanisms,
- knowledge of relationships and resources.

Knowledge of customers has become a key resource in competition, causing an increase in investment in databases, so that it is possible to collect large amounts of information about customers. Many companies have collected and continue to collect a variety of data about their customers, but at the same time have great difficulty transforming this data into information and knowledge in order to be able to make decisions which would result in higher profits for their business.

It should be noted that having the appropriate knowledge and information delivered in a timely manner increases the likelihood of making the right decisions. Despite the large amount of knowledge a manger may have on account of modern technology, there will always be an information gap, the difference between the information a manager needs to make decisions, and the information he has. Of

course, the smaller the information gap, the more likely the right decision will be made. However, the selection of knowledge, and finding its best sources, is not easy; therefore, according to many researchers, the different categories of knowledge play important roles and should be treated as the principal element of the enterprise's management system.

The benefits resulting from knowledge management

Currently, it is difficult to imagine a modern enterprise which does not benefit from computer technology. Information systems play an important role in the success of any business. They are a source of information to satisfy the needs of senior management. Satisfying these needs is associated with the quantitative and qualitative demand for knowledge and information.

In a competitive economy, an important issue is the management of information and knowledge, which should lead to an increase in added value. According To M.E. Porter, added value is the sum of the costs of implementing a value-adding activity and the margin (Porter, 2006, p. 66). Value-adding activities include primary and secondary activities. Primary activities are the physical manufacturing of the product and its transfer to customers and include: internal logistics, operational activities, external logistics, marketing, sales and servicing. Secondary activities include procurement, technology development, the management of human resources and the company's infrastructure, all of which should lead to the support of primary activities. It is only possible to achieve high added value if companies coordinate all their processes in an effective manner (Skrzypek and Hofman, 2010).

Company managers should assess their knowledge of customers and consider its utility for the long-term objectives of the company. The starting point is to audit specific knowledge within the enterprise, and thus determine who has what knowledge of specific business areas related to customers. In the case of knowledge of customers, it is necessary to identify the people who have access to customer data, are responsible for its analysis, are responsible for the development of promotional campaigns, work with research agencies, advertising, etc. This attempt to gather information about who knows what is the first step to systemizing the process of managing knowledge about customers.

The introduction of knowledge management into the enterprise, in addition to the positive impact on the processes taking place in the economy, allows for:

- an improvement in communication,
- speeds up the decision-making process,
- increases innovation in the enterprise,
- accelerates the creation of a wider range of products,
- reduces the time needed to resolve key issues,
- improves the performance of the company on the market
- broadens the competence and knowledge of workers.

There is no doubt that knowledge is created by individuals (employees of the enterprise). It is often the employees who are the carriers of knowledge. The company should develop conditions to stimulate the process of knowledge creation, and at the same time, find a way to collect and use the results obtained. Individuals share knowledge with others, creating collective knowledge. The collective knowledge of the group is much larger than the sum of individual knowledge (Soppe, 2011).

Company managers may need knowledge about both current and potential customers. The subject of cognition can be the behavior of customers (both before, during, and after the purchase), as well as their needs, prized values, lifestyle and purchasing power. In the case of international business activities, managers should take into account that knowledge on behaviors in one country, for example, the response to a particular advertisement, may not apply in the case of another country. Cultural differences among countries may make it necessary to acquire additional knowledge about customers of a particular country to ensure the effectiveness of the campaign.

When creating knowledge, one can use the following sources:

- databases (one's own and those of others),
- the Internet,
- marketing research,
- experts (internal and external),

- company employees: traders, sales agents, distributors,
- statistical data,
- reports and studies.

The results of research carried out in 2009 by the Warsaw School of Economics are quite interesting. In the study, managers were asked what sources of information they used to create knowledge about customers (Figure 1). The results of the study show that the primary source of information for the creation of knowledge about customers is the company's own database. This is confirmed by the fact that managers are aware of the importance of the database in obtaining information about the customer. In second place, respondents cited the Internet, and third, conversations with customers. Empirical studies confirm that the Internet is used by management as a source of information about customers. Although the study covered medium and large sized enterprises (companies employing more than 200 people), which were theoretically able to afford outsourcing marketing research to research agencies, it turned out that it was much more likely for marketing research to be carried out by company employees than by a commissioned research agency.
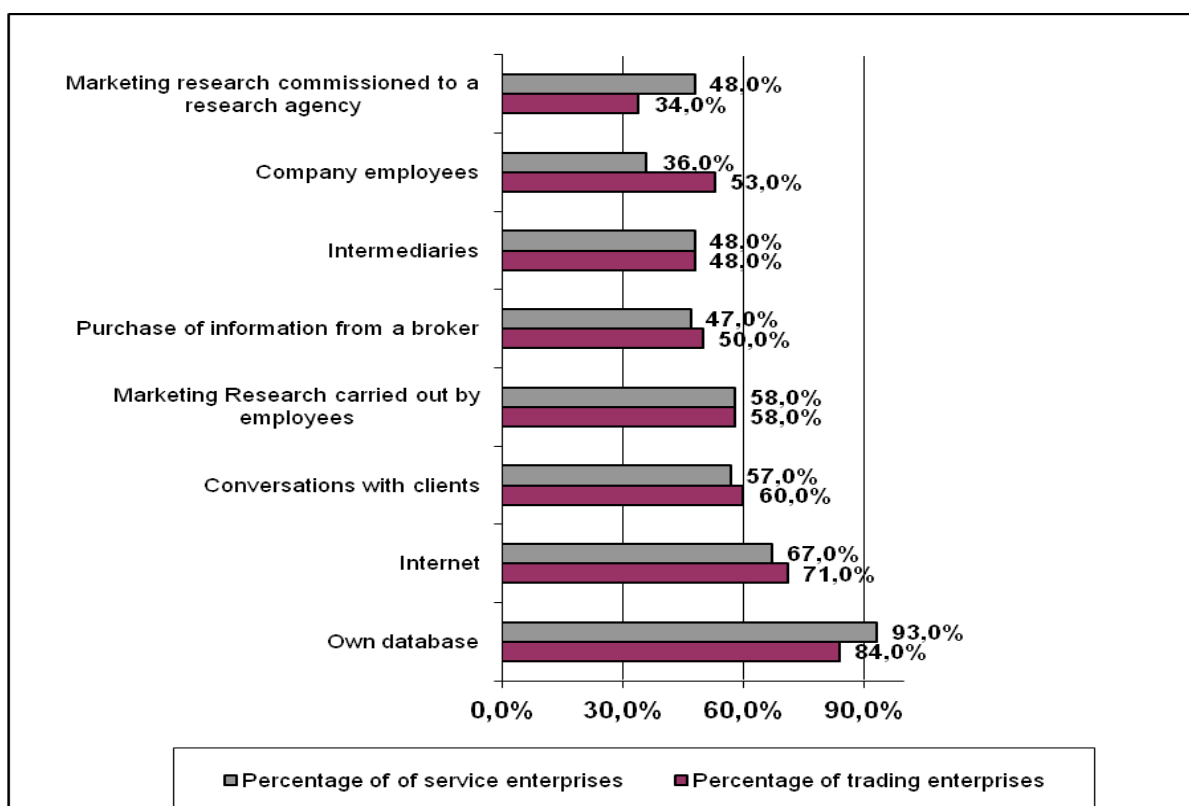

Note: *percentages do not add up to 100 because of multiple responses.*
Source: own work based on Sobolewska, 2010, p. 215.

Figure 1. Sources of information in the creation of knowledge about the customer

However, it appears that the opportunities offered by modern technology in gathering data about customers are not commonly used. This is confirmed by the results of the research carried out by researchers at the Warsaw School of Economics (Sobolewska, 2010). One hundred fifty enterprises participated in the 2009 study: 30 industrial and 120 service enterprises (including 62 trading companies). Respondents were asked what type of data about customers they accumulate in their databases, as shown in Figure 2. When trading companies were treated as separate from other service enterprises, it appeared that it was relatively more common for them to track a greater variety of data on customers and the purchases they made than service enterprises.
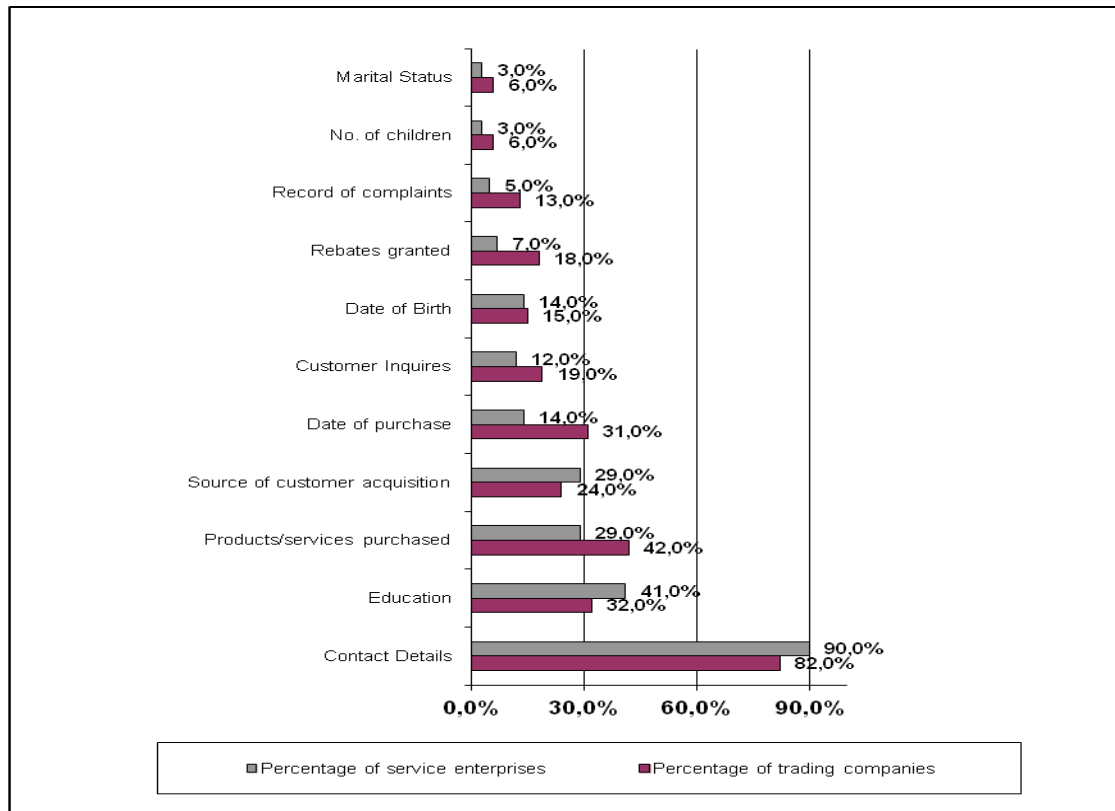
Source: own work based on Sobolewska, 2010, p. 209

Figure 2. Data tracked by trading companies and other service enterprises

Trading companies are more likely to collect data on details related to purchases and complaints made by customers, but it is still not a common practice (Figure 2). Data on purchased products is collected by 42% of trading companies, dates of purchases - 31%, and granted rebates - 18%.

As can be seen in Figure 2, service enterprises still have a long way to go in terms of customer data collection. Expanding and updating the contents of the database allows for more detailed analysis of the data, allowing the company to streamline its activities and improve customer relationships.

Individuals participating in this process gain access to new sources of knowledge within the organization. However, not all information within the organization should be equally available to all individuals. Knowledge management in the enterprise requires defining who has access to what information. According to Lethbridge's taxonomy (Lethbridge, 2001) we can distinguish among the following categories of information flows:

- planning-information specifying a common objective, the scope of activities, the direction of the development of the organization,
- coordination - information used in the creation of products and services,
- operational-information used in everyday communication (e.g. to keep in touch with customers, information about the order, delivery etc.).

The knowledge created within the enterprise should be put into practice, as the practical verification of knowledge provides the basis for creating new knowledge. Knowledge of customers can be used to change the strategy of communication with customers or the distribution of products (more customer-friendly), etc. The use of knowledge by the enterprise should foster the creation of value attractive for the customer, increasing the company's competitive advantage (Lindgreen, Vanhamme & Beverland, 2009). Many researchers draw attention to the continuing undervaluation of customers as recipients of products and services. They cite the results of research, where 48% of respondents do not carry out any research before developing new products and services (Hollins and Shinkins, 2009). Due to

the low cost of using the Internet as a source of information about customers, it may be worthwhile to pay attention to its ability to create relationships with customers and acquire knowledge about them.

Consumer knowledge and its utilization

The modern consumer is more and more often the creator of their position on the market, by making decisions in regard to sustainable development, health and economic issues, and awareness of the consequences of their behavior. They are also more aware of their consumer rights. An educated consumer can become a valuable business partner, since him (Dabrowska, 2010):

• has the ability to change his lifestyle, to be more responsible in decision making and actively participate in society as a consumer-recipient;

• can effectively use his material and financial resources;

• is better prepared to acquire information about the products on offer and use this information to rationalize decisions;

• has a defined idea about the quality of the product and the relationship between quality and price.

• can perhaps more responsibly satisfy his needs and shape the structure of consumption;

• knows how to assert his consumer rights.

Design by consumers is the active involvement of consumers in the process of product development using tools provided by the company. This strategy aims for the integration of consumer participation in the process of creating innovation and planned and systemic utilization of his knowledge. The best form for realizing this strategy appears to be crowd sourcing. The Internet and social media offer a wide range of tools that support the implementation of the strategy of using consumer knowledge. The array of tools is presented in Table 1.

Table 1. Tools for the utilization of consumer knowledge within the Internet environment

Models for the utilization of consumer knowledge	Implementation tools
Designing for the consumer	Electronic surveys Analysis of the server logs Data extraction from web pages The use of cookies Analysis of social networking sites, blogs, forums Rating sales outlets
Designing with the help of consumers	Corporate blogs Sponsored online communities Corporate websites Company profile on social networking sites
Design by consumers	Crowdsourcing

Source: own work.

The use of any of these strategies for the acquisition and utilization of consumer knowledge significantly increases the chances for success in finding an optimal solution to a customer's problem or in creating an offer that maximally matches the expectations and preferences of users, since information coming directly from consumers significantly reduces the risk of making the wrong decision (Hutter, 2011).

Activities involving consumers are a typical feature of virtually all operating social networking sites. The combination of many Internet users and the use of applications for the development of social relationships, such as sharing experiences or group shopping, create a kind of collective intelligence, which has begun to function in the virtual world. J. Surowiecki defined it as the wisdom of the crowd, insisting that it can help to achieve much better results than using the knowledge and creativity of individuals (Surowiecki, 2004). In his opinion, for "the crowd to be wise", the following conditions must be met:

- members of the population should be diverse in terms of knowledge and skills,
- member activity must be independent (not be too heavily influenced by other people from the group),
- decentralization should allow members of the community to become specialists,
- the aggregate must be capable of making collective decisions based on individual judgments (Surowiecki, 2004). H. Rheingold introduced the concept of the clever crowd, who, with the use of tele-information technologies, are able to organize in clusters around current events (Rheingold, 2002).

However, there are researchers who see some weaknesses in collective interaction. According To J. Lanier, collective decision-making on the Internet causes trivial content to dominate over more ambitious content, that which requires user attention and engagement (Lanier, 2006). He gives the example of the website Digg, which ranks information based on the votes of users. Information about a student ice-cream eating competition was rated as more important than the news of an earthquake in Java. Yet overall, there is no doubt that users of social media have become a valuable source of knowledge for modern organizations, and as prosumers, people have the potential to strongly influence business activity (Ryan, 2011).

Open methods for creating new solutions have significant advantages over the conventional approach to acquiring external sources of knowledge. The best example of the effectiveness of this type of activity is the company Starbucks, which through their MyStarbucksIdea.com website acquired 100 thousand ideas from its customers. Dell, thanks to their platform Idea Storm, acquired 13 thousand new ideas, of which they have implemented four hundred. One of Lego's projects involved 10 thousand users. In turn, 25% of all new Procter & Gamble products come from *open innovation*; as a result of these activities, there has been an increase in the share of new products from 15% to 50% (www.pi.gov.pl). Utilizing the wisdom of the crowd through the use of social media is an effective way to gain consumer knowledge that today's Internet users are extremely happy to share with companies.

Consumer activity on social networking sites has also become appreciated by international corporations, who treat it as an important source of knowledge to be used in the improvement of products. For example, Coca-Cola commissioned a research agency to provide information on consumer opinions by tracking content on social networking platforms, primarily on Facebook and Twitter. Through the research, the company can find out people's opinion on all of its brands and determine exactly what its consumer's need.

Currently, there is increasing user participation in the process of creating information systems. Users typically participate in the creation of models for business processes and in the design of output systems, managerial dashboards, contents of screens, reports, etc. which are customizable to meet the needs of the user. The use of the right tools for the modeling and defining of business processes increases user participation at all stages of system construction (Mayo, 2001, pp. 3-5). Users can perform certain tasks on their own, without the need to involve programmers. Increasingly, information systems are built in accordance with the strategy of engaging users in the process of creating and customizing the system to suit their needs, and in adding new functionality. TA person who uses the system is a consumer, but when he is given the ability to customize the system to suit his needs, and these changes are implemented, he becomes a prosumer.

3. Conclusions

1. The importance of knowledge in the world is steadily growing, becoming one of the most important factors determining the development of modern economies. In this context, a fundamental role is played by both knowledge and the ability to use it to create new solutions (ideas) and generate innovation.

2. Knowledge is essential for the creation of economic value. A belief that is starting to dominate in the business world is that in order to achieve competitive advantage in the knowledge-based economy, it is not enough to improve the internal processes of the organization, but it is also necessary to have continuous cooperation with all business partners. Stress is put on the importance of the diffusion of knowledge and the transfer of technology to improve innovation, and therefore the competitiveness, of the company. Effective flows of information and knowledge between partners has become the overriding objective in the efficient

management of the enterprise.

3.   The conventional approach to the role of the consumer in the process of product design, innovation creation and knowledge acquisition marginalized the role of the consumer. Social media has changed the attitudes and behaviors of both organizations and consumers, becoming a platform for communication and knowledge exchange. Companies gained an enormous chance and new opportunities to use the knowledge they have of their customers. The behavior and attitudes of consumers has also changed. The Internet has allowed consumers to become active contributors of content, products and innovation.

4.   The use of consumer knowledge to create new products, search for innovative ideas or solve different types of organizational problems is widely practiced by modern enterprises. Due to the dynamic development of social media and social activity of Internet users, there are new opportunities for engaging consumers and using their collective knowledge.

5.   Systemization of the knowledge management process can effectively assist the company in its rivalry with competitors both in domestic and foreign markets. The mechanisms presented in this work show the most important elements of the process of knowledge management in the enterprise. For the success of an organization in knowledge management, good solutions for both the management of human resources and technology are needed. These solutions should allow the company to discover the values most important for their customers.

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