

PRACE NAUKOWE

Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS

of Wrocław University of Economics

Nr 334

Local and Regional Economy in Theory and Practice

edited by
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Publishing House of Wrocław University of Economics
Wrocław 2014

Copy-editing: Elżbieta and Tim Macauley

Layout: Barbara Łopusiewicz

Proof-reading: Barbara Cibis

Typesetting: Adam Dębski

Cover design: Beata Dębska

This publication is available at www.ibuk.pl, www.ebscohost.com,
Lower Silesian Digital Library www.dbc.wroc.pl,
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www.wydawnictwo.ue.wroc.pl

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Wrocław 2014

ISSN 1899-3192

ISBN 978-83-7695-496-7

The original version: printed

Printing: EXPOL, P. Rybiński, J. Dąbek, sp.j.
ul. Brzeska 4, 87-800 Włocławek

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INTELLECTUAL CAPITAL AS AN IMPORTANT ELEMENT OF KNOWLEDGE MANAGEMENT

Summary: In modern organizations intellectual capital is becoming an increasingly important resource. Hard assets are clearly losing their importance and non-material resources are gaining in it. Non-material resource management of organization may be held by means of intellectual capital management and knowledge management. In this article an attempt to present a model of knowledge management has been made with particular emphasis on intellectual capital. Knowledge management should result in the appropriate generating of changes of knowledge resources and ultimately to the development of intellectual capital. Therefore the need for different approaches to the modeling of this system arises, which may contribute to the increasingly effective use of knowledge in each organization.

Keywords: knowledge management, intellectual capital, model.

DOI: 10.15611/pn.2014.334.04

1. Introduction

Technological, social and economic changes contributing to the large variability of the environment have directed the economy to a new course of development, i.e. economy-based knowledge. That variability has enforced the need for research for new ways of organising and managing economic activity in various entities, especially enterprises.

In modern enterprises, an increasingly significant part is no longer played by natural resources but by intellectual assets which, first and foremost, are considered as competence acquisition and continuous learning, and their special feature is that their basis is created by knowledge. Thus, knowledge as a resource has been gaining more and more importance. This is inseparably connected with people and therefore it cannot come into being without their participation. One can say that all that is created in an enterprise has its own origin in human minds, preferences, competencies and the cognitive system. The factor that makes an enterprise stand out among other organisations is often the highly specialist knowledge of its employees and their ability to use this knowledge into action. The efficient utilisation of knowledge is referred to as knowledge management. A characteristic feature of knowledge-based

organisations is knowledge management and focusing on the development and effective utilisation of intellectual capital.

This article aims at presenting intellectual capital effectively integrated in the knowledge management system in an enterprise.

In the practical activities of enterprises, both the entire knowledge management system and parts thereof, i.e. processes, development-oriented and the effective utilisation of the intellectual capital are taken into account. The interrelations and interactions existing between these components and affecting the maintenance of the whole knowledge management system are of great importance.

2. Different concepts and approaches to intellectual capital in an organisation

Over the last few years a number of proposals appeared that have created different scenarios of intangible assets which have their sources in slightly diverse research approaches. They have become a starting point for the conceptualisation of intellectual capital. The chronological arrangement of the development of research on intellectual capital makes it possible to distinguish several trends in the scientific discussion.

An important research trend is related to the creation, utilisation and increase of the knowledge gathered in an organisation. In this approach, intellectual capital is the total of the knowledge, practical skills and abilities of the creative members of organisations, aimed at the achievement of strategic goals. When considering these goals of the enterprise, the assets of an enterprise can be classified into a variety of categories such as market assets, employee-related assets (human capital), intellectual capital assets (intellectual property) and infrastructure assets. Market assets are created by customers and their loyalty, the brand, distribution channels, contracts and agreements as well as licence contracts. The assets held by employees are the ability of creative thinking, problem solving and leadership, and the entrepreneurial and managerial skills of workers. The intellectual assets are, first of all, know-how, trade secrets (copyrights, patents) and trademarks. The infrastructure assets include organisational culture, risk assessment methods, methods and tools facilitating efficient sales management, customer and market databases as well as communication systems. The transformation of the intellectual assets into goodwill is an important aspect of knowledge management. From time to time in an enterprise, attempts are made to manage knowledge efficiently, thereby skipping process management. It is then forgotten that knowledge management means managing any knowledge generating processes rather than managing knowledge itself. Knowledge management creates the intellectual capital in an organisation. It requires the suitable elaboration of a knowledge management style which, in turn, should lead to the suitable generating of changes in knowledge resources, and, in consequence, changes

in the level (scope) of intellectual capital. Then the accepted concept of intellectual capital gains in importance.

In the process of building the concept of intellectual capital, two approaches can be identified: the individual approach and the organisational approach. In the individual approach intellectual capital is examined through the capital connected with an individual (human capital, individual capital), whereas in the organisational approach intellectual capital is connected with an organisation (structural capital). This means that the individual approach includes the talents and abilities of individual employees. On the one hand, human capital is analysed from the perspective of an individual and it is often described as the emotional and spiritual resource of an organisation. On the other hand, it is assumed that the human capital and human relations prevalent in an enterprise create the social capital. So we may talk about the dual nature of human capital. In every organisation, human capital is the set of individual features of its members which is shaped by the predispositions, talents, knowledge, skills and competences gained during their professional work. In turn, human relations in an organisation refer to such organisational behaviour as motivation, training, job satisfaction and possible conflicts.

The organisational approach has been created on the basis of social capital. In this respect, intellectual capital is analysed as a set of resources of an enterprise, in their broad sense, having an intangible nature. Social capital, as the sum of the human capital and human relations in an organisation, affects and combines all the elements making up organisational capital (organisational structure, intellectual property, organisational culture, customer relations and relationships, etc.).

Therefore it must be clearly underlined that in the aspect of knowledge management, intellectual capital in its essence should be limited to a description of its components, because, primarily, it includes overall capital flows, intermingling and remaining continuously dependent on one another as shown in Figure 1.

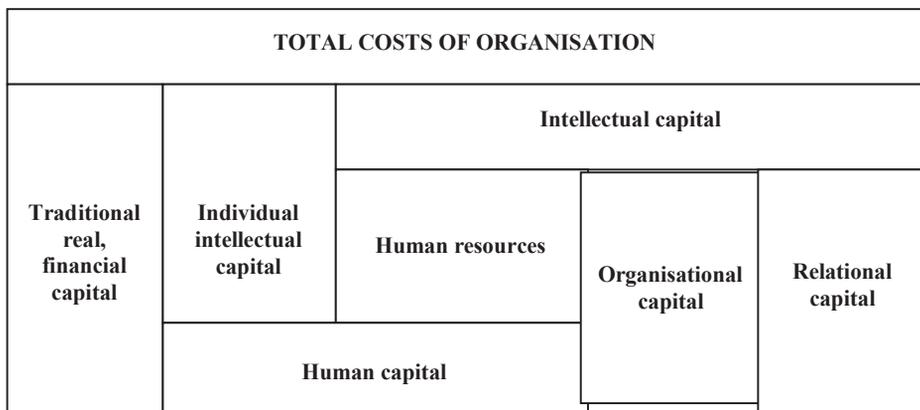


Figure 1. The dependency model of components of intellectual capital in an organisation

Source: author.

The above figure demonstrates that the intellectual capital of an organisation encompasses overall mutual relations and overall knowledge flows among its particular components. Accordingly, it is part of total goodwill, representing the difference between the market value and the book value of goodwill that enables an organisation to have a competitive edge. This is a trend in research on intellectual capital which refers to the reporting and measurement of intellectual capital. It is assumed that intellectual capital is used for creating and increasing the value of an organisation and, consequently, it is important to create a suitable data system, facilitating the identification and the measurement of characteristics other than financial, and the settlement of their relations to traditional financial data. Advantages stemming from the possession of the intellectual capital by an organisation depend on how efficiently an enterprise is able to identify and assess as well as to develop and use its capital.

3. Selected modelling approaches to knowledge management

The present practice of knowledge management in an enterprise at microeconomic level includes: knowledge allocation, knowledge development, knowledge sharing and distribution, knowledge utilisation and knowledge preservation. There are many models of generating knowledge in an organisation that are theoretical elaborations presenting knowledge management concepts (the Japanese approach i.e. “the knowledge spiral”, the resource-based view, process approach). They are usually presented as a cycle composed of particular processes of knowledge management. In the literature on this subject [Probst, Raub, Romhardt 2002, p. 42] there is a description of a model composed of the following processes:

- knowledge allocation,
- knowledge acquisition,
- knowledge development,
- knowledge sparing and distribution,
- knowledge utilisation,
- knowledge preservation.

In the process of *knowledge allocation*, the most important factors include the internal and external transparency of resources (this allows to avoid any unnecessary data reproduction) and facilitating the allocation of these resources by employees. The allocation of external knowledge is carried out by the description and analysis of the environment of the organisation in the area of knowledge. The identification of the internal knowledge of an organisation mostly consists in determining who knows what and what somebody can do and where collections of information are to be found. *Knowledge acquisition* is a knowledge flow process from the environment of an organisation to its interior, as well as a process where employees gain knowledge from internal sources, i.e. from collaborators, records and databases, accessible books and periodicals. A significant part of the knowledge resources of an enterprise originates

from outside sources. They include relations with customers, suppliers and agents in distribution channels. Another manner of knowledge acquisition from outside sources is the purchase of knowledge, understood as the employment of external experts. Knowledge acquisition can also consist in the extraction of knowledge from the products of competitors or the formation processes of workers' competencies based on benchmarking. This process takes place through participation in training courses, conferences and symposia as well as through formal relations between people. *Knowledge development* supplements knowledge acquisition from outside sources. This process encompasses gaining skills, designing new products, the promotion of innovations, and activities of managerial staff, all of which are aimed at producing any possibilities which have so far been unavailable to an organisation (for example a market survey carried out by a unit responsible for marketing and market research). *Knowledge sharing* is a process consisting in the reciprocal transfer of knowledge by people in the communication and cooperation process. Personalised explicit knowledge and tacit knowledge are shared in this process. As a supporting factor for this process people may use codified knowledge (information from the organisational records) and "established" knowledge obtained, for example, from a product damage analysis. *Knowledge distribution* is a fully developed form of its dissemination, and the difference refers to the catchment area. Making knowledge available is a process oriented at specific individuals and knowledge can become incidentally protected against access by unauthorised persons. Knowledge distribution is also an activity aimed at the creation of generally accessible information from a given resource of knowledge. This often takes place through advertising, opening Internet websites containing information about a company and its products, and placing descriptions of cases and best practices. Suitable conditions for the dissemination of knowledge ought to be created in the process of knowledge distribution. In an enterprise people deliver knowledge to their own collaborators, for example by giving spoken instructions or availing access to databases and records.

Even very good knowledge allocation and distribution are not a guarantee of its proper utilisation. There are many barriers that hinder the use of external resources of knowledge. It is important that the intellectual resources (patents, licences) of an enterprise creating its structural capital be *utilised* in their entirety. The utilisation of knowledge requires a combination of both categories of knowledge such as explicit and tacit, to facilitate a decision-making process composed of the following steps: need recognition and problem awareness, designing of solutions, evaluation of alternatives and choosing the best solution. In each of these steps an essential part is played by knowledge the lack of which means that decisions which are made are irrational. Therefore, in the decision-making process, explicit knowledge available in an enterprise and tacit knowledge held in workers' minds should be used. *Knowledge preservation* refers to the recording and storage of knowledge. The recording of knowledge is aimed at creating an organisational knowledge base, while the storage of knowledge encompasses various ways of its stockpiling. Accordingly,

it is important to use an employee's individual memory. Personalised knowledge is fixed in the minds of workers. The use of data carriers and devices designed for the recording of information contributes to the formation of codified knowledge. Knowledge stored on carriers should be from time to time assessed and verified as well as cleaned from useless elements.

The knowledge management system model described above depends on the accepted strategy of the creation and utilisation of organisational knowledge. The construction of this model is embedded in the management process in an enterprise. Interrelations between the main strategy of the organisation and the knowledge management strategy will have various forms: from cases when the knowledge management strategy is of a supportive and supplementary nature to cases where this will be in practice a prevailing strategy in an organisation.

4. Intellectual capital and the knowledge management level – the soft model

The elaboration of the soft model in an enterprise, understood as a concept of an internal model of an organisation with the intellectual capital compared to the level of knowledge management, requires the assumption of a specific concept of intellectual capital. Therefore the subject of this analysis is the concept of intellectual capital proposed by T.A. Stewart [Stewart 2001, p. 142]. Intellectual capital is the total of human capital (talent), structural capital (intellectual property, methodologies, software, documents etc.) and customer capital. Conjointly with tangible assets, intellectual capital creates the entire market value of an organisation (Figure 2).

TANGIBLE ASSETS	<p>INTANGIBLE ASSETS</p> <ul style="list-style-type: none"> • Human capital (human skills, knowledge, talents, etc.) • Structural capital (intellectual property, patents, processes, databases, networks, etc;.) • Customer capital (customer-supplier relationships)
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Figure 2. The concept of intellectual capital

Source: author.

This accepted model approach is based on the assumption that an enterprise promotes the knowledge it possesses and the knowledge which can be acquired and converted in the development process. Therefore, it is proposed to present in the

first instance the starting model of the knowledge management system which was prepared based on the study carried out in company X, the manufacturer of a wide range of biomaterials and wound dressings used in vascular surgery, general surgery and cranioplasty.

The knowledge management system presented by company X consists of the following three processes:

- knowledge acquisition process,
- knowledge developmental transformation process,
- knowledge distribution and utilisation process.

The knowledge acquisition process encompasses the creation of both explicit and tacit knowledge. A great amount of information can result in some chaos, because information acquisition should take place in a well-ordered manner that would suit the needs of an enterprise. Sources of acquired knowledge in company X can be divided into several kinds. *Internal sources* are related to knowledge possessed by particular structural units which are different departments of the enterprise (including the company's research and development department). The knowledge in the enterprise is allocated to the following structural units of the organisation: managerial staff; research and development department, marketing and sales department, export department, accounts and payroll department, manufacturing department. Annual reports on the company's operations, financial statements, business plans as well as development and investment plans prepared on a regular basis as documents indispensable for the strategic analysis are in the possession of the managerial staff. The marketing and sales department has such information as data of the volume, structure and dynamics of the sales of particular products in different market segments. The accounts department provides the information that makes it possible to assess the market position of another enterprise competing with company X and its monopolistic power based on economic analyses at enterprise level. The manufacturing and export departments are the source of information on production processes and capacity, suppliers, and they also possess information on the assessment of implemented innovations. The most important internal source of knowledge is the research and development (R&D) department where product innovations and technologies applied by the company come into being. The engagement in R&D activities is diverse enough: from one specialist who understands sufficiently well the use of technology to realize individually an R&D project, to the independent R&D department with modern equipment. The practice of cooperation and the use of the results of R&D activities carried out by other R&D centres in Poland is highly appreciated. The enterprise uses a database management system composed of data and a specialist computer programme for data collection and processing.

The knowledge from the macro-environment is acquired from outside sources. In company X they include research on the environment in respect of buyers of medical products, research on the technological environment and competitive environment, which directly and indirectly influence the company's position on the market of

medical products. The company also receives information obtained from unrelated companies and from competitors.

Another very important outside source of knowledge is the training of workers provided outside their workplace. The practical utilisation of acquired knowledge takes place upon the completion of the instruction process. According to managers of company X, trained employees should have advanced knowledge in their specific research area in addition to basic and specialist knowledge. The knowledge possessed by workers enriches their competencies. The improvement of competencies, which mean workers' qualifications and skills as well as experience gained over time in company X, takes place by the application of the following methods:

- participation in different training courses, whereby employees supplement their knowledge to a level indispensable for the correct realisation of assignments;
- participation in seminars where a greater engagement on the part of participants is required; they are mostly a series of lectures run by experts in a given field, followed by exercises in task groups where discussions are held and highly specialist knowledge is extended;
- participation in workshops during which participants work out solutions for specific problems; this is a pragmatic approach to knowledge acquisition;
- benchmarking, consisting in comparing practices and processes realized by the enterprise with practices in enterprises which are deemed to be the best in a given line of business; benchmarking in company X consists in studying and learning as well as the creative adoption of best practices from foreign competitors; the company identifies and attempts to thoroughly comprehend processes observed in other enterprises in the medical industry, for the purpose of transferring them to itself.

A source of knowledge which is a combination of outside and internal sources is the transfer of technology which has an active form in company X. Upon the acquisition and implementation of technology in the enterprise from outside sources, the company's own R&D work is used as well. The transfer of technology by the employees of company X is understood as the transfer of knowledge and information in two forms, such as technical data (engineering, scientific knowledge) and legal procedures (patents, licences).

An extremely important stage in the knowledge management system is **the knowledge developmental transformation process**. In company X this is realized, on the one hand, through the implementation of information technology systems, and on the other hand, through experience being acquired by workers. The combination of these activities leads to the broadening of tacit knowledge. The technological solutions used in company X include, but are not limited to, the intranet, Internet, extranet, document flow systems, teleconferencing and databases of experts. For the management of knowledge databases and documents the "Alfreso" system is used. All data collected and made available by workers are kept in a repository accessible by an authorised worker at any time. The use of data warehouses or a customer relations management system (CRM) is deemed as unhelpful.

The acquired knowledge, previously verified and assessed, now entered into information technology systems, is being transformed. The explicit knowledge converted and perfected by the workers' experience becomes unique. The aim of company X is maintaining the status of being a superb producer of medical materials. To achieve this aim, people with high qualifications, strong motivation for activity and experience are needed.

Therefore tacit knowledge, so difficult to classify and file, is so valuable. This kind of knowledge is combined with the continuous process of improving employees' qualifications. The creation of new knowledge is a priority in the manufacture of medical products and therefore the R&D department fulfils a central function in the development of company X. R&D activities are carried out by the company's own centre. They are the largest source of internal as well as tacit knowledge. The R&D department employs people who, thanks to their knowledge, high competencies and experience, have a considerable contribution to the creation of new knowledge which is so necessary in the innovative activity of the company. In this department new technologies and product innovations are created. This is the place where the most outstanding specialists are employed. Most frequently they carry out the following assignments: they acquire knowledge from the environment, improve the knowledge transfer process, follow the latest trends and customer expectations, exercise protection over innovations and hold relations with the external environment of the company.

The knowledge sharing and distribution process includes the transfer of knowledge in the process of its sharing and the utilisation of knowledge in the decision-making process at the optimum involvement of all the workers of company X. Knowledge sharing and distribution are the activities where single, isolated pieces of information or skills become transformed into resources of organisational knowledge. This happens as the result of good motivation of workers under favourable organisational culture conditions which are reflected in the warm atmosphere among workers of this company, appreciation of their successes and achievements by their superiors and the formation of various promotion prospects. Nevertheless, in company X specialist knowledge is properly protected. Tacit knowledge and knowledge referred to as "secret/confidential" is possessed by a limited number of workers. Knowledge in the form of inventions and technical solutions is protected by patent claims and utility models.

The study of the knowledge management system based on the example of company X was aimed at the analysis of the phenomenon of knowledge management and relations with intellectual capital. The further development of company X is connected with managing in a better way the intellectual capital, external and internal relations in the organisation, its workers and their skills, and directing appropriately employees' behaviour towards self-education.

For the purpose of the development and improvement of the knowledge management system in the knowledge-based enterprise which company X undoubtedly is, the soft model is proposed, as shown in Figure 3.

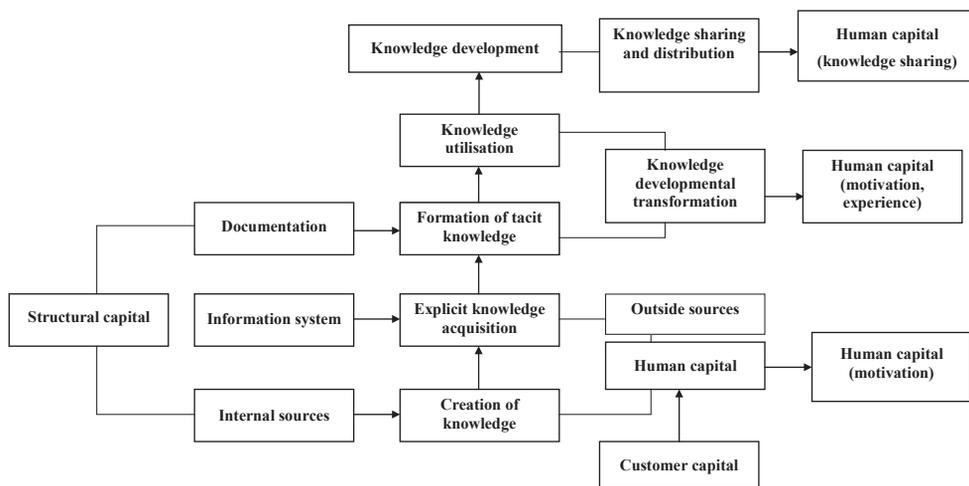


Figure 3. Intellectual capital and the knowledge management level – the soft model

Source: author.

The soft model shown in Figure 3, worked out on the basis of the results of the study carried out in company X, presents three basic processes of the knowledge management system: knowledge acquisition, knowledge developmental transformation and knowledge sharing and utilisation.

The knowledge acquisition process encompasses the creation of knowledge through the acquisition of explicit and tacit knowledge from various sources (internal and outside sources) and its storage. An extremely important stage in the presented knowledge management system is knowledge transformation into a developmental resource of the enterprise. The combination of the data and communications systems with the experience of workers leads to the extension of knowledge and the broadening of tacit knowledge. An enterprise intending to offer top quality products to its customers must concentrate on creating and transforming knowledge inside the organisation. The third stage comprises knowledge sharing and distribution, which contribute to the formation of organisational knowledge in the form of explicit and tacit knowledge. The application of this knowledge during the decision-making process is the confirmation of its efficient utilisation.

5. Final recommendations

The proposed knowledge management model reflects the general analysis of the phenomenon of knowledge management in company X whose mission is the improvement of safety in its broad sense, by the application of biomedical technologies in scientific research in the production and availability of biomedical medical products.

The presented soft model, taking into account the complex knowledge management system, extended by the intellectual capital, has numerous advantages, which in effect of the above analysis means that:

1. Both explicit and tacit knowledge is the base for the development of an enterprise, and workers properly motivated for the further development of their skills, knowledge sharing and enhancement of their experience become a requisite link integrating knowledge management system processes.

2. In the presented model, at the level of intellectual capital, competencies gain special importance. The suitable behaviour of both workers and superiors correspond to the mission and targets of the enterprise and they contribute to measurable advantages to both parties. Company X actively incorporates its workers in the activities connected with the improvement of the knowledge management system, creating the possibility of submitting ideas and initiatives. The management of the company, along with its employees, coordinates many specific targets and assignments.

3. After implementing the soft model, it will be possible to have a more efficient knowledge management system, to better understand the need of extending knowledge by employees – it is important to stimulate and maintain the need for continuous self-improvement. The realization of the knowledge management process requires the effective management of the intellectual capital.

With the prospect of the further development of company X, the use of this model can be considerably improved by:

- the process of the continuous improvement of the activity of the enterprise, the assurance of the efficient flow of information about tasks and their realization,
- the efficient identification and solution of existing problems,
- the transparency of knowledge management system processes,
- the determination of an employee's career path.

Accordingly, intellectual capital as an element of knowledge management has a huge influence on the efficiency of knowledge allocation, acquisition, development, distribution, utilisation and preservation.

6. Conclusion

Existing market trends, the increasing competitiveness of enterprises and customer requirements produce the need for the use of more and more perfect knowledge

management systems being conducive to the development of intellectual capital. The range of this process depends on accepted knowledge management methods, techniques and tools, whereas the value of intellectual capital is considerably effected by the competencies of the employees of company X, according to the analysis described in this study (especially their abilities of the effective utilisation of knowledge), is substantially a reflection of the knowledge management system in this company. It ought to be clearly underlined that knowledge management should result in the suitable generating of changes in knowledge resources, and, in consequence, the development of intellectual capital. For this reason the need arises for different approaches to the modelling of this system, which will certainly contribute to the efficient utilisation of knowledge resources in every organisation.

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KAPITAŁ INTELEKTUALNY JAKO WAŻNY ELEMENT ZARZĄDZANIA WIEDZĄ

Streszczenie: We współczesnych organizacjach kapitał intelektualny staje się zasobem coraz ważniejszym. Wyraźnie tracą na znaczeniu aktywa trwałe, a zyskują zasoby niematerialne. Zarządzanie niematerialnymi zasobami organizacji może odbywać się za pośrednictwem zarządzania kapitałem intelektualnym i zarządzania wiedzą. W artykule podjęto próbę zaprezentowania modelu zarządzania wiedzą, ze szczególnym uwzględnieniem kapitału intelektualnego. Zarządzanie wiedzą powinno prowadzić do odpowiedniego generowania zmian zasobów wiedzy, a w efekcie do rozwoju kapitału intelektualnego. Zatem rodzi się potrzeba różnych podejść do modelowania tego systemu, co prawdopodobnie przyczyni się do bardziej efektywnego wykorzystania zasobów wiedzy w każdej organizacji.

Słowa kluczowe: zarządzanie wiedzą, kapitał intelektualny, model.