3

Management of Knowledge Acquisition from Human Sources in Innovation Transfer

Antoni Zwiefka and Malgorzata Nycz
Lower Silesian Voivodeship Marshal Office, Health Policy Department, Wroclaw
Wroclaw University of Economics, Faculty of Management
Finances and Business Informatics
Department of Artificial Intelligence Systems, Wroclaw
Poland

1. Introduction

The term 'Knowledge Management' (KM) appeared several years ago and at first it was applied only to information systems. It was obvious soon that its meaning was broader and connected with business processes reengineering and management of quality. Knowledge management concentrates on recognition of all intellectual assets within an organization as well as on managing them. The main purpose of KM was obvious: better achievement of business goals.
In knowledge based economy the role and importance of information and knowledge is still growing. Knowledge is becoming one of the most valuable assets in any organizations. Fast progress at the field of scientific research – especially in medicine, new information and communication technologies, etc. enforce not only the necessity of innovation transfers but also the necessity of developing and creating knowledge.
Knowledge management can be seen as a result of evolutionary human development. In the last quarter of the 20th century this development was observed in continuously growing application of information and knowledge in societies and in organizations. Today information and knowledge are crucial and especially valuable due to the rapid developed and continuous progress in every sector of our life. Fast exchange of medical knowledge, new medicals, creation and propagation of new knowledge etc. are possible due to the achievements of 'informational revolution'.
For our further investigation we have taken into account medicine as a domain/discipline. Why medicine? For some quite obvious facts: our health is of great importance not only to us (people) but also for our countries. And on the other hand, medical clinics have a high intellectual potential for product innovation, process and service development. There are many reasons why this potential of innovation is not sufficiently transferred to the results, such as product development by companies and better health care. The barriers concern, among others, different interests. Clinics are mainly focused on the efficient management and welfare of patients. Whereas the objective of the industrial units is all about economy and economic importance. Today big business companies and corporations dominate as suppliers of ready innovative products. So far, the changes initiated by the employees of clinics and small and medium-sized enterprises (SMEs) have no chance to transfer knowledge and ideas. But this is the flexibility of SMEs in developing lab types, prototypes

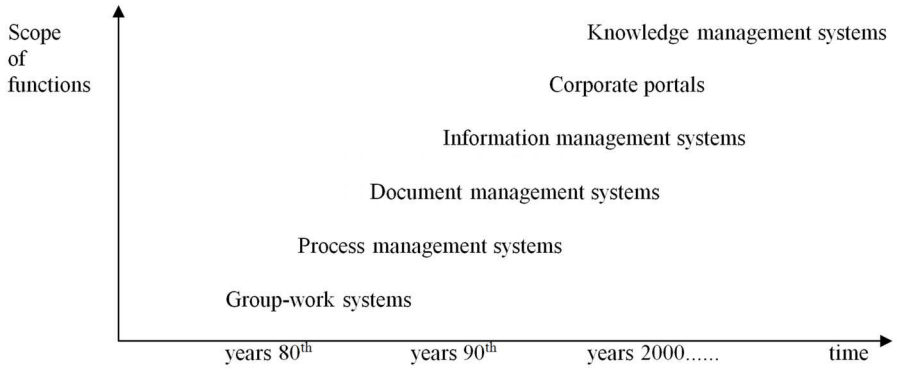
and small business solutions , that can help to improve the daily work of clinics and, in particular, its quality[1].
The chapter consists of six parts. After a brief introduction to the subject, there are basic definitions. The following definitions are characterized: knowledge management, information society, knowledge based economy, knowledge based organization, knowledge and its classifications, intellectual capital, sources of knowledge, gaining knowledge from different sources (knowledge discovery from databases and knowledge acquisition from human sources). Part three has been devoted to modeling of knowledge management. Then we describe the acquisition of knowledge treated as a process. In this part we present a model of knowledge management system in which we distinguish: input, processing and output. Within the processing module we distinguish discovery of evident knowledge from databases and acquisition of tacit (human) knowledge. In the next part we focus on knowledge acquisition and present some techniques of obtaining the knowledge (topic maps, skill maps, knowledge maps, contact books, knowledge sources maps, knowledge matrix, competency matrix). Part five presents ontology impact on knowledge management. Consequently, it has effects on the performances and validity of the KM system. Short summary ends the paper.

2. Basic definitions

Knowledge management can be seen as a result of evolutionary human development. In the last quarter of the 20th century this development was observed in still growing application of information and knowledge in societies and in organizations. In the 80th of XX century, the group work systems appeared. The next steps towards knowledge management were document management as well as information management systems. Diffusion of Internet in a global scale can be treated as a mile step in KM because new forms appeared in the shape of corporate portals. At the end of the last century we could observe a new type of systems: knowledge management systems. This evolution can be presented as in fig 1.
Today information and knowledge are crucial and especially valuable due to the fact that the progress in all sectors of our life is still growing. Our society is becoming more and more information society. Sometimes we can say we live in the information and knowledge era and our economy is based on knowledge.
The role and importance of innovation and creativity in the information society is becoming more and more important. The main features of the information society are as follows:

- Domination of services in economy,
- Domination of specialists and scientists,
- Importance of theoretical knowledge as a source of innovations,
- Tendency to social control of technical development,
- Permanent life learning,
- Creation of 'intellectual technologies' that are treated as a basis of social and political Decision making process.

[1] The authors participate in the IntraMED-C2C project. This project began to develop and provide the tools for increasing the access of small and medium-sized enterprises (on a European scale) to the innovation potential in clinics. This will open up new markets for their products. Workshops may be a good tool for initiating SMEs' access to clinics. Within the project, in accordance with the needs of the regions, there are arranged such pilot workshops.



Source: based on (Wierzbicki, 2004)

Fig. 1. Evolution of information systems: from group-work systems to knowledge management systems

Knowledge based organization is a system basing on a permanent process of gaining knowledge from any possible sources and using it. It possesses, inbuilt into its organization structure, learning, knowledge creating and innovative processes. There is a permanent process of knowledge exchange and conversion between external structure, internal one and individual competences of workers (Sveiby, 2003).

The intensive development of information and communication technologies increases the number of accessible information and enables its fast processing. In modern management it is neither structure, rules nor the newest methods and instruments, but well educated, creative, innovative, intelligent people and teams created by them, that decide about success of the organization.

If a modern organization wants to be competitive on a global as well as local market, it should meet two general conditions. It has to possess the appropriate knowledge and be able, to know how to use this knowledge.

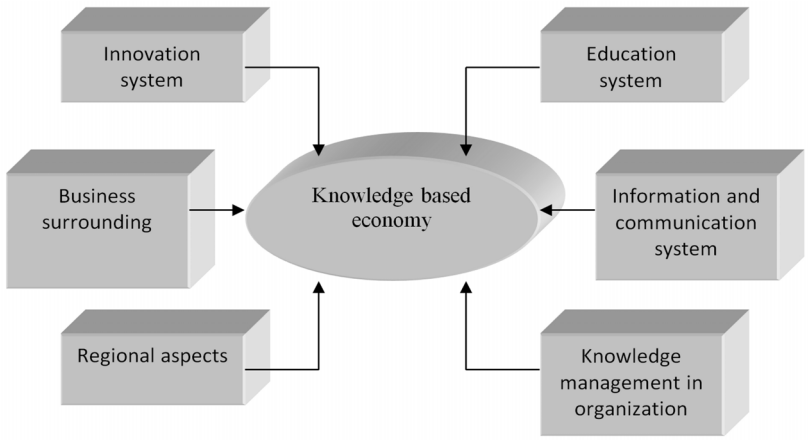
New economy can be called knowledge based economy, new economy, digital economy or network economy and be applied to all sectors of economy, also to the medical one. Knowledge based economy is based on six following pillars:

1. innovation system,
2. education system,
3. communication and information system,
4. business and institutional surrounding,
5. knowledge management in organization,
6. regional aspects

which are shown in fig. 2. All these elements influence each other.

When we realize that our health is one of the most important features not only for a given person but also should be seen in a larger scale, we understand how important the medical knowledge management is for a given country, region, etc. Fast exchange of medical knowledge, new medicals, creation and propagation of new knowledge, etc. is possible due to the achievements of 'informational revolution'.

There are many definitions of knowledge that can be found in literature. Knowledge can be seen either in a narrower or broader meaning. According to an encyclopedia definition knowledge in its narrower meaning is understood as the whole credible information about the reality with the ability to use it. In its broader meaning knowledge is a set of information, believes, etc. that are of practical or recognizable value (Encyklopedia Powszechna, 2005). Knowledge can be described as all information and skills used by people to solve their problems which cover practical and theoretical elements as well as hints and rules how to proceed. Knowledge can be treated as the implementation of information in practice. It also can be seen as early collected and cumulated information. From the information systems point of view, knowledge consists of facts and reasoning rules. And another definition of knowledge says that data are transformed into information, then into knowledge by adding context, experience and interpretation. Knowledge is a skill to realize concrete tasks basing on information (Probst & Raub & Romhardt, 2002). Dependencies among data, information, knowledge and wisdom are shown in fig. 3.



Source: (Nycz, 2007)

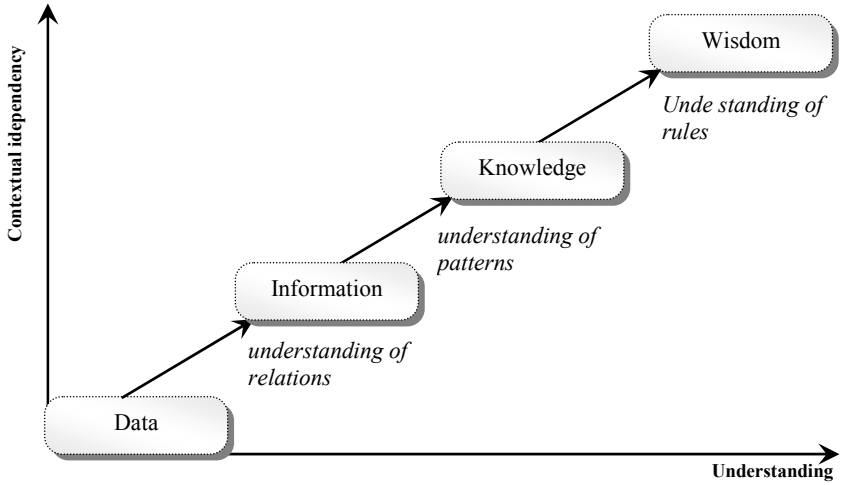
Fig. 2. Basic pillars of knowledge based economy

Classifications of knowledge can be different, depending on the criterion which has been taken into account. Knowledge can be *a priori* or *a posteriori* one. Knowledge can be divided into *science* that is general knowledge and *techniques* used in achieving economical effects. We can also distinguish knowledge which is conscious and unconscious (tacit) one (Nonaka & Takeuchi, 2000). Tacit knowledge is our knowledge, experience or context, in which we see information. Knowledge can be classified into *procedural, declarative* or *mixed* one. Knowledge can be also seen as *domain knowledge* (e.g. medical, technical, financial, managerial etc.) or *meta-knowledge* (knowledge about knowledge). Knowledge can also be static, dynamic, causal, full or not full, sure or unsure, primordial or secondary, secret or open, managerial or technological.

Knowledge is connected with innovations; knowledge and innovations – with creativity of people. Knowledge as any other asset in organization has to be managed.

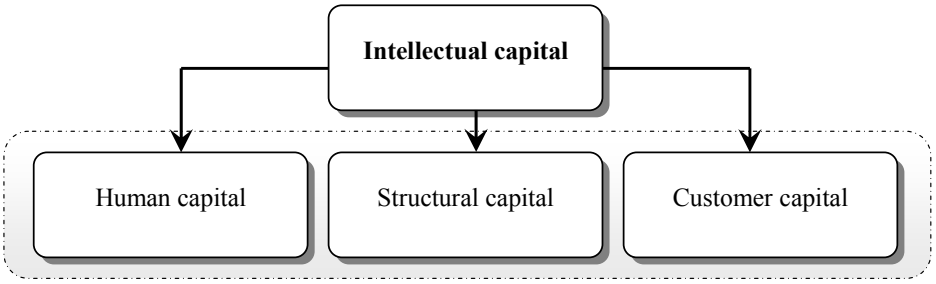
In knowledge based economy we treat intellectual capital as a strategic asset. It is a sum of knowledge of people in the organization and it decides about the value of the organization,

the value that is different from the financial one. Intellectual capital consists of patents, workers skills, technologies, information about clients and suppliers and experience (Stewart, 1997) and it can be presented as in fig. 4.



Source: (Chauvel & Despres, 2002)

Fig. 3. From data to wisdom



Source: (Stewart, 1997)

Fig. 4. Forms of intellectual capital

Knowledge management covers such areas as information management, management of conscious knowledge (that has been previously codified in structural and non-structural databases and data warehouses – knowledge about processes), management of non-conscious knowledge (that workers possess in their brains), and management of intellectual capital (that means management of production processes basing on intellectual assets of the organization) (Caldwell & Harris, 2002).

When talking about knowledge management we should think also about such aspects as law conditions which are applied in a particular country, norms, standards, disposals, law regulations within organization as well as those coming from the outside, cultural and

technological regulations. Considering these aspects, it is useful to define some layers of medical knowledge management. They can be distinguished as following: (1) law regulations, (2) knowledge assets of the organization and particular workers, (3) scientific researches carried out with cooperation with medical universities – they can be treated as processes enhancing general as well as specialized knowledge, (4) general information standards that are obligatory in a country, (5) universal systems of economic object identification, (6) infrastructure information systems in medical sector.

As we have already said, knowledge, as any other asset in organization, should be managed. There are many descriptions and definitions of KM in literature. For the purpose of this book we propose the following definition:

Knowledge Management is such an approach that covers identification, collecting (storing), development, enlargement, co-usage of both material and non-material information assets in organization. Our further investigations will be based on this definition.

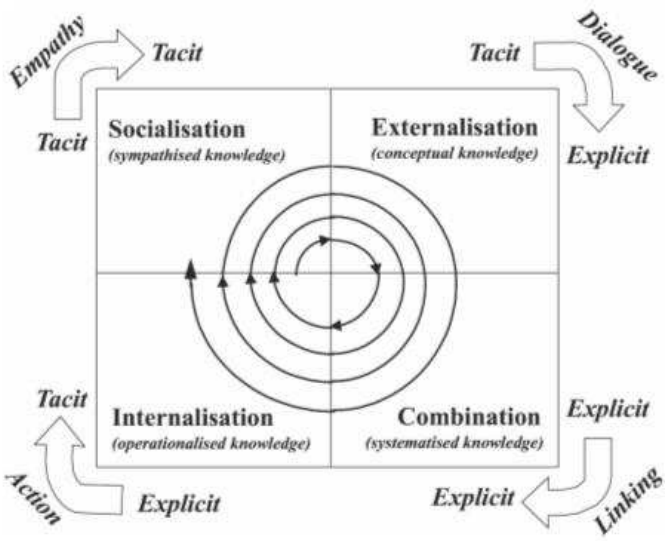
Sources of medical knowledge can be different. They are grouped according to different criteria. When we consider how 'modern' they are, we can distinguish traditional sources (written on paper like books, articles in medical journals, scientific reports, etc.) in the shape of traditional documents (e.g. patents, certifications), and electronic sources, like traditional databases and data files, audio and video documents, hypertexts, multi-media databases, data warehouses, knowledge bases, located inside the organization as well as outside, which are accessible via Internet or other nets. These sources are depicted to the conscious knowledge which is structuralized and accessible to those who need it (in fact it is only theoretically, because not all the knowledge especially this very new, innovative one is open to everybody).

But what about the tacit knowledge? Its importance is still growing and this is the obvious truth we all know. But how to manage it? How to convince people to share their knowledge, experience, results of their experiments, etc.? We will try to answer these questions below.

3. Modeling of knowledge management

In the process of gathering information, documents, professional experiences and know-how at a corporate level, a big issue is modeling of *knowledge management. It is used t*o understand easily and clearly how knowledge may be dealt with, **transforming tacit knowledge into more explicit forms**. The Nonaka's and Takeuchi's KM model, as one of the most famous among the existing models, focuses on a knowledge spiral that explains the transformation of tacit knowledge into explicit knowledge and then back again as the basis for individual, group, and organizational innovation and learning" (Dalkir, 2011).

The concept of knowledge socialization must be understood in the conversion of tacit knowledge into the explicit knowledge by sharing the hidden (internal) knowledge during the implementation of joint activities by members of the organization. External expression is (in turn) understood as a process of translation of tacit knowledge into the explicit one by expressing it in a generally accessible, acceptable and digestible form. Combination model, is treated as the expression of explicit knowledge in another form or its conversion into a new form. In addition, it is treated as a combination of communication, distribution and systematics of explicit knowledge. The fourth and final element in the model is a learning process - the conversion of the explicit knowledge into the tacit one.



Source: www.emeraldinsight.com

Fig. 5. Nonaka's and Takeuchi's knowledge management model

The key to this model is the interaction between forms of knowledge and levels of the organization. The spiral resulting from the conversion of the explicit knowledge into the hidden one on each level, is the basis for the creation and playback of knowledge in the organization. Knowledge of the Japanese model is individual, group, organizational and inter-organizational. The spiral of knowledge creation in organizations can be activated by fulfilling the following demands:

- Spiral is driven by the intentions, aspirations and objectives of the organization – it must be present and makes the workers until they become their targets,
- It must provide employees with autonomy because it is a catalyst for the emergence of new ideas and positive motivation,
- Organization should be characterized by the creative chaos and instability. It can be used to violate workers' routines and interaction with the rapidly changing environment. It also allows more reliable and faster respond in the event of a crisis.
- In the organization, there should be some redundant information - going beyond the needs of operational activity, and the organization should be as internally differentiated as its surrounding.

Members of the organization more easily adapt to their environment when they differ from each other.

The Ba concept (model) by I.Nonaka and L.Konno can be seen as the enhancement of the Nonaka's and Takeuchi's model. It can be understood as a space where there is a dynamic exchange of knowledge and there are knowledge-conversion processes listed above. Within this model four spaces have been characterized:

- "original space - space to share emotions, experiences and mental models,
- interaction space - space to convert tacit knowledge into the explicit one, the key here are dialogues and metaphors,

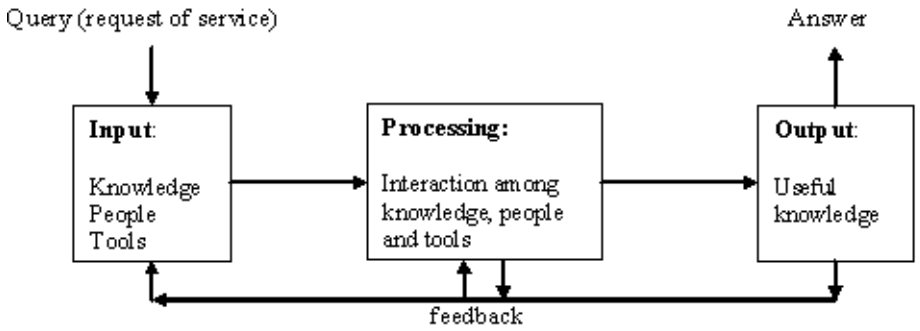
- cyberspace - virtual space of interaction – it is a combination of new and the existing explicit knowledge in the organization, and
- exercise spaces - supports internalization, learning" (Nonaka & Takeuchi, 2000).

The authors of the concept of Ba believe that the creation of knowledge in the organization runs perfectly in the following five phases:

- "dissemination of tacit knowledge (…),
- search of ideas - in the course of brainstorming, the concept of dialogue is created, which eventually takes the form of public - this phase corresponds to the externalization,
- confirmation of ideas - because according to Nonaka knowledge is the confirmation of convictions, therefore the ideas created in the previous phase should be verified - that will be beneficial to the organization,
- building pattern - in production it corresponds to the creation of a prototype. In this phase, the concept takes a material form,
    - leveling of knowledge - both in the inside as well as inter-organizational. A concepts arising in one cycle become the beginning of another process at a higher level" (Nonaka & Takeuchi, 2000).

4. Knowledge acquisition as a process

According to the technological approach to knowledge management, the system of KM can be seen as any other information system. It consists of three modules: input, processing and output and among them we distinguish feedbacks (see fig. 6.)



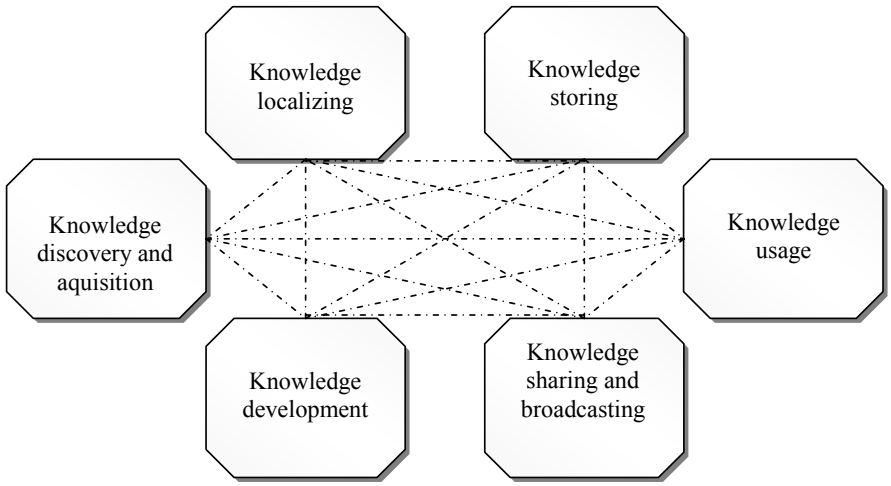
Source: (Nycz, 2007)

Fig. 6. Model of knowledge management system

Input module enables introducing the query to the system that can be in the shape of a request to realize the knowledge service, e.g. finding necessary knowledge. Each request of service has to be identified and authorized. Each request is monitored till its end. Through the input module, new knowledge and any updating are introduced to the system.

The processing module realizes interactions among knowledge assets, information tools and people who need knowledge, people who are responsible for system administration tasks and people who possess necessary, required knowledge. Within the processing module, the process of knowledge management is realized. It consists of some sub-processes such as:

knowledge localization, knowledge collecting and storing, acquisition of knowledge, knowledge sharing and its broadcasting, usage of knowledge and its development. The processing module can use one or more knowledge sources. It can also use data mininig techniques to find/generate required knowledge from accessible databases. But it can also find knowledge from personal sources (tacit knowledge). It can deliver information about where and who possesses the required knowledge and how to achieve him/her. In the frame of this module, the appropriate infrastructure of services has to be done, through which knowledge sources are accessible.
Before the obtained knowledge is to be delivered to the user, it has to be verified and assessed and visualized in the form required by the user.
Now let's concentrate on the processing module. Interactions among sub-processes can be presented as shown in fig. 7.



Source: (Probst & Raub & Romhardt, 2002)

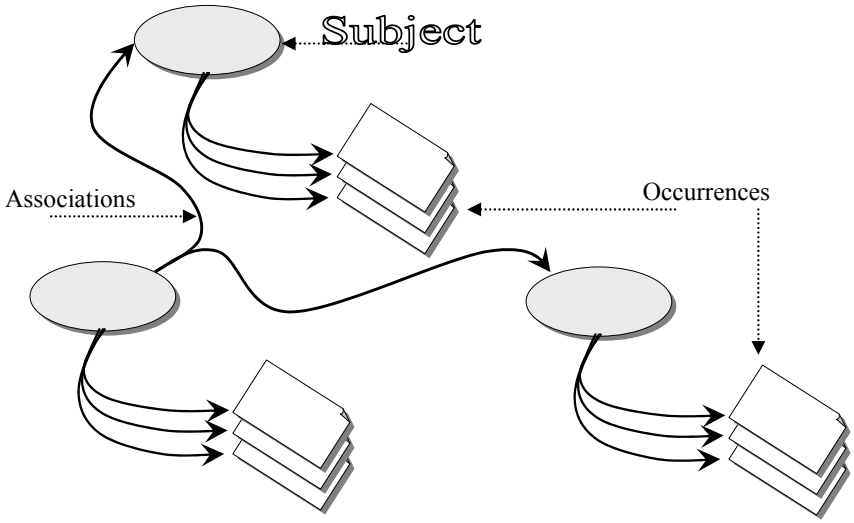
Fig. 7. Interaction between sub-processes of knowledge management

Knowledge management process is realized all the time. It can be in one of two states: active, when the request of service appeared, or stand by, when waiting for the request.
Gaining of knowledge means obtaining knowledge from the sources where it is. These are: 1) sources connected with human factor; in this case we talk about *knowledge acquisition* or sources in a raditional shape (paper sources) as well as in 2) a digital form (e.g. databases) from which we *discover* the required *knowledge*. If we want to use information techniques to obtain knowledge from paper sources, first they have to be converted into a digital form. There are many different techniques of knowledge acquisition from human sources and we will present them below.

5. Techniques of knowledge acquisition

Knowledge acquisition relates to human sources. In a modern organization workers contact each other in many ways: e.g. personally, using fax, email. It is important to know where, at

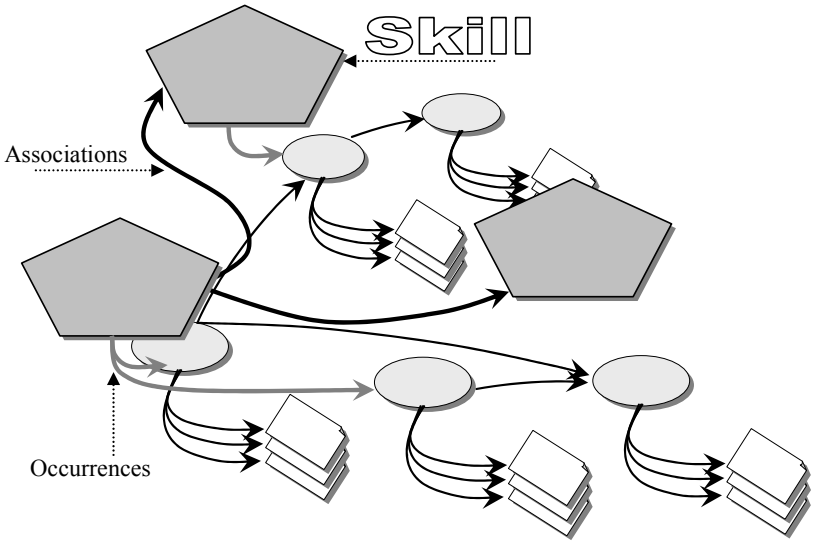
whom, in which documents, data files, law regulations we should seek necessary knowledge. Knowledge acquisition can be realized by topic maps, skill maps, contact books, knowledge maps, knowledge matrix, competency matrix (Supply_Chain Council, Supply-Chain Operations Reference-model Overview Version 5.0, 2003).
Topic maps are the ISO standard (ISO/IEC 13250). The basic elements in a topic map are: subject, associations and occurrences (fig. 8.)



Source: ibidem

Fig. 8. Topic map structure

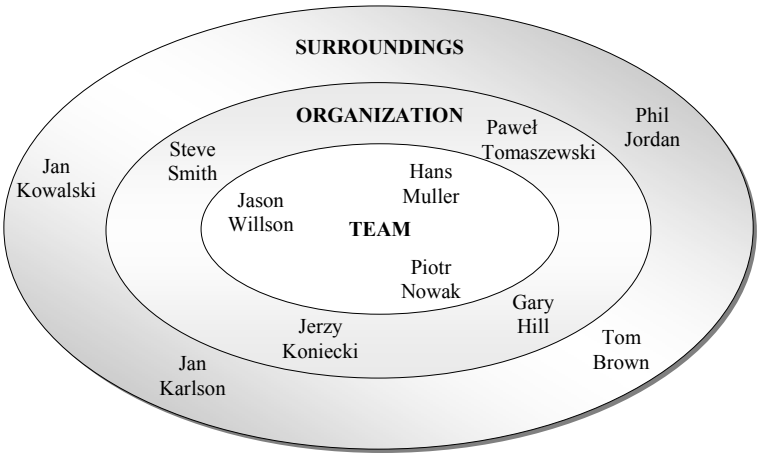
Subject is a basic element in a topic map and it can be a person, document or any other thing. It can be an abstract idea or a real one.
Occurrence is an assignment between the subject and the information source, e.g. a document on a given subject, video or/and audio sequences, archives collecting documents on a given subject.
Associations among subjects can be understood as a binding element showing relations between subjects of different types. There are two subjects in any association and each subject may realize different function, e.g. association of 'is father' type can have the subject of 'human being' type and one of them is 'father' and the other - 'child'.
Topic maps are the advanced solution of structuralization, gathering and knowledge representation problem. But, they deliver limited set of instruments especially when we want to use them to present our workers knowledge or to assure them the possibility to use more advanced mechanisms of database searching, e.g. navigation mechanisms. To implement such functions, it is necessary to enlarge the technology of topic maps by creating new structures that are needed to store information about the workers, their knowledge and skills.
Skill map has been created by adding new, the third layer to a topic map. There are new created objects (e.g. skills, associations between them) as well as associations with their occurrences (subjects) in this layer (fig. 9.).



Source: ibidem

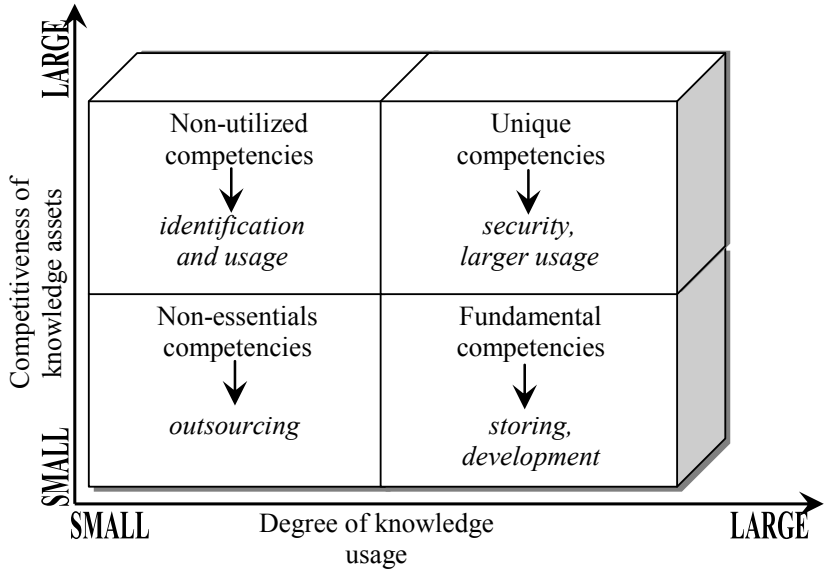
Fig. 9. Exemplary skill map

Contact books are a very simple way to localize knowledge sources. Such a book contains information about our employees or experts within our organization. Contacts can be categorized due to e.g. competences, departments, potential problems, etc. Those workers who need specialized knowledge from experts should have access to contact books. The advantage of contact books is obvious: saving time when looking for the desired knowledge.
Knowledge maps called also knowledge sources maps are especially useful when we want to find location of required knowledge assets. They present graphically dependencies among intellectual actives, their sources of origin and applications. Knowledge maps have been created to answer the requests coming from users to systematize assets connected with human capital (still growing) as well as associations of tasks with the appropriate intellectual assets in the organization.
Taking structure as a criterion we can distinguish several types of knowledge maps, e.g. topographical knowledge maps, information assets maps, geographical information maps, knowledge sources maps. Exemplary map of knowledge sources is shown in fig. 10.
Knowledge matrix can be very useful in presentation of intellectual assets. It can be seen as another way of knowledge assets presentation that is collected in the organization. Knowledge matrix consists of carefully selected categories. For example, it may be the pairs of appropriate matched types of knowledge (explicit and tacit, internal and external).
Competency matrix is used when we want to define how particular knowledge areas influence the management of organization. The matrix possesses two dimensions. It consists of four parts (fig. 11.).
They are created when crossing two-dimensional space of knowledge assets with two axis: vertical that represents e.g. competitiveness of organization assets, and horizontal one representing the degree of knowledge usage in organization. All assets can be assigned to one of four matrix areas. Each area represents the strategy of usage of 'its' knowledge source.



Source: (Probst & Raub & Romhardt, 2002)

Fig. 10. Knowledge sources map



Source: ibidem

Fig. 11. Competency matrix

6. Ontology impact on knowledge management

Taking into account the definition of knowledge management and its elements (see the previous sections of this chapter), now we have to consider how knowledge is to be

collected (and then processed) within the information system. One general condition has to be fulfilled: knowledge must be written in knowledge base using such formalism of its representation that can be understood by both people and computer. Ontology is one of such mechanisms and seems to be especially useful when we talk about tacit knowledge. There are some expectations put towards ontology[2]. These expectations can be described in the following way:

- to make easier the communication between people and organizations by common understanding of ideas, reduction of any possible misunderstandings, synonymous definitions of ideas and integration of many points of view,
- to make possible the representation and usage of knowledge in any part of information system,
- to assure the cooperation of many components, modules and systems by sharing and mapping of knowledge,
- to use the system dictionaries by delivering coherent and rich user interfaces, reduction of system creation time, multilingualism maintenance, many ways of visualization, etc.,
- to modify the systems during their activity by introducing the parameterization of functionalities within ontology as well as by the usage of generative user interface.

6.1 Ontology definitions

There are some definitions of ontology known from the literature[3]. For example J.A.Hendler says that "an ontology is a formal definition of a body of knowledge"[4]. Another definition explains ontology as a theory of a particular domain or sphere of knowledge, describing the kinds of entity involved in it and the relationships that can hold among different entities"[5]. One more definition says "An ontology defines the terms used to describe and represent an area of knowledge. Ontologies are used by people, databases, knowledge-bases and applications that need to share domain information (a domain is just a specific subject area or area of knowledge, like medicine, tool manufacturing, real estate, automobile repair, financial management, etc.)[6].

In our further investigations we would like to concentrate on the definition proposed by J.F.Sowa who says that "the subject of *ontology* is the study of the *categories* of things that exist or may exist in some domain. The product of such a study, called *an ontology*, is a catalog of the types of things that are assumed to exist in a domain of interest *D* from the perspective of a person who uses a language *L* for the purpose of talking about *D*. The types in the ontology represent the *predicates*, *word senses*, or *concept and relation types* of the language *L* when used to discuss topics in the domain *D*"[7].

---

[2] http: //www.rodan.pl/web/guest/oferta/platforma_officeobjects/officeobjectsontology_manager, 8.07.2011

[3] See e.g. http://www.aaai.org/AITopics/pmwiki/pmwiki.php/AITopics/Ontologies, 9.07.2011

[4] ibidem

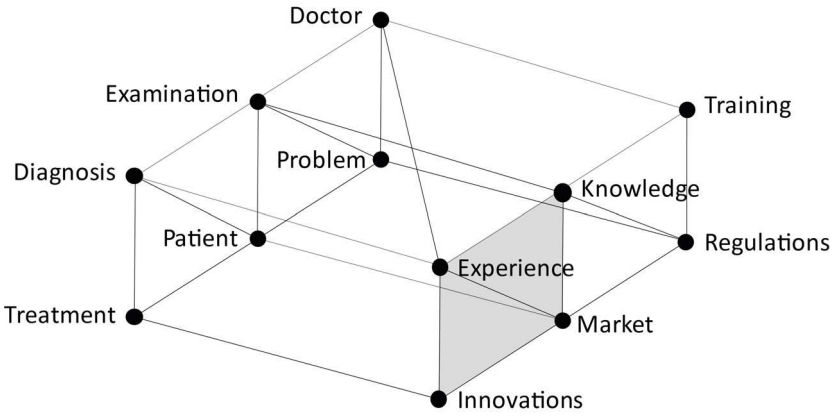
[5] D.S.Weld (ed.): The role of Intelligent Systems in the National Information Infrastructure, The American Association for Artificial Intelligence, 1995,
http://www.aaai.org/AITopics/pmwiki/pmwiki.php/AITopics/Ontologies, 9.07.2011

[6] J.Heflin (ed.): OWL Web Ontology Language Use Cases and requirements, 2004,
http://www.aaai.org/AITopics/pmwiki/pmwiki.php/AITopics/Ontologies 9.07.2011

[7] http://www.jfsowa.com/ontology, 9.07.2011

6.2 System of medical ontologies as an exemplary ontology

The treatment of patients is the main goal in medicine. When a doctor has made (after examination) a diagnosis, the next step is to select the best form of treatment. Parallel to this, is a pathway of solving the patient's problems. Both are typical ways to get experience. There is a hypothesis that the proposed system of nodes feature different ontologies of expertise. These domains of influence have to be taken into account because of the diversity of knowledge involved in health-care.



Source: own elaboration

Fig. 12. Relations in the process of medical innovations

Evolution of medical practice (treatment) involves interactions both within and among the foregoing aspects. Thereby, in Fig. 12 nodes correspond to the subcomponents of aspects of the patient-practitioner correlation. The system includes the provision of patient services. This process is supported by training and regulations having influence on the knowledge used for examination. There are two kinds of knowledge in the medical sector. Tacit knowledge is generated e.g. within experience. The emergence of relations in the presented system reflects both the application of knowledge into specific activities as well as the exchange of information across the relations.

Differently from linear or flat models of medical innovation, the undirectionality of pathways within this scheme does not confine the potential of innovation (grey area) only to scientific breakthroughs but at calls for appreciation of multiple sources across all domains. It is worth mentioning that the importance of variety in the system of innovation draws attention to the central role of institutions. Scientific progress requires such clearly defined system of understanding to describe the space in which ontological solutions are searched.

7. Conclusions

In knowledge based economy the role and importance of information and knowledge is still growing. Knowledge is becoming one of the most valuable assets in any organizations. Rapid progress in the field of scientific research – especially in medicine, new information and communication technologies, etc. enforce not only the necessity of innovation transfers but also the need of development and creation of knowledge. Knowledge discovery from

the existing databases have been known for +- 30 years, but the acquisition of tacit knowledge is much younger. Human capital consists of creativity, an innovative way of reasoning, experience and knowledge of people and – as any other assets in the organization – should be managed. This chapter covers some problems of tacit knowledge management. We have chosen medicine as an exemplary discipline where transfer of knowledge is of special importance.

In the medical sector innovation transfer will open up new markets for SMEs' products. This may be a good possibility for clinics to become a part of that. Clinics have a high potential for product innovation, process and service development. There are many reasons why this potential of innovation is not sufficiently transferred to the results, such as product development by companies and better health care. The barriers concern, among others, different interests. Clinics are mainly focused on the efficient management and welfare of patients. Access of small and medium-sized enterprises (on a European scale) to the innovation potential in clinics can improve their economy. Whereas the objective of the industrial units is all about economy and economic importance. Today big business companies and corporations dominate as suppliers of ready innovative products. So far, the changes initiated by the employees of clinics and small and medium-sized enterprises (SMEs) have no chance to transfer knowledge and ideas. But this is the flexibility of SMEs in developing lab types, prototypes and small business solutions , that can help to improve the daily work of clinics and in particular its quality.

When we consider knowledge management in context of the innovation transfer, we should remember about new possibilities of processing that is cloud computing. It is – according to the National Institute of Standards and Technology – "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or services provider interaction". There have been distinguished three sorts of services in cloud computing: infrastructure as a service, platform as a service and software as a service. Knowledge management within cloud computing seems to be the field for further investigations.

8. Acknowledgement

The presented studies were conducted in frame of InTraMed-C2C Project (2CE096P1 - CENTRAL EUROPE Programme 2007 – 2013) in cooperation with Wroclaw University of Economics. The co-operation is much indeed appreciated.

9. References

Caldwell F., Harris K. (2002). *Cykl popularności metod zarządzania wiedzą w roku 2002, [in:] Knowledge Management. Zarządzanie wiedzą w organizacji*, ComputerWorld Custom Publishing, May 2002 (in Polish)

Chauvel D., Despres C. (2002). *Intellectual Roots of Knowledge Management*, KMSS 2002, Sophia Antipolis, September 2-6, 2002

Dalkir K. (2011). *Knowledge management theory and practice*. Second Edition. Boston, MA: MIT Press, 2011

Davenport T., Prusak L. (1998). *Working Knowledge*, Harvard Business School Press, Boston 1998

Encyklopedia Powszechna, PWN, Warszawa 2002, http://encyklopedia.pwn.pl/, 22.01.2005 (in Polish)

Nonaka I., Takeuchi H. (2000). *Kreowanie wiedzy w organizacji*, Polska Fundacja Promocji Kadr, Warszawa 2000 (in Polish)

Nycz M. (2007). *Pozyskiwanie wiedzy menedżerskiej. Podejście technologiczne*, Wyd. AE im. O.Langego we Wrocławiu, Wrocław 2007 (in Polish)

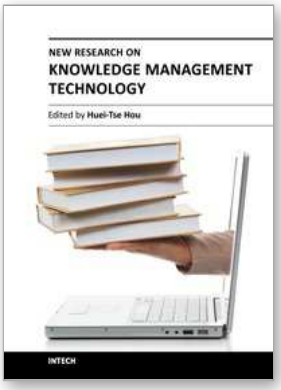
Probst G., Raub S., Romhardt K. (2002). *Zarządzanie wiedzą w organizacji*, Oficyna Ekonomiczna, Kraków 2002 (in Polish)

Stewart T.A. (1997). *Intellectual Capital*. The New Wealth of Organisations, New York 1997

Wierzbicki M. (2004). *Czy e-learning, zarządzanie wiedzą, jakością i procesami to oddzielne wyspy*, MacroSoft S.A., 2004 (in Polish)

Supply_Chain Council, Supply-Chain Operations Reference-model Overview Version 5.0, http://supply-chain.org/slides/SCOR5.0OverviewBooklet.pdf, 4.03.2003

Sveiby E. (2003). *A Knowledge-Based Theory of the Firm to Guide Strategy Formulation*, http://www.sveiby.com.au, 15.11.2003



New Research on Knowledge Management Technology

Edited by Dr. Huei Tse Hou

ISBN 978-953-51-0074-4
Hard cover, 228 pages
Publisher InTech
Published online 24, February, 2012
Published in print edition February, 2012

Due to the development of mobile and Web 2.0 technology, knowledge transfer, storage and retrieval have become much more rapid. In recent years, there have been more and more new and interesting findings in the research field of knowledge management. This book aims to introduce readers to the recent research topics, it is titled "New Research on Knowledge Management Technology" and includes 13 chapters. In this book, new KM technologies and systems are proposed, the applications and potential of all KM technologies are explored and discussed. It is expected that this book provides relevant information about new research trends in comprehensive and novel knowledge management studies, and that it serves as an important resource for researchers, teachers and students, and for the development of practices in the knowledge management field.

InTech Europe
University Campus STeP Ri
Slavka Krautzeka 83/A
51000 Rijeka, Croatia
Phone: +385 (51) 770 447
Fax: +385 (51) 686 166
www.intechopen.com

InTech China
Unit 405, Office Block, Hotel Equatorial Shanghai
No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821