KNOWLEDGE CAPITALIZED AT THE ENTERPRISE LEVEL

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Abstract: Today, in order to develop intelligent business for become competitive, the enterprises must increase the quality and technologic level of products and services conform with applicable codes and standards, to have permanent new product or to make old products bettering, to respect the customers, suppliers or partners contracts terms and conditions, to respect the market rules, the applicable laws and to have a good prices politic. These activities request a large amount of date, information and knowledge collecting from all sources and then transferring knowledge at each enterprise level. This paper describes how the knowledge can be capitalized at the enterprise level using the enterprise resources.

Key words: Enterprise, knowledge capitalized, knowledge, middleware.

1. INTRODUCTION

Globalisation of the new economy and the resulting competitive industrial environment demands that industry develops new products with shorter lead times and better overall performances. Knowledge has become the more important economical factor for to have permanent competitive products and services. This knowledge is mainly based on market demands, technical processes, customer requirements, technology improvements, laws, suppliers, competitors etc. In this new era of information, the fundamental sources of wealth are knowledge and communication, and not natural resources or labor [1].

During the first decades of the computer science, the emphasis was data management. In order to transform data into information it is required tools. All the same, in order to transform information into knowledge it is needed time. Knowledge is to use information (and as a consequence data) to generate new ideas or solutions. Also, today, are differentiating these three classes of elements as [1]:

• Data (a discreet and objective group of facts of a certain event).

• Information (a message containing an originator and a receiver and whose meaning involves a new interpretation based on a group of data).

• Knowledge (a mixture of experiences, values, contextual information and intuition, forming a framework in a person's mind that enables him/her to evaluate and to obtain new experiences and information).

The main studies are identified two important distinctions of types of knowledge that has been used [2]:

• The tacit knowledge (it is the knowledge that the people possess but it is not described in any place. It is just residing in your heads).

• The explicit knowledge (it is the knowledge that is registered in some ways and therefore it is available for the other people).

Many studies on knowledge management are based on the successive passages from tacit knowledge to explicit knowledge and vice-versa.

These studies have also suggested four basic conversion patterns for the knowledge creation in an organization. These four basic standards are presented in Fig. 1 in such a way that the creation of the organizational knowledge is based on a continuous and dynamic interaction between the tacit knowledge and the explicit knowledge:

• From tacit knowledge to tacit knowledge: it is a process of sharing experiences and, therefore, the creation of tacit knowledge. The base input for the acquisition of this knowledge type is experience.

• From tacit knowledge to explicit knowledge: it is a process of articulation of the individual's tacit knowledge in explicit concepts. This conceptual knowledge usually happens through: symbolic representation of the tacit knowledge (through metaphors, analogies, models, concepts, hypotheses by using the figurative language); oral reports and films; description of part of the tacit knowledge through spreadsheets, texts, images, illustrations, rules, scripts, design history, lessons learned etc.

• From explicit knowledge to explicit knowledge: it is a conversion process of some type of explicit knowledge generated by an individual to add up to the explicit
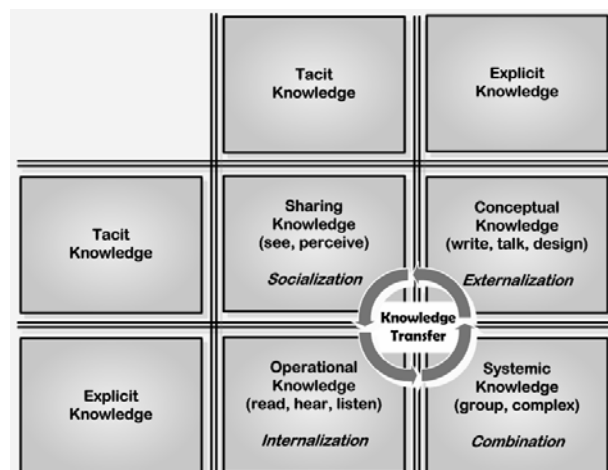

Fig. 1. The four basic standards for the knowledge creation or ways of converting knowledge.

knowledge of an organization. Individuals exchange and combine knowledge through documents, meetings, chats etc. Usually this systemic knowledge happens by grouping and processing different explicit knowledge that could generate into a new knowledge.

• From explicit knowledge to tacit knowledge: it is the process of incorporating explicit knowledge from the organization into individual's tacit knowledge. This operational knowledge usually happens through: reading/visualization and individual studying of documents from different formats; individual interpretation and experimentation.

2. KNOWLEDGE MANAGEMENT

"Knowledge management is a certain form of looking into the organization in the search of points of the business process where knowledge can be used as competitive edge" [3].

Also, Knowledge management is not technology but it can be benefited from new technologies of the information and of communication. Knowledge management is not creativity and innovation but it is related to how to use the innovations generated in the company in a systematic way for a better market positioning.

Knowledge management is not quality but it uses techniques and tools that have already been applied in the quality management and in the approaches of continuous improvement. Knowledge management is not marketing but it can help companies in the competitive intelligence.

Knowledge management is not documentation but it is related to organizational collective memory. Knowledge management is not also administration of human resources but it only takes place with the people of the organization.

In fact, Knowledge management is a new area within information technology and management, a new field among the strategy, culture and information system an organization. Today, we define knowledge management as being the process by which the organization generates wealth, from their knowledge or intellectual capital. In this context, wealth happens when a Virtual Enterprise uses its own knowledge to generate more efficient and effective processes. Companies tend to differentiate themselves from what they know (intellectual capital) and from how they use this knowledge. The interest for knowledge within companies begins with identification that the value of market of several companies is much larger than the value of their own physical patrimony (equipments, facilities etc.). The total value of the shares of those companies incorporates an intangible data (the value of their brands, their patents, their capacity of innovation, the talent of their employees and the relationships with their own customers). Companies turned into knowledge management with the intention of understanding, organizing, controlling and profiting with this intangible value (i.e. knowledge).

Knowledge management for computer supported collaborative work in design includes:

• Mechanisms for knowledge sharing (Interested actors can share both input and output knowledge. To achieve this, some communication mechanisms between actors are required).

• Operators (The operators can transform input knowledge into output knowledge and shall be equipped within actors).

• Triggers (e.g. failure or success of a design) will trigger one or more agents to learn).

• Collective memory (Individual actors shall have their own memory for knowledge storage. Also, there shall be a common memory where all the actors can access to acquire knowledge and likewise actors can store their knowledge in the shared memory).

The product development process has become an intensive process of knowledge application and it consists of a process of transformation of information [4]. Each activity of the product development process should be seen as a theoretical-empiric framework, limited by the time, where a group of information is treated, transformed and passed ahead to another activity at the appropriate time. The information do not enter at the beginning of each activity and nor leave in the end of each activity, the flow of information happens at every moment of the product development process. Knowledge is created through the interaction and sharing that happens among people during the execution of those activities and the flow of information happens in a chaotic way during that process. The tacit knowledge that emerges from this process is interactive and it is the base of the process of knowledge creation within the organization.

3. ORGANIZATIONAL KM MODEL

Besides the knowledge that can be learned individually, there are other types of knowledge that may only be learned through collective learning [5]:

• Knowledge of actor's interactions.

• Common knowledge.

• Meta-knowledge (Meta-knowledge is the knowledge of knowledge).

Also, the additional steps are: obtain and use, learn and contribute, evaluate and sustain, discharge and support. The knowledge of the organization is composed by the sharing knowledge of each individual. Based on the steps described in the figure 2 an efficient and effective management of the intellectual capital of the company is obtained. Figure 2 presents the company's knowledge and it shows a simplified manner to present how organizations can generate, retrieve and dispose its knowledge to strategically create adding value for their products [2].

The steps obtain and uses are well known within organizations. People always seek information and use them later to solve their problems, to take decisions or to create new products. Therefore, new technologies (e.g. intranet/internet/extranet) allow that the large amount of information that flows within organizations can be correctly managed.

The steps learn and contribute are relatively new for organizations. For example, it has been difficult to convince employees to contribute to the organization's knowledge base. New technologies have helped companies easily organize, send and transfer certain types of information. However, this facility has been seen by the employee as a threat for his/hers own job security. The most difficult task is to convince individuals that their
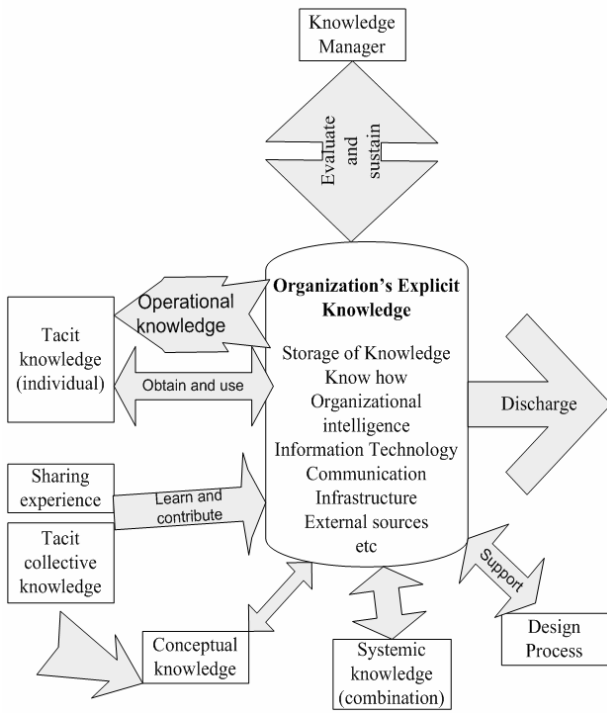
Fig. 2. Organization knowledge management model.

contribution will give return to their organization as well as to themselves.

The step evaluate indicates that the organization should define its own necessary knowledge for its mission and classify its own currently intellectual capital. In other words, the knowledge manager does more than organize the content in system on-line; he/she should understand and foresee the community's needs.

The step sustain or maintain should assure that the future intellectual capital will maintain the organization viable and competitive. Organizations tend to build their own intellectual capital through their relationships with customers, employees, suppliers etc. The knowledge manager should also be responsible for the maintenance of the organizations knowledge base.

The step discharge excludes any useless knowledge from the organizations knowledge base. However, some knowledge can be more valuable if it can be transferred to outside of the organization.

The step support can be used for the continuous improvement of the product design process.

4. KNOWLEDGE CAPITALIZATION AT ENTERPRISE LEVEL

At the level of the enterprise, knowledge can be capitalized through (see Fig. 3):

1. *Gathering data, information and knowledge from customers, providers and partners*:

- collecting all data, information, knowledge from clients into a knowledge base;

- using the info on customers for product and services development and modernization purposes;

- tight connections with customers through the Internet - maybe opening a forum for discussions;

- a thorough recording of the staff's contacts with the customers, of customers' wants for anticipations in the future.
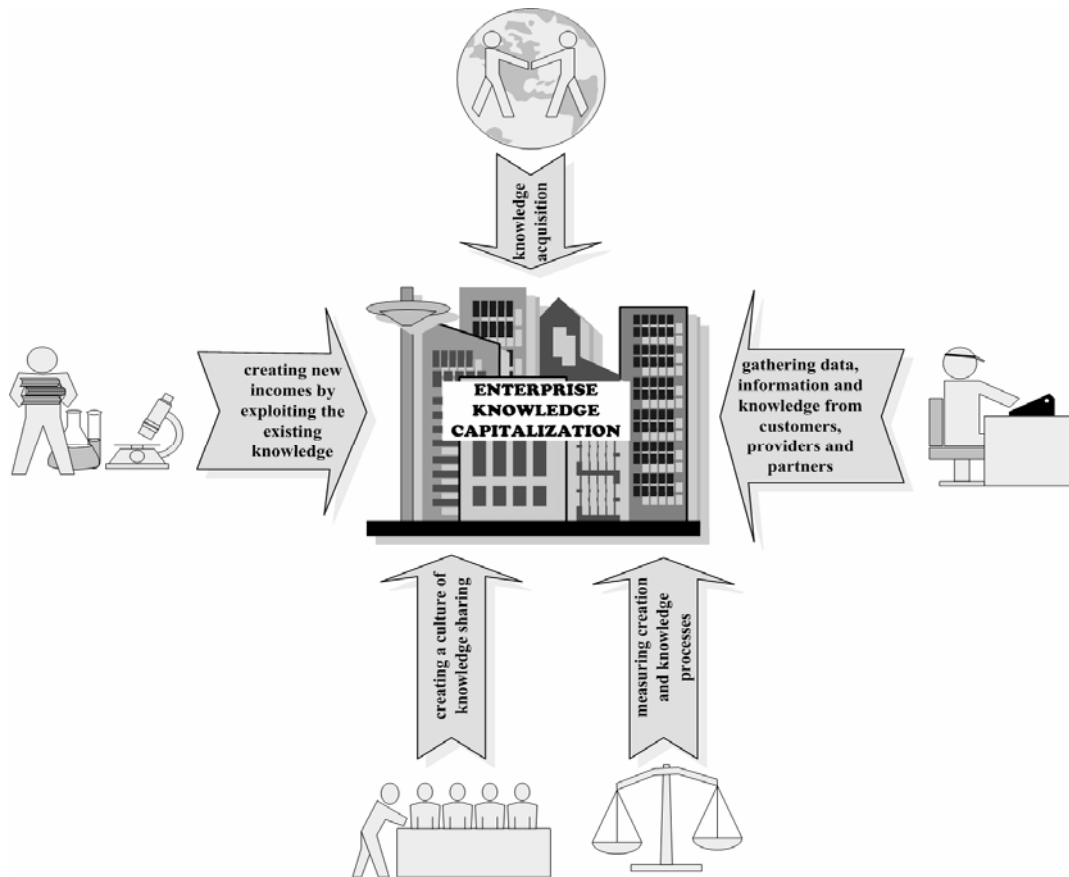

Fig. 3. Knowledge capitalization at the enterprise level.

2. *Creating new incomes by exploiting the existing knowledge*:

- keeping all patents, licenses, market and necessity research, technical and economic research in a database accessible to the personnel;
- in case of changing profile within the company into a similar one: keeping all methods and expertise acquired during the former one;
- selling knowledge/expertise to other companies by means of license, patent, consultancy, etc.

3. *Creating a culture of knowledge sharing*:

- encouraging learning and improvement;
- supporting those failing their attempts;
- upholding a competitive environment and rewarding personal initiative;
- creating a culture of knowledge sharing from the top of the organization to all its lower levels;
- enlarging people's knowledge area beyond their field of expertise;
- setting goals to employees;
- creating environment for knowledge transfer - such as teamwork, meant especially for knowledge and info transfer from experts to newly employed.

4. *Knowledge acquisition*:

- keeping all experience gained in every (previous) activity in a knowledge or database;
- creating a knowledge database comprising the best practice, methods, rules;
- facilitating communication through e-mail, video-conference, Internet forum, etc.;
- rewarding employees having good results in the acquisition and accumulation process;
- equal male and female employment, as well as of foreigners; diversity and multicultural representation lead to creativity.

5. *Measuring creation and knowledge processes*:

- performing a knowledge quality audit;
- calibrating customers, providers and partners according to the value of their contribution to the knowledge process;
- annual balance-sheet including profit and loss in HR terms and a balance of HR investments;

discouraging the use of financial indices in management and mainly in knowledge management.

4. CONCLUSIONS

This paper analyses the knowledge capitalization at the enterprise level and proposes a method, based on the enterprise resources used during the product and services development process and business strategies elaboration. The validation of this methodology will be carried out based on a practical application in a university and Romanian SME partnership. The aim of this project (university-SME's partnership) is to determine the new organization type for integrating in the virtual enterprise medium and to outsource shared resources of the university research centers to the industrial partners.

REFERENCES

[1] Roşu, S.M., Drăgoi, G., Guran, M., Roşu, L., (2006), *Knowledge management support to product desing process within CESICED platform,* in the Academic Journal of Manufacturing Engineering, Vol. 4, No 1/2006, pp. 37-43, ISSN 1583-7904.

[2] Roşu, S.M.; Drăgoi, G., Guran, M., & Coteţ, C.E., (2006), *Knowledge management in the CESICED platform to improve collaborative product development*, in theAnnals of DAAAM for 2006, Proceedings of the 16th International DAAAM Symposium „Intelligent Manufacturing & Automation, Katalinic B. (Ed.), pp. 351-352, ISSN 1726-9679, University of Viena (www.daaam.com).

[3] Michalski, R.S., (1993), *Inferential Theory of Learning as a Conceptual Basis for Multistrategy Learning. Machine Learning*, 11(2/3), pp. 111-151.

[4] Grecu, D., and Becker, L (1998), *Coactive Learning for Distributed Data Mining*, in Fourth International Conference on Knowledge Discovery in Databases - KDD-98, Menlo Park, CA: AAAI Press.

[5] Rodgers, P.A., Caldwell, N.H.M., Hoxor, A.P., Clarkson, P.J., (1999), *WEBCADET: a knowledge management support system for new product development*, Cambridge/UK: 6th IPDMC.

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