ANALELE UNIVERSITĂȚII
"EFTIMIE MURGU" REȘIȚA
ANUL XV, NR. 1, 2008, ISSN 1453 - 7397

Ileana Hauer, Antoaneta Butuza

# KM Tools and Technologies that Share Distribute Knowledge

*The exponential increase in information, primarily due to the electronic capture of data and its storage in vast data warehouses, has created a demand for analyzing the large amount of data generated by today's organizations so that enterprise can respond quickly to fast changing markets. There are various tools and technologies that can be used to share and distribute knowledge, include e-mail, groupware, data mining ,expert systems and others. The paper outlines these technologies, which dominate the technical tools for sharing knowledge from an organizations data assets and finally. The case study, an Expert System, use expert knowledge to attain highlevel decision performance in a narrow domain.*

***Keywords:*** *knowledge management, technology, process, knowledge creation*

## 1. Introduction

Knowledge management (KM), while conceptually ancient, is a relatively new form of collaborative computing. KM is collaboration at the organization level [Turban, et al. 2007].

Knowledge management involves processes through which organisations generate value from their intellectual capital and knowledge-based assets [Wickramansinghe, von Lubitz 2005].

Central to any knowledge management endeavor is the creation of knowledge. Knowledge however, is a multifaceted construct, exhibiting not only many manifestations of the phenomenon of duality such as subjective and objective aspects but also having tacit and explicit forms.

There are several frameworks that have been developed recently that help us understand what types of knowledge are involved in the process of knowledge creation, and under what organizational structures different types of knowledge are created and applied. These include the people-oriented perspective of

knowledge creation as well as the technology-oriented perspective and offers the socio-technical perspective of knowledge management. Finally, by taking a process-oriented perspective and incorporating the ideas of Boyd [Barnett 2004; Boyd 1976], we have the final and most integrative model of knowledge creation.

## 2. Theory fundaments. The KM triad

Paramount to knowledge management is the incorporation of the socio-technical perspective of people, processes and technologies [Alavi, Leidner 2001; Schultze, Leidner 2002; Wickramansinghe, von Lubitz, 2005; Wickramansinghe, 2005a] .

This stems primarily from the fact that knowledge itself is a multifaceted construct embedded in people's heads, in processes, and created and generated by means of a wide range technologies. It is useful to visualise this concept as the KM triad (Figure 1). The significance of the KM triad is to emphasise that knowledge can be created by people and/or technologies and can also be embedded in processes. Thus, to be successsful, KM endeavors must always consider these three elements.

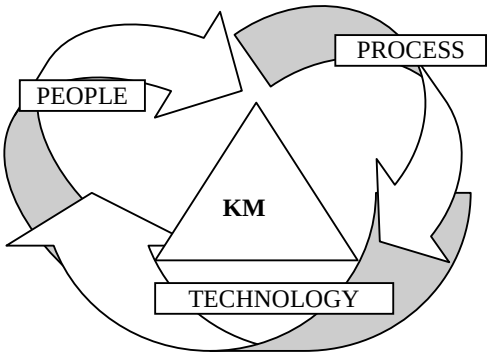



**Figure 1**:The KM triad Source*:* Wickramasinghe, 2005b

From the KM triad it is possible to analyse the steps involved with KM and their interrelationships. Broadly speaking, knowledge management involves four key stages of creating/generating knowledge, representing/storing knowledge, disseminating/using/re-using knowledge, and applying knowledge which comes directly from the KM life cycle [Davenport, Grover 2001; Davenport, Prusak 1998; Drucker 1993; Markus 2001; Wickramansinghe 2005a].

We can combine these four steps with the KM triad in Figure 1 to form the KM Diamond. The KM diamond in Figure 2 highlights the importance of the impact of three elements of KM, namely people, process, and technology on the four steps of

knowledge management (creating/generating knowledge, representing/storing knowledge, accessing/using/re-using knowledge, and disseminating/transferring knowledge). In othe words, successful KM initiatives require consideration and interactions among all of these components. Ignoring such a holistic perspective is analogous to omitting interaction factors in statistical regression analyses. The main factors (shown in the figure as inward pointing arrows) that impact knowledge (shown as the resultant outward pointing arrows) are people, processes and technology, while the interactions among the constituents are represented by the four key steps of KM and the inner double headed arrows.

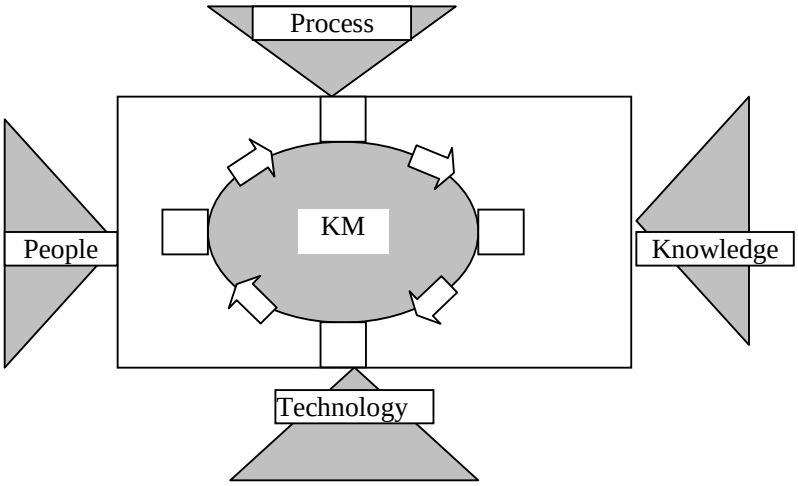



**Figure 2**. The KM Diamond Source: Adapted from Wickramansinghe, 2005b and DeFillippi, et al. 2006

### 3. KM tools and technology

Many dimensions are involved in describing KM tools. Ruggles [Ruggles 1997] provides a classification of KM technologies as tools that:

Enhance and enable knowledge generation, codification and transfer.

Generate knowledge (e.g. data mining that discover new patterns in data).

Code knowledge to make knowledge available for others.

Transfer knowledge to decrease problems with time and space when communicating in an organization.

Computer networks provide an effective medium for the communication and development of knowledge management. The Internet and organizational intranets are used as a basic infrastructure for knowledge management [Alavi, 1999; Wickramasinghe 2003].

The systems that are used to share and distribute knowledge include [Wickramasinghe, Lichtenstein 2005]: e-mail, group collaboration systems, groupware, intranets, extranets and the Internet, document management systems, geographic information systems (GIS), which involve digitized maps coupled with powerful computer software that permit the superimposition and manipulation of various types of demographic and corporate data on maps, Help desk technologies, and even office systems such as word processing, desktop publishing, and Web publishing (Table 1).

**Table 1.**

| Technologies & Tools | KM Steps Supported |
|---|---|
| E-mail | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Groupware | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| CAD | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Data Mining | Knowledge Creation/Generation |
| BI/BA tools | Knowledge Creation/Generation |
| Expert systems | Knowledge Creation/Generation<br>Knowledge Use/Re-use<br>Knowledge Application |
| Distributed hypertext systems | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Document management | Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Geographic information systems | Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Help desk technology | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use |

| | |
|---|---|
| | Knowledge Application |
| Intranets | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Hypertext (an expanded semantic network) | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Information modeling | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Concept mapping | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Symbolic Knowledge Acquisition Technology (SKAT) | Knowledge Creation/Generation<br>Knowledge Use/Re-use<br>Knowledge Application |
| Information modeling | Knowledge Creation/Generation<br>Knowledge Representation/Store<br>Knowledge Use/Re-use<br>Knowledge Application |
| Web Based Groupware Portal | |

**4. Case study**

We used Corvid, an expert system generator developed by EXSYS Inc., for implementing the application presented in this paragraph.

An expert system is regarded as the embodiment within a computer of a knowledge-based component from an expert skill in such a form that the system can offer intelligent advice or take an intelligent decision about a processing function. Expert systems are computer-based programs which are designed to record human expertise (knowledge), and then to be able to apply this knowledge to applications in a certain domain.

The application contains MetaBlocks, which provide a way to build systems that put generic decision-making information in Logic Blocks that interact with spreadsheet files that contain all of the detailed product data. This type of advisory system provides a probabilistic "best fit" recommendation of products to meet a user's overall needs. The results are quite different from a database approach, which requires a match on every feature.

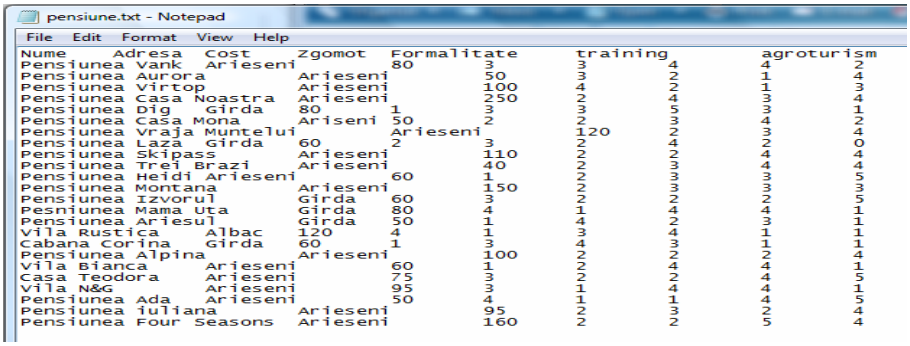
MetaBlocks can be used for many types of systems, but they are best for selection problems that involve frequently changing properties or features of the items being selected among.

TimTravel, a travel agency, with 5 offices and a sales staff of 12 full-time and 8 part-time agents, has high turnover rate among agents (in Timis county).

At TimTravel each agent's objective is to show potential destination only those locations that a prospective client is likely to find appealing. The inexperienced agents have problems matching clients to the available destinations. These mismatches invariable result in wasted time and unhappy clients. The owner of TimTravel, Mr. Popescu, decided to hired a consultant.

After reviewing the situation, the consultant decided to develop an expert system to help both inexperienced and veteran agents do a better job. of matching buyers with available properties. The purpose of system is to create a profile of a holiday that meets the clients'need. The consultant interviewed the sales leader from company, Mr. Andronic, ask him to share his expertise. Mr. Andronic said that he asks his clients a series of questions relating to their needs and desires. He was based on the client's responses when searching the list of available destinations to determine which ones to show the client.

The database (Excel spreadsheet) where we stored the features offered by the agency contains following fields (Figure 3) : name, address, cost, noise, pension's level, training, rural-travelling, business, lunch, dinner, breakfast, image, notes.


pensiune.txt - Notepad

File Edit Format View Help

| Nume | Adresa | Cost | Zgomot | Formalitate | training | | agroturism | |
|---|---|---|---|---|---|---|---|---|
| Pensiunea Vank | Arieseni | | 80 | 3 | 3 | 4 | 4 | 2 |
| Pensiunea Aurora | | Arieseni | | 50 | 3 | 2 | 1 | 4 |
| Pensiunea Virtop | | Arieseni | | 100 | 4 | 2 | 1 | 3 |
| Pensiunea Casa Noastra | Arieseni | | | 250 | 2 | 4 | 3 | 4 |
| Pensiunea Dig | Girda | 80 | 1 | 3 | 3 | 5 | 3 | 1 |
| Pensiunea Casa Mona | | Arieseni | 50 | 2 | 2 | 3 | 4 | 2 |
| Pensiunea Vraja Muntelui | | | Arieseni | | 120 | 2 | 3 | 4 |
| Pensiunea Laza | Girda | 60 | 2 | 3 | 2 | 4 | 2 | 0 |
| Pensiunea Skipass | | Arieseni | | 110 | 2 | 2 | 4 | 4 |
| Pensiunea Trei Brazi | | Arieseni | | 40 | 2 | 3 | 4 | 4 |
| Pensiunea Heidi Arieseni | | | 60 | 1 | 2 | 3 | 3 | 5 |
| Pensiunea Montana | | Arieseni | | 150 | 2 | 3 | 3 | 3 |
| Pensiunea Izvorul | | Girda | 60 | 3 | 2 | 2 | 2 | 5 |
| Pesniunea Mama Uta | | Girda | 80 | 4 | 1 | 4 | 4 | 1 |
| Pensiunea Ariesul | | Girda | 50 | 1 | 4 | 2 | 3 | 1 |
| Vila Rustica | Albac | 120 | 4 | 1 | 3 | 4 | 1 | 1 |
| Cabana Corina | Girda | 60 | 1 | 3 | 4 | 3 | 1 | 1 |
| Pensiunea Alpina | | Arieseni | | 100 | 2 | 2 | 2 | 4 |
| Vila Bianca | Arieseni | | 60 | 1 | 2 | 4 | 4 | 1 |
| Casa Teodora | Arieseni | | 75 | 3 | 2 | 2 | 4 | 5 |
| Vila N&G | Arieseni | | 95 | 3 | 1 | 4 | 4 | 1 |
| Pensiunea Ada | Arieseni | | 50 | 4 | 1 | 1 | 4 | 5 |
| Pensiunea Iuliana | | Arieseni | | 95 | 2 | 3 | 2 | 4 |
| Pensiunea Four Seasons | | Arieseni | | 160 | 2 | 2 | 5 | 4 |

**Figure 3**. Part of the content of the database used in metablock

A part from the implementation of the Corvid's metablock is presented in figure 4.


**Figure 4.** A part from the implementation of the Corvid metablock

Finally, the recommended options are depicted in figure 5.

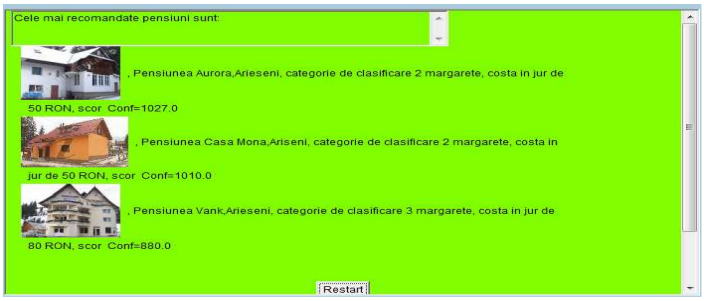



**Figure 5**. Result screen with recommended options

## 4. Conclusion

Creating a competitive edge is the goal of all organizations employing knowledge discovery for decision support; however, the specific mix of technologies may vary. Organizations need to constantly seek information and turn this information into needed knowledge that will enable better decisions to be made which in turn will generate greater revenues, or reduce costs, or increase product quality and customer service.

Expert Systems are versatile tools, which can be used as multi-purpose systems such as decision support system, diagnostic system, self-learning tool, and teaching aid etc. Effectively disseminating and providing access to expert systems greatly increases a firm's potential in many ways, and is an ideal way to disseminate specialized skills with minimal training. Expert Systems with Metablocks provide a probabilistic "best fit" recommendation of products to meet a user's overall needs instead of a database approach, which requires a match on every feature.

Integrating all KM tools and technologies enables an organization to understand customers better and devise business strategies accordingly.

**References**

Please insert here the references according to the example below.


[1] ***** *Exsys Corvid-Knowledge automation Expert System. International Standard* , Software user guide 2000-2004.

[2] Atkinson, R.D. *The innovation economy: A new vision for economic growth in the 21st century*, Washington, DC, Progressive Policy Institute, (2003)

[3] Baker, W. E*: The network organization in theory and practice. In Nohria, N., Eccles R.G., (Eds.), Networks and organizations: Structure, form, and action,* Cambridge, MA, Harvard Bussiness School Press, (1992), 397 - 429

[4] Alavi, M., Leidner, D., *Knowledge Management and Knowledge Management Systems: Conceptual foundations and research issues*", MIS Quaterly, vol. 25, no.1, (2001), 107 - 136

[5] Andone, I. et al. *Developing intelligent systems in economy*, Ed. Economica,, (2001)

[6] ] Barnett, T.P.M. *The Pentagon's new map*, New York: G.P. Putnam&Sons, (2004)

[7] Boyd, F.R.. *Destruction and creation*, In R.Coram (Ed.), Boyd. New York: Little, Brown&Co, (1976)

[8] Dalkir, K.: *Knowledge Management in Theory and Practice*, Elsevier Butterworth-Heinemann, (2005)

[9] Davenport, Th., Grover, V*. Knowledge Management", Journal of Management Information Systems,* vol.18, no.1: 3-4, (2001)

[10] Davenport, Th., Prusak, L*. Working Knowledge: How Organizations Manage What They Know* , Boston, Harvard Business School Press, (1998)

[11] DeFillippi, R.J., Arthur, M.B., Lindsay, V.J*.: Knowledge at work. Creative collaboration in the global economy,* Blakwell Publishing, USA, (2006)

[12] Drucker, P*.: Post-capitalist society,* New York: Harper Collins, (1993)

[13] Markus, L.: *Toward a theory of knowledge reuse: Types of knowledge reuse situations and factors in reuse success,* Journal of Management Information Systems, vol.18, no.1, (2001) , 57-93

[14] Ruggles, R*.: Knowledge tools: using technology to manage knowledge better,* Knowledge tools: using technology to manage knowledge better, (1997)

[15] Schultze, U., Leidner, D*..:Studying knowledge management systems research: Discourses and theoretical assumptions,* MIS Quaterly , vol.26, no.3 2002, 212-242

[16] Turban, E., et al.: *Decision Support and Bussiness Inteligence Systems,* Eighth Edition, Pearson Education, Inc., Upper Saddle River, New Jersey, 2007
[17] Wickramansinghe, N., von Lubitz, D.: *Knowledge-based enterprise. Theories and fundamentals,* Idea Group Publishing, Hershey, SUA, 2007
[18] Wickramasinghe, N.: *Knowledge creation". In D.Schwartz (Ed.), A metaframework,* Hershey, PA: Idea Group Publishing , 2005, 326-335

*Addresses:*

- Lect. Drd. Hauer Ileana, "Faculty of Economic and Business Administration" University of Timişoara, Str Pestalozzi, nr. 16, 300115, Timişoara, ileana.hauer@fse.uvt.ro
- Lect. Dr. Butuza Antoaneta, "Faculty of Economic and Business Administration" University of Timişoara, Str Pestalozzi, nr. 16, 300115, Timişoara, antoaneta.butuza@fse.uvt.ro