Knowledge Creation / Conversion Process

Sebastian CEPTUREANU
The Bucharest Academy of Economic Studies, Romania
Eduard CEPTUREANU
The Bucharest Academy of Economic Studies, Romania
E-mail: cepty@hotmail.com
Phone/fax: +4 0213191967

Abstract
Capturing and / or creating knowledge is a central part of the implementation of knowledge management and is the first stage of the cycle knowledge management. There are several approaches, techniques and tools that can be used to "extract" explicit knowledge to create new ones and to organize all knowledge in a systematic manner. Translation of knowledge into a form explicit or understandable called encoding, facilitates other knowledge management processes, such as storage or dissemination of knowledge. Multidisciplinary nature of knowledge management is highlighted by the fact that techniques used to capture knowledge from several fields such as sociology, economics, mathematical analysis etc.

Keywords: *knowledge, model, conversion, creation*

JEL classification: D83, M15, O32

1. Creation, capture and conversion of knowledge

Creating knowledge requires the existence of a person or group of people who come up with new ideas, new concepts, innovative product or process, etc.. Knowledge creation can be achieved through research, innovation projects, experiments, observations etc. Firestone [2] suggests that knowledge production begins with the request of knowledge, followed by individual or group learning, information acquisition, application for evaluation of knowledge and ultimately, build organizational knowledge.

According to Nonaka [4], organizational knowledge creation and conversion is based on two dimensions. The first dimension shows that only individuals create knowledge. The second dimension relates to the interaction between explicit and tacit knowledge. These two dimensions form the basis for defining the four processes of creation / conversion of knowledge - socialization, externalization, combination and internalization.
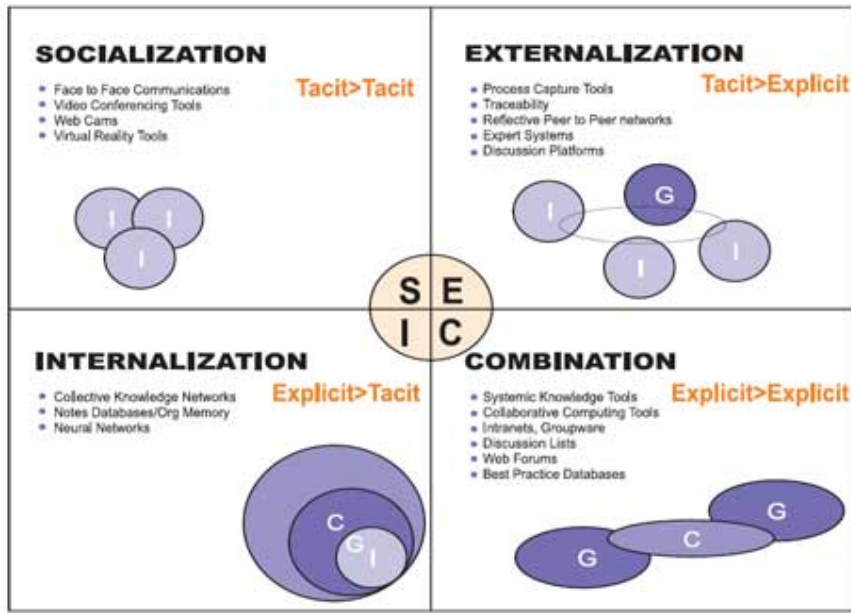
SOCIALIZATION

- Face to Face Communications
- Video Conferencing Tools
- Web Cams
- Virtual Reality Tools

Tacit>Tacit

EXTERNALIZATION

- Process Capture Tools
- Traceability
- Reflective Peer to Peer networks
- Expert Systems
- Discussion Platforms

Tacit>Explicit

S E
I C

INTERNALIZATION

- Collective Knowledge Networks
- Notes Databases/Org Memory
- Neural Networks

Explicit>Tacit

COMBINATION

- Systemic Knowledge Tools
- Collaborative Computing Tools
- Intranets, Groupware
- Discussion Lists
- Web Forums
- Best Practice Databases

Explicit>Explicit

Figure 1 The four processes of Knowledge creation/conversion

- Socialization - tacit knowledge is converted into tacit knowledge during discussions, meetings, etc.
- Externalization - tacit knowledge is converted into explicit knowledge and outlined in documents, manuals, etc..
- Combination - explicit knowledge are converted into another form of explicit knowledge
- Internalization - explicit knowledge is converted into tacit knowledge by individuals.

The four ways determines a spiral of knowledge conversion without beginning or end. This continuous and dynamic process is rooted in people's behavior, the main agents that create knowledge. For example, when people try to combine explicit knowledge (this happens, for example, when someone uses mathematical formulas and physics to solve a complicated problem) they can at the same time, to discuss with their colleagues as exchanging tacit knowledge with them. Instead, they can visit different forums to find solutions, the forum will have to outsource or to explain the problem, seeking help. Nonaka consider a model consisting of five phases for the creation of organizational knowledge. The five phases are:

1. Sharing tacit knowledge - correspond socialization;
2. Creating concepts - knowledge shared is converted into explicit knowledge by constructing new concepts;

3. Proof of concept - the justification for new concepts allow the organization deciding whether continued;
4. Building a model - the concept is transformed into a model, prototype or operational mechanism etc.
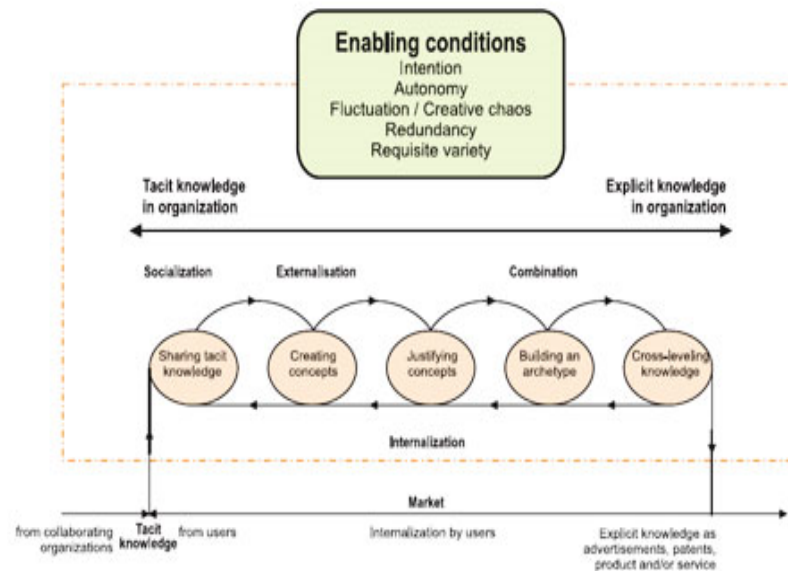5. Dissemination of knowledge - at this stage, the knowledge created is spread throughout the company.

Figure 2 Phases of organizational knowledge creation

An interesting model is one of Soo, Devinney and Midgley [14], who reach the following conclusions:
- Formal networking is not as important as informal networking as a source of information acquisition for organizations;
- Know-how is not acquired directly but synthesized from the acquisition of information;
- Know-how synthesis is strongly determined by the ability of the individual employee to absorb new knowledge and the incentives and systems of the firm that encourage knowledge acquisition;
- This know-how contributes to the performance of the firm through the level of creativity in problem solving which, in combination with comprehensiveness and consensus, is the key contributing factor to the level of new knowledge created by the firm; and,
- New knowledge impacts directly on firm innovative output, which, in turn, is a positive influence on financial performance.
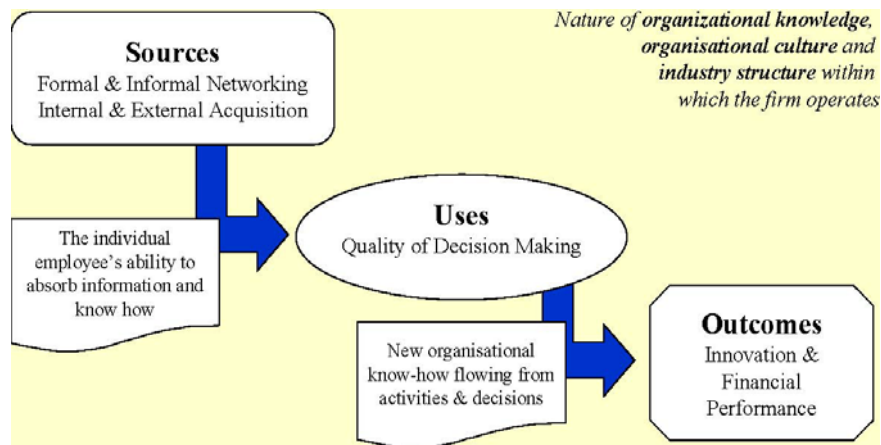
Figure 3 Soo, Devinney and Midgley model of knowledge creation

2. Capturing knowledge

During this process, is important to attract both explicit knowledge and the tacit, although it is more difficult for the second category. Tacit knowledge is found in rumors, legends, stories, rules, beliefs, while explicit knowledge appearing in books, documents, databases, websites, email etc. Capturing explicit knowledge is following cycle: attracting, organizing and refining the information to make them easier to find, while facilitating learning and problem-solving. Managing tacit knowledge requires capturing the experience and expertise of individuals so that they are available to all who need them. During the process of creating, capturing and codifying knowledge, there are various new concepts to be tested and validated to determine their veracity or value. This means that new concepts must be higher than existing ones. We must not forget either that most organizations and employees accumulate knowledge unconsciously, through various methods, practices or situations. Some of these skills are controlled by company management, but others are not, because it occurs in the course of daily, informal meetings, observation and listening to others, various lessons learned from practice etc. Evaluation of new concepts is in terms of competitiveness and improved organizational effectiveness. The "balanced scorecard" is a perfect tool that link prospects with knowledge of their financial companies, customers, business or prospects of development. However, SMEs need to take care that the evaluation of new concepts does not entail lengthy and expensive procedure that does not bring any benefits to the company. Research done on the method "balanced scorecard" shows that it is more useful for large firms, is therefore not detailed in this manual. If new findings come from experiments or observations, they must be examined, explained and verified. It should also generate hypotheses to explain the experiments or observations and must be determined if any line between new and existing knowledge. Knowledge of company stock to be updated

by incorporating new knowledge [10]. In general, the acquisition of knowledge from individuals or groups can be characterized as transfer and transformation of expertise from a source of knowledge (eg, experts or documents) in a warehouse of knowledge (eg, organizational memory, intranet, documents, etc..) [10]. Organizational memory is represented by all knowledge, from tacit (based on the experience of employees), the data and information that can be stored in company archives. Firms can not control the knowledge held by employees if such knowledge is not embedded in tangible systems or if those assets are not accessible to employees. Organizational knowledge acquisition involves "knowledge amplification and expression of individual company level, so that they are internalized in the firm knowledge base.

3. Enabling Conditions for Knowledge Creation

Given that knowledge creation is a complex and fuzzy process, the main role of the organization is to provide the proper context for facilitating group activities as well as the creation and accumulation of knowledge at the individual level. The following five conditions [13] are considered as requirements in promoting the knowledge creation spiral described below:

Intention: The level of organizational aspiration to its goals is the driver of the knowledge spiral. Business settings within the efforts to achieve the goals usually take the form of the strategy. From the viewpoint of organizational knowledge creation, the essence of strategy lies in developing the organizational capability to ASSURE, create, accumulate and exploit knowledge. The most critical element of the corporate strategy is to create a clear vision about what kind of knowledge should be developed and to effectively implement that vision in practical terms. This process is referred to as strategy management literature operationalisation. This refers to the process required for the strategy to be transformed from a vision or a documented plan into everyday real and measurable actions with concrete results. In the KM context, this process implies the conversion of KM strategic visions and goals into decisions and practices at an operational level. Given that knowledge is very specific context, the operationalisation of KM strategy could also be referred to as KM customization reflecting existing organizational structure, culture, staffing issues, business operations, products and customers.

Autonomy: Autonomy is the second condition for promoting the knowledge spiral. It increases the motivation of individuals to create new knowledge or original ideas. By allowing individuals and groups to act autonomously the organization may increase the possibility of introducing unexpected opportunities. Self-organized team serves as a basis in Japanese innovation creation.

Fluctuation and creative chaos: fluctuation (breakdown of routines, habits etc.) and 'creative chaos' increase tension and focus attention on defining problems and resolving crisis. They promote the knowledge spiral by strengthening

the subjective commitment of individuals as well as stimulation of interaction with the external environment. Fluctuation and creative chaos act as a trigger for individual members to change their fundamental ways of thinking and challenge existing concepts. They also help to Externalize their "hidden" tacit knowledge.

Redundancy: In business organizations, redundancy refers to intentional overlapping of information between employees and departments etc. about various business activities, management responsibilities and the company as a whole. It is characterized by the existence of information that goes beyond the immediate operational or functional requirements of specific organizational members. This does not mean that this knowledge is not useful. Rather, it helps speed up the knowledge creation process through sharing of extra information. It is important at the concept development stage where certain employees, functions or departments have information and knowledge beyond their own functional boundaries, eg on other areas of the organization. This "external" information and knowledge can help them generate additional creative and innovative capacity. Redundancy of information enables staff to contribute to dialogues more actively and to clearly justify their ideas widely known corporate business using terms or company jargon. In addition, redundancy of information supports smooth corporate hierarchy alterations. This is crucial for organizations with high employee turnover and where there is a resultant risk of sudden and frequent loss of tacit knowledge. Job rotation is a way of incorporating the benefits of redundancy.

Required Variety: An internal diversity organizations should match the variety and complexity of the environment. Providing equal access to information within the organization supports the exchange of different viewpoints and interpretations of new information. Organizational members can cope with many unexpected events if they have a variety of information and experience. This variety can be enhanced by combining information differently, flexibly and quickly [13].

4. Techniques used to capture knowledge

To capture tacit knowledge from individuals or groups can use three approaches. In many cases, these approaches can be combined [10]:

- Expert interviews - structured interviews with experts are the most used technique to convert tacit knowledge into explicit forms essential. In many organizations, structured interviews are conducted when employees scholars, with more knowledge, is near retirement.
- Learn from what you are saying - the interviewee expresses knowledge and refines them and at the same time, the interviewer clarify and validate the knowledge, putting them in an explicit form. This form of acquisition of knowledge requires, among other things, simulations, which are especially effective in the later stages, validating, refining and completing the process of capturing knowledge.
- Learn from observation - observation is an important tool that can provide a wealth of information. Observing the silence is the best way to capture

some characteristics of a spontaneous process or a procedure. There are other techniques that can be used to extract tacit knowledge from individuals and groups, including [10, 11]:

- Tale stories - stories are another excellent way of capturing and codifying tacit knowledge. An organizational story involves a detailed account of the actions of managers, the interactions between employees or other events of the organization are transmitted informally within the firm. Transmission of information through stories is a good way, because information workers stay longer in memory than would have happened in another context. Tales improve organizational learning, emphasizes shared values and sets of rules, they are an excellent means of capturing, encoding and transmission of high-value tacit knowledge.

- Questionnaires or surveys - when they have interviewed many people, the first step is developing a questionnaire, followed by individual interviews. The questionnaire may contain questions closed and / or opened. Open questions are best to get more information as not limit the respondent to choose one of predefined responses, such as closed questions.

- Brainstorm or ad hoc meetings - these are sessions that last no longer than 30 minutes and that share ideas in an open atmosphere, stimulating. These sessions can take place during face to face meetings, or may take place by means IT, e-mail, teleconferencing or chat rooms.

- Focus groups - involving structured sessions in which a group of stakeholders is required opinion on various issues presented.

- Learing histories - is a retrospective of the most important events that occurred in the recent past of the organization, described by people who were involved in these events. Development begins with determining the purpose istorioarelor story, the event will be reported. After the event participants are required to display their view, thinking that they used. Appear as new items, capture and encoding of these elements increases the firm's knowledge assets. After that, the information gathered from interviews are synthesized into a form more readable, accessible and understandable. In this way, story is written, validated and published to disseminate it. Thus, the story becomes part of the memory organization. A story with moral is the story of successes and failures so to capture best practices and lessons learned.

- Documentation-documentation of existing systems may be of archival information, policies, procedures manuals, reports, memos, notes of meetings, standards, e-mails, public regulations and other guides, etc..

- Participation - learning from what you do or training at work are invaluable sources for obtaining knowledge and experience increase. It is a form of experimental learning, deductive, which means meaning different occurrences that appear and establish a causal relationship between actions and results. Discipleship, trainings and mentoring are ways that people experience knowledge transmitted by novice, uninitiated.

• Task analysis - is a method that involves testing each task they performed an expert and characterization of these tasks in terms of knowledge and skills required, frequency, difficulty, overlap with other tasks. It also examines the consequences in case of errors and the task is perceived as the expert who carried a (routine eagerly anticipated or feared). This analysis can be done by observing (in silence) or by direct interview with the expert concerned.

• Learning from Others - involves activities such as external benchmarking - this involves learning about best practices of leaders from various publications and websites, followed by adapting and adopting their best practices. Benchmarking is useful to identify better ways of doing business. Other sources of learning are the acquisition of companies or mergers, conferences and exhibitions. Also invite specialists in an organization is an opportunity to bring a new perspective or a different view on the difficulties facing the company.

References

[1] Bryan Bergeron, *Essentials of Knowledge Management*, John Wiley & Sons, Inc., Hoboken, New Jersey, 2003

[2] Firestone, Joseph M., Mark W. McElroy, *Key issues in the new knowledge management,* Butterworth-Heinemann, 2003

[3] Davenport, Thomas H., and Laurence Prusak, *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Boston, 1998

[4] Ikujiro Nonaka & Hirotaka Takeuchi, *The Knowledge Creating Company*, Oxford University Press, 1995

[5] Armit Tiwana, *The Knowledge Management Toolkit*, Prentice Hall, 1999

[6] Alex and David Benet, *Organizational survival in the new world*, Butterworth-Heinemann, US, 2004

[7] Becerra-Fernandez et al., 2004

[8] Mertins, K., P.Heisig, J.Vorbeck, *Knowledge Management – Concepts and Best Practices*, Springer Verlag, Berlin-Heidelberg, 2003

[9] Lehaney B., Clarke S., Coakes E., & Jack G., (2004) *Beyond Knowledge Management,* Idea Group Publishing

[10] Kimiz Dalkir, *Knowledge Management in Theory and Practice*, Elsevier Inc., Oxford, 2005

[11] Jessica Keys, *Knowledge Management, Business Intelligence, and Content Management*, Auerbach Publications, New York, 2006

[12] Leibowitz, J. (2003), *The Knowledge Management Handbook*, CRC Press LLC

[13] Nonaka & Takeuchi, *Hitotsubashi on Knowledge Management*, John Wiley & Sons, 2004

[14] Christine W. Soo Timothy M. Devinney, David F. Midgley, *The Process of Knowledge Creation in Organizations*