

# Knowledge Processes: On Overview of the Principal Models

Adriana Maria ORTIZ LAVERDE<sup>1</sup>, Alvaro Fdez. BARAGAÑO<sup>2</sup> and Jose Maria SARRIEGUI DOMINGUEZ<sup>1</sup>

<sup>1</sup>TECNUN, University of Navarra Manuel de Lardizabal 13, 20018 Donostia, Spain  
Tel: +34 943219877; Fax: +34 943311442; Email: amortiz@tecnun.es; jmsarriegui@tecnun.es;

<sup>2</sup>Index Servicios de Ingeniería

Pol. Ind. De Bayas. C/Oron 4. 09200 Miranda de Ebro (Burgos)  
Tel: +34 947 049622, Fax +34 947 049787; Email: abaragano@indexing.es

**Abstract.** Last years Knowledge Management has been one of the more often used concept and it has been defined in many different ways. The current article presents a summary of well-know Knowledge Management models. Although, these models do not present the same framework, their terminology is similar and it depends on the context of each one. The article describes briefly these models and focuses onto its common elements and main differences.

## 1. Introduction

During the last years, a growing interest for the learning and knowledge creation processes has been experimented. The result of all this is the appearance of several theoretical models that pretend to explain how organizational knowledge is created, transferred and crystallized.

Relating to research and definition of the different processes for knowledge creation, we understand that there are several proposals to be considered. Nevertheless, we think that the set of processes of knowledge is not simply the sum of all the stages and processes proposed in each model, but that is possible to make an effort of grouping and synthesis since, in content, some of them are very similar.

Reviewing the main models, we believe opportune to begin by the model of Nonaka and Takeuchi (1995) since it is the one of greater diffusion and the one than greater impact has had in the academic world. In the same line as Nonaka and Takeuchi's offer, we found other authors as Probst et al. (1997), Heisig (2000) and McElroy (2002), who add other important elements for consideration.

On the other hand, some other authors as Tannembaun and Rastogi, explain Knowledge Management in an incremental way. They define Knowledge Management as going through some evolutive states, so that the first states must be reached before to evolve to the next. Even the structure of the two groups of models differ, they used terminology quite similar.

## 2. The Nonaka and Takeuchi Model (1995)

As defined by the authors, the organizational knowledge creation process is based on a basic framework that contains two dimensions: epistemological and ontological.

The epistemological dimension shows that only individuals create knowledge. Therefore, organizational knowledge creation should be understood as a process that organizationally amplifies the knowledge created by individuals and crystallizes it. The ontological dimension relates to the interaction between tacit and explicit knowledge.

These two dimensions constitute the base for defining the four Knowledge Creation Processes: Socialization, Externalization, Combination and Internalization.

- **Socialization** is the process that transfers tacit knowledge from one person to tacit knowledge in another person.
- **Externalization** is the process for making tacit knowledge explicit among individuals within a group.
- **Combination** refers to the knowledge transfer once knowledge is explicit.
- **Internalization** is the process of understanding and absorbing explicit knowledge into tacit knowledge held by the individual.

Nonaka and Takeuchi combine the four modes of knowledge creation and five enabling conditions with a time dimension in order to create a five phase model of knowledge creation.

### ***Sharing Tacit Knowledge***

The creation of organizational knowledge begins with the tacit knowledge held by individuals. However, tacit knowledge cannot be communicated or passed onto others easily since it is acquired primarily through experience and is not easily expressed in words.

### ***Creating Concepts***

The most intensive interaction between tacit and explicit knowledge occurs in the second phase. Once a shared mental model is formed in the field of interaction, the self-organizing team articulates it through further continuous dialogue, in the form of collective reflection. The shared tacit mental model is verbalized into words and phrases, and finally crystallized into explicit concepts. In this sense this phase corresponds to externalization.

### ***Justifying Concepts***

Justification involves the process of determining if the newly created concepts are truly worthwhile for the organization and society.

### ***Building an Archetype***

In this phase the justified concept is converted into something tangible or concrete, namely, an archetype. An archetype can be thought of as a prototype in the case of a new-product development process.

### ***Cross Levelling of Knowledge***

Organizational knowledge creation is a never ending process that upgrades itself continuously. The new concept, which has been created, justified and modelled, moves on to a new cycle of knowledge creation at a different ontological level. This interactive and spiral process, also known as cross levelling of knowledge, takes place both intra-organizationally and inter-organizationally.

### **3. Tannembaum and Alliger (2000) and P.N. Rastogi (2000)**

Other authors see Knowledge Management from a more static perspective, defining different stages that are due to cover for the development of the knowledge but without raising an iterative cycle.

Both, Tannembaum et al. and Rastogi do not define the different stages of an organizational knowledge creation process, but assert that there are four major aspects of Knowledge Management that collectively determine its effectiveness.

In this way, Tannembaum and Alliger (2000) take a systematic look at the effectiveness of Knowledge Management by examining four aspects: ***knowledge sharing***, ***knowledge accessibility***, ***knowledge assimilation*** and ***knowledge application***.

- ***Knowledge Sharing*** is the extent to which people share their knowledge.
- ***Knowledge Accessibility*** is the extent to which people have access to the information they need to make decisions, solve problems, perform job tasks and service customers.
- ***Knowledge Assimilation*** is the extent to which people learn or assimilate the knowledge they need to perform well; and finally,
- ***Knowledge Application*** is the extent to which people apply or use knowledge to effectively make decisions, solve problems and service customers.

The payoffs from knowledge management efforts derive from the last aspect described above; however, each of the prior aspects contributes to knowledge application.

In parallel, Rastogi (2000) affirms that for meeting the requirements of knowledge, which should be born from the strategy of the company, firms must plan and implement a set of operations.

- ***Identification*** of the knowledge required for a competitively effective implementation of enterprise strategy.

- **Mapping** the existing and available knowledge including expertise and skills.
- **Capturing** the existing knowledge through its formalized representation.
- **Acquiring** needed knowledge and information including know-how.
- **Storing** the existing, acquired, and created knowledge in properly indexed and inter-linked knowledge repositories.
- **Sharing** knowledge through its automatic access and distribution to users on the basis of their needs and interests.
- **Applying** in support of decisions, actions, problems-solving, providing job aids and training.
- **Creating** generating or discovering new knowledge through R&D, experimentation, lessons learned, creative thinking and innovation. This last step is considered by Rastogi as the most advanced stage of knowledge management in a firm.

#### 4. Probst, Raub and Romhardt (2002) and Heisig (2001)

Unlike the previous authors and in the same line as Nonaka and Takeuchi model, Probst et al. and Heisig, see Knowledge Management as a dynamical cycle that is in permanent evolution.

The Probst et al. model (2002), called “The building blocks of knowledge management”, involves eight components that form two cycles, one inner cycle and other outer cycle. The inner cycle is composed by the building blocks of **Identification, Acquisition, Development, Distribution, Utilization** and **Preservation** of knowledge.

- **Identification** is the process where external knowledge for analysing and describing the company’s knowledge environment is identified.
- **Acquisition** refers to what forms of expertise should the company acquire from outside through relationship with customers, suppliers, competitors and partners in co-operative ventures.
- **Development** is a building block which complements Knowledge Acquisition. Its focus is on generating new skills, new products, better ideas and more efficient processes. Knowledge Development includes all management efforts consciously aimed at producing capabilities.
- **Distribution** is the process of sharing and spreading knowledge which is already present within the organization.
- **Utilization** consists of carrying out activities to make sure that the knowledge present in the organization is applied productively for the benefit its.
- **Preservation** is the process where takes place the selective retention of information, documents and experienced required by management.

There are two other processes in the outer cycle, Knowledge Goals and Knowledge Assessment, which provide the direction to the whole Knowledge Management cycle.

- **Knowledge Goals** determine which capabilities should be built on which level.

- **Knowledge Assessment** completes the cycle, providing the essential data for strategic control of Knowledge Management.

These two processes represent the biggest difference between the Probst et al. and Heisig models.

In this way, Heisig model presents similarities with the components of the inner cycle of Probst et al. Although, the Heisig model is composed only of four processes among which a different processes, called *Create*, is found.

- **Create** refers to the ability to learn and communicate. To develop this ability, existing knowledge and experience. It is considered of critical importance to share information, to create connections between ideas, and to build cross-connections with other topics.
- **Store** the second element, requires a structured storage capability, which reflects in a quick search for information, access to information for other employees, and the effective sharing of knowledge as it is easily stored for everyone's use.
- **Distribute** this process concedes importance to the development of a team spirit that supports the sharing of knowledge, as colleagues feel connected to each other because they follow common goals and they are dependent on each other in their activities.
- **Apply**, the fourth process starts from the idea that it is possible to create yet more knowledge with the concrete application of new knowledge. This element closes the circle of the core process of unified knowledge management.

## 5. Mark W. McElroy (2002)

McElroy, acting with other members of Knowledge Management Consortium International, has defined the framework of Knowledge Management called "The knowledge life cycle", KLC.

This model has important consideration, because in addition to the proposal of Nonaka and Takeuchi (1995), it assumes that knowledge exists only after it has been produced, and after this it can be captured, codified and shared.

Consequently, the McElroy model divides the Knowledge Creation Process in two big processes, *Knowledge Production* and *Knowledge Integration*.

- **Knowledge Production** is the process where new organizational knowledge is created. This is formed by *Individual Group Learning*, *Knowledge Claim*, *Information Acquisition*, *Codified Knowledge Claim*, and *Knowledge Claim Evaluation*. This process is synonymous with "organizational learning".

- **Knowledge Integration** is formed by some activities that allow the knowledge sharing and distribution. It includes knowledge *Broad-casting*, *Searching*, *Teaching*, *Sharing* and other social activities that communicate.

The McElroy model, introduces two new concepts, Demand Side and Supply Side.

- **Supply-side** is the practice of Knowledge Management in any way that is designed to enhance the supply of existing knowledge to workers in an enterprise.
- **Demand-side** focuses on the supply of existing knowledge to a workforce. It seeks to enhance their capacity to produce. The mission of demand-side Knowledge Management, then, is to enhance an organization's capacity to satisfy its demand for new knowledge.

The important assumption is the impact on an organization's capacity to produce and integrate knowledge by making a range developing of interventions aimed at supporting, strengthening, and reinforcing related patterns of behaviour.

## 6. Conclusion

- Although all the studied models use similar terminology, they do not share meanings. Inside this terminology the studied models present seventeen different processes, such as Socialization, Externalization, Combination, Internalization, Sharing, Accessibility, Assimilation, Application, Identification, Mapping, Development, Distribution, Knowledge goals, Knowledge assessment, Create, Codified knowledge claim, Knowledge claim evaluation. These processes must be interpreted according to the context given by each author.
- This situation generates confusion onto firms and slows the practical development of Knowledge Management projects and supposes an urgent need of lexical standardization.

## References

- 1 Heisig, P., Mertins, K. and Vorbeck J. *Knowledge Management. Concepts and Best practices in Europe*. Second edition. ISBN 3-540-00490-4. Springer-Verlog. Berlin Heidelberg. New York, 2001.
- 2 McElroy, M. *The New Knowledge Management, Complexity, Learning, and Sustainable Innovation*. ISBN 0-7506-7608-6. Butterworth-Heineman. Burlington, England, 2002.
- 3 Nonaka, I. and Takeuchi, H. *The Knowledge-Creation Company: How Japanese Companies Create the Dynamics of Innovation*. New York/Oxford: Oxford University Press. 1995.
- 4 Probst, G. *Managing Knowledge, Building Blocks for Success*. ISBN 0471-99768-4. Wiley. West Sussex, England, 2002.
- 5 Rastogi, P. N. *Knowledge Management and Intellectual Capital - The new virtuous reality of competitiveness, Human Systems Management*. 2000.
- 6 Tannenbaum Scott I., Alliger George M. *Knowledge Management : Clarifying the Key Issues*. ISBN 0967923913. IHRIM, 2000