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**MAPPING ORGANISATIONAL KNOWLEDGE**

**Ph.D. thesis - summary**

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## **1. OBJECTIVES AND BACKGROUND OF THE RESEARCH**

The role of knowledge in the economy, the utilisation of knowledge, the creation of knowledge and knowledge management in general, have become popular topics for the pursuers of a number of scientific disciplines. Researchers investigating management, organisational theory, psychology, sociology, information systems and cognitive sciences are among those affected. There are at least three different fields which provide background for the topic: the resource-based approach of corporate competitiveness, organisational learning and the field of intellectual capital. During the nineties a number of publications were published in these fields ranging from popular literature to ambitious scientific articles.

The objective of the research was to help companies taking their first steps in the introduction of the knowledge management function with practical advice. A company is said to have a knowledge management function if there is a designated organisation or person with the task of

- locating, saving and transferring the knowledge elements selected for the purpose,
- monitoring the process of mapping relevant knowledge of the company as well as external knowledge in accordance with a specific set of criteria,
- ensuring that mapped knowledge can be captured, saved and transferred; as well as ensuring the evaluation of the efficiency of the previously mentioned activities.

In the literature authors show a preference for discussing the creation of new knowledge and innovation (Nonaka 1994, von Krogh 1998b, Nahapiet and Ghoshal 1998, Schüppel 1998). Innovation is considered as one of the most important factors of competitiveness (Huang 1998, Swan and Newell 2000) and knowledge is viewed as a tool of strategic importance (Winter 1987, Liebeskind 1996, Probst, Büchel and Raub 1998). Far less attention is paid to the systemisation and accessibility of existing knowledge of the company.

The research is based on the assumption that systematic mapping of knowledge is the basis on which all knowledge management activities rest. It is senseless and useless to speak about the creation of new knowledge unless the company is well aware of its available knowledge including both the company's internal knowledge and the external knowledge relevant for the company.

The company can assess its available knowledge by mapping and scanning it. **Consequently, the thesis examines the systematic mapping of organisational knowledge.** One of the questions posed by the research is **how and in what extent do companies rely on the mapping of available knowledge in the course of introducing and operating knowledge management.**

In this context I investigated what **the first steps are during the course of building up a knowledge management function.** There are articles in the literature about „knowledge management projects” which describe their success in a very colourful manner (Davenport, de Long and Beers 1998). The introduction of a knowledge management function rarely appears as a goal, instead, certain initiatives are qualified by the researchers as knowledge management projects.

A further question of the research was **how knowledge mapping is carried out and what factors effects its process.** When examining knowledge mapping I wanted to describe the process of mapping as well as the products created as a result of the process. I was also interested in whether companies had any intention of defining and measuring the activities carried out during mapping and in case they had, were there any indicators used to measure the resources spent.

In formulating the questions I put forward certain expectations and I examined them in the case studies.

## **2. RESEARCH METHODOLOGY**

In order to select the methodology for a research it is necessary to examine the topic in a broader sense as well as the environment available for investigation. The characteristic features of knowledge management as a broader topic are the following:

- Basic terms have no uniform definition. Those cultivating different disciplines focus on different things due to their different notions and their assessing criteria are also different.
- Activities of knowledge management, as opposed to accounting or production activities, do not exist on their own right. Knowledge management activities traditionally cannot be separated from everyday activities of the company.
- Approaches in the literature are mainly based on case studies, though there are also quantitative analyses that use statistical methods (Hall 1992, Bierly and Chakrabarti 1996), as well as large sample surveys made by consulting firms, which examine state-of-the-art practice (Ruggles 1998, KPMG 2000a). One of the reasons for this phenomenon could be that it is very difficult to operationalise terms which can be interpreted in different manners.

### **2.1. The Characteristics of the Research**

The characteristics of the questions in this research are the following:

- There are no deductive investigations aimed at the verification of hypotheses among the questions which are of an inductive nature. That is why the research deals with expectations rather than hypotheses.
- The research concentrated on a series of subsequent events (the beginning of the setting-up of the knowledge management function), which well suited to the method of field research (Babbie 1996:305).
- One of the goals of the research was to compile practical recommendations for companies about to introduce the knowledge management function.

As the operationalisation of the terms is difficult and the character of the research is inductive, I used the field research method and within that the preparation of case studies. In Yin's view, case studies should be used when "*... how or why question is being asked about a contemporary set of events over which the researcher has little or no control*" (Yin 1994:9). The triangulation methodology (in the sense of the Balaton-Dobák interpretation, Balaton-Dobák 1991:101) could not have been used in consequence of the reasons exposed above, and for that reason I made no use of statistical tools, either. From amongst six possible authentic sources of evidence classes set up by Yin (Yin 1994:80), I used the studying of documents and historic records and interviews.

The companies investigated in the case studies were selected on a qualitative basis, on the ground of determined aspects. The selection criteria were:-

- knowledge mapping should be important for the company. This could be recognised from the resources expended on it.
- The company should be a Hungarian company and a large company on an Hungarian scale.
- The company should be introduced to the stock exchange.

The ground breaking conference „*Knowledge management and knowledge economy*” organised in Budapest in 2000 by a firm engaged in organisational development and human resources consulting helped me in finding suitable companies. Besides foreign experts, three Hungarian companies also delivered lectures at this conference about their ideas. It was an obvious choice to study their practice.

## **2.2. The Steps of the Investigation**

I used Eisenhardt's structural model in planning the steps of the investigation (Eisenhardt 1989:533). This model can be considered as a fine tuned version of Yin's classification (Yin 1994:49).

Venzin, von Krogh and Roos put forth the method of contextualised theory building. Before formulating research questions it is required to define the most important core questions of the field, then one must choose consciously from among possible constructions of the basic terms to be used; these will become the basic assumptions of the research. The basic assumptions must be confronted with the most important questions and terms of the field under investigation as well as with the applications of the field. This process is called retrofitting (Venzin, von Krogh and Roos 1998).

Under the aegis of this contexture I dedicated a separate chapter in the thesis to the definition of the term knowledge and knowledge management. I defined these terms by listing their characteristic properties (in my view). I considered the ecological approach to knowledge as the starting point (Davenport 1997) as well as the connectivist approach described by Venzin, von Krogh and Roos. According to the connectivist approach, an organisation consists of individuals, its action is self-organised and steered by local rules that refer to several frames of reference. Knowledge resides in the connections of experts and it is dependent on the state of the network of interconnected components. Local rules in a network of individuals determine how knowledge is accumulated. Finally, different units of the organisation develop different pictures about the outside world and adapt to it in different ways.



### **3. MAIN RESULTS AND FINDINGS**

The most important and new results and findings in the thesis are the following:

- I formulated the term of abstract maturity model and examined its usage in the context of knowledge management. In this context I raised the possibility of further generalising the maturity model concept.
- I overviewed the process of knowledge mapping, its outcomes and techniques. I made a distinction between project-like and institutionalised types within the mapping process.
- When investigating knowledge elements, I proposed to examine both their object and process aspects.
- When describing a knowledge element as an object I extended Collins and Blackler's typology by pointing out its temporal and multispectral nature. Building on these features I proposed a suitable descriptive technique.

I will overview below the findings of the thesis in the order of the research questions.

#### **3.1. Planning the Introduction of Knowledge Management**

The literature describes numerous distinct approaches regarding knowledge management initiatives (Davenport et al. 1998, Skyrme 1998, Davenport and Smith 2000). Thus, the plan for introduction also changes from organisation to organisation. In the same way as in contextualised theory building (Venzin, von Krogh and Roos 1998), the assumptions, the construction of the term knowledge and the company culture will determine what the introduction plan will contain exactly. There are also precedence rules that must always be followed during the implementation of knowledge management. One such a rule is for instance, that only institutionalised processes can be optimised (Demarest 1997). These rules are very general by nature and an existing company should prepare a plan at a more concrete level where, naturally, the general rule will be obeyed.

In the course of a conscious implementation the management of the company will make its basic assumptions explicit. **In the theses I examined the use of the maturity modelling technique which is suitable to articulate the underlying assumptions.** Setting up a maturity model determines the activities of introducing knowledge management in a natural way.

### *3.1.1. The Abstract Concept of Maturity Modelling*

The technique of maturity modelling is used in several areas. I defined the following abstract concept of maturity modelling on the basis of these areas.

A maturity model describes the development of a thing or an entity in time from a well-defined aspect. The entity in question could be a person, a process or a function of an organisation. The maturity model

- (i) describes the development of a single entity with the help of a small number (at most four-six) of levels;
- (ii) from a given level up to the uppermost one (this latter is the „perfection” level in respect of the given aspect) levels are completely ordered;
- (iii) the development proceeds through the levels starting from the initial level. In the course of the development no level can be left out;
- (iv) different levels can be characterised by defining requirements. In order to reach a level the entity must conform to the requirements posed at that level.

The maturity model can also be viewed as a life cycle model. During its life the entity marches towards „perfection”. Hence a maturity model can be used on the one hand to plan the next steps and on the other hand it can clearly become a tool for benchmarking.

In the field of knowledge management maturity models have already been proposed on the basis of the experience of consulting companies and from the academia, too. The proposals arriving from industry are practical and solution oriented. Their common feature is their normative nature, though practice shows that the

introduction of the knowledge management function can be attained through different routes. Based on concrete examples and the investigation of the technique, I pointed out that **a maturity model is a suitable tool for the introduction of a knowledge management function and for the formulation and articulation of the vision. The concrete content of the maturity model used in the implementation, however, can alter from organisation to organisation. The model itself is not important, it is the process of the common preparation and acceptance of the model which is relevant** as it will reflect the common notions regarding the term of knowledge prevailing and commonly accepted at the company.

The advantage of a maturity model is its simplifying nature, which makes it easy to understand and communicate. This is also its weakness as it can be controversial. This criticism can be partly eliminated with a further generalisation of the abstract maturity model by the weakening of the criteria contained in the definition I proposed. I did not choose this route as it seemed to be clumsy.

### **3.2. The Process and Result of Knowledge Mapping**

The basic idea is that knowledge mapping can be carried out in the same manner as it is done during requirements analysis in information system analysis. By applying the analogy of requirements analysis **the result of knowledge mapping will be a catalogue of knowledge elements** which lists knowledge elements that refer to a given area of the company.

#### *3.2.1. The Types of Mapping Processes*

I have discerned two types of mappings: **project-like** mapping and **institutionalised mapping**. Project-like mapping creates the catalogue of project elements, which later is kept up-to-date by institutionalised mapping.

When using the **project-like method** the usual project steps must be performed in the context of knowledge mapping. It is necessary to prepare the mapping project: define its scope, divide the company into investigation areas, set up the project organisation, study the history, develop project plans and kick-off the project.

**Institutionalised mapping** is like an inventory audit. Having verified the basic assumptions, that is, business objectives, all knowledge elements must be examined one by one to assert whether they are necessary and whether they conform to current business needs. Also, starting from the activities and business objectives of the company it should be examined whether it is necessary to enter new knowledge elements.

### **3.3. The Description of Knowledge Elements**

A knowledge element, following on Polányi's ideas, can be understood both as an object and as a process. The principal construction used in practice is that of an object, though without understanding the evolution and development of the knowledge element it cannot be construed at all, or in part only. For this reason **a knowledge element should be described both as an object and as a process.**

#### *3.3.1. Description of a Knowledge Element as an Object*

As an object, a knowledge element can be described from several aspects. The **importance of a knowledge element** is based on business objectives. Should a knowledge element be of importance, its transferability must be provided for, and to this end the characteristics of its transfer must be examined. And lastly, it is necessary to the preservation and operation of the knowledge element that its current bearers and owners be determined. In order to describe importance I used the matrix technique.

I made use of the typology developed by Collins and Blackler (Blackler 1995) to characterise the knowledge element from the aspect of transferability. Blackler classified knowledge as encoded, embodied, embrained, encultured and embedded.

**In the thesis I pointed out the temporal and multispectral feature of this typology** and illustrated this with examples. The classification is multispectral because a knowledge element can simultaneously exhibit characteristic features from more classes. The classification is temporal because the importance of the different features can change over time. The importance of knowledge exists in the eyes of the beholder only, just like beauty.

**In order to describe the knowledge bearing community** I have proposed naming or identifying the community or individuals possessing the knowledge.

### 3.3.2. *Description of a Knowledge Element as a Process*

**When a knowledge element is perceived as a process it is necessary to examine how it evolves, remains, develops and changes.** The primary instrument for the process type description is the textual documentation.

Relying once again on Blackler's ideas the description of the knowledge element should be examined from the following aspects:

- *knowing as mediated*: it is manifested in systems of language, technology, collaboration and control,
- *knowing as situated*: it is located in time and space and specific to particular contents,
- *knowing as provisional*: it is constructed and constantly developing,
- *knowing as pragmatic*: it is purposive and object-oriented.

## 3.4. Overview of the Case Studies

Knowledge management is not very well known among the Hungarian companies. Consequently, the selection of the companies to be investigated was not an easy task.

At the first company conscious introduction of the knowledge management function is in progress. A project had been set up for the purpose which started to implement a knowledge management function after careful preparations. At the second company there is no conscious setting up of a knowledge management function. However, the size and complexity of the company has long led to the necessity of homogenising and institutionalising the available knowledge. At that company I investigated the use of Lotus Notes, which in the literature is often referred to as a knowledge management tool. The third company met with knowledge management in the framework of a development project created in consequence of a concrete problem.

In all cases the terms "information" and "knowledge" were basically considered to be the same, which is called the cognitivistic approach by Venzin, von Krogh and Roos.

**In all three cases the first step was mapping existing knowledge which was followed by the development of an information system.** The initiative based on vision and strategy proved to be faster and more successful than steps initiated from the bottom of the hierarchy.

**Both project-like and institutionalised mapping could be observed in the cases studied. I met some of the knowledge element description techniques in practice. More techniques that I proposed were not applied during mapping** (process description, identification of knowledge bearers, determination according to the way of knowledge transfer). This may hinder the selection and planning of the correct way of knowledge transfer.

### **3.5. Possibilities for Extending the Research**

I see several possible directions for continuing the investigation

- A method for knowledge mapping evolved as a result of the research where the techniques to be applied and the product to be prepared, and the catalogue of knowledge elements were defined. As in the cases studied not all instruments were used a **trial of the complete method in practice seems to be an obvious extension.** Knowledge management is just becoming known in Hungary and thus companies (including a significant number of large companies, too) are starting on this road, such investigations are worthwhile.
- The primary objective of knowledge mapping was the *identification* and not the *description* of knowledge elements. **A possible subsequent step could be to describe the contents of suitable and worthy knowledge elements.** The fine toolkit of the field of artificial intelligence could be successfully used for this purpose (this is the so called "hard" approach). The Information Systems Department hosting my research has years of experiences and research potential in the use of the CommonKADS methodology (Schreiber et al. 1998), suitable for the extraction of knowledge. Another possible extension is the description

of the contents of knowledge elements on CommonKADS basis and to fit it into the proposed method.

- Further investigation of the communities of practice, to be identified in the characterisation of knowledge elements as object, could also rise interesting questions. **The question is the relation of these communities to each other both from the aspect of power and organisation**, and how this could be visualised

## **4. POSSIBLE EXPLOITATIONS OF THE RESULTS**

As far as I know very few companies in the Hungarian economy tried to implement a knowledge management function (KPMG 2000b), therefore it is expected that in the near future these initiatives will proliferate. My objective was to collect applicable and at the same time theoretically sound ideas and advice to help the institutionalisation of knowledge mapping. To ensure adequate description of the knowledge elements I used numerous techniques in my work and I generalised others. Therefore, after the verification of the complete toolkit it can be directly exploited by companies wishing to opt for the conscious and planned route of introducing knowledge management adapted to their business objectives.

Among the theoretic findings of the thesis the abstract concept of maturity models and its further generalisations could be utilised. This abstract concept can be extended for the so-called continuous maturity modelling technique, too. I did not consider this route worth pursuing due to its complexity and its intricate applicability in knowledge management. In other fields, however, it could prove to be fruitful.

The thesis can also be used to investigate the role of the company's current knowledge in creating new knowledge. If the current knowledge elements are known, it could help management in identifying the new knowledge elements needed in future.



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