Knowledge Map
Do Organizations Take Advantage of Knowledge Map?

Paper within IT and Business Renewal
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Abstract:

What? The subject of studies is Knowledge Map. I would like to know if organizations make use of knowledge maps. Knowledge maps not only show where to go to get the required information but also by connecting different sectors together create sufficient interactivity between them.

Why? This subject was my concern for many years. I remember those years working in companies and couldn’t find what I needed. I remember how frustrating it was searching for something in the middle of nowhere! I remember how difficult it was finding the experts I needed for consultancy.

And I remember many other things; I couldn’t find my way!

How? I was supposed to conduct my research in Schenker which is a famous logistic company in world. I had a meeting their and I visited the company and its different sites. There was nobody found in that branch with knowledge of mapping! I was introduced to another branch located in Gothenburg. During data collection I didn’t received any answer from them; otherwise I would have a large variety of different samples for my data collection. At the end 12 employees form different companies in different countries where interviewed. I’ve found them through my local network.

Main result? Most of the companies don’t take advantage of mapping!

Keywords

Knowledge, Knowledge Management, Mapping, Knowledge map, Business Processes
1 Introduction

1.1 Background

How is knowledge generated? How can it be used? These two main questions always have been the main concern of organizations. Organizations to maintain their competitive advantage always need to update their knowledge of external world to know the rivals, to harness the information and to use it for achieving their goals. As we know business goals are based on knowledge. We live in a context; elements are interpreted according to their context, and knowing more about the context leads to knowing more about how to succeed and knowing means knowledge.

As Merriam-Webster Dictionary & Thesaurus (2006) says:

“The fact or condition of knowing something with familiarity gained through experience or association.”

Here we are going to explore knowledge map, one aspects of knowledge management. Also knowledge map (or in another word if we want to make it more specific mapping strategic knowledge) is a subdivision of mapping science.

The importance of mapping strategic knowledge within organizations made me explore the world of mapping. The topic is broad therefore I will have to focus on the use of knowledge map in organization. I would like to know if companies take advantage of that.

White (2002) narrates from Liebowitz that Knowledge management is one of the fastest emerging fields in industry today but he points out that however most of the knowledge management activities do not seem to have rigorous and comprehensive knowledge management methodologies, tools, and techniques. He says one technique that can greatly aid the knowledge management field can be borrowed from knowledge maps.

Figure 1-1 Knowledge map as a subdivision of knowledge management, here domain is organizations.
1.2 Problem Discussion & Research Questions

The subject matter of the thesis is the use of knowledge map in different organizations; I would like to know if average employees make use of knowledge map for their business processes. The reason that this topic deserves to be studied is the necessity of discovering a method to access information and employees’ experience within the organizations fast and clearly. This can be done by visualizing all processes, experience and information through mapping methods.

KM (knowledge management) in current time can’t be implemented without the help of technology. The structures and processes in organization nowadays are so complicated that using traditional instruments for KM keep companies out of the game. Facing KM raises many issues from the technological to the theoretical. Here we study some main problems. The use of knowledge map is increasing due to the development in computer fields. Nowadays by using computer technology lots of advantages can be taken from maps to access the required data fast and conveniently. The main problems for companies to access information are how & where to search for information and they are normal due to the huge amount of data needed for doing different types of projects. Nowadays everything gets more and more sophisticated compared with past. Staff most of the time, depends on the projects search for information for a long time. Even for the type of information generated within the company there is no enough space. Frequently data is stored in the wrong place and in a different category which makes searching processes so difficult. The need for a map connecting all pieces of information together is a new challenge for companies. Those who manage the map successfully will achieve their goals faster as far as they will find the information easily, faster and more usefully.

Bryson, Ackermann, Eden& Finn (2004) depict the problem clearly:

“Do you ever Wonder What to Do? Are you ever Confused about how to proceed? You are not alone. Most of us puzzle about important matters. Often it is hard to know what to do about important issues at work – or even how to think about them.”

Mapping helps individuals to understand situations better and act on them more effectively (Bryson et al. 2004).
1.3 Research questions

The thesis is written to answer the following questions:

1.3.1 Main questions

What is the role of “Knowledge Map” in organizations? Do they take advantage of knowledge map?

1.3.2 Sub-questions

1. Do companies store staff’s personal experience (through a kind of mapping technique)?
2. Do companies store the experience based on customers’ reaction observation?
3. Do companies map the experience based on customers’ reaction observation?
4. Do normally employees find the information they need for their daily routines?
5. Do employees collect their daily experience based on success?
6. Do employees collect daily experience based on failure?
7. Have employees ever used any mapping software?
8. Is the learning path of employees mapped (to enhance the quality of training)?
9. What do employees think? Does mapping knowledge enhance business processes?

1.4 Hypothesis

Based on literature on mapping knowledge and different previous research mapping organizational knowledge can give a significant advantage to companies. My main hypothesis is that organizations don’t realize the benefit of knowledge map and therefore they don’t make use of it extensively to maintain their comparative advantage.

Concerning the nine sub-questions my hypotheses are: the majority of the researched companies or employees don’t:

- store staff’s personal experience (through a kind of mapping technique)
- store the experience based on customers’ reaction observation
- map the experience based on customers’ reaction observation
- find the information they need for their daily routines
- collect their daily experience based on success
- collect daily experience based on failure
- use mapping software (to store their experience or find the information they need)
- design a learning path to train the employees faster and appropriately
But after realizing the benefits of knowledge maps they do:

- think mapping knowledge enhances business processes

1.5 Purpose

The purpose of this paper is to know if organizations use knowledge map for their business processes. In other words based on the literature and previous research companies can benefit from mapping knowledge, I would like to know if organizations realize the importance of mapping knowledge and if so average employees within those organizations should make use of knowledge map for their daily tasks. The thesis will show if such thing happens among selected employees in the researched organizations.

The readers of this thesis can be all business specialists who are eager to enhance business processes. The paper can help these people to focus on the advantages of knowledge map for organizations. This focus can lead to a map design for different business processes.

1.6 Perspective

This thesis is written mainly from consumers-employees perspective. I worked in a few companies and I remember how difficult it was reaching the knowledge I required. I was the employee and at the same time a consumer of information which was not well organized. I remembered for simple item like business card I used to search a lot, and I couldn’t find the right printing house. Why? The knowledge of previous employees who did the same task was not mapped within the company!

1.7 Delimitation

In the current thesis I limit my research on average employees. A research could be done into the use of knowledge map among top managers, but the aim of this paper is to observe if the average employees for their daily routines use knowledge map.
2 The Frame of Reference

2.1 The logic

Why I chose the following references? The following references were exactly chosen to support the empirical data collection. Data collection is done to provide answers to the research questions and in this paper first technical terms are defined clearly from different points of view. The definitions clarify what I mean by knowledge map and it helps the reader to understand other concepts discussed in different chapters. It assists the reader to explore the importance of mapping knowledge according to different experts. First maps and knowledge maps are defined clearly. The related concepts needed for supporting maps and types of maps as well as a case study from AIXTRON and a personal experience from me are discussed. Introducing the readers to different types of maps is valuable as far as knowing these types helps business planners to realize the importance and usefulness of mapping. The case study shows briefly how mapping can be applied to a real company. My personal experience also is mentioned to show my personal understanding of the subject in a company, my experience there was one of the main reasons that I chose the current topic for my thesis; “Knowledge Map”.

All these provide the reader with the background required to understand the research conclusion. Reading the following literature also helped me to understand the concepts of mapping more clearly. It also assisted me to grasp the significance of mapping. The following literature is selected among many other references. The advantage of the current reference is its clear definition of what a reader needs to understand the concept of mapping.

The main purpose is to dig into the references deeply; therefore my effort is to focus on few references thoroughly instead of having many references with superficial approach.

2.2 What is a Map?

As Huff & Jenkins (2002) describe, a common language is needed for definition of a map. Considering this, a map:
“Is a visual representation that, established a landscape, or domain, names the most important entities that exist within that domain, and simultaneously places them within two or more relationships.”

Figure 2-2 What is map? It shows you the way, where to go, how to go!

2.3 Knowledge Map

Knowledge map guides managers through the process of mapping knowledge by providing distinct types of maps as well as tips on how to choose the right focus and scope of mapping (Vestal, 2005a).

The process of identifying and mapping knowledge includes collecting, reviewing, validating, storing, and sharing knowledge and information (Vestal, 2005b).

The aim is how to formulate the knowledge hidden in employees and how to store the best practices to use them later.

As a simple example knowledge map helps organizations get from point A to point B more efficiently.

As Jetter (2006a) mentions, like geographical map, knowledge maps guide the user and help him to find the required knowledge, either in the form of knowledgeable people and experts or in the form of knowledge media. As he says furthermore, knowledge maps structure a knowledge domain in order to provide a common understanding & vocabulary.

Jetter (2006b) refers to a successful result of knowledge mapping in a high-tech SME (Small medium size enterprises). In this company a new knowledge map developed to facilitate new product development mainly by using an internet knowledge application map to codify the processes for easy navigation.

“The knowledge map in the system mainly deals with the assistance to find the needed knowledge easily and effectively. The primary purposes of using a knowledge map in the system are as follows: The knowledge map (1) is represented in a clear and visual way to identify key knowledge areas that are most strategic and critical to the project, and (2) deals with the assistance for users to find the needed knowledge easily and effectively.”
2.3.1 Managing Knowledge: A Critical Task

As Vestal (2005c) says if organizations do not fully improve their existing expertise, then they risk losing a valuable asset: internal know-how. In other words, they will lose what they experienced and practiced, here it is important to find the latest ways of storing and accessing the required information & practices in organizations. The first one is codifying the practice done successfully. It should be done immediately after the successful result of practice otherwise the practice can be lost—second storing the codified practice, here can be the use of the latest way of storing which is Ontology (a new generation of database based on mapping and linguistics).—third is retrieving the data easily by a simple search, any involved employee should be able to retrieve the data they need for the project fast without facing many links, here ontology will help.

Organizations capture, transfer, and use knowledge in order to attain strategic goals in a more efficient and innovative manner.

As Vestal (2005d) mentions prior to 1995, few tools existed to understand what knowledge was embedded in organizations or analyze the stream of knowledge in organizations, and any methodologies for improving stream and use were immature. In other words, knowledge management was a theory struggling to discover application in reality. For more than a decade, APQC (a publishing company) has worked on establishing methods and conducting standardized studies that have advanced the practice of knowledge management.

Currently, most large organizations have realized the importance of managing knowledge and have begun to set explicit knowledge management activities into their operations. These activities connect people to people and to the knowledge and information they need to act effectively and to generate new knowledge (Vestal, 2005e).

Capturing & codifying lessons learned, reusing patterns, transferring best practices, and enabling collaboration and access to expertise are a few of the approaches that organizations are adopting as part of their knowledge management initiatives. By opening up avenues for knowledge and information exchange, organizations can avoid repeating mistakes (Vestal, 2005f).
2.3.2 Mapping Knowledge: the critical First Step

Anyone undertaking a knowledge management initiative must first discover what knowledge already resides in their organization (Vestal, 2005g).

Like a traveler preparing for a road trip, business managers must be aware of two aspects of their journey: where they are headed and how they are going to get there. A map can provide a visual representation of the land leading to a final destination, making the trip easier and the goal achievable (Vestal, 2005h).

Therefore first the organizational goal should be determined and for any goal a knowledge map should be designed, if there are different goals, for any goal a specific map will be designed.

By knowledge map managers and employees quickly understand gaps in knowledge, uncover key knowledge resources, and learn where to find in-house experts who can offer advice to avoid mistakes (Vestal, 2005i).
As Vestal (2005j) says knowledge map helps staff to easily find:

- Knowledge gaps between different processes – for example there is no road between point C and D. In the other words the required knowledge from phase C to D doesn’t exist and by drawing knowledge map it can be easily specified.

- Knowledge recourses which can be divided into many sectors like books e-books, videos, experts etc. They include any source of knowledge codified from books to none-codified which can be experts.

Without a map of the processes, goals, and knowledge assets inside one's organization, it will be difficult to reach one's destination.

However, just having a map will not actually get organizations to their final goals. They must still drive to their goals, operate their processes, and manage staff (Vestal, 2005k).

Knowledge mapping is an active phrase because the act of mapping, of understanding and linking pieces of the organization together, is the important concept. It can be summarized as: Knowledge map is the act of mapping, of understanding and connecting pieces of organization together (Vestal, 2005l).

Maps are wonderful resources but must be constantly updated to meet shifting needs and new challenges (Vestal, 2005m).

Knowledge mapping is quickly gaining favor across a wide spectrum of industries as a formidable tool for identifying knowledge, gaps in skills, and opportunities for improving organizational performance (Vestal, 2005n).

Knowledge map can identify

- Knowledge
- Gaps in skills
- The links available for sharing knowledge & coordination (specially for parallel sectors like IT and business groups)

And therefore can improve organizational performance (Vestal, 2005o).

### 2.3.3 Knowledge Codification & Knowledge Maps

Knowledge codification is the process by which explicit knowledge is separated from its source and change into a form in which can easily be transferred via different media such as software or books (Jetter, 2006c).

Knowledge maps help to detect the source of knowledge & information (Jetter, 2006d).

### 2.3.4 Types of Knowledge Maps

(Figures of different knowledge maps can be found in appendix one.)
1. Hierarchal or Radial Structure Map; Concept Maps and Mind Maps:

As Jetter (2006e) says, hierarchal knowledge maps are strongly related to psychological models that are grounded on the notion that human brain organizes semantic knowledge in networks or hierarchies of concepts.

Concepts maps provide one model for hierarchal structure of knowledge from top level to low one (Jetter, 2006f).

Mind map consists of concepts that are link radially. The mapping process starts with a key topic in the middle of the map. In the resulting mind map, the most specific aspects of the key concept are at the edge of the map & the more general ones are in the center (Jetter, 2006g).

2. Network Knowledge Structure Map: Casual Maps:

As Jetter (2006h) mentions Causal mapping is characterized as a technique to connect strategic thinking & acting, helping to make sense of complex problems.

Causal maps are related to codifying knowledge about cause and effects. They are graphs consist of nodes (concepts) and edges (arrows) that display causality (Jetter, 2006i).

Causal maps are designed to capture complicated mental models of individuals to provide a starting point for strategic business analysis. They are referred to by different names such as “cognitive maps”, “oval maps”, “influence diagrams” & “patterns of interactions”. In other words, causal maps encode dynamic behavior which means something happens because and after something else has happened (Jetter, 2006j).

As Bryson et al. (2004) mention:

“Causal mapping can help us take a more optimistic, objective and action-oriented look at the situation. As a result, we are more likely to take effective action and feel better.”

Also the same authors give us a very clear description of Causal map:

“A causal map is a word-and-arrow diagram in which ideas and actions are causally linked with one another through the use of arrows. The arrows indicate how one idea or action leads to another.”

3. Knowledge Source Maps:

Knowledge Source Maps (or knowledge carrier maps) can be described as organizational charts that don’t display functions, responsibility and hierarchy but expertise. They help to detect experts in a specific knowledge domain so that managers can find people for their teams easily as well as advisors for particular problems that can not be solved within the team (Jetter, 2006k), (Davenport & Prusak, 1997) & (Eppler, 2001).

As Jetter (2006l) states, knowledge source maps can be extended through so-called yellow pages or blue pages that include information on the individual internal experts (yellow pages) or external experts (blue pages) such as name, photo & contact data, position, fields and level of expertise, membership in professional organizations & personal interests.

4. Knowledge Flow Maps:
Knowledge flow maps show the process of doing something phase by phase. Knowledge flow maps can be used for knowledge codification and detection (Jetter, 2006m).

2.3.5 Case Study: Knowledge Maps to Improve NPD (new product development)

Jetter (2006m) introduces us to a case study about AIXTRON which is a large SME with approximately 400 employees worldwide. The company develops manufacturing equipments for the production of semiconductors.

For the company, product development is a core process in which the use the re-use of formerly acquired experience as well as creation of new knowledge have to be put together (Jetter, 2006n).

At the start of the case study, new product development was based on a process called “development & qualification order” (DQO). It was a procedure used to be supported by paper documents, that guided the development process from kick-off to final documentation of development result. The process was accepted among managers but the details offered by process were not sufficient. For example the test result for accepted products existed but the one for rejected product didn’t. This could lead to the repetition of the same mistake during the new product development. Also a lot of knowledge was documented in media (different types of database in different software applications) or some was stored in mailboxes. In other words electronic file storage did not always follow a transparent and consistence system, making it difficult to find the documents (Jetter, 2006o).

In this case study, the knowledge mapping exercise shows a variety of suggestions for small process improvement.

- The knowledge transfer between functional areas was not as transparent to some employees as originally assumed-they were not fully aware of what other departments did. With the knowledge they provided.

- File storage was a key problem; staff didn’t know where to store documents that can be retrieved later easily according to the classification.

- The map shows the access of staff to certain files and information should be more customized to make sure that people do not have to handle documents that they do not need for their daily job.

- The map shows for different projects the required knowledge was not codified with necessary details.

To solve the problem identified through mapping exercise, the company designed an intranet-based knowledge application map (Jetter, 2006p).

Improved processes:

As Jetter (2006q) mentions this application map brings about the following advantages:

- The entire DQO is visualized and explained on intranet pages making all steps of product development transparent. Documents created within the DQO system are automatically stored without the user having to decide how and where to store them.
(Jetter, 2006r). This technique avoids further confusion about the place of data storage as far as everything is stored in the same place that everybody knows about.

- All DQOs are registered and can be viewed using different search & sorting techniques such as keywords, project numbers, development stage or release status & responsible person and departments.
- Depending on their roles and responsibilities staff is given access to different documents, those they really need.
- Comments and approval of development steps and modifications, take place automatically. An email system informs the individuals involved in the projects.

The process of designing a map can include two steps:

First, collecting and codifying the required knowledge for IT & business processes.

Second, design a map to show how to access that knowledge easily without waste of time.

2.3.6 Personal Experience: Valfajre Shipping Company

This case study is based on my experience in a shipping company called Valfajre shipping company (previously called Valfajre-8 shipping co). It was established in 1986 in order to speed up & encourage traveling across the Persian Gulf. During my stay in the company I worked with IT personnel in different areas such as web, graphic & animation design. What grabbed my attention there was the lack of communication between IT and business personnel. The advantages of a web based application that could include all business processes from timetable of ships to booking tickets were clear to IT staff but no real communication existed between these two groups. IT personnel were waiting for business managers to design and approve new IT plans suited for business. Within the company it was not clear who had enough knowledge about business processes. In other words there was no clear connection between IT policy and business policy as far as business personnel lack updated IT knowledge. For example business policy makers didn’t know about the latest IT developments & the advantages of booking tickets online, advertising online and different techniques that could be used by e-business for sales promotion. There was no coordinator. There was a gap which remained invisible mainly because no knowledge map was designed for the company. A simple knowledge map, defining the tasks and expertise could show how lack of expertise in different sections affected IT and business policy.
3 Research Methods

The aim of the thesis is to answer the research questions and test the hypotheses. For this appropriate methods were chosen. In the following part it will be explained how the empirical work has been carried out.

3.1 Field study

The research was conducted in Jönköping, Sweden in April, May and June 2006. Many other personnel out of the city and Sweden were interviewed by MSN messenger or phone.

3.2 Assisting materials

Classification sheets and computer applications (such as Microsoft Excel) were used.

3.3 Target groups

Target groups consisted of the average employees of different companies. The selection method for the staff was both random & purposive! Among a list of personnel I knew 16 were selected. The personnel work now or used to work. Among those who didn’t work anymore only those were selected who didn’t end their job before 2004. All 16 were contacted face to face, by phone, email or MSN messenger. The aim of the thesis and the value of their contribution were explained clearly. Among 16, 13 answered the questions. One of the answers reached me late and therefore was eliminated. Finally the answers of 12 personnel were included in this research.

3.4 Data Collection Method

Figure 3-1 Observation
3.4.1 Interview

It is usually used to collect detailed information. Data can be collected by sending interviewer to conduct face-to-face interviews. As the questions are answered, the interviewer records the answers on a questionnaire, enters them into a computer or tapes or videos the interview. Interviews are considered a part of qualitative method.

Here all 12 personnel were interviewed. About 30 to 45 minutes were spent for each interview except for employee no. 12 which was 10 minutes due to his occupation. First the main concepts of mapping were defined clearly then each question was described. To make sure that all the questions were understood by the interviewees, enough interactivity was maintained and a few complementary questions were asked. To record the interview pen and paper as well as computers were used. All the interviewees read the questions before interview to have a better idea about the whole issue.

Figure 3-2 Interview

It should be emphasized that all the questions were emailed before the interview to the employees to make them familiar with the subject. Some of the interviewees read the questions before the interview and some didn’t due to the lack of time. My experience shows those who got more input about the meaning of knowledge map answered the questions much easier (mainly in face to face interview) but those who were interviewed on the phone or MSN Messenger were confused a little because they had difficulty to understand the concept of maps. For my questions as observed before I gave definition of each concept to make sure interviewees can understand the questions. Using bold styles was based on my experience as advertising manager. Using different fonts or size can grab the attention.

3.4.2 Questionnaires

Questions concerning the use of knowledge map are emailed to the target group. After that by face to face, phone, email or MSN messenger, the concepts were detailed more. It helped the target group answer the questions more precisely.
3.4.3 Book and article reviews

To learn the basic concepts of mapping, different books & e-sources were studied. The references were selected among many other ones based on the clarity of the issue. Many references were eliminated because of the time limit.

3.4.4 Qualitative Method

It is usually text-based information that provides descriptive details, often collected from interviews, focus groups, or observations. In this project qualitative method was mainly used for interview.

3.4.5 Quantitative Method

It is usually numeric information that is subject to statistical analysis. Here it was used for data collection conducted by questionnaires.

3.4.6 Purposive Method

The target group is selected according to purposive method. According to this method as it can be realized by the name, the sample is selected base on a purpose.

Here the employees were selected based on different purposes:
The purpose was to get required response from employees, therefore only those were selected who would probably answer the questions. These people normally were those who know the interviewer and therefore feel themselves committed to accept his requests. I only emailed those who I knew or I was introduced by others.

The target group was selected according to the purpose of the thesis which was answering to the research questions. To answer the research questions average employees should be selected then the level and use of mapping can be measured. All selected employees were average employees.

3.4.7 Random Method

According to this method the sample is selected randomly. Here I chose many employees purposive, and among all these who were selected purposely some were selected randomly as far as I couldn’t select my entire purposive sample due to the lack of time. As described on experts.about.com (2006)

“The word random is used to express apparent lack of purpose, cause, or order. The term randomness is often used synonymously with a number of measurable statistical properties, such as lack of bias or correlation.”

The focus on “lack of bias” here was the main reason I selected this method. The bottom-line here is I used two opposite methods for my target group (Random and purposive).

Managers-net.com (2006) explain this method clearly:

“Random sampling is akin to the lottery methods and is the best method in statistical terms as it is more likely to reduce the effects of bias. There are several ways in which a random sample can be taken such as drawing well-mixed numbers from a container without deliberate selection or using the random numbers published in textbooks as tables, or computer spreadsheets.”

For my random method first purposively I chose 30 of the employees that I knew or was introduced to by other friends. In chapter 3.4.6, I explained how I selected them purposively. As far as I didn’t have time to complete my data-collection for 30 randomly I chose 16 among them. The random method I used was “drawing well-mixed numbers from a container without deliberate selection”. I wrote the name of each person in a piece of paper and put them in a bowl and mixed them and at the end selected 16 out of 30. As described before all 16 were contacted.
3.5 Reliability and Validity

![Figure 3-5 How to make a research reliable and valid?](image)

3.5.1 Reliability

Reliability means that the findings would be consistently the same if the study was done again. There are different ways to ensure reliability.

Reliability for most instruments can be divided into three classes: test-retest, equivalent form, and internal consistency. All measure consistency differently. Depends on the research one or all of these methods can be used. Test-retest measures consistency from one time to the next. Equivalent-form measures consistency between two versions of an instrument. For example if a thermometer is used to measure the temperature of a glass of water, another brand of thermometer is used to make sure if the same result will be achieved. Internal-consistency measures consistency within the instrument. For example if the thermometer used for that glass of water today shows 5, is the result the same tomorrow?

Using longer tests is often recommended to increase reliability (Cook and Campbell 1979). In this study each subject had to answer the questions within a short time due to the fact that many of them were busy at the time of research and including many questions even could make them ignore the questions. My effort was to include enough questions, as well as my personal description of them to increase the reliability. My logic was that if the target group digests the meaning of questions through my explanation, they will give the same answers to the questions, if the test is repeated. In the other words I tried to maintain enough interaction with interviewees to make sure that the concept of questions is understood carefully by them.

Due to the lack of time a post-test was done for the first five employees a day after the pre-test, the answers to all the questions (which required yes or no answer) were the same.

3.5.2 Validity

A measurement is valid when it measures what it is supposed to measure. For a measurement to be valid first it should be reliable. In other words If a measure is valid, it is reliable. This definition differs among critics as Moss (1994) puts emphasis on that.
Researchers generally ensure validity by raising a series of questions, and also will look for the similar answers in the research of others. I started with research questions to make sure whether I can answer the questions I have posed with the selected research instrument. For this reason for interview I made sure that the interviewee understood all my questions by maintaining adequate interaction. By further explanation I was ensured that the questions were clarified.
4 Empirical Findings
This part includes the result of empirical research.

Figure 4-1 Results of empirical research

4.1 Reviews
A complete research is done to collect data for:
-Defining the concepts of mapping.
-Realizing the benefits of mapping for organizations.

For this purpose many related books and articles were studied. The content of the research is mentioned in the chapter “The frame of reference”.

The main purpose of this part in the thesis was to reach the necessary concepts needed for design and explanation of interview’s and questionnaires’ questions. Finding the user-friendly definition and description of mapping helped me to communicate the concept of mapping much easier and clear to the target group. The result was better understanding of the questions and therefore validity of answers.

4.2 Interviews
As mentioned in chapter two, randomly and purposively employees in different companies in different countries were interviewed: face to face interview, Interview through MSN messenger & phone. The purpose was to know if average employees make use of knowledge maps for their daily tasks (do they take advantage of knowledge maps?). The aim was to discover if companies are familiar with the concept of mapping and to what level they make use of that. The questions cover:
Please read the introduction before answering the questions

Introduction:

Mapping is a process that helps organization to know where to go to get the required information. Also the experiences done within the companies can be mapped to be used later. The aim of the interview is to know if managers and employees are familiar with mapping & if so what types of map have been developed in the company. For example a map simply can be a search engine that you search keywords in with this difference that you view how information is connected together. We presume that the majority of staff is not familiar with the concept of maps but they developed mapping methods unconsciously to facilitate business processes. Staff doesn’t want to search for a long time, instead they want to develop a map to know where to go to find the exact information they require for their projects. Currently advanced mapping strategies include software applications in which knowledge needed for doing a project, is displayed visually with maximum interactivity. It can be like interactive web-based city maps that you click on different locations to zoom in and to get more details and to follow the path on the map to know how to go there.

Ex: If the knowledge of employees and managers won’t be mapped, if they leave the company their knowledge will get lost. Even if their knowledge gets stored (in a database etc) but not mapped again it can get lost among the huge amount of data. Maps can exactly show you visually and tangibly where to go to get what you want.

Notes for both the interview and questionnaires:

Note1: If you don’t know the answer to a question please mention “I don’t know”

Note2: If you work in educational, institutional centers replace “companies” with your organization like “universities, institutes etc”, also replace “business processes” with “educational, institutional processes”

Note3: Please answer both the interview and questionnaires.

Interview:

Please write your name & family name (they will be kept anonymous):
1. What is the name of the organization you work for? If please mention the website of your company if there is any.
2. Where is it located? (only country & city)
3. When did you work there (from... to...)?
4. What are the activities of your company?
5. What is your position in the company? What do you normally do in this position?
6. How many employees are there in your company?
7. What maps have been developed in your company? (If there is no maps developed, what similar methods are used to help personnel access the required information or experts?)
8. Have maps (or similar methods) been developed for all business areas in your company?
9. Who are the key players responsible for the development and updating of maps (or similar methods)?
10. Who can access the information and to what level?
11. Have you ever stored or mapped customers’ service experience for operations improvement? (Maybe you recognize it as feedbacks if so how did you store feedbacks and how staff can access feedbacks of customers to know how to improve products, services and totally operations- note: If you work in educational centers your customers will be students.).
12. Have you ever stored your experienced based on your observation of customers’ reaction? If yes, how, where?
13. How do employees access each other’s experience? How is their experience stored? (if you are a teacher for example answer how teachers access each others’ experience, is there ant software, meeting for that, if there is meeting how do you store the experienced achieved by meeting)

As viewed the more important questions were highlighted as bold.
The questions in the tables are the shorter and summarized version of the previous questions. They should be compared with questions above to be understood fully. As viewed in the table, the first six questions give general information about the employees. The questions are important as far as they are necessary for understanding the tasks and working environment.

The next seven questions specifically deal with different types of mapping. Reading the complete version of questions with definition of maps mentioned before them, clarify the preliminary concepts.

I tried my best not to affect the answers of the questions. All the questions for both interview and questionnaires were typed by the interviewees. After more interaction with interviewees if they were present I asked them to type their answers in front of me with more details, or if they were not there I typed their answer with their permission. It means the answers to the interview were completely objective and I had no role for any revision. The answers in the tables may look long but summarizing the answers more by me could damage the essence of objectivity. It is possible for different readers to interpret different concepts by reading the complete version of answers. The conclusion is I prefer to keep the answer as they are. Only in some rare cases that an answer was very long I shortened the answer. Even for having more objectivity I tried not to revise the sentence or the style of the interviewees. In some cases the style and tone of voice indicate the viewpoint of the interviewee towards the subject (knowledge map), which shouldn’t be ignored.
Table 4.1: Answers to the interviews (E means Employee)

<table>
<thead>
<tr>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>E4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of the organization</strong></td>
<td><strong>Target agency for travel and tourism</strong></td>
<td>Müller Dairy (UK Production) <a href="http://www.muller.co.uk">www.muller.co.uk</a></td>
<td>Romanian Bank</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Syria, Damascus</td>
<td>Market Drayton, England</td>
<td>Romania</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>August-October 2005</td>
<td>Summer 2004 (8 weeks)</td>
<td>2005-2006</td>
</tr>
<tr>
<td><strong>Activities of the company</strong></td>
<td>Outbound tourism</td>
<td>Production of dairy products (yoghurts etc)</td>
<td>Banking</td>
</tr>
<tr>
<td><strong>Employee’s position</strong></td>
<td>Public relations; Organizing programs for tourists going abroad</td>
<td>Support department in various tasks</td>
<td>Banking</td>
</tr>
<tr>
<td><strong>No of employees</strong></td>
<td>10</td>
<td>1100 on that site</td>
<td>50</td>
</tr>
<tr>
<td><strong>Type of map developed</strong></td>
<td>No map. We contacted each other through emails, phones or faxes</td>
<td>Meeting (face to face), phoning someone, getting support from different departments. I had a list of different phone no, But no real map was designed there. I used search engines to find the names of experts but those experts were not connected to each other. No relationship</td>
<td>I don’t know</td>
</tr>
<tr>
<td><strong>Map for all business</strong></td>
<td>No, but with emails, mails,</td>
<td>No, no visual representation for</td>
<td>No</td>
</tr>
<tr>
<td><strong>areas</strong></td>
<td>phones faxes we communicated to different travel agencies inside and outside.</td>
<td>connecting different areas.</td>
<td></td>
</tr>
<tr>
<td><strong>Who updates and develops the map</strong></td>
<td>There was no map</td>
<td>There was an IT department there but not for maps only for search engines etc</td>
<td>No maps</td>
</tr>
<tr>
<td><strong>Who accesses the information</strong></td>
<td>Concerning the task we had access to what we needed</td>
<td>Everybody had access to the information that needed.</td>
<td>I don’t know</td>
</tr>
<tr>
<td><strong>Mapping customers service experience</strong></td>
<td>We had their info. If we needed we communicated with them. We didn’t store their feedback, but we received them orally. We communicated feedbacks orally to personnel who were in charge.</td>
<td>IT was not part of my job there</td>
<td>No</td>
</tr>
<tr>
<td><strong>Mapping the experience based on customers’ reaction observation</strong></td>
<td>No. But I think it would be better if we registered</td>
<td>IT was not part of my job there</td>
<td>No</td>
</tr>
<tr>
<td><strong>Access to each other's experience—is that stored?</strong></td>
<td>Fax, phones, face to face discussions, emails.</td>
<td>Meeting (face to face) or phoning someone, getting support from different departments. I had a list of different phone. no use of maps</td>
<td>Meeting but not with IT</td>
</tr>
<tr>
<td><strong>Name of the organization</strong></td>
<td>E5</td>
<td>E6</td>
<td>E7</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Location</td>
<td>France-Saint Die des Vosges</td>
<td>Mexico City, Mexico</td>
<td>Orlando, Fl USA</td>
</tr>
<tr>
<td><strong>Activities of the company</strong></td>
<td>The company produces different equipments for cars like Seat Acoustic package Cockpit Front end Door.</td>
<td>They develop and administrate call-centers (normally used for product support etc)</td>
<td>Education K-10th grade</td>
</tr>
<tr>
<td><strong>Employee’s position</strong></td>
<td>I worked with the quality manager.</td>
<td>Software Development</td>
<td>Latin teacher, other duties including study hall, general supervision</td>
</tr>
<tr>
<td><strong>No of employees</strong></td>
<td>600 in my branch</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td><strong>Type of map developed</strong></td>
<td>I have specific domain on the computer and there I have all the folders that I need for my project. All of them are organized like a tree with different levels.</td>
<td>No map. Meeting (face to face), phoning or emailing the persons I needed.</td>
<td>‘There was a curriculum support person who sent us materials about teaching that she found. There was no map or any formalized way to access information</td>
</tr>
<tr>
<td><strong>Map for all business areas</strong></td>
<td>This kind of organizing folders is used for the whole company.</td>
<td>No, the communication between people was so bad.</td>
<td>I do not know about the non-teaching parts of the company.</td>
</tr>
<tr>
<td><strong>Who Updates and develops the map</strong></td>
<td>Folders in this design were there before. I don’t know who did but for me but I can access those folders I need and I can save something that is</td>
<td>There was no map</td>
<td>Headmaster of school, curriculum coordinator</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>related to my task and there are located in the common domain.</td>
<td>I don't know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who accesses the information</td>
<td>Everybody according to their needs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everything was out of order, there were no manuals. I couldn't understand what they wanted me to do, there were no routines there.</td>
<td>All employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mapping customers service experience</td>
<td>The structure of relationship is like: Suppliers-Customers It means I work in one part and I'm supplier of next section and at the same time customer of previous one. We use these programs for storing and mapping customers service experience: GMAO, GPAO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>We didn’t have any process for that. Really there was a need to register customers’ feedbacks but nobody was used to it. And the same mistakes were repeated and repeated again.</td>
<td>I mapped out certain grammatical concepts about language for the students to learn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mapping the experience based on customers’ reaction observation</td>
<td>Yes we store in an application.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, and it was really a need for that to not repeat the same mistake.</td>
<td>I only kept track informally about how things worked.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to each other's experience-is that stored?</td>
<td>We share the domain. I can phone or email them. I have a map on the wall to find the people I need.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I used to go to that person</td>
<td>We had a common computer drive around the school where anyone could access the lesson plans of other teachers, in case they wanted to integrate concepts from other classes. I do not think many people actually used this service.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stored orally</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E9</td>
<td>E10</td>
<td>E11</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Islamabad, Pakistan</td>
<td>France, Paris La Défense</td>
<td>Bangladesh, Dhaka</td>
</tr>
<tr>
<td><strong>Activities of the company</strong></td>
<td>Educational services, research and technology.</td>
<td>IT services provider</td>
<td>It is a University</td>
</tr>
<tr>
<td><strong>Employee’s position</strong></td>
<td>Lecturer</td>
<td>I'm in charge of conception, development and validation of software</td>
<td>System Engineer</td>
</tr>
<tr>
<td><strong>No of employees</strong></td>
<td>Around 1000</td>
<td>47000</td>
<td>400</td>
</tr>
<tr>
<td><strong>Type of map developed</strong></td>
<td>web portals, websites</td>
<td>We only use Windows file system</td>
<td>Educational system</td>
</tr>
<tr>
<td><strong>Map for all business areas</strong></td>
<td>yes</td>
<td>I don’t know</td>
<td>I don’t know</td>
</tr>
<tr>
<td><strong>Who Updates and develops the map</strong></td>
<td>IT department</td>
<td>The users of the file system</td>
<td>System administrator</td>
</tr>
<tr>
<td><strong>Who accesses the information</strong></td>
<td>different employees are given different access</td>
<td>Only the member of the project can access project’s information</td>
<td>Administrator, maximum level and those who need it</td>
</tr>
<tr>
<td>Mapping customers service experience</td>
<td>No</td>
<td>No</td>
<td>Through website and student judge depend on some factors faculty, labs and resources</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----</td>
<td>----</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mapping the experience based on customers’ reaction observation</td>
<td>No</td>
<td>No</td>
<td>Same answer</td>
</tr>
<tr>
<td>Access to each other's experience-is that stored?</td>
<td>In case, students’ record, they are on portal, but access is restricted.</td>
<td>I don’t know</td>
<td>Teachers have regular meeting and discuss how to improve the quality of teaching on regular basis.</td>
</tr>
</tbody>
</table>

### 4.3 Questionnaires

According to statcan.ca (2006) there are two types of questionnaires, one is mailed or emailed questionnaire and the other is hand-delivered questionnaire. The second one can be defined as self-enumerated survey where questionnaires are hand-delivered to target groups and mailed (or emailed) back by them after completion. This method usually results in better response rates than a mail survey because target groups feel more responsible to return the questionnaire. In this research questionnaires were emailed to the target group but to increase the chance for receiving the answer, I phoned them one by one or met them face to face.
Please answer the following questions with YES or NO, also if there is need for explanation, please make it.

Questionnaire 1; Mapping- for Managers-Employees- Teacher etc

1. During your work in the organization have you ever felt you couldn’t find the information you wanted because you didn’t know where and how to find it? If yes, did you find a solution for that? If yes, what was your solution? Was that a kind of mapping? Do you have any stories about that in your company that you wanted to find something and you didn’t and you felt the need of map to direct you to what you needed? If you have any stories please mention!

2. Do you collect and store your daily experience based on success in your task within the company? (to repeat the success by doing the same process) If YES, briefly explain HOW.

3. Do you collect and store your daily experience based on failure in your task within the company? (to avoid repeating the failure by not doing the same process) If YES, briefly explain HOW.

4. Do you believe in “trial and error”? (making mistakes to learn from them and map & store them to not repeat them again for the next project)

5. Have you ever worked with “mapping software” (a software application which displays visually the relationship of different expertise, experts and knowledge sources within or even outside the company, and also it shows where to go to find them)

Questionnaire 2; Learning Path; for managers, teachers etc:

Please read the definition before answer the question.

Definition:

Mapping learning paths means to show all the steps of your training in the company phase by phase. The map shows your leaning process in the company from the beginning till now. It helps you to find if there is any gap between the learning process or if you received the suitable training concerning your current task. All steps of previous training will be shown on the map in details and based on that a new training program will be designed and mapped; therefore there won’t be any gap between steps and no irrelevant training concerning the task. In the map feedback will be received, during & after each step. The bottom line: you will be trained faster, easier and better.

1. Has the learning path of employees been mapped within your organization?
2. If yes does it help? How? - If no, how did you evaluate your training period in your company? If it was useful and well-designed, mention what structure it had, if it was not, state in your opinion what were the weaknesses of the training?

AND the LAST QUESTION!

- After facing all these questions, do you think mapping knowledge can significantly enhance your business or educational processes? Answer with “YES”, “NO” or “I DON’T KNOW”:

Thanks a lot for your patience!
Reza

As viewed in the following the tables are designed based on the questions. To understand the logic of my table design please refer to the chap 4.2

Table 4.2: Answers to the questionnaire I (E means Employee)

<table>
<thead>
<tr>
<th>Problem with Finding the required information</th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>E4</th>
<th>E5</th>
<th>E6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem with Finding the required information</td>
<td>NO</td>
<td>NO, because always I had someone there to help me to find what I needed.</td>
<td>NO, always I could find somebody to help me face to face.</td>
<td>NO, We have maps on the wall.</td>
<td>NO, Everything is not so organized.</td>
<td>YES, and I didn’t have someone there to help me to find what I needed and I needed to wait even two days to find someone who can help me.</td>
</tr>
<tr>
<td>Problem with Finding the required information</td>
<td>NO</td>
<td>Details: My manager was responsible for finding information and contacts; she gave me all I needed. My job was not so challenging, therefore I could find whatever I needed</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td><strong>Collecting daily experience based on success</strong></td>
<td>NO</td>
<td>NO, because I was at the beginning of my career and inexperienced compared with other staff.</td>
<td>NO</td>
<td>NO, I don’t need that because my job is simple.</td>
<td>YES, via computer programs.</td>
<td>NO, but it was a need for that, it could be useful.</td>
</tr>
<tr>
<td><strong>Collecting daily experience based on failure</strong></td>
<td>NO</td>
<td>NO, same reason</td>
<td>NO</td>
<td>NO, same answer</td>
<td>YES, same answer</td>
<td>NO, same answer</td>
</tr>
<tr>
<td><strong>Believe in “trail and error”</strong></td>
<td>YES</td>
<td>YES &amp; NO, sometimes it works, depends on the situation; it shouldn’t be used too much. Because you will face serious loss and risk problems.</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES &amp; NO. It works but is the most unproductive way to do things.</td>
</tr>
<tr>
<td><strong>Using Mapping software</strong></td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES, Similar programs like Visio</td>
<td></td>
</tr>
<tr>
<td><strong>Mapping the learning path of employees</strong></td>
<td>E1</td>
<td>E2</td>
<td>E3</td>
<td>E4</td>
<td>E5</td>
<td>E6</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>NO, My job was easy no need for that.</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>I didn’t have such a thing. They briefly explained my tasks but they were not formulized. You had face to face interaction with your managers and it was enough to learn the routines. We set up an informal plan (not written), I could go on with different tasks very flexible depending on my progress with tasks.</td>
<td>NO</td>
<td>Training period was too short and information given was too vague</td>
<td>YES, It seems so. Everything is according to a kind of map. It helps a lot.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mapping knowledge will enhance business processes</strong></th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>E4</th>
<th>E5</th>
<th>E6</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES, sure! Definitely, knowledge outflow faced when employees leave is a serious loss to the company.</td>
<td>YES</td>
<td>NO!</td>
<td>YES &amp; NO, Concerning the task that I have no, it is so simple, no need for map but generally for more complicated tasks of course. I think it is a good idea.</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Problem with Finding the required information</td>
<td>E7</td>
<td>E8</td>
<td>E9</td>
<td>E10</td>
<td>E11</td>
<td>E12</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>NO, normally found all information on website</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>I NO</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collecting daily experience based on success</th>
<th>E7</th>
<th>E8</th>
<th>E9</th>
<th>E10</th>
<th>E11</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES, NO</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collecting daily experience based on failure</th>
<th>E7</th>
<th>E8</th>
<th>E9</th>
<th>E10</th>
<th>E11</th>
<th>E12</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES, briefly explain</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>They organize some educational activities like programming contest. I learn how to organize a successful event.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES, briefly explain</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>I only documented things that did not go well, so that I could improve them. That included disciplinary methods, teaching methods, etc. I kept a journal of things that happened.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Believe in “trail and error”</th>
<th>E7</th>
<th>E8</th>
<th>E9</th>
<th>E10</th>
<th>E11</th>
<th>E12</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO, It could be a negative experience for the students.</td>
<td>YES</td>
<td>&amp; YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

33
<table>
<thead>
<tr>
<th>Mapping the learning path of employees</th>
<th>E7</th>
<th>E8</th>
<th>E9</th>
<th>E10</th>
<th>E11</th>
<th>E12</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES,</td>
<td>NO</td>
<td>YES,</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>My first year there was a standardized training process all teachers went through so that we would teach like they wanted us to. It was a month-long course taught by various people, and it had a formal structure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mapping knowledge will enhance business processes</th>
<th>I DON'T KNOW.</th>
<th>E11</th>
<th>E12</th>
</tr>
</thead>
<tbody>
<tr>
<td>I DON'T KNOW.</td>
<td>YES</td>
<td>YES</td>
<td>I DON'T KNOW.</td>
</tr>
<tr>
<td>I think it depends on the type of business. Where there is a lot of creativity needed, I think forcing people to use the knowledge of others might not work as well as in a high-routine job.</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
At the end I would like to select my favorite example, which was employee no 6. His answers to the Questionnaire 2; about Learning Path were so long that I removed them from the table. For your convenient I will mention the questions again the answers are highlighted as bold to be distinguished easily. For preserving the tone of voice which I consider very important I haven’t revised his answer.

Employee no 6:

1. Has the learning path of employees been mapped within your organization? They gave me a big picture of call center, but they never gave me the instruction, how to do that. One thing I didn’t like, they didn’t have any database for their training sources. After teaching me something, I would easily forget the training and there was no place to find it again, and I had to ask it again and I felt bad to ask again and again. They needed to give me a manual with step by step instruction supporting by pictures. The bottom-line is all these show there was no learning path designed for staff training.

2. If yes does it help? How? - If no, how did you evaluate your training period in your company? If it was useful and well-designed, mention what structure it had, if it was not, state in your opinion what were the weaknesses of the training? The same answer. In UPS package Service Company, you just need to stand there and look at the wall, there is manual there on the wall with lots of pictures and a little text with step by step instruction about how to do your specific task. Such a manual on the wall helps us not to need any person for help, everything is clear.

Rughase (2002) points out a very interesting method for capturing knowledge. He shows the importance of story telling. In one computer application there is an especial box for customers info, one of the staff of the company asks the customers for any experience that they have concerning the company. He asks them to say their experience through a story. He assures the customers that they should tell their story frankly and also they are encouraged to express their feeling openly. This method is called “story telling approach” and during the interview I tried to encourage the interviewees to tell a story. My intention for not revising the interviewee’s answers is based on this approach. I would like to include the feeling of the interviewees.

4.4 Facts about Interview and Questionnaires

Both questionnaires and interviews’ questions were sent to about 16 persons from different companies located in different countries 12 of them answered on time and all were interviewed (face to face, phone, MSN messenger). Those who were interviewed returned the questionnaires with answers through the email. Even for questionnaires I gave an explanation (face to face, phone or MSN messenger) to interviewees to make sure that they realize the concept of questions. My observation showed when I spent more time for explanation, interviewees showed a better understanding of questions and therefore their answers were more reliable.
The relationship between interview-questionnaires’ questions and research questions:

- Answer to the question 13 of the interview, is the answer to the research question 1.
- Answer to the question 12 of the interview, is the answer to the research question 2.
- Answer to the second part of question 12 of the interview, is the answer to the research question 3.
- Answer to the question 1 of the questionnaire 1, is the answer to the research question 4.
- Answer to the question 2 of the questionnaire 1, is the answer to the research question 5.
- Answer to the question 3 of the questionnaire 1, is the answer to the research question 6.
- Answer to the question 5 of the questionnaire 1, is the answer to the research question 7.
- Answer to the question 1 of the questionnaire 2, is the answer to the research question 8.
- Answer to the last question, is the answer to the research question 9.

As viewed here all the selected questions (interview-questionnaires) are the answers to all the 9 research questions.

Any other questions are mentioned here to give extra information which can be interesting to knowledge map activists.
5 Analysis

For this part, pie charts were used to display the result. Other statistical methods were not used here as far as the no. of employees was limited to 12. Also all questions from interview to questionnaires included a qualitative method too as far as for even questionnaires I had interaction with my sample to get more information and make sure if they understood the questions fully. The method I used for data analysis sufficed for the result.

5.1 Storing staff’s personal experience

<table>
<thead>
<tr>
<th>Do companies store staff’s personal experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies which store staff’s personal experience</td>
</tr>
<tr>
<td>Companies which don’t store staff’s personal experience</td>
</tr>
</tbody>
</table>

25% 75%
Only 25% of staff collects their personal experience. It shows how top manager are ignorant about employees’ experience. Collecting personal experience is a prerequisite for mapping.

5.2 Storing the experience based on customers’ reaction observation

42% of employees store customers’ reaction observation. Customers’ reaction observation means if we notice something useful from customers’ reaction we will collect it (capture it, codify it and then store it). It helps us to modify something within our business culture or processes to increase the customers’ satisfaction towards our company or products. The hypothesis is true. Employees are ignorant of this sort of experience as far as their managers are the same.
5.3 Mapping the experience based on customers’ reaction observation

The difference between this one and the last one is clear, the last one focused on storing, it can be simply storing the experience in a database like what normally we search through search engines. Here focus is on mapping (capture it, codify it and then map it, instead of store it). Mapping is storing something visually by showing its connection (visually) to other elements. It is probably the fastest way of finding what we want. The result shows how mapping is in its first stages. None of the staff had any idea about mapping customers’ reaction observation. As displayed in figure 5-4 every member of an organization is the customer of the next member and at the same time the supplier of the previous one.

The hypothesis is true. There is no deep understanding of this type of mapping among researched companies.
5.4 Finding the required information

As shown in the figure 92% of the researched employees can find the information they need to complete their business tasks. The finding was totally in opposition to the hypothesis. Interview shows that some tasks for some employees are so simple that there is no need for searching information or always there is someone there to help. During the interview I was told by the employees that if the task was more difficult they would need a strategy to find the required information.

5.5 Collecting daily experience based on success

Only 17% of employees collect their daily experience based on success. The hypothesis is true. Top managers practically don’t value staff’s experience; otherwise they would ask the
staff to collect their experience. The result is if employees leave the company their expertise will get lost.

5.6 Collecting daily experience based on failure

Only 25% of employees collect their daily experience based on failure which is more than the previous one. The figure shows companies don’t value the experienced achieved through both success and failure. The hypothesis is true. They are still ignorant.

5.7 The use of mapping software

Only 25% of researched employees have used a sort of knowledge map application software before. It shows normal employees don’t use advanced mapping techniques for their normal
routines. All advanced mapping techniques normally should be conducted via computer applications.

### 5.8 Mapping the learning path of employees

![Figure 5-9 mapping the learning path of employees](image)

Again only 25% of researched employees confirmed that there was a learning path within the company. It shows the majority of companies are unfamiliar with the new training techniques based on mapping. The hypothesis is true.

### 5.9 Mapping knowledge & business processes

![Figure 5-10 Will mapping knowledge, enhance business processes?](image)
As viewed, the pie chart shows the majority of researched employees agreed that mapping knowledge will enhance business processes. The important item here is that all employees who answered “No” or “I still don’t know” were those who had the least interaction with me and it was mostly because of lack of time. It shows if benefits of mapping become evident to people, they will easily support it. The hypothesis is true.
6 Conclusion

The summary of the analysis shows the validity of my main hypothesis (based on my main research question); that organizations don’t realize the benefit of knowledge map and therefore they don’t make use of it extensively to maintain their comparative advantage.

The main research question is designed in a way that by answering the sub-questions I can be able to draw a conclusion. The answers to my sub-questions show the lack of knowledge of top managers about knowledge maps and mapping techniques. They are unfamiliar with this subject and therefore their employees who should be trained towards the subject remain totally unaware.

The encouraging message is that by proper demonstration almost all the staff will admit the advantage of mapping for organizations.

On this research totally all hypotheses were true except one. Some tasks are so easy that mapping looks unnecessary. But what should be considered is, maintaining the culture of mapping for all processes from the easy to the complex, will help companies to develop more advanced mapping techniques customized for different tasks and projects.

Based on the answers to my research questions, the culture of mapping doesn’t exist within companies. Maps can be used to visualize almost everything as well as showing the connections.
7  Final Discussion

![Figure 7-1 mapping discussion](image)

7.1 Knowledge map

Knowledge map is extremely an effective tool for defining the tasks and expertise of IT and business personnel within organizations. It shows the way clearly to help the staff to access the source of knowledge from documents to experts. It expedites the process of codification by pointing out the right translator. It leads us towards the goal by taking us to the detailed knowledge we need to conduct our projects. It shows us the gaps between IT and business sectors within or out of organizations. It visualizes the invisible defects within our process, it shows us what is lost from sector A to B. Knowing these depicts the need of mapping for connecting different pieces like IT and business experts to create a parallel coordination. It is an interactive communication in which every task and goal are defined and displayed clearly. Future will tell us how interactive digital maps can provide faster and easier communication. It gives us the fastest means for finding what we need for different processes from receiving and storing feedbacks to product development as well as a common domain between IT and business policy.

Grey (1999) describes knowledge map as a quest within organizations to help discover the location, ownership, value and use of knowledge artifacts, to learn the roles and expertise of people, to identify constraints to the flow of knowledge, and to highlight opportunities to leverage existing knowledge.

7.2 Mapping activities

On Usenet Business, I found an interesting question about the need of a business owner for mapping customers’ information. The case shows how new owners gradually move towards visualizing and connecting knowledge.

“If I want to see where my customers live, for marketing purposes, I could gather their addresses and push thumbtacks into a map on the wall. I can do that on a computer, too, no? For example, maps.com has a service where you can upload up to a hundred addresses and get back a map with a hundred icons on it, one for each address. I’d like something with a little more functionality. For example, I’d like to be able to import a thousand (or possibly more) addresses into the program. Another nice feature would be if the map came back with different colors on it showing the density
of the number of customers in a particular area. Any suggestions for an existing service or a
program? I would rather not have to develop such a thing, but if there is a tool that can be easily
integrated into a database or spreadsheet, I'd suppose that's an option too.” (Turco, 2005)

The discussion indicates the attempt of companies to design a more detailed map for
different areas like customers; here customers can be located on an interactive digital map
and viewed according to their addresses. Even it is possible depends on the application
design to show other details of customers on the same map. Mapping currently is going to
visualize all different information that used to be stored by text in the database. The result is
everything will be displayed more clearly with more details and with easier access. The
bottom-line: Everything will be more user-friendly

7.3 Mapping software

There are different mapping software applications available on the market which one of
them is “Market Mapping Software”. A quick view at http://www.market-modelling.co.uk/MMS/MMS_Overview.htm will show how mapping
software connects different elements together to visualize the relationship.

The interesting thing is that the company is the one specialized in mapping but even on its
website “site map” is mistaken for “site index”. It is not a real site map, the relationship is not
depicted. For a good example of mapping (except for the visualisation) refer to
http://www.wordreference.com/ and look up a word. The relationship between elements
will be shown (here is the use of ontology based on linguistic concepts).

7.4 The fact about data collection

One of the most important achievements of this thesis (which was not my purpose but
achieved through my data collection) was answer of employees to the last questions: Will
mapping knowledge enhance business processes?

Those who answered “no” or “I don’t know” was not clarified about the benefits of mapping
knowledge by me, and all those with answer Yes, were clarified about the benefit of
knowledge map with details. The bottom-line is all who had more interaction with me leaned
more about knowledge mapping and therefore they answered “YES, definitely!” & “YSE,
sure!” It shows the need for knowledge map clarification for public to receive their support.
Personally I was surprised how a good demonstration can affect people!

Without my explanation employees within selected organizations didn’t know the benefits of
mapping knowledge. Even those who knew a little about the meaning of the word were
unfamiliar with the real use and benefits of mapping. When the subject was clearly
demonstrated by me they confirmed that “mapping definitely helps organizations to achieve
their goals easier and more conveniently”. What dosed it indicate? Mapping knowledge is at
the beginning of its way and it is not clarified for the majority of organizations. Familiarizing
the organizations with the real benefits of mapping will lead to the extensive usage of that in
many different business areas.

As Grey (2005) states, using a questionnaire has proved, in his experience, to be the least
effective way to map and understand knowledge gaps, surface issues, to identify worthwhile
new practices or opportunities. In my experience the first time that I asked the employees to
answer the questions, theirs answers were different which was derived from the lack of
interactivity. After further explanation they were motivated to answer with more details and precision. It proved me that even for answering questionnaires there is a need for interactivity (like interview) otherwise the answers of the target group to the selected questions could be irrelevant and even nonsense.

7.5 The lost knowledge

The research shows among some researched companies if employees leave the companies their knowledge will get lost and this can have a crucial effect on the development of the company.

Top managers are still unaware of the benefits of knowledge maps, why? Because their employees don’t make use of knowledge map for their daily routines!

7.6 Why I chose it?

The aim of writing this thesis was to attract the attention of business managers & experts to the importance of mapping. I chose this subject based on my experience in different companies, I remember how frustrating it was searching for days and days and not finding what I needed for completing the projects.

I can’t hide my aspiration for mapping; I would like to see a future with pieces all connected together. Over the Internet the words “site map” and “site index” are familiar. On site maps the relationship of pieces is visualized and depicted but on site index no relationship between elements can be viewed. Take a look at those site maps, are they really site maps? This is a good question for me: Can I see a real “site map” in future instead of a “site index”?

(The fact is many site maps are site index, it is just lack of understanding of the meaning of maps)

At the end I would like to mention; without mapping the connections are lost, pieces are separated and visual presentation of reality which is a closer simulation for reality doesn’t exist. Now maybe you will tell me; will organizations make use of mapping for all different fields of business in the close future?!

Figure 7-2 would you like to find your way easily?!
7.7 Choosing the frame of reference

Instead of choosing many references I preferred to choose good few ones. It means I spent a lot of time for finding appropriate literature. Many books and articles were studies but only those were included which were exactly related to mapping. Personally I believe that reading a good reference carefully is more useful than reading many references with shallow understanding.

7.8 Could I do it better? A quick review

And the last, could I do my research better? Maybe it can be a feedback. The period for writing the thesis was too short. At the same time I had other courses to do. I felt the need of an internship in a real company. I would be ready to map the strategic knowledge of employees by using mapping applications. It could be a very interesting task to see the difficulties of mapping and the cons and pros of current computer applications. It could be a process from capturing and codifying to mapping. It could be so challenging and therefore amusing to me to turn the textual information into visual one, to connect expertise and people based on different types of mapping strategies, and at the end to see the practical use of my research. Yes, it could be better.

Figure 7-3 the figure shows what I mean by “could I do it better”: theory & practice. Maybe it can be considered as a very simple example of mapping (with many steps lost in the middle)!

Looking back to the thesis and reviewing what has been done for that, reveal the following facts for me:

- In chapter 3.5 Reliability and validity are discussed. Reviewing that chapter gives a general view of my data collection.
- If I could have a chance to work with the personnel in a company to map their knowledge, I could see the practical result of my thesis more visibly.
- The time for data collection was not enough and if I had more time I would choose another sample too besides my current one. Another sample would include all experts working in different companies who know about mapping process. I could
do a survey on how these people use knowledge maps. They could share their experience of using maps which would lead to some new conclusions.

- If I had more time to explain all the required concepts for the interviewees I would get more detailed answers to my questions which could disclose more facts about the use of mapping within companies.
- If I could interview more than 12 persons probably I would have a more reliable result.

7.9 Future research

This thesis reveals if knowledge map is used extensively by the researched companies. A future research can be done to show how knowledge map can enhance business processes. For such a research the similar methods mentioned in chapter 2.3.5 for the case studies can be used. Also a research can be done to show how the latest mapping software applications affect business processes. Searching for the most famous and reliable mapping software applications and discovering the best patterns can be other steps for the future studies.
References


Appendices

Appendix 1
Refer to the chapter 2.3.4 for further explanation.

Figure A.1 Causal map of environmental forces and characteristics of a technology.
Figure A.2 Knowledge source map.
Figure A.3 Process flow and knowledge flow map

Figure A.4 Top-level knowledge transfer map for AIXTRON
Figure A.5 Customers’ causal cognitive map