An Information Systems Design Theory Proposal for Knowledge Management Systems

A Business-to-Customer System in a Swedish Textile Agency

Carlos Betancourt

November 2009

MSI
Växjö University

SE-351 95 VÄXJÖ

Report 09083
ISSN 1650-2647
ISRN VXU/MSI/IV/E/--09083/--SE
**Abstract:**

Knowledge has become one of the most important assets for companies nowadays. Knowledge Management (KM) uses organizational knowledge as a resource to make companies more competitive. Knowledge Management Systems (KMS) are gaining popularity, however, the failure rate remains high, with many projects not achieving their goals or being shut down early. KMS are often underestimated and treated as normal systems. IS practices do not cover certain aspects specific to KMS, aspects that do not show in other IS (e.g. socio-cultural issues). There are many studies concerning the KMS failures but they just focus on the symptoms and do not provide a solution to the problem. The goal of this master’s dissertation is to generate a preventive tool that will help the KM field. With the experience gained by working in a real KMS project within a textile agency in Sweden and relevant literature, an Information Systems Design Theory (ISDT) for KMS was developed. As some authors suggest, KM needs an ISDT of its own. An ISDT will guide practitioners through the process by restricting practices and features of the system to a more effective set. It will also encourage the academia to work on this theory for its improvement, completion, and validation.

**Acknowledgements**

I want to thank my tutor Jan Aidemark for all the guidance, help and time dedicated through these 10 months of work, to my teachers Anita Mirijandotter and Niclas Eberhagen who participated and helped me through the process and to my opponents who took the time to read and comment on my work. I would also like to thank to the people working at Aldén & Olsson AB who provided me with all the information needed, for all the time they spent in my thesis and to the always-positive attitude towards my work.

Special thanks to my family who has always supported me and to whom I owe all my achievements.
# Table of Contents

List of Figures and Tables ............................................................................................................ v

List of Abbreviations .................................................................................................................. v

1. Introduction ............................................................................................................................. 1
   1.1. Background ....................................................................................................................... 1
   1.2. Problem Discussion ......................................................................................................... 1
   1.3. Justification .................................................................................................................... 2
   1.4. Research Aim .................................................................................................................. 3
   1.5. Scope and Limitations ................................................................................................. 3
   1.6. Ethical Issues ................................................................................................................. 3
   1.7. Summary ....................................................................................................................... 4

2. Theoretical Background ......................................................................................................... 5
   2.1. Information Systems Design Theory (ISDT) .................................................................. 5
      2.1.1. Why Design Theory? ............................................................................................... 5
   2.2. Knowledge, Knowledge Management and Knowledge Management Systems ............ 6
      2.2.1. What is knowledge? ................................................................................................. 6
      2.2.2. What is Knowledge Management? ........................................................................ 8
   2.3. What are Knowledge Management Systems? ............................................................... 9
   2.4. Knowledge Management Theories .............................................................................. 9
      2.4.1. Challenging aspects of KMS .................................................................................. 10
      2.4.2. Common mistakes in KMS Projects ..................................................................... 13
   2.5. Knowledge Management Cycle .................................................................................. 16
   2.6. Information Systems Development Life Cycle ............................................................... 17

3. Methodology ........................................................................................................................... 19
   3.1. Type of Dissertation ..................................................................................................... 19
   3.2. Research Approach ....................................................................................................... 19
   3.3. Research Method .......................................................................................................... 19
   3.4. Research Strategy ......................................................................................................... 19
   3.5. Data Collection Procedure ........................................................................................ 21
      3.5.1. Primary Data .......................................................................................................... 21
      3.5.2. Secondary Data .................................................................................................... 22
   3.6. Data Collection Process ............................................................................................... 22

4. Aldén & Olsson AB: The Case ................................................................................................. 25
   4.1. Introduction to the case ............................................................................................... 25
   4.2. The company ............................................................................................................... 26
      4.2.1. Company Processes/Activities .............................................................................. 26
   4.3. The System .................................................................................................................. 27
      4.3.1. System Requirements ........................................................................................... 27
      4.3.2. System Features ................................................................................................... 28
      4.3.3. System Architecture ............................................................................................. 28
      4.3.4. The prototype ....................................................................................................... 29
   4.4. Improvements to the company ..................................................................................... 30

5. Analysis ................................................................................................................................. 32
   5.1. Information Systems Design Theory Principles for KMS ............................................ 35
   5.2. Discussion ..................................................................................................................... 43
      5.2.1. Lessons Learned .................................................................................................... 44
6. Conclusions .................................................................................................................. 46

6.1. A proposal for an IS Design Theory for Knowledge Management Systems .. 47
6.2. Critical Review ........................................................................................................ 48
6.3. Further Research .................................................................................................... 49
6.4. Recommendations .................................................................................................. 50

7. Appendices .................................................................................................................. 51

7.1. Appendix 1: Project Description ........................................................................ 51
7.2. Appendix 2: Interview # 1 .............................................................................. 54
7.3. Appendix 3: Interview # 2 ................................................................................ 56
7.4. Appendix 4: Interview # 3 ................................................................................ 60
7.5. Appendix 5: Presentation # 1 .......................................................................... 63
7.6. Appendix 6: Presentation # 2 .......................................................................... 65
7.7. Appendix 7: Prototype Screenshots .................................................................. 67

8. References ..................................................................................................................... 71
List of Figures and Tables

Figures:

FIGURE 2-1 KNOWLEDGE HIERARCHY (DIKWT) ................................................................. 7
FIGURE 2-2 DIFFERENT TYPES OF ORGANIZATIONAL KNOWLEDGE .................................. 8
FIGURE 2-3 KNOWLEDGE MANAGEMENT CYCLE ............................................................... 16
FIGURE 2-4 SYSTEMS DEVELOPMENT LIFE CYCLE ........................................................... 17
FIGURE 4-1 SYSTEM ARCHITECTURE .................................................................................. 29
FIGURE 5-1 ORGANIZATION’S INTENSIVE TYPE LOCALIZATION ...................................... 37
FIGURE 5-2 KMC AND ISDC INTEGRATED MODEL BY THE AUTHOR .................................. 43
FIGURE 6-1 A PROPOSAL FOR DESIGN THEORY FOR KNOWLEDGE MANAGEMENT SYSTEMS .... 47

Tables:

TABLE 5.1 INITIAL ISDC AND PROBLEMS ENCOUNTERED WHILE ATTEMPTING TO APPLY IT .......... 33
TABLE 5.2 REVISED IS DESIGN THEORY FOR KMS .............................................................. 34

List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;O</td>
<td>Aldén &amp; Olsson AB</td>
</tr>
<tr>
<td>B2C</td>
<td>Business-to-Customer</td>
</tr>
<tr>
<td>CAD</td>
<td>Computer-Aided Design</td>
</tr>
<tr>
<td>DSS</td>
<td>Decision Support Systems</td>
</tr>
<tr>
<td>EIS</td>
<td>Executive Information Systems</td>
</tr>
<tr>
<td>EKP</td>
<td>Emergent Knowledge Processes</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
</tr>
<tr>
<td>HRM</td>
<td>Human Resource Management</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>IS</td>
<td>Information Systems</td>
</tr>
<tr>
<td>ISDT</td>
<td>Information Systems Design Theory</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>KIS</td>
<td>Kunskap och Innovation I Småland</td>
</tr>
<tr>
<td>KM</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>KMC</td>
<td>Knowledge Management Cycle</td>
</tr>
<tr>
<td>KMS</td>
<td>Knowledge Management Systems</td>
</tr>
<tr>
<td>SDLF</td>
<td>Systems Development Life Cycle</td>
</tr>
<tr>
<td>TPS</td>
<td>Transaction Processing Systems</td>
</tr>
</tbody>
</table>
1. Introduction

This chapter is an introduction to the dissertation and gives the reader an overview of the subject and the motivation for this study. The background, problem discussion, justification of the topic, research aim, scope and limitations, and the ethical issues involved are following presented.

The effective development of new systems is an interesting topic for practitioners and researchers. IT has evolved through the years and has reached a higher level of complexity harder to overcome and to deal with every new day. New aspects are introduced into the development practices such as social and cultural issues. Different types of systems and new development methods are created (Markus, Majchrzak, & Gasser, 2002). New systems, such as Knowledge Management Systems (KMS), demand new development principles for more effective practices. An ISDT (Information Systems Design Theory) is in integrated prescription formed by: user requirements, system features and effective development practices (Walls, Widmeyer, & El Sawy, 1992). An IS Design Theory's intention is the contribution of the development process. This paper proposes a new IS Design Theory for KMS, created in parallel with the project of B2C (Business-to-Customer) system for a Swedish textile agency.

1.1. Background

Knowledge Management is an emerging discipline (Jashapara, 2004) in the Information Systems (IS) field. The roots of Knowledge Management (KM) come from different disciplines (Hart, 2004, p. 9). Knowledge has become one of the most important resources (Little & Ray, 2005, p. 37; Jashapara, 2004, p. 8) (Widén-Wulff, 2007) and the center of many companies’ economy nowadays; it has become a vital factor for survival and success (Kluge, Stein, & Licht, 2002, p. 4)(Jashapara, 2004, p. 9). Firms know that their machinery, equipment, and facilities are not anymore their most important assets (Akhavan, Jafari, & Fathian, 2005). Know how of the workers is the most important and valuable property that the enterprises have; knowledge has become essential for both, innovation and profitability (Giddens, 1979, p. 69). There is a huge growth of the so-called knowledge-intensive firms and knowledge workers (Hislop, 2005, p. 2).

KM publications have increased drastically during the past years. All this factors show the relevance and importance of KM and its study. Despite the growing popularity, KM has not yet reached a mature phase. This means that there is still a lot to learn and to improve in this discipline. This paper is an effort to contribute to the field by developing a IS Design Theory specific for this type of systems.

1.2. Problem Discussion

Despite the fact that there are many companies who have achieved high competitive advantages through the use of KMS, such as 3M, Hewlett-Packard, Buckman Laboratories, Scandia AFS, and Xerox (Bhatt, 2001), there is a high failure rate.
Some researchers claim that the failure rate for KMS Projects is around 50 percent (Akhavan, Jafari, & Fathian, 2005). The director of PLC, Daniel Morehead states that nearly 70 percent of KMS Projects do not accomplish their objectives; this does not mean a complete failure or earlier termination of the project, but that the goals were not achieved as initially proposed (Akhavan, Jafari, & Fathian, 2005).

This study was done in parallel with a real case in a textile agency located in the south of Sweden. At the moment the company’s work processes are all done manually in one if its departments (Design Department), without the aid of any IS. They are willing to acquire a system that will help them generate knowledge inside the organization and serve better their customers. The whole case and problem is explained in Chapter 5.

The audiences for this paper are KM specialists, researchers, practitioners, and in general people in the IT/IS field with an interest in KM. This paper will represent a helpful tool for project leaders and staff who are about to start a KMS project and lack experience and/or want to improve their current practices.

1.3. Justification
Markets and industries have changed through time; they have moved from being work-based industries to skill-based industries. In the actuality skill-based industries are turning into knowledge-based industries (Handy, 1984, p. 4). It was in the 1970’s when economies became more information and knowledge intensive (Hislop, 2005, p. 3). With all the recent advances in the IS, knowledge has a greater potential in the problem solving area (Zuboff, 1998). Organization’s traditional strategies do not let managers react efficiently in this fast moving market anymore. Compared to the past, markets now move at a faster pace; strategies that used to work before are not good enough for this rapid-changing and complex market; (Jashapara, 2004, p. 174). Companies need to develop new strategies based on their experience (Jashapara, 2004, p. 178); experience can then be translated into knowledge. Often firms are not able to react and respond fast enough to the constant changes and problems in the nowadays markets.

KMS are often seen as a completely new tool, but in reality they are an adaptation or building of the already IS (Hart, 2004, s. 14). KM is not just about technology (Bhatt, 1998), it is about the interaction among technologies, people and techniques what makes it an effective tool; this interaction is quite complex and specific for each organization, making it hard to copy from one place to another (Bhatt, 2001). Palmer (2006) mentions that a success factor for KMS is not relying on technology. A balance between the socio-cultural aspects and the technology must be achieved for a KMS to be successful (Bhatt, 2001). Not dealing with the cultural and change management issues results into failure, a KM tool is not by itself sufficient to achieve success (Davenport & Laurence, 1998). If the KMS is not used or the employees are not willing to share their knowledge, no matter how good or promising the system is; it will not achieve its goals. Many failed KMS did not actually deal with knowledge, being this, their reason of failure (Palmer, 2006); others had no real impact inside the organization (Little & Ray, 2005, p. 222) or did not meet their objectives, they either ended in an unsuccessful way or where shut down before completion.

Authors like Palmer (2006) question if with all the actual failures there can be successful implementations of KMS and/or if a higher success rate can be
reached. KMS are a complex and hard to achieve task, but I believe that the practices can be improved; both researchers and practitioners need to work on preventive tools. (Little & Ray, 2005, s. 79). There is a need to investigate deeper these failure factors; authors like Akhavan, Jafari and Fathian (2005) were encouraged by this subject matter to do their work. Failure to investigate and solve these issues will result in a slower growth, improvement and maturity to the field; there is also a risk of the audience losing interest in the KM field. This IS Design Theory is an important contribution to the IS due to the recent interest and relevance of Knowledge and KM and its potential future.

1.4. Research Aim
This research aims to build a first proposal for an IS Design Theory specific for KMS. This ISDT is intended to contribute to the KM practices by reducing the failure rate. It is important to emphasize that the purpose of this study is not to mention or point out the common mistakes of failure, which can be widely find in journals and books about KM, but to contribute to the practices of the field in study.

The purpose of the paper is to develop a preventive strategy for KMS; a proposal specific for an ISDT for KMS, which differ from regular IS Design. This does not mean that KMS are a completely different type of system and that they need to be treated entirely different, but that there are certain aspects and pitfalls that arise exclusively in this type of systems.

1.5. Scope and Limitations
The scope will be limited to just one company; no comparisons with other companies or cases will be made. The study covers the design and the analysis phases. Time limitations made it impossible to completely implement the system and check results after. Coding and implementation do not take part in the study. Therefore programming languages, programming techniques, tools, etc. are not mentioned or analyzed in this paper. Choosing the adequate technology is also not part of this study. However, a prototype was created with the purpose of collecting more data for the results. Prototyping provided a faster and easier way to obtain some results and learn more about the process without all the work that coding and implementing will result in.

The study will be limited to the matters concerning the generation of guidelines for KMS. Going through different literature and constant communication and interaction with the company were required. In order to prove our theory and get more results the prototype will be used. This prototype will be limited in the way that its only purpose is to help the design theory development, no further work or functionalities will be added if they do not help or benefit the main purpose of this research.

1.6. Ethical Issues
The ethical issues for this research relate mainly to all the data collected from the company. During all the visits, interviews, emails exchanged, and documents shared different information was obtained. It is important to follow the level of confidentiality about the information obtained according to the company policies. The company authorized the use of the company name and of the personnel. All the data used was subject to their approval, so that the paper does not violate their confidentiality policies or shares private information that could affect the
company if read by their competitors or any other entity. A first email was sent asking them about the policies of the company for sharing their information in the thesis. They replied and said that all the information and the names of the personnel and managers can be included without a problem. Previously to hand in the paper an email was sent asking them if they wanted to read the thesis to approve all the information, the replied that there was not need, that there was nothing the would like to omit or not be mentioned in the paper, and that the names of the company and the people involved on the study could be shared as well. Also Diana Unander was contacted to approve the use of her name and Studenter i Regionen in the paper. All the information shown in the paper was approved.

This research’s ethical issues also concern about the veracity of the information and results and also to the sources of information used. All the work by other authors was properly referenced and all the findings and statements made are solely the product of my work. None of the statements were modified or adapted to fit the study or to show positive results, the results or information as not altered to “improve” the results and the paper in general. Things were taken as they came, whether they were supporting or not the intentions of this research. The IS Design Theory is based on the results obtained and the lessons learned from this study and the literature, statements in the theory were not made out of nothing.

1.7. Summary

The aim of the dissertation is to build a proposal for an IS Design Theory for KMS to contribute and deal with the issues and problems involved in the development of such type of systems. Following chapters include the theory background which presents KM theories, including common mistakes in KMS often found in the literature and a brief description of the two life cycles followed (KMC and SDLF). The following chapter explains the methodology used for this dissertation as well as the data collection procedures. The case with the company is presented, both the first picture of the problem and the final solution are presented, and the prototype is explained (screenshots of the prototype can be found in Appendix 7). An analysis of the whole case is presented in 8 principles which are part of the proposal of the IS Design Theory. Conclusions of the work, further research and a diagram including the proposal of the ISDT are included. Appendices of the interviews, presentations and the prototype are also included.
2. Theoretical Background

This chapter defines the concepts knowledge and knowledge management, as well as important aspects of the latter one, such as challenging tasks and common mistakes in KMS. It includes also the Information Systems Design Theory and the Knowledge Management Cycle and Systems Information Life Cycle.

2.1. Information Systems Design Theory (ISDT)

"Defining a system to perform pre-specified functions in its highest efficiency and economy with the use of technical information, scientific principles and imagination is called design" (Feilden, 1963).

Design is central to engineering among other fields, and clearly important to the Information Systems discipline (Walls, Widmeyer, & El Sawy, 1992, p. 37). Science focuses on analysis while design on synthesis (Walls, Widmeyer, & El Sawy, 1992, s. 37). Kock (2007) citing Archer (1992) compares science and design: science seeks to generate principles from observation of a control phenomena and design produces a practical result from a particular need.

Information Systems Design Theory is a prescriptive theory which purpose is the creation of paths that will help the production of effective IS based on theoretical foundations; it provides guidance to developers and is based on theory (Walls, Widmeyer, & El Sawy, 1992). An IS Design Theory will help the practitioners by limiting the features of the system and the development processes and its improvement to achieve a higher success rates. This theory will help both practitioners and researches; it will represent the beginning of an assignment towards the improvement of the practices for developing KMS. An IS design theory will tell, “how a design process can be carried out in a way which is both effective and feasible” (Walls, Widmeyer, & El Sawy, 1992, s. 37).

A design theory will help the developers, by letting them focus and limit their options and make the whole process more tractable, resulting in improved outcomes, and it will also suggest hypothesis for the researches to test (Markus, Majchrzak, & Gasser, 2002). An ISDT is formed by three interrelated sets of elements: set of user’s requirements, set of user processes (kernel theory) and set of principles (Walls, Widmeyer, & El Sawy, 1992). The work of Markus et. al. (2002) served as a base, guide and example of the process and development that building a new ISDT implies. Its work had a great influence and impact on this dissertation process. Even though Markus work is about EKP and not KMS, it served as an example of the process of building an ISDT that help the construction of this proposal for KMS.

2.1.1. Why Design Theory?

There is plenty of research made on KM Failure. A huge amount of articles, case studies, etc. all explaining the reasons of failure can be found, but why are the problems still there (Palmer, 2006)? Literature about the failures has increased dramatically, but the failure rate has barely moved. Authors are more concerned
in looking to the errors but not into stating procedures and principles for the better of the KM field (Bhatt, 2001).

Previous studies on KM have often dealt with the common failures; they have been looking for and analyzing the symptoms, but a few of them had tried to deal with a solution. Not enough theoretical work has been done on KMS. Literature on KM has not focused on why the KM initiatives fail and what can be learned from those failures (Little & Ray, 2005, p. 222), but merely on the sources of failure.

The actual literature gives little or not theoretical guidance for designing and using requirements for KMS (Kakola, 2009). Knowledge Management is not as mature as other disciplines in the IS field, but it has reached the point where there is a need for developing a design theory of its own (Zilli, Damiani, Ceravolo, Corallo, & Elia, 2008). Other types of systems have already their own design theory, for example: DSS, TPS, EIS. A better understanding of the design and use of KMS is still in an emerging state, both on the practice and academia (Walls, Widmeyer, & El Sawy, 1992, s. 37).

2.2. Knowledge, Knowledge Management and Knowledge Management Systems

As previously mentioned, knowledge has become quite important in the last quarter of the twentieth century. It has been argued that the nature of the organizations and the work activities by the employees have been transformed due to the increased importance of knowledge nowadays (Hislop, 2005).

There are two different epistemological perspectives of knowledge, the objectivist perspective and the practice-based perspective. The former one refers to the collection and codification of knowledge and the latter one refers to interaction and communication of knowledge sharing between members in a company (Hislop, 2005, p. 39).

The literature about KM can be divided in three key themes: its importance in the actual economy, being a vital factor for organizational performance, and that the companies nowadays have become more knowledge-intensive (Hislop, 2005). KM Projects involve most popularly: intranets, groupware tools, decision support tools and data warehouses, reported on a survey by Ruggles (Hislop, 2005, p. 105). Now that different technologies were mentioned it is important to emphasize that technology, plays an important role, but not to be confused and take it as the most vital aspect for a successful implementation. Nevertheless, it is important to take in account the socio-cultural context in which the system is implemented (Hislop, 2005, p. 120), but these issues will be discussed more deeply in later chapters.

2.2.1. What is knowledge?

There are many definitions of what is knowledge in the contemporary literature (Hislop, 2005, p. 13). This does not mean some are correct and other not, neither that some definitions are better than others. The traditional definition defines knowledge as a “justified true belief” (Little & Ray, 2005, p. 24). Different authors define knowledge in different contexts and for different purposes; they conceptualize the term in different ways based on different epistemologies (Hislop, 2005, p. 13). Therefore, for this paper, the definitions to be used cover our purposes this means that they fall in the IS context. Following is presented a
definition of knowledge based on different definitions by Bhatt (2000), Hislop (2005), and Marakas (1999):

Definition:

*The application, analysis and productive use of organized data and/or information with a set of rules, procedures, and operations learnt from practice and experience. Knowledge is interpreted data or information, with an extra layer of intellectual analysis added. Knowledge has a ‘meaning’ attached by the mind; it is through this meaning that information becomes knowledge. Knowledge helps understand data/information and provides a guide for meaningful action. It is socially constructed and culturally embedded.*

It is important not to confuse the terms data and information with knowledge. Specially when talking about KM it is important to distinguish knowledge from information and data (Widén-Wulff, 2007). The difference between information and knowledge is often unclear (Little & Ray, 2005, s. 86). These different terms can be seen in a hierarchical way (Figure 2-1) where data is the source for generating information, and information is the source for generating knowledge (Hislop, 2005, p. 16). Another common mistake is assuming that knowledge and knowing are the same (Little & Ray, 2005, p. 60).

![Figure 2-1 Knowledge Hierarchy (DIKWT)](image)

Many authors, when defining knowledge, emphasize its relation with (human) activities (Little & Ray, 2005, s. 86) (Widén-Wulff, 2007; Avison & Fitzgerald, 2006), stating that knowledge is inseparable from practice (Hislop, 2005, p. 27), and that it is dynamic and context-specific (Little & Ray, 2005, p. 24; Avison & Fitzgerald, 2006). Moving data around does not mean knowledge creation, as Liam Fahey (professor at Babson College in Wellesley, Mass) mentioned; it may or may not add value to the enterprise (Ambrosio, 2000). In order to get knowledge, information needs to be meaningful (Bhatt, 2001); knowledge is “actionable information” (Jashapara, 2004, p. 16). It is the “organization” that
differentiates information from data, and it is the “interpretation” what differentiates knowledge from information (Bhatt, 2001).

Knowledge can be collective/organizational or individual (Hislop, 2005, p. 18). Individual learning can be found on the early stages of micro-firms, as the organization grows, organizational learning starts to develop (Jashapara, 2004, p. 59). Knowledge is not eternal, is temporally relative and constantly changing (Mangers & Willcocks, 2004, p. 389); this means that current knowledge may or will become meaningless in the future. Another aspect refers to knowledge as context-related, this means that what is knowledge for someone, might mean nothing to someone else (Little & Ray, 2005).

It is important to structure and determine the knowledge of the organization according to the four-dimensional model in Figure 2-2.

![Figure 2-2 Different Types of Organizational Knowledge](source: Spender, 1996)

### 2.2.2. What is Knowledge Management?

After explaining the concept of knowledge, it is now important to understand what Knowledge Management means. Unfortunately many projects have used the term KM to overprice their systems (Palmer, 2006). This issue has given a wrong reputation to KM of being just a fancy name for normal systems. It is important to understand what it is and what it does.

**Definition:**

“Knowledge Management draws from existing resources that your organization may already have in place – good information systems management, organizational change management, and human resources management practices” (Davenport & Laurence, 1998).

The definition by Laurence and Davenport is an integration of an IS and a Human Resources perspective. Increasing the intellectual capital and improving the company’s performance are the main purposes of KM (Davenport & Laurence, 1998).

The process of knowledge creation, validation, presentation, distribution and application is called Knowledge Management (Bhatt, 2001). These five phases will help the company to: learn, unlearn, relearn and reflect in order to maintain their core competencies (Bhatt, 2001), and also to renew their knowledge base. This approach used by Bhatt is similar to the one suggested by Jashapara (2004),
just that they group and name the phases in a different manner, but each of the aspects is covered in both approaches.

Different parameters, different opinions, and different cultures can define differently the relevancy and level of knowledge a company and its workers has. It is important to take in mind this as not everyone will agree about the validity of all the different theories presented in this chapter.

2.3. What are Knowledge Management Systems?

“...an application system that combines and integrates functions for the contextualized handling of both, explicit and tacit knowledge, throughout the organization or that part of the organization that is targeted by a KM initiative. A KMS supports networks of knowledge workers in the creation, construction, identification, capturing, acquisition, selection, valuation, organization, linking structuring, formalization, visualization, distribution, retention, maintenance, refinement, evolution accessing, search, and last but not least the application of knowledge the aim of which is to support the dynamics of organizational learning and organizational effectiveness” (Maier, 2004).

The simplest definition states that a KMS is a system for managing knowledge inside organizations. These systems are a special type of KMS. They can be an existent or new application which main purpose is to improve the use, generation or transfer of knowledge within an organization.

A KMS is not the wheel reinvented. In other words, a KMS is an Information System with a different purpose, which is managing knowledge inside an organization. Unfortunately many projects have used the term KMS to overprice and/or make the project more interesting and attractive, but in reality they were a normal IS. It is important to emphasize that even though a KMS is not the same as normal IS, it is still an Information System, just that it has a different and specific purpose.

The difference of data, information and knowledge were presented. The next layer to understand was KM. And the final layer is to explain what are KMS. The name KMS causes controversy to some authors who point out that “management” is not an appropriate term and they suggest different names for this type of systems. But the point here is not discuss if it is the appropriate naming or not, but to understand what they do and their purpose.

2.4. Knowledge Management Theories
This subsection presents theories of KM. Important definitions and terms are presented. As well as challenging aspects that make KM a hard task and common mistakes of KMS found in the literature.

Knowledge-Intensive Firms and Knowledge Workers:
If our actual society can be defined as knowledge-intensive, organizations are also victims of this change, making knowledge-intensive firms and knowledge workers key elements (Neef, 1999). Knowledge intensive firms are regarded to be different compared to other types of firms (Hislop, 2005, p. 215). Different
criteria can define knowledge workers and/or knowledge-intensive firms differently. It can be said that all types of works are knowledge works, but some of them are more knowledge intense than others (Hislop, 2005, p. 221). There is always a debate when defining the intensiveness of an organization or of a specific type of work. When referring to knowledge-intensiveness, knowledge is divided into technical knowledge and client knowledge. Different typologies of knowledge are presented in the next subsection.

**Typologies of Knowledge:**
Knowledge has become a popular theme in contemporary literature, however they discuss knowledge as if it was just one general piece, being of just one kind; there are different types of knowledge and the differentiation between these different types is vital for a better understanding of the organization (Little & Ray, 2005, p. 52). Knowledge can also be divided into individual and group knowledge and also into tacit and explicit. Literature usually relies on individual knowledge over group knowledge and on tacit over explicit (Little & Ray, 2005, p. 52). Not all knowledge is the same, and treating it like this limits the theoretical and operational work, resulting in a limited ability to assess and support (Little & Ray, 2005, p. 52) the companies’ needs when proposing the use of a KMS. It is also plays an important role to determine which knowledge is important and relevant and which knowledge is reified and marginalized (Hislop, 2005, p. 102). Dealing with the wrong knowledge will result in no benefits for the firm.

Two important terms that are constantly presented in the KM literature and that are marked as important and fundamental are communities of practice and intercommunity knowledge process, which are next explained.

**Communities of Practice:** They can be defined as a group of people with the following characteristics: work activities in common, they share a body of common knowledge, collective identity, shared values (Hislop, 2005, p. 70), and a passion for a topic (Jashapara, 2004, p. 203). These communities of practice underpin the learning processes inside an organization, both individual and organizational (Hislop, 2005, p. 70). Communities of practice are an approach whose intention is to provide benefits to the organization by the generation of tacit knowledge around it (Jashapara, 2004, p. 203). Sharing tacit knowledge is easier in the communities of practice because of their common and shared knowledge and values; this with the shared identity also helps the building of trust-based relationships (Hislop, 2005, p. 70).

**Intercommunity Knowledge Processes:** Groups or communities inhibit knowledge sharing due to the lack of common aspects and the different assumptions and values by each group; the more aspects they share, the stronger the relationship will by (Hislop, 2005, pp. 80-84). Knowledge sharing between different groups demands a good level of trust and a better understanding of the values, assumptions and points of view of each other’s knowledge base (Hislop, 2005, p. 84). KM is an interdisciplinary discipline (Jashapara, 2004, p. 9); therefore participation in the project should not be just from the IS experts, but also from the rest of the people involved and affected by the project.

**2.4.1. Challenging aspects of KMS**
KM is a complex task, there are many different issues that need to be taken care of. This different challenges are described in the literature. The most common and relevant aspects found in the books that make the process challenging are
following presented. However these different aspects might not have the same impact in different projects. In some cases some of them will represent a big challenge while on other cases they will hardly have any impact. Also different authors will emphasize more in some of them and other not. This dissertation does not judge which ones are more relevant or not. The ones found more commonly in the literature and the ones believed to be more relevant to the case and to the purpose of the dissertation were taken into account. It is also important to remember that each project is different and that each company is different. Not all cases behave the same, sometimes the employees have a really good attitude which diminish the impact of some of these aspects and some other cases not. This does not mean that this theories are not valid, just that they do not have the same weight in all cases.

**Knowledge Creation:** Knowledge is created through the continuous interactive process between tacit and explicit knowledge, this process is called knowledge conversion and there are four different modes of this process (SECI process): socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit) (Nonaka & Takeuchi, 1995). Creating knowledge is a never-ending process, moving from mode to mode does not form a circle, but a spiral (Little & Ray, 2005, p. 28); one mode can trigger another mode and so on.

Knowledge creation requires a constant communication between tacit and explicit knowledge, using just one of them is not enough (Little & Ray, 2005, p. 25). KMS focus on explicit knowledge and many companies’ success is based on their tacit knowledge (Jashapara, 2004). Knowledge creation is not just between organizational members and the environment; it goes further than the boundaries of a company. The customers and the market itself participate in the knowledge creation process (Little & Ray, 2005, p. 46).

**Organizational Learning and Memory:** Learning in the organizations can be found in two different ways: individual learning and team learning. There are two types of learning: single loop learning and double loop learning (Jashapara, 2004, p. 65). Single loop learning is the process of correcting or fixing an error with the already defined rules of process to do so. Contrary to that double loop learning questions the rules defined for solving a problem, and defines new rules for correcting the problem.

Organizational memory is the knowledge repository created within the years. This knowledge is often stored in the employees mind. A turnover of the staff results in the lost of the organizational knowledge forever (Hislop, 2005, p. 124), new organizational knowledge needs to be created again (Jashapara, 2004, p. 73). According to Jashapara (2004) organizational memory can deal with different issues such as: problem solving, skills, experience, and locating information inside the company.

**Dealing with Change and Knowledge Management:** Organizations often do not know how to deal with and manage knowledge. Jashapara (2004) citing Sayer (1992) explains the common misconceptions of knowledge: Knowledge is just gained by observing, knowledge is limited to what we can speak or write, and knowledge is a final product. From these misconceptions we can learn that: knowledge is gained by participating, interacting and also by observation, knowledge is wider than what can we express, knowledge is always in the present and continually reproduced.
KMS implementation often results in major changes inside the organization. These major changes involve socio-cultural and change issues. Change Management and Socio-cultural issues are a wide and complex subject, it is hard to cover all the different aspects that these issues engage. Every company and every project is different, and so are the problems and challenges (change and socio-cultural) that will arise. The design and implementation phases should be socio-cultural sensitive for a better handling of this type of issues (Hislop, 2005, p. 120). Study and analysis prior the design and development phases should be made for a better understanding and handling of these problems.

KMS failure issues often lay on the cultural side, rather than on the technological one (Jashapara, 2004, p. 187). Knowledge-sharing cultures tend to be better in knowledge-creation and improved performance (Jashapara, 2004, p. 199); therefore, many managers seek and promote this type of culture in their organizations. From previous attempts of creating a knowledge-sharing culture we can learn McDermott & O’Dell, (2001) and Newell et al. (2002) cited by (Jashapara, 2004, p. 203):

- Connection from the knowledge sharing strategy with the firm goals
- Promotion of rewards and recognition
- Provision of appropriate resources (for knowledge-sharing)
- Linkage of knowledge-sharing to the organization values (core values)
- Promote knowledge-sharing between different groups (inside the company)
- Designate and support a leader for the knowledge-sharing attempt.

The role of a leader is vital when dealing with change (Jashapara, 2004, p. 218), and cultural issues. It is important to link the KM initiatives to the core organizational values and to the existing networks of social relations that are invisible elements of the culture of an organization (McDermott & O'Dell, 2001). The KM initiatives need to be grounded with the company’s strategy (Zack, 1999).

Relationship between Organizational Culture and KM Initiatives: The personnel should support management initiatives on knowledge processes in order for them to succeed; this is an important and complex task (Hislop, 2005, p. 136). It is the management who can influence the personnel to have a positive attitude; workers need to develop commitment and loyalty towards the knowledge strategy (Hislop, 2005, p. 136). Reward practices are an HRM practice to improve the attitude and behavior of the workers towards a KM initiative (Hislop, 2005, p. 136). Employees will commit more and cooperate actively to the executives decision, even if the do not completely agree or even disagree, if they feel that the process taken by the executive has been fair (Kim & Mauborgne, 2003). Valuing employees (Jashapara, 2004, p. 223) and listening to their ideas will help their attitude towards change.

The relationship between organizational culture and knowledge management initiatives is not an easy task. Management initiatives should be made to fit the organization’s culture (McDermott & O’Dell, 2001, p. 77) and not the other way around. There is a debate when dealing with the organization’s culture. McDermott and O’Dell (2001) mention that organizations that succeed implementing KMS had not modified their culture, and that modifying it could lead into failure. Thus, Hislop (2005) argues that shaping the culture and relevant
HRM policies will help change the attitude of the employees toward the KM initiatives. Dealing with organization’s culture is a sensitive aspect and should be managed carefully. KM initiatives should fit the company’s culture and when needed “shape” the culture to improve the attitude of the workers, culture should not be modified drastically.

One of the biggest challenges is managing change. Firms tend to maintain their current activities if they are working fine; this makes it harder for change to take place (Jashapara, 2004, p. 63). If something is successful at the moment they see no need for change. On the other hand users might or not take a positive and helpful attitude towards change. To deal and overcome with this issue, Jashapara (2004) suggests the following model:

The three-phase process model (Lewin, 1951):
- “Unfreezing and loosening current sets of behaviors, mental models and ways of looking at a problem;
- Moving by making changes in the way people do things, new structures, new strategies and different types of behaviors and attitudes;
- Refreezing by establishing and establishing new patterns and organizational routines.”

It is important to define and remain focused on the organizational needs (Jashapara, 2004, p. 92) in order to determine which type of solution or tool is needed; choosing the wrong tool will result in not dealing with the organization’s needs.

Defining the objective and goals of the KMS is an important task, which areas or needs are the KMS going to cover? The three most common and effectively solutions by Ernst & Young survey in 1997 are: knowledge about clients, knowledge about best practices and improving effectiveness of processes, and knowledge about the capabilities and competencies of the organization (Jashapara, 2004, p. 92).

A mix of solutions, compared with a single solution, is a better approach to deal with cultural issues (Jashapara, 2004, p. 215). Apart from the social aspects, it is also important to keep in mind at all time the business strategy and the end customers (Jashapara, 2004, p. 129).

2.4.2. Common mistakes in KMS Projects
The list of mistakes found in previous attempts of KMS implementation is quite extensive. However this mistakes can vary from case to case, being more critical for some projects or even not showing in some cases. From all the common mistakes found in the literature, the most “important” and relevant for this research are next presented. Other mistakes not mentioned are also important to now, but it was nearly impossible to list all the common errors when dealing with KSM, therefore the list had to be limited.

When it comes to listing the common mistakes, many authors will disagree on the selection. Each authors builds their own theories according to their own perception and experience. Each of them has their own valid point of view, which other people might disagree on. For example, some people might be highly IT oriented, which will influence their opinion about the importance of IT in KMS. Others for example, question the relevance of the commitment from the managers to the project, stating that it does not influence at all, and it is the commitment from the users of workers what matters. For this study the main
mistakes highlighted on the literature were taken with the purpose to prove them right or wrong in this case. If some of them were not present or relevant for this study, it will be shown by its omission in the principles and conclusions of the paper. As mentioned before, each project is a unique case, where the factors that drive it and all the issues that arise differ from the rest. There might be cases where codifying knowledge was not a issue, or cases that do not demand the commitment of the managers, but nevertheless this does not mean that this theories are not valid or that they are not true, just that there are exceptional cases where they do not appear at all. From the following problems mentioned, some of them cause more controversies than others, commitment from managers and rely on technology are the ones that can be found with more opposed opinions. But in a personal opinion, when it comes to KMS they appear more often or have more impact than in other IS.

**All Knowledge is codificable:** Tacit knowledge is often wrongly defined as ‘knowledge-not-yet-articulated’ (Nonaka & Takeuchi, 1995), or knowledge waiting to be ‘converted’ or ‘translated’ to explicit knowledge (Little & Ray, 2005, p. 122). These definitions limit the scope of tacit knowledge to just what can be translated or articulated.

Tacit knowledge cannot always be codified into explicit knowledge, no matter how motivated is the worker he cannot make explicit all his assumptions because he might not be even aware of all of them (Handy, 1984, p. 46). The skills of a worker have many tacit dimensions that even experts may not be able to make them explicit (Little & Ray, 2005, p. 164). Tacit knowledge is personal, hard to communicate, and hard to formalize. Converting tacit knowledge into explicit knowledge represents one of the mayor challenging tasks in KM (Nonaka, 1994). Just the explicit knowledge can be managed (Nonaka & Takeuchi, 1995). KM tools focus mainly on explicit knowledge, however it is important not to forget that effectiveness in firms is often achieved through tacit knowledge (Jashapara, 2004, p. 92). Explicit knowledge should not replace tacit, but to complement and/or support it (Little & Ray, 2005, p. 342). "Tacit and explicit knowledge are inseparable" (Hislop, 2005, p. 29).

Knowledge is codified in person, slowly, patiently and systematically (Little & Ray, 2005, p. 158). Outsiders, people on the IS project do not have the tacit knowledge hold by the insiders, but still they can and should help the insider through the codification process. Codification of explicit knowledge is not a hard task with the appropriate tools and technology (Jashapara, 2004, p. 203), but dealing with tacit knowledge represents the main challenge, not to mention that firms’ advantage relies more on the tacit one.

**Lack of commitment from the managers:** To get a better commitment from the top management a good understanding of their concerns is vital. As Jashapara (2004) refers to the Price Waterhouse Review (1995), the main concerns of the top managers in IT investment are: System is aligned with the organization’s objectives, transformation through IT, infrastructure, uncertainty and budget. Keeping this concerns in mind along the entire project are a good practice for gaining commitment from the top-executives. Commitment from the top managers is only at the initial state when the system seems to be an add-on and easy task; once it gets complicated they draw back (Little & Ray, 2005, p. 223). Depending on the circumstances the commitment of the managers can have a greater or smaller impact. Some project might be selfdriven, without the
intervention of the managers, while in others the managers will play an important role to guide the employees and motivate them through the whole process.

People willingness to share their knowledge: Another reason of partial or complete failure is the cultural and social factors (Handy, 1984, p. 41). Knowledge sharing is a complex process with infinite number of factors affecting it (Widén-Wulff, 2007). Taking for granted that people will be willing to participate in knowledge management initiatives is a bad practice (Handy, 1984, p. 54). There are many reports that state people being reluctant to share their knowledge is not uncommon; motivation is a fundamental factor for knowledge sharing (Handy, 1984, pp. 44-45; Hislop, 2005).

Commitment, motivation, trust and loyalty from the employees to the new project (KMS) are vital for the success of the project. A good way to achieve this is the use of rewards (Hislop, 2005, p. 136). Rewards may include free time for the personnel to work in things they like (Hislop, 2005, p. 125). The use of a reward and recognition system will help the development of these values inside the firm. This will result in greater performance (for the company) and greater satisfaction (for the personnel) achieved through a higher engagement and effort made by the employees (Jashapara, 2004, p. 229). Trust is vital in knowledge sharing; it is based on expectations and interactons (Widén-Wulff, 2007). Building trust among the employees towards the project is a complicated task; different aspects such as role of the employee, frequency of communication, etc. can affect it (Widén-Wulff, 2007).

KMS projects rely just in technology: One of the reasons of KMS failure is that projects rely merely on technology as their means for success. They emphasize and put more attention and resources on the technical side. KMS projects do not often reach their expectations due to their high IT orientation (Jashapara, 2004, p. 129). As Bhatt (1998) mentions, KM is not just about technology. The interaction between technologies, people and techniques it is what makes a KMS effective; this interaction is quite complex and specific for each organization, making it hard to copy from one place to another (Bhatt, 2001).

As having the top and most expensive technology does not warrant success, it does play an important role and should not be left apart. It is important to emphasize that this does not mean that technology does not play an important role, a proof of this is the increasing popularity in Information and Communication Technologies (ICT) in the recent literature (Hislop, 2005, p. 105). Technology does impact and influence the project and with it, the outcome. A balance between the social aspects and the technology within the company must be achieved for a successful KMS implementation (Bhatt, 2001). It is also important not to force an ICT to manage knowledge that it is not suited for; if so problems on design and implementation will appear (Hislop, 2005, s. 117).

There is a debate between contemporary literatures about the role of ICT in KM processes, however ICT can indirectly help and make it easier to mediate and facilitate knowledge processes (Hislop, 2005, p. 119). Different ICT applications according to the KM role include: search engines, web portals, CAD Systems, DSS, Intranets, e-mails and groupware (Hislop, 2005, p. 108).

O'Dell (2000) states that a technological solution should not exceed one third of the KM budget. Many authors may disagree with this statement and would place
more than one third of the total budget in technological solution. The purpose of this statement is to underline that there are other important aspects, besides technology, to be taken seriously. Technology does not play the main role and should not be part of the core design but it can surely impact the results of the project. As mentioned before, not all authors agree on the impact of technology, but as in some cases is not that relevant, in some other literature we can find that some projects actually failed because they were highly technology oriented and failed to address some other relevant issues.

2.5. Knowledge Management Cycle
There are different approaches for the Knowledge Management Cycle. The cycle followed for this study is the one of Jashapara (2004). This cycle is formed by five phases: Discovering Knowledge, Generating Knowledge, Evaluating Knowledge, Sharing Knowledge and Leveraging Knowledge. In Figure 2-3 important aspects for each phase are indicated. Each phase is briefly described next.

![Figure 2-3 Knowledge Management Cycle](Source (Jashapara, 2004, p. 5))

**Discovering Knowledge:** This phase concerns about the definitions of ‘knowledge’ and ‘knowledge management’. These terms are often unclear, therefore it is important to have a complete and clear understanding of their meaning and all that they imply both positively and negatively. This phase also deals with the difference between data, information and knowledge. It is important to understand these concepts before working with knowledge.

**Generating Knowledge:** This phase deals mainly with organizational learning. Literature found for this subject is more mature than for others such as Knowledge Management (Jashapara, 2004, p. 59). It is also part of this phase to dig into the different KM Tools and technology available. Different tools work on different phases of the cycle.

**Evaluating Knowledge:** This phase explores the improvements of the management processes and how they will impact the organization in terms of
competitive advantage. It is also in the scope of this phase to take a look at the different types of KMS and to the strategic management perspectives.

**Sharing Knowledge:** This phase deals with the different and challenging aspects that arise when dealing with cultural issues. Organizational culture, leadership and attitude of the employees towards KM are looked in this phase. It also deals with the optimization of knowledge sharing in an organization and the change management for the implementation of it.

**Leveraging Knowledge:** This phase concerns on organizational learning and the intellectual capital. Knowledge is a complex factor, not easy to grow, nor to measure (non-financially). Different models and perspectives exist for this two concepts.

### 2.6. Information Systems Development Life Cycle

The methodology used for the development process was the Systems Development Life Cycle (SDLC) found in different literature (Avison & Fitzgerald, 2006; Harris, 1999; Friedman & Cornford, 1993). This life cycle covers the different stages for developing computer-based IS. There are many variants of this cycle by different authors; they divide the life cycle in different number of stages with different names. The use of a methodology helps cover all the specifications from the beginning, avoiding late changes and modifications which will increment the cost and time of the project, also the division of the process in stages lets the team review the project after each stage is completed (Avison & Fitzgerald, 2006).

For the purpose of this paper, the version of the Systems Development Life Cycle used is a traditional five-phase model: Planning, Analysis, Design, Implementation, Maintenance. However for the scope of this study, just the two first phases were applied in total, a third one was done partially and complemented with a prototype. Therefore just the first three phases are following explained:

![Figure 2-4 Systems Development Life Cycle](image)

**Planning:** This phase objectives are assessment of the user needs and diagnosis of the problem (Friedman & Cornford, 1993, p. 182). A feasibility study is made by looking at the present system and determining which are the new requirements for the new system, a brief description of alternative solutions, exceptional conditions and possible constrains is made (Avison & Fitzgerald, 2006, p. 31).
**Analysis:** This phase attempts to understand all the current aspects of the system, how are things done and why, which are different alternatives for these methods, and also analyses the growth rates of the data (Avison & Fitzgerald, 2006, p. 33). This stage also helps to define the system requirements. In this phase preliminary sketches of the possible solutions are generated and economic consequences are taken into account (Harris, 1999, p. 35).

**Design:** This phase involves the design of the system taking into account, inputs, outputs, processes, structure, security issues, backup systems, and testing and implementation plans (Avison & Fitzgerald, 2006). The final design presented may vary from the one originally made/planned in the planning stage. This phase requires technical expertise and creativity (Harris, 1999, p. 142).
3. Methodology

This chapter is an overview of how the research was carried out. It also provides the different methodology aspects chosen for this dissertation and its justification. Date collection process, and primary and secondary data are also explained.

3.1. Type of Dissertation
This paper is a work-based dissertation at a master's level. The study is done in parallel with a Swedish textile agency. Results and/or improvements will be achieved for both sides: academic for the master’s thesis, and professional for the company. The results for this type of dissertation are actionable; this means that they are capable of being implemented (Hart, 2004, p. 128).

3.2. Research Approach
The approach followed was of doing a research in the field of KM to learn more about the subject, its theories and to find the common mistakes that lead projects into failure. Having all these theories the next step was to do some research inside a company and prove these theories right or wrong. Working a real KMS project with a company will help test the theories and collect more information to build a Design Theory. In other words, the theory found and studied helped building the principles, which later were tested in the case with the Swedish company. With the real case, each principle was understood better and proved true or wrong, in which case will not be included as a principle. If proven truth it would be analyzed and compared, the theory with the real story in the company. The explanation of each principle relates the theory found with a real issue found in the process followed with the company.

3.3. Research Method
A qualitative method was chosen based on the research problem and its purpose. In this type of method skills and experience of the researcher impact the analysis of the data (Ghauri & Grønhaug, 2005, p. 110). The information was collected through a qualitative method. Quantitative results are obtained through statistical methods or any other procedure of quantification; quantitative methods use measurement while qualitative methods do not (Ghauri & Grønhaug, 2005, p. 109), therefore this research falls in the qualitative side. The results of this research study are the improvement of the design practices in the KM field in parallel with a real case in a company.

3.4. Research Strategy
Action research is a serious and increasing and alternative in the research methodologies (Kock, 2007). This is an action research dissertation; therefore, the paper is done in a narrative style. As the term itself indicates, the research takes action in the enterprise studied in which participants are involved in the research; researchers are also practitioners, often called ‘practitioner researcher’ (Herr & Anderson, 2005, p. 2). Kock (2005) among other authors states that for the IS, action research represents an important qualitative research method.
Results from an action research do not guarantee that they will be meaningful in other situations, but this problem is not just present in action research (Kock, 2007). Walls (1992) suggests action research as an appropriate research strategy for building design theories. A research inside a company on how to introduce a KMS will be made in order to learn and get information that will help to build the proposal of a Design Theory. Initial requirements are made from the kernel theory, these requirements are used to generate system features and then these ones lead to new hypothesis principles (Markus, Majchrzak, & Gasser, 2002). This study followed the mentioned action research strategy.

This research tries to make a difference in the KM field; therefore action research is an appropriate way of conducting this research. Action research and case study differ in that in the former one the researcher is involved directly into the change process and that case studies do not seek change (Kock, 2007). Action research makes it more convenient and easier by doing the study at the work place (Herr & Anderson, 2005, p. 2). It is a collaborative study between the researcher and the organization studied. A contribution to the KM theory is the desired outcome of this action research.

Herr and Anderson (2005) define action research as an investigation in an organization done by or with insiders. For this case the insiders are the personnel in the Design Department. The collaboration between the insiders and the outsider (the researcher) will involve the researcher with important aspects and resources that need change (Herr & Anderson, 2005, p. 4) and that are relevant for the study. Knowledge will be created from problem solving in a real-life situation (Lewin, 1946). This means, using action research in a company to generate knowledge for the building of a design theory. Through action research, findings will be backed up, so they do not result in just unsupported generalizations, or as defined by Shaw (2003, p. 4) ‘rules of thumb’.

Action research means the creation of knowledge about a practice in order to improve it or change it (Herr & Anderson, 2005). According to Kemmis (1982) cited by Herr & Anderson (2005), action research is constituted by a spiral of action cycles formed by four steps:

1. Improving the actual situation with the development of a plan of action
2. Proceeding to implement the plan
3. Observing the effect of the action taken
4. Reflecting on this effect as a base for further planning, action

These four steps can be described in the context of our case as:

1. Research about KM issues and elaboration of KMS proposal
2. Starting the development process in a prototype base
3. Presenting the prototype and observing reactions
4. Reflect and analyze all the information gathered

Due to time limitations and to the purpose of the action research, this research will consist only of one cycle; however there will be suggestions for further research for the improvement of the ISDT. With each of the steps, mentioned before, the knowledge will be increased for the purpose of the paper.

Considering how the knowledge generated through the research will be used in the future is part of the action research methodology. This research will have as an outcome an ISDT specific for KMS. The theory will be a prescriptive guide
for KMS development. The design theory will be the way of transferring out findings to the public domain, in this case, to the KM field.

3.5. Data Collection Procedure

This work employed both primary and secondary data. The different approaches to collect primary data in a qualitative research are: interviews, observation, and questionnaires (during the interview). The primary data used for this research were interviews and observation. Secondary data was used to underpin the theoretical background and support of the primary data. Secondary data helped in getting a better picture of the background and problems in the KM field.

3.5.1. Primary Data

One of the advantages of primary data is that it provides the study with data more related and consistent to the study. Primary data for this research was collected by observation and communication with the company. Communication is the most used primary collection method (Ghauri & Grønhaug, 2005, p. 121). Communication involves asking people in order to collect the information, in this case the employees inside the company.

Interviews, often considered “the most efficient data collection method” (Ghauri & Grønhaug, 2005, p. 132), were the main communication medium selected for this case. There are three types of questions that can be asked in interviews (Ghauri & Grønhaug, 2005, p. 123):

- Structured – questions and answers are predetermined
- Unstructured – questions are more or less predetermined, answers are not predetermined, the respondent can use his/her own words
- Semi-structured – questions are predetermined, answers are not predetermined, the respondent can use his/her own words

Just unstructured and semi-structured questions were used in the interviews. The aim of the interviews was learning about the company, knowing more about how they do things and the problems they have. Therefore the questions needed to be answered with the own words of the respondents. Prior to the interviews some questions were predetermined, but as the interview took place, several new questions arose. Using structured interviews would have limited the information collected through the process, by not letting the respondents express themselves widely, with no constrains.

The different types of interviews used according to the communication media used are: personal, telephone and email. Personal and email interviews were the only ones employed in this research. Personal interviews compared with different communication mediums such as video conferencing, telephone and email, have the most information richness (Hislop, 2005, p. 113); they also help to keep the motivation of the users, compared to questionnaires for example. Face-to-face interactions help the development of trust with the personnel and to get a rapid high-quality feed back (Hislop, 2005, p. 113) of the issues inside the company and is a good start for “overcoming possible resistance to change” (Avison & Fitzgerald, 2006, p. 32). Personal interviews are good for sharing tacit-knowledge (Hislop, 2005, p. 113), which is an important aspect of the study due to its KM nature.
The other communication media used was email interviews. Emails are an asynchronous, informal, spontaneous and geographically independent media that makes it suitable for situations where the need for formality and information richness is not needed (Hislop, 2005, p. 113). Emails were the second medium (not the main one) for exchanging information with the personnel of the company when it was either a simple issue/question, or when response could not wait until the next formal appointment or visit to the company. Observation (listening and watching) helped collecting first-hand information in a natural environment (Ghauri & Grønhaug, 2005, p. 120). This facilitated the learning process about the activities that take place in the Design Department. One of the advantages of observation over other data collection types is the possibility to capture the “dynamics of the social behavior” (Ghauri & Grønhaug, 2005, p. 121).

The personal interviews were held with the Design Department in the head office of Aldén & Olsson. The department is formed by: Sanna Leo, Inga Leo and a third designer, who did not participated in this study. Formal appointments were made prior each interview. A set of unstructured questions was prepared each time, however, many different questions arose at each meeting. These questions were asked as the interview took place. Emails were exchanged just with Sanna Leo, being here the main contact with the company. A mayor issue in collecting primary data was the scheduling of meetings with the staff, due to the huge amount of work they had during the period of the study.

3.5.2. Secondary Data
Secondary data helped the study to get a better understanding of the research problem (Ghauri & Grønhaug, 2005, p. 91). Literature about KM principles and the common causes of failure were the main focus of the literature review.

The secondary data was obtained mainly from articles in journals and books in the KM field. Due to the amount of literature found, part of the process was identifying the most relevant articles and books and evaluating its usefulness for this study (Ghauri & Grønhaug, 2005, p. 91). A point of reference for articles and books was looking into authors that have made a mark in the field of KM. Filtering data that was not relevant or reliable was a difficulty of the secondary data collection process. Data was not be used just because it was easily found or easily accessible.

Data concerning IS Design Theory was mainly based and influenced by the Markus, Majchrzak and Gasser (2002) in their work “A Design Theory for Systems that support Emergent Knowledge Processes”. EKP and KMS are not the same thing, but the process they followed to build an ISDT was really helpful to this paper. Structure and tables used for building the Design Theory were taken as a base for the construction of a new ISDT. Other authors and papers were also used for this study.

3.6. Data Collection Process
The data collection process started with the project description document created by Aldén & Olsson AB. This document was created by Sanna, and sent by email by Diana Unander from Studenter i Regionen, since she was the link with the company at the beginning. The next step was exchanging emails with Sanna Leo, in the Design Department, for the arrangement of the first meeting.
The first meeting took place in the beginning of January 2009 in the head office of the company located in Älmhult. One of the purposes of this first interview was presenting myself and meeting the staff of company. The other purpose included learning more about the problem, the company itself, their needs, objectives and expectations they had about the project. It was during this meeting that the project/thesis was formalized, or in other words, when the two parties agree to start with the project.

The next step included the analysis of the data collected, studying the case. Emails with simple questions were exchanged; questions that did not required a personal interview or that needed a quick answer and could not wait until the next meeting.

The second interview consisted in getting a deeper view of the company and its processes. Getting tacit knowledge and studying its possibilities or potential were also addressed. Observations of the activities done by the Design Department were followed. The meeting concluded with a discussion about the possibilities of the system: list of requirement, possible and desired features. A better definition of the system was stated. Sanna Leo and Inga Leo participated in this second interview.

Between the second and third interview emails with simple questions were exchanged. Analysis of all the data collected was made and the prototyping process started. An action plan for further phases, coding and implementation of the system was also prepared. This does not mean that the KMS will be developed and implemented for real but for the interests of the research, feedback about the coding and implementation process was needed.

The third meeting’s purpose was the presentation of the prototype and the action plan for coding and implementation. It was presented to the Design Department Staff. During and after the presentation a series of questions arose and were clarified both about the system development process so far and also about changes or desired features for the system. This third interview was vital for collecting data for the analysis chapter. Not that the past interviews were not important, but the presentation of the prototype and the collection of data about it were an important aspect for the study. Feedback about the commitment of the executives and how all this process started was gotten as well.

The fourth visit to the company was a presentation with one of the owners of the company. A project plan and the prototype were presented. This presentation was different from the last one; this one was oriented to the executive’s needs and interests. A description of the project and its objectives, the prototype, outcomes, schedule and all the requirements that the project might imply were presented. The purpose of this interview was to capture the interest of the executives and commit them to continue with the project.

The fifth visit to the company was a presentation to a person that worked previously on the development process of an IS that the company had in the past. This presentation aim was to answer questions and concerns by the owner. This concerns are due the fact that the have implemented two IS inside the company and with both of them the company has had problems and has not been satisfied. Therefore this former developer will be able to ask more technical questions and give advice and recommendations both to the project and to the executives. This presentation was the last part of data collection phase. Working on the analysis chapter was the following step.
The whole process since the first contact with the organization until the presentation of the prototype and the last emails exchange took 5 months. During these 5 months data was collected and analyzed, for the developing the prototype and then presenting it for the final data collection.

3.7. Research Process Critical Review
The research methodology chosen was influenced by recommendations from the literature used. A research of the appropriate or better said recommended methodologies for this type of work was done. I am satisfied with the methods and process used for this work. They were suitable and effective for the aims of this paper. I definitely recommend the methodology used for research of the same nature. It is also important to mention that other methodologies can result in different outcomes. Taking a different perspective and using different methods can surely influence the results generated. Action research demands an active participation inside the company, which can influence the personal opinion of the researcher, since the researcher is actively participating and in constant communication with the employees, it seems like both researcher and users come and meet in a middle point, where both agree on something. By this I mean that my opinions and perspective of the problem could be influenced by the opinions of the employees and the people that participated in the project. Other strategies might result in a less influence conclusion. When recommending the methodology used it is not meant that other methodologies are not good or do not work, but that for this case, the methods used were appropriate and the results were obtained. Nevertheless I consider that looking at similar studies with different perspectives is a good practice, since each approach has different weakness and strengths and a constructive discussion of different results can improve the overall purpose or discoveries.
4. Aldén & Olsson AB: The Case

This chapter is about the case with the company, the case was built as the results of all the interviews, emails, presentations, etc. A description of the proposed solution is described. Requirements, features and a prototype are described.

4.1. Introduction to the case

Aldén & Olsson AB is one of the biggest textile agencies in Sweden. Many of their products are manufactured in Asia, but their customers are located mostly in Scandinavia. The problem starts with the huge size of their design bank. The bank stores thousands of designs, and the growing rate is quite high. Dealing with and managing all these information is not an easy job. At the moment the entire job is done manually, this means that they do not have a system for administrating and using the design bank. Printed catalogues and Windows Explorer are their current tools for searching different design patterns. Dealing with such a big quantity of information has an impact in the performance and quality of the services provided by the company and absorbs most of the time of the staff in the Design Department, leaving no time for creativity and innovation (new designs creation) which are one of the main tasks of the department. The Design Department has been working in the same way for many years, doing things differently from one day to another will not be an easy task.

Different issues arise from these problems, affecting the whole organization. The main problems/issues inside the company are:

- Information/Knowledge about the design bank and the customers preferences is limited to the employees memory
- Knowledge is not in the organization, but in the employees
- Doing things manually takes longer time, affecting their service efficiency
- Designs proposals for the customers are limited to what the staff can find, not to what they have
- Creation of new designs does not take in account the current design bank at all
- Designs are unorganized, uncategorized and duplicated
- Hard to know if a design is available or it was sold already
- Almost no free time to create new designs

The design department is aware of the need of an IS to deal with the internal issues and improve their work environment and quality of their services to the customers and the other departments inside the company. They are also aware that the knowledge resides only on the employees and not in the organization; they see the need to become more knowledge oriented.

Studenter i Regionen is part of Växjö Universitet’s structure fund project called Kunskap och Innovation i Småland (KIS). This project helps students to get in contact with the regional work life and to the business sector in the region. Studenter i Regionen sent letters to all the companies inviting them to participate in this project.
Diana Unander visited Aldén & Olsson AB around October 2008 and talked to the owners and all the staff in the organization. With this meeting the executives decided that they needed to implement an IS to stay competitive on the market and improve their internal processes. It was at this point when the Design Department got formal support to their proposals from the executives of the company.

They started by developing a document where they explained their understanding of the problem and stated their needs and the goals to be covered. In the document they identified: three different aspects/issues, and current and future features for the system to cover. The first aspect talks about a system dealing with the design bank and supporting an easy way to search through it. The second aspect refers to the connection of the new system with the order system (already implemented). The third one is about a desired future feature, communication with the customers via a restricted access area through a website. The company has already a domain name, but no website has been developed yet. The company’s plans for the website are not just as a marketing tool to reach more customers on the Internet, but also as tool for communicating and showing their designs to the customers (in a restricted way).

4.2. The company
The structure of the company consists in three departments: Administration Department on the first level and on the second level the Sales and the Design Department. There is a constant communication between Sales and Design, they constantly request and share of information. This communication between departments is done in person; there is no system that exchanges information between departments.

The strategy of Aldén & Olsson AB to differentiate from their competitors relies on the efficiency of its service (order-delivery time frame) and on the variety of their designs. Communication with the customers and suppliers is done by regular post or by emails; this depends on the customers and the supplier’s request. Customers can only reach Aldén & Olsson AB via phone, email or a visit to the head office. After the customers request, the Design Department makes a selection of designs to be sent to the customer.

Following is the mission of Aldén & Olsson AB:

Swedish (Original): “Aldén & Olsson skall som agent sälja och förmedla varor i stora volymer till konkurrenskraftiga priser genom ett årligt och ansvarsfullt agerande, präglat av korrekt, enkel och snabb kommunikation och service gentemot såväl kunder som leverantörer.”

English (Translated): Aldén & Olsson shall as an agent to sell and convey goods in large volumes at competitive prices through an honest and responsible behavior, characterized by accurate, simple and fast communication and service towards both customers and suppliers.

4.2.1. Company Processes/Activities
The different processes and activities in the Design Department are done manually and without the help of any system, rather than the Windows Explorer Search Tool, they also use printed catalogs. Relevant information for selecting the design patterns to present to the customer is hold by the Sales Department, meaning that a constant exchange of information is done between departments every time a request is placed. This communication is done personally.
Following is presented the sequence of activities and processes that occur when a customer contacts the company and requests their services:

1. Customer contacts Aldén & Olsson AB and requests design patterns according to his/her needs.
2. Design Department staff looks through all the printed catalogs to find design patterns that match the customer petition and his/her preferences (if known)
3. Chosen design patterns need to be verified for availability, this means that the design can be sold if not in quarantine (a design cannot be sold to different customers in the same area for a certain period)
4. After finding the design patterns, the files are searched in the hard disk of the PC to prepare them for the proposal to be sent to the customer.
5. Use of special software to modify, edit and prepare the proposal for the customer.
6. Proposal is sent to the customer.
7. Customer chooses and approves design patterns or denies, new proposal can be prepared, and process starts from step 2.
8. Design Department prepares the files of the design pattern(s) chose by the customer to be sent to the supplier.
9. Sales Department sends the files and the supplier takes over the process, supplier works on the request and sends the final product to the customer.
10. Sales Department verifies that the product arrived as promised and that the customer is satisfied.

Another activity of the Design Department is the creation of new designs. The creation is influenced by the new trends and the recommendations of the managers mainly. The current design bank can influence the process but not as much as the other two factors just mentioned. The company offers both own designs and designs owned by suppliers.

4.3. The System

4.3.1. System Requirements
The original requirements formulated by Aldén & Olsson AB are stated in the Project Description Document (Appendix 1). After data collection and analysis of the case, new and different requirements came up and others were modified or adjusted. Therefore a new and complete list of requirements was formulated to cover all the needs and to solve the main issues and problems found in their current way of working. It also covers the KM aspects demanded by all the features in the proposed solution.

The system shall:

R1. Store all the designs patterns in a structured and organized way.
R2. Store information about each design such as: name, availability, colors, category, season, date of creation, etc.
R3. Store thumbnails for each pattern.
R4. Provide an easy and fast way of searching designs by different parameters.
R5. Aloud users to combine different parameters for more specific searches.
R6. Include thumbnails in the search results screen.
R7. Have a restricted-web-interface for customers to provide access to private and personalized information.
R8. Improve communication with customers
R9. Create client-profiles with information about their searches, preferences, previous orders, etc.
R10. Register searched words for each design pattern, both for the employees-interface and for the website.
R11. Include statistics, graphics and numbers about sold designs.
R12. Support the designers in the creation of new design patterns
R13. Support the designers in the process of finding and suggesting design patterns on customers request

4.3.2. System Features
This subsection explains the features of the system in less technical way, compared to the requirements list. Normal language, avoiding technical terms, was used in this section for the reader to better comprehend what the solution is all about. It is also important to point out that final proposition of the system is not the same as the first one defined by the Design Department. As the project went through, adjustment and modification to the proposal were made. As I knew more about the company and their problems, the solution took different perspectives. The aim and objective of the system stayed the same.

Aldén & Olsson AB desired outcome is an improved service and relationship with the customers. This will be achieved by: a more efficient communication process with the customers and a better service provided. This means offering the customer the best design patterns for him/her, chosen according to his/her needs and preferences. The base for all this relies in the knowledge base, which will help the Design Department on the selection of the best designs patterns according to the profile for each customer.

The system will have two interfaces: one for the staff in the Design Department and one for the customers. The former consists of a search engine, a statistics section and administration section. The search engine will include thumbnails in its search results. It will also have the option of narrow the search results by they use of different parameters. Results can also be sorted by relevance according to the preferences of a customer. The statistics section will let the staff get different pictures about their design bank and the customer’s database. They will be able to check which categories are selling more, which customers are buying more, which are the favorite suppliers, etc. The final section, administration, will let them add, remove, edit information about design patterns, customers, administrate the website profile section for each customer, etc.

The second interface is for the customers to access their profile online. This part of the system will let the clients place requests of design patterns according to their needs, check design patterns, previously authorized by the Design Department staff, and place the final order.

4.3.3. System Architecture
The proposed system will follow the architecture shown in Figure 4-1. Two different interfaces for two different types of users will be included. The first
interface is for the personnel of the Design Department; it will be a local application to be accessed in the company's facilities. The second one is for the customers of Aldén & Olsson AB and will be accessed through the website with a password protected access. All the data will be stored in the Relational Model Knowledgebase which will feed the Query Generator and then will be shaped and filtered by the Customer Profile Engine and then presented to the user. The local interface will also be the tool for administrating the web-based user interface for the customers.

![System Architecture](image)

Figure 4-1 System Architecture

4.3.4. The prototype

The design phase in our development cycle was made through the software prototyping methodology. The prototyping methodology is formed by different components. For this case, the last phase used was testing the prototype; converting and installing the prototype phases were not included in this research.

The prototype had two main purposes:

» To show the company the results of the analysis and design phase. This will help them have a better picture of the system and what it can do.

» To learn and test results. Presenting the prototype generated, impressions, comments, and arose questions from the company members. All these impressions were used in the analysis chapter. It also helped to test the system and to estimate the improvements that the KMS system will bring to the company.

The reasons for using prototype methodology were its advantage in decreasing communication issues, reducing costs, early discovery of design problems, early creation of the interface and to help the users visualize the system and what they want it to do (Lantz, 1985, pp. 15,18). A horizontal prototype was used to clarify the scope and the requirements. Building the prototype also helped to the completion of the requirements list and the communication between users and
developers. Presenting a prototype, instead of a report was useful for the organization to visualize the system, avoid misunderstandings and give their comments, opinions and questions about it. The latter aspect was vital for the development of the IS Design Theory.

The prototype model consisted of eight screens and simple database design (entity-relationship diagram) was made. The selection of features to prototype was based on the most relevant characteristics to present and to cover as much requirements as possible, this means avoiding screens with similar features. This first and only version of the prototype is not the whole system, since the main objective of the prototype for the research is learning from the process and not the implementation of the system.

The layout of the prototype includes a horizontal menu bar, a vertical menu bar, a navigation bar and body. The vertical menu bar options vary from screen to screen, as well as the contents of the body. The website is formed by three main sections: Home, Statistics, and Admin. Next are briefly mentioned the contents for each screen:

- **Home:**
  - Basic search options – initial screen
  - Search results – including thumbnails, option for printing, emailing or adding results to a customer’s website profile.
  - Advanced search – with all the different options for narrowing search results

- **Statistics:**
  - Category Statistics – offers a variety of graphical representations of data sorted by different parameters, in this case, by category.

- **Admin:**
  - Edit customer’s profile – editing customer’s information, add and edit rules about the customer preferences, and login access information.
  - Edit design pattern info – editing a design pattern information, and thumbnail for each different version or color of the same pattern
  - Search customer’s profile – finding a customer to authorize and deauthorize design pattern access
  - Customers authorized design patterns – adding and deleting the design patterns that the customer can have access from the website

**4.4. Improvements to the company**

The Design Department wanted to spend more time creating design patterns instead of going through printed catalogs and picture files all day long. They also wanted to improve the efficiency and quality of the service provided to the customers by providing a faster and better selection of their design patterns for each customer. KM is a helpful tool for innovation purposes among other aspects, such as core competencies and the management of intellectual capital (Little & Ray, 2005, p. 51).

The system will improve the relationship with the customers and possibly later on the relationship with the suppliers. The use of a Customer Relationship Strategy will improve/build stronger relationships with clients based on mutual trust (Crosby, 2002), with this, the web interface will be the means of sharing more information with the customer, improving the relationship and improving the service timing. The system will generate knowledge that will help the staff in
the Design Department to know better their customers and provide them better services. They will be able to know the preferences and characteristics of the customer and also to not just depend on one of the members of the department, who holds all the knowledge about the customers.
5. Analysis

This chapter analyses all the results from the data collected on the interviews and emails. The principles to be included in the IS Design Theory are presented. New adapted/modified models are proposed in this section.

This chapter is the analysis of all the data collected from the work done together with Aldén & Olsson AB. All the interviews and emails exchanged were the source for getting useful data that was the foundation for the IS Design Theory. The system development (until the prototype phase), the creation and presentation of the prototype also contributed with the generation of relevant data and experience for and about the study.

The process followed was of building up theories based on the literature researched. As the process continue more vital information was collected that serve for the building of the theory. The project with the company served to test each of the theories found in the literature. During the whole process different aspects found in the literature were arising. The practical part of the dissertation served to test the theory and to complement it. By this I mean that just the literature was not enough for the construction of the Design Theory. The action research made with the company complemented and contributed with valuable information that helped the ISDT.

The real case of a KMS with a company helped to not just know what commonly goes wrong, or better said, what failures are commonly attributed to, but to go deeper and to find out how to deal with all these issues. All these findings, together with all the previous theories from the literature lead into the construction of the IS Design Theory. A theory was build, and a real case tested and complemented it.

Table 5.1 summarizes the findings in the development process. The process taken was a SDLC with its Design Theory. As the cycle continued, I learned that the SDLC was not completely suitable for KMS. The issues or problems found are stated in the third column of Table 5.1. This table contains three columns: the first column states the initial requirements of the process of designing the system, the second column shows its counter part done via SDLC, the third column contains the problems encountered. These three columns are summarized in Table 5.2 and are the base and inspiration for the IS Design Theory.
| Table 5.1 Initial ISDC and Problems Encountered While Attempting to Apply it *

<table>
<thead>
<tr>
<th>Initial Requirements</th>
<th>Initial Design Theory</th>
<th>Problems Encountered when trying to apply the Initial Design Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Management Design is a regular Information System Design</td>
<td>The solution is a Knowledge Management System developed via SDLC</td>
<td></td>
</tr>
</tbody>
</table>

**System Planning**

| The organization is aware of the problem and defines a solution | Project will focus on the requirements stated by the organization | The solution proposed might not be the correct or optimal one |
| The organization decides to implement an Information System to solve their issues | Information System project is authorized by the executives | Executives ignore the roots and size of the problem |
| Planning of the project and optimal solution are proposed | Study concludes in the implementation of a Knowledge Management System | The organization might not be knowledge-intensive or prepared for a high-impact KMS implementation |

**System Analysis**

| Different problems, issues and solutions arise after a system analysis (Knowledge-oriented) | List of requirements is reviewed and updated | Increased impact, work and socio-cultural issues are not contemplated |
| Codification of tacit knowledge into explicit knowledge | Processes are based on a knowledge-base | Replacing tacit knowledge and assuming a successful codification of knowledge |

**System Design**

| Inputs, outputs, security, backup and processes of the system are defined | Design of the system (software and hardware) | Design does not keep in mind KMS issues and gets more technological |

* Table structure based on the work of Markus, Majchrzak, & Gasser (2002).
<table>
<thead>
<tr>
<th>Revised Requirements</th>
<th>Revised IS Design Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Management Design differs from SDLC</td>
<td>The solution is a KMS, developed via its own methodology</td>
</tr>
<tr>
<td>System Planning</td>
<td></td>
</tr>
<tr>
<td>▪ Original definition of the problem and the solution (by the organization) must not be taken as the optimal one. After analysis, different problems and solutions can be found</td>
<td>1. The organization should be open for redefining and redirecting the course of the project towards a knowledge approach. This does not mean losing the alignment with the organization mission and goals but taking a knowledge orientation if needed</td>
</tr>
<tr>
<td>▪ Often users know better the roots and the reality of the problem and hold the knowledge in their minds while managers often have an unclear understanding of the problem.</td>
<td>2. Workers should participate in the definition of the problem and shaping of the solution since the know better the roots of the problem and they also hold the organizational knowledge</td>
</tr>
<tr>
<td>▪ Organizations have different intensive-types. Not to take for granted that all organizations are knowledge-intensive or prepared to become knowledge-intensive</td>
<td>3. Study must define organization’s intensive-type and analyze the possibility and impact of becoming knowledge-intensive</td>
</tr>
<tr>
<td>System Analysis</td>
<td></td>
</tr>
<tr>
<td>▪ Completing the requirements list is not enough. Different issues and challenges will arise through the process, managers are unaware of these problems</td>
<td>4. Study the potential change and socio-cultural issues that might arise in further stages of the process</td>
</tr>
<tr>
<td>▪ Explicit knowledge can not replace tacit knowledge and transformation from tacit to explicit is not an easy task, not to mention that users might oppose to share their knowledge (if they aware it)</td>
<td>5. Management should be aware about these issues and agree to commit and continue the project</td>
</tr>
<tr>
<td>▪ Tacit and explicit knowledge are not exclusive; they complement each other. Users must be guided, motivated and rewarded to discover and share their knowledge</td>
<td>6. Tacit and explicit knowledge are not exclusive; they complement each other. Users must be guided, motivated and rewarded to discover and share their knowledge</td>
</tr>
<tr>
<td>System Design</td>
<td></td>
</tr>
<tr>
<td>▪ Project takes a technological direction, as the means for achieving success</td>
<td>7. Choosing the best technological solution is not the main aim nor the strongest factor in the design</td>
</tr>
<tr>
<td>▪ Different phases of the development process focus on different aspects, forgetting or leaving behind the knowledge ones</td>
<td>8. The design process should not lose its main aim which is managing knowledge at every stage</td>
</tr>
</tbody>
</table>

*Table structure based on the work of Markus, Majchrzak, & Gasser (2002).*
5.1. Information Systems Design Theory Principles for KMS
The proposal for an IS Design Theory contains eight principles that are described in this section. These principles are more oriented to the design part, but also cover some of the development process. This is due to the fact that the study’s final phase was the development and presentation of the prototype, as previously mentioned. Each principle was elaborated from the problems found in while using SDLF, and evolved into a IS Design Theory for KMS.

Principle #1: Include and evaluate KMS alternatives and re-define the project if needed
The staff of the Design Department saw the need of a system to deal with the problems inside the Design Department. They defined the problem according to their own perspective and based on this the goals and the desired outcome of the system to be implemented. They attributed the problem to the unavailability of thumbnails in the search results provided by the search tool in Windows Explorer. This problem was explained in the Project Description (Appendix 1) and was discussed during the first interview as well. As the first interview went further, more questions arose regarding the real causes behind the problem. After following the process that Design Department takes after they received a customer’s request until they send the proposals back to the customer, the problem took a different direction and new roots/causes of the problem were found.

Indeed, the lack of thumbnails represented an issue, but it was not the only one found in the Design Department processes. The problem begins when the personnel looks manually in the printed catalogs to find the best design patterns that match the customer’s request. Once they were selected, a search for the files was done through Windows Explorer. Since the files were not organized and there was often more than one duplicate for each design pattern, searching for a specific design pattern represented also a problem, not to mention that thumbnails will make the search of files faster.

The next problem was about the organizational knowledge. This problem had two sides. The first one was that the knowledge created about both the customers and the design bank was limited to what the personal could keep in their minds. As a consequence, the staff could not keep track of all the information they dealt with everyday. Second, the knowledge was in the employees and not in the organization. Losing an employee will mean losing the knowledge inside the department.

When comparing the first picture of the problem with the final one, there was quite a difference in the issues that were going to be handled and the results of the project itself. The aim of the KMS project remains the same, fixing the problems found in the Design Department (included the thumbnail problem) and make it more efficient for a better communication and service to the customers. The objectives were shaped and redefined to cover all the different issues found and to improve the output of the system, and not just cover a simple isolated issue. It is important to have an open mind when defining the problem and the solution, so the project can adjust its course for the benefit of the company.

Principle #2: Users to participate in definition of problem and solution.
My perception of the problem inside the company changed many times through the process, as mentioned on the previous principle. My first picture was after
Talking with Diana Unander from Studenter i Regionen, the second was after reading the project description (Appendix 1) made by Sanna Leo. The third one was after visiting the company and interviewing the staff of the Design Department (Sanna and Inga). Although it was always the same issues, it was explained, understood and seen in different ways.

It represented a key factor that the staff of the Design Department was involved both in defining the problem and shaping the solution. The employees were the ones involved with all the activities and the problems on a regular basis. Therefore, they were a good source for explaining the issues and concerns since they were directly affected by the problem. They were also helpful in the definition of the desired solution.

Talking later with the staff of the Design Department, I found out that the executives supported the project but that their knowledge about the problems was not so deep. They were aware about the issues and decided to act on it, but they were not completely informed about the real causes behind the problem. After realizing this and thinking about how my perception of the problem changed, I realized that the role the employees had in the definition of the problem and the solution was really important. Having worked the project by just listening people outside the department would have resulted in a totally different outcome.

The personnel in the department were the knowledge holders; therefore interviewing them was the best way of learning about the organizational knowledge. Executives concerns and job role are different inside the company, hence they were not the indicated ones to clarify and explicate the knowledge issues inside the department. Participation of the employees should not be just in the development process but also in the definition of the problem and the solution, different people have different perceptions of the problem, hearing different versions and of the people who are close to or affected by the problem is fundamental, specially when they are the ones involved and affected by the introduction of a new system that incur into socio-cultural issues.

**Principle #3: Define organization’s intensive type and knowledge management objectives.**

After analyzing the situation in Aldén & Olsson AB, one of the main problems found was related to KM. The project was then defined as a KMS, whose main objective was the codification of knowledge inside the company along with other issues found inside the department. Breaking down the KMS into different tasks or subsystems will show how all the different issues are covered. In other words, putting together all the different features of the system will form a KMS.

As the interviews took place and emails were exchange, I found out that there was almost no internal information in the department. They worked with data and with information provided by other departments. This represented a challenge, since the gap from their current location to becoming knowledge-intensive was bigger. The work needed to pass from data to knowledge is bigger than from information to knowledge.

The second aspect was the context of the department itself. The Design Department did not involve many different actors, activities, processes, data or information in their daily work, therefore the room for generating knowledge was limited in a certain aspect. An example will clarify or explain better this
point: the store around the corner is not expected to generate the same quantity of knowledge as a company like Wal-Mart does; the amount of information, actors and activities involved is quite different between them. This does not mean that the results and benefits cannot be good; not because a company does not manage big quantities of knowledge it does not mean that it can get remarkable benefits out of it. There is opportunity inside the company to enhance their knowledge with the help of a tool (KMS). The amount of information was not quite big, but certain activities made by the personnel represented knowledge-tasks, which gave room and potential to the project.

The third aspect found was that the level of expertise in the company with Information Technologies (IT). The Design Department was familiar with Design Software Tools used for modifying, adjusting and creating new design patterns, but rather than these tools, no other system were used. They also mentioned that they were not really experienced with computers. Introducing a complex system was not the best/optimal solution for the company.

It is important to determine the company's intensive type; amount of information and knowledge involved and IS expertise of the potential users to determine the amount of knowledge that can be generated and which amount or level of knowledge they can manage successfully. Data-oriented and-information-oriented firms do not often see the need of turning into knowledge-intensive.

An analysis of the context of the company needs to be made in order to determine the intensive-type of the organization. Locating at which point in Figure 5-1 is the company located will help determining how much can it be done in a successful way.

![Figure 5-1 Organization’s Intensive Type Localization](image)

Figure 5-1 helps the System Designer to determine at which stage is the company regarding their maturity level. We base this maturity level according to their orientation type (data, information or knowledge oriented). The more they have moved from the data side to knowledge side, the more mature the company is. This is an abstract representation of the organizations maturity level, there are many other factors and points of view that determine whether a company is mature or not, but for the purpose of this study, this diagram covers the points needed. In Figure 5.1 the maturity level is determined according to their orientation, this means if the work is based more in data, information or knowledge, or a combination of the first two or the last two. Once the maturity
level of the company is determined, the designer will have a better picture of where is the company located at the moment and where does the project intends to move it. Knowing where it is and where it goes makes it is easier to determine the process to achieve this and the difficulty to make it happen.

**Principle #4: Define change, socio-cultural and impact issues in early stages.**
The first interviews with the company were mainly about issues they had and how they wanted to improve them. As the project went further, conversations were more about desired features and characteristics of the system. When Diana Unander visited Aldén & Olsson AB the executives agreed to seek for help in order to start the project of developing a system that will help the Design Department. After all the process a prototype was made and presented. It generated positive impressions and motivated the staff inside the department to the development and implementation of the system. After the presentation of the prototype an action plan was shown with all the issues involved in the development and implementation of the KMS. This plan showed them that the process would demand certain characteristics, which they probably did not contemplate at the beginning.

The schedule of the Design Department was quite tight. Even the arrangement of the interviews took a while due to the amount of work they have. I explained them that the project demands an active participation during the whole development process; therefore spending some hours per week to work with the project will have to be done. The second issue was filling the entire database with all the designs in order for the system to work. The third one was creating a profile for each customer in order to keep the knowledge inside the organization. The whole project represented extra work, which was not really discussed at the previous stages. Although they are motivated with the project, their primary work will always have a higher priority and will overtake the time designated to the project.

The fourth issue is that Sanna Leo is the one holding most of the knowledge inside the Design Department. This is because she has been working longer in the company and second because she works in a full-time basis, while Inga Leo and the other designer do not. Sanna Leo will be responsible for all the knowledge-work, while most of the benefits will be for the other designers. This issue represents an inequality in workload and benefits. At the moment the panorama looks good, Sanna is willing to help and codify her knowledge for the benefit of her colleagues, future staff in the department, and the organization itself. But nevertheless as the work is done, motivation issues will arise; the benefits will not be immediate and will not be directly to the person who did all the hard work. In this case, the staff in the Design Department seems to have a really good relationship with each other, which will be an important and helpful factor for sharing knowledge.

In this particular case the staff had a really positive attitude towards change and socio cultural issues. I attribute this positive behavior to three main factors: the first one is that idea and need of a system started with the Design Department and not by the executives. Second the fact that the staff has a close and good relationship with each other, so sharing knowledge for the benefit of the others is not an issue. And third that the staff favorite activity is the creation of new
designs, being creative; the system will help making the routine and tedious work more efficient, leaving more free time for the creation of new designs. When the management takes the initiative to implement a system, trust issues arise. Employees feel threaten by the new system and often do not understand the real reason behind it. They feel scared and threaten that the system will replace their jobs rather than help them, but these issues concern the next principle. In this case, the employees saw the system as something beneficial rather than something that is jeopardizing their jobs. Even though the advantage or results of the system will not show immediately, they know that at the end they will benefit from it.

It is vital to take in account and analyze all the possible issues that the project will encounter. Managers often commit to an IS project but not to the change and socio-cultural issues, and this happens because they were not aware of these at the beginning of the project. KMS do not deal just with generating, codifying and sharing knowledge but also with all the social, cultural and change factors involved. It is also important to keep people motivated especially when the benefits will be long-term ones.

It is also important to know that not all cases are like this one. Larger companies and bigger KMS Projects can be translated into bigger change and socio-cultural issues. From all the literature analyzed I can tell that not all the cases are the same as the one studied in this dissertation. Even though these problems did not present a mayor issue as far as the study went, in many cases they do.

**Principle #5: Confirm commitment and support from managers and users after studying and analyzing possible future issues.**

As mentioned before, the initial definition of the problem and the solution changed through the process. At the beginning, the problem sounded more like a simple search tool with thumbnails, later on it was defined as a KMS with many other features. In this particular case the users (Design Department staff) supported the project at all times. Of course this is not always the case, many times the employees feel threaten by the new system, being afraid to lose their jobs, also with KMS employees are not willing to share their knowledge, therefore they do not commit completely to the project.

The problem has been present in the company for some time, but it was until Studenter i Regionen visited the company when the executives decided to take action on this matter. With this we can see that the Design Department has not gotten the support they wanted from the beginning, in other words, there have been support issues from the managers to the Design Department. As they first defined the problem, the executives decided to do something and committed to seek for help and solve the issues.

After analyzing and studying the case, the problem turned out to be more complicated than first defined. Different problems were found and at the end the solution took the shape of a KMS, as mentioned before these types of systems incur different issues (change, socio-cultural and a greater impact). Extra effort, attention and work are required to overcome these issues.

Fortunately socio-cultural issues did not represent any problem in this project, but the system itself will have a greater impact in the company and will change drastically how the Design Department works. All these resulted in a more
complex implementation, which may require more time and work done. For the executives this meant a more expensive and riskier project. When the project presented to them they were not sure about whether they will want to implement the whole system or just some features of it. This was due two facts: first that implementing the entire system will be more expensive, and second that they had previous bad experience on implementing expensive and/or complex systems and just using a small part of it. At this point the commitment of the managers was not to the whole project but just to a small section of it.

It is important to mention that the managers were not aware of the real problem, they knew what it was about but they did not understood all of it. They were informed of the issues and they knew that they would eventually have to do something about it. If the executives do not approve hiring someone to enter the design bank into the system, it will take months until the database is complete, not to mention that the bank is growing constantly. Second, if they support this, still the Design Department needs to transfer all its knowledge to the system. This will also be a task demanding a lot of time, and since the benefits will not show in a short time, motivation will decrease, therefore the executives need to commit more to the project to make it work and to motivate the employees. Rewarding the employees to work on the project can get better results to the project. The Design Department can be seen as a community of practice already, they work together, and the are constantly sharing knowledge, This is a good opportunity that will facilitate the implementation of the system and should not be affected by other issues such as the lack of commitment from the top managers.

After the last presentation, they decided to first consult it with the other executives and also with the staff of the Design Department. The managers were going to discuss it, more in a financial manner, and discuss it with the Design Department to hear their opinion about the system and also about whether they think they need, all the features of the system or just a basic version of it.

It is really important to get the attention, participation, support and commitment of the executives. The company and the employees can be aware of the problem and its consequences, as this was the case, but when they were presented the whole proposal, which was more complex than they thought, they decided to take a step back and discuss it. This showed that the commitment and support that the Design Department thought they had from the management was not as strong as they thought. It is important to get the support and commitment of the executives to the project before going further in the project and later having it been shut down or postponed. A constant communication between the staff involved in the project and the managers is vital. Otherwise the project can lose track or even the budget that the managers are willing to spend on it. Commitment to the project does not mean just approving the start of the project or financing it, but to also participate actively, communicate with the staff, know what is going on in the project, and support all the changes, adjustments, etc. that the project might imply.

**Principle #6: Develop good practices for enhancing, dealing, codifying and using knowledge.**

As the solution was shaped and the knowledge issues arose, different assumptions were made. The Design Department deals with many customers and
many design patterns. When a customer puts a request, the designers often know the preferences of the customer and in which catalogs they should look first. All this tacit knowledge is in the personnel. The first assumption made was to codify all this knowledge into the system, so the organization could hold all the knowledge just mentioned.

Later on the project and after investigating more about how they chose the design patterns that were later sent to the customers, issues for codifying knowledge arose. Even the staff is not completely aware of all the factors involved in their selection process. For example, two different designers that have worked with the same customer will not select the exact same design patterns. Trying to get the knowledge from the employees was not an easy task. I started orienting them, asking different questions, and suggesting factors that they might take into account when selecting design patterns and it was after these when I got some hints of how they do it. Since all the knowledge was not explained in detail, I ask them to think about this issue and to later on send me an email with what they found out about it. When they were later asked if they could think of other aspects, the answer was that there were no more aspects than the ones discuss, they could not find any new aspects that guided their selection process. In the next interviews a couple of aspects were discovered but there were still factors missing.

Dealing with tacit knowledge and with codification is not an easy task, therefore guiding and assisting the knowledge holders helps and motivates them through the process. Tacit knowledge is personal, hidden, hard to take out and hard to formalize, in the case, it is possible to take out, part of it, but not all of it. Leaving the task of codifying their tacit knowledge alone to the personal is not a good practice; it will lack motivation and guidance. It is also important to remember that tacit knowledge cannot be codified entirely. As Handy (1984) mentions the consultant or developer must take an active and willing part in the codification process to help the knowledge holder through the process. It was also assumed wrongly at the beginning that this knowledge could be entirely codified. The system will be able to assist them with the process, but it would never take over the selection activity due to the limited explicit knowledge available.

**Principle #7: Technology as an important factor but not as the core for success.**

As mentioned before, at the beginning the project had a big technical orientation, concerning more about architecture, databases, programming languages, platforms, etc. After interviews took place and after reading some related literature (KM), I realized that the success of the project would not rely just on the technology. Of course, technology does play an important role, but it does not assure or guarantee the success of the project, however it can improve the results. As the interviews took place and the project went forward the way of attacking the problem changed. I was aware of the possibilities that the actual technology can bring to the project and kept them in mind, but for the early stages of the project the focus was on knowing better the company, how they work, the problems they had, etc. thinking about which technology to use was left apart. Then the requirements and goals of the project were defined. Once the first two stages were complete, technology came back into the concerns but without
forgetting or leaving behind KM issues. It is important to first define your problem and solution, where the company is now and where the company wants to be, and then look for the best technology that suits the case, that will take you from where you are to where you want to go. Doing it the other way, choosing the best technology and then adapting the solution to that technology will limit the possibilities of the project and it can even result in the failure of it.

Both the project itself and the literature showed that many projects are very technology-oriented, and this results in the failure of it, either because they did not meet their goals or because the project was a complete failure. Projects often lose track and focus on the KM side. As further phases are reached, the team tends to focus more on technological aspects and lose attention on KM aspects. This results in a system underpinned on just technology.

The technology chosen plays an important role. In this case the project demands the use of a quite new technology that will be: compatible with other systems already in use inside the company, that can be scalable for future projects and that will cover the workload of the company in present and future times. It also needs to cover efficiently all the requirements of the system. But it was important to first define what it needed to be done and then look at the technology that best fit the project. First you need to study the problem and define your options and then make a study of which technology is best for this case, and not the opposite. Of course when doing the planning and analysis I had in mind the possibilities that technology could give to the project, new features, new ways of getting info, presenting it, etc. But the project was not strongly oriented in a technological way; the main concerns of the project were not which was the appropriate technology (except for the time of choosing the adequate technology) but how the problems were going to be solved.

**Principle #8: Design for Knowledge Management at every phase.**

After analyzing the Project Description and the first interview with the company the solution was confirmed as a KMS for Business-to-Customer relations. As I worked through the project and went through different phases of the SDLF, I often realized that I was not contemplating the knowledge aspects for the case. My understanding of the knowledge side of the system and its potential became clearer as the project advanced through the different phases. This resulted in rethinking and reworking some of the previous work made.

Studying the whole knowledge process in the early stages of the project would have helped the clarification and understanding of the potential that knowledge had in the project. Getting the whole picture of the Knowledge Management Cycle (KMC) and keeping it present at every stage, improves the understanding and handling of the knowledge issues as well as keeping you in the knowledge track at all time.

It is important to keep in mind all the different aspects that the KMC involves through the entire SDLC. This means that each phase of the KMC does not have an equivalent or counterpart with the different stages found in the SDLF. The entire KMC should be taken in account during the whole process, this means at every phase. It is important to clarify that the relevance and/or importance of each phase in the KMC varies from phase to phase in the SDLF. For example, the Discovering Knowledge phase will be more relevant in the Planning stage
compared to the Design Stage, but it should be just taken in account in the first phase and be completely forgotten during all the different stages.

This model is shown in Figure 5-2. The inner circle is the Knowledge Management Cycle by Jashapara (2004) and the outer circle represents a Systems Development Life Cycle. The triangles show how each stage of the SDLC should think of the entire KMC and not just a specific phase the KMC.

![KMC and ISDC integrated model by the author](image)

Each phase of the SDLF should look at the knowledge management cycle, of course with the limitations of their own scope, but should not miss or avoid any aspect of the KMC, since it is important and crucial to look at the big picture and all the relevant aspects and issues in the early and in the different stages of the development.

### 5.2. Discussion

The result or outcome of this dissertation is a first proposal for an IS Design Theory. This proposal reflects the learning from all the process of this research and it is presented and formatted for the reader as Design Theory. The different aspects learned from this research went through different stages. Table 5.1 and
Table 5.2 are the first stages, then the principles and at the end the proposal for an ISDT. The results are intended to help people involved in the KMS field. An ISDT by itself should be helpful enough to the reader; this means that the reader does not have to go through the whole dissertation, reading an ISDT should be enough. However, reading the explanation of each principle would be recommended. Therefore a special care in the creation and redaction of it was taken in account to make it as clear and as complete as possible.

This dissertation should server both practitioners and researchers, people who are interested in the KM field as mentioned before. People involved in KMS project may find it interesting and useful. But it is important to state that not just people actually involved in the development of such systems are the audience, but anyone else with interests or curiosity about KMS.

The process of this research study was really interesting in the way that my picture of the problem, the solution proposed to the company and the dissertation itself where changing through the process. My first impression of the project after reading the project description was completely different to my impression at the end of it.

One of the hardest issues of this research occurred at the early stages of the project. I was leaning more to the technical side, thinking basically as a computer science engineer (my bachelor’s mayor), but after advice and recommendations of my tutor, teachers, and opponents I got back on track to the academic side. Separating the academic part (the thesis) from the technical part (the system) was difficult at the beginning. After managing to do this, things became clearer and the process became easier to understand and to follow. By this I do not mean that the research became easier but process of writing a dissertation.

There is a lot of literature about KM and the problems on the KMS. All these articles present the common issues that lead projects into failure. They are post-analysis of the problem; they go and look deeply into the company to find out the reasons behind it. None of them have attempted to work on the solution of these issues. Despite the wide literature available the failure rates I the field have barely moved, failure is still an issue. This is one of the reasons that made this research important and relevant. This research did not focus on finding and analyzing previous mistakes but to develop a tool that will help future practitioners when designing a KMS. The kernel theory, requirements and principles are completely based on the literature reviewed and the experienced gained through the process. I am aware that there are other issues that are also important and should be included on the theory but since they did not showed up in this research they were not included. This was made with the purpose of maintaining the veracity of the statements made, so that the reader is sure that all the statements he/she reads come from the learning process of this project and not from other projects which I was not involved, nor present.

5.2.1. Lessons Learned

From this researched I learned different things. First the fact that KMS might not be a completely new type of system but they definitely have special developing variables, and requires different skills. It is important not to underestimate this type of systems and prepare well for designing and developing them. Another aspect is that it is important to determine whether the company is ready for such a project or not. This means that for some cases it is
better to start with a simple KMS. Forcing high and ambitious goals in a project inside a company, which is not ready for such a change, might not be the best option. Stating objectives of the project higher that what can be possibly made, results in unsatisfied customers because the system did not accomplished what was promised, meaning the system was not completely successful. Sometimes the goals might seem quite simple, but the results can be quite good, this is better than having goals that seem quite big and results that are not good at all. It is better to start simpler and succeed than wrongly aim high and fail.

It is also important to determine whether the company really needs a KMS or not. Forcing the project to be a KMS is not the solution neither is the case of forcing the system to manage more knowledge than it should.

The managers also need to not just support to the project, but also to commit to it, this means supervising and actively participating in the project. In this case the managers were too busy to get involved. Results would have been better if their participation was active during the whole process.

Another aspect was differentiating the dissertation goals with the project goals (as a real project inside a company). Differentiating the goals of the case (the company) and the goals of the dissertation (thesis goals) is an important task. Once defined it is important to keep in mind both of them and do not mix them or let them overlap, however keeping in mind that they are related. This means that the main goal of the research was not developing a system, but learning from the development to create an ISDT. We can say the project with the company had two goals (for the author), one the development of the system and second gather information for the creation of the ISDT. While for the company the only main goal was implementing a system for the benefit of the Design Department and with it the benefit of the whole company. Of course a secondary goal to help and contribute with the thesis work done.

As mentioned previously, I also realized that one should not just think technically. Since my background is of Computer Science and just recently of Information Systems, I frequently tended to think as a programmer when attacking a problem, this thesis work taught me the “hard” way to separate them. Since this was not a computer science (programming) project, the role needed was of an IS consultant, leaving behind any programming background and skills.
6. Conclusions

This chapter includes the conclusions of the research. It also presents the IS Design Theory. Agenda for future research and recommendations are also included in this chapter.

As the result of this research, a first proposal for an IS Design Theory for KMS was created; it covers different aspects found in the literature and learnt through the case with A&O. An IS Design Theory is divided in three parts: Characteristics of KMS (Kernel Theory), Requirements for IT support of KMS, and KMS Support System Design and Development Principles (introduced in the previous chapter).

The process was hard and it took quite some time, but the result makes all the work worth it. It is important to mention that the veracity and completion of this theory is still to be proven, but this is discussed in later in this chapter. This ISDT is intended to help practitioners and researcher to develop better practices when it comes to KMS. An ISDT should serve by itself; this means that especially for practitioners, they do not need to read the whole thesis in order to understand it and to make it useful. The intentions are that the theory can be taken as a guide for better practices, and it does not require the reader to go through all the paper, however, if it is in the interests or/and questions arise, the paper will help giving a deeper explanation and better understanding, it will also show the reader where all this information came from.

The literature reviewed served as a base and to learn more about the KMS and the issues that surround the practice. After getting knowledge about the field a case helped to complement all this knowledge and get own opinions, problems, findings and results for the study. Having the means of working a real case with a real company definitely improved the results of this paper. The ISDT is influenced by all the information found in the literature and by the project with a company. The result of using either of them will not have been the same, the combination of both helped getting a better result. It also backups the results obtained improving the credibility to the reader. It is important to emphasize the important role that the work or Markus et. al. played in this study. Not that the study would not have been possible without taking in account this work, but that it serve as a base and a great introduction to the Design Theory subject. Their paper gave a better understanding of what was an ISDT and good an example of the constriction of such type of theory. Although the subjects of study of these two ISDT are not the same, the process followed is what was learnt and what helped the development of a new proposal of a Design Theory.

Based on the results obtained in this research and with the proposal itself I can conclude that KMS indeed have special characteristics that demand a special treatment for a successful implementation. This does not mean that KMS are a completely different case but that certain aspects, that does not show in normal IS implementations, need to be taken in account. Because of the growing interest on the topic, having a proposal for an ISDT represents a first step into many to take in order to learn more about KM and reduce the failure rates. This will let us focus on all the potential that KMS will provide in the future and forget about the common mistakes.
6.1. A proposal for an IS Design Theory for Knowledge Management Systems

- Unforeseen problems/issues decrease management commitment
- Different companies handle KMS an its impact differently
- KMS do not mean ‘state of the art’ technology

- KMS involve socio-cultural issues and a greater impact/change inside the organizations compared to other IS
- KMS scope must be defined according to the organization’s intensive-type
- KMS must focus on other equally important aspects than just focusing on technology

- Include and evaluate KMS alternatives and re-define the project if needed
- Users to participate in definition of problem and solution
- Define organization’s intensive type and knowledge management objectives
- Define change, socio-cultural and impact issues in early stages
- Confirm commitment and support from managers and users after studying and analyzing possible future issues
- Develop good practices for enhancing, dealing, codifying and using knowledge
- Technology as an important factor but not as the core for success
- Design for Knowledge Management at every phase

Figure 6-1 A proposal for Design Theory for Knowledge Management Systems
As the result of analyzing the process that a KMS takes, different aspects or characteristics differ from this type of systems to other systems. These differences are presented in the proposal for an IS Design Theory.

The Kernel Theory and requirements consist of three main aspects that appear frequently on KMS development. These three points try to cover all the different aspects found in this study; if not covered directly, they do are related to them.

Commitment from the managers is a common issue in KMS. Normally one could think, if the problem is already known why not assure commitment from the beginning and problem solved. Unfortunately is not as simple as that. Probably in many project it has been thought exactly this way, and they have still had issues about it. The problem is not getting the management to commit at the beginning of the project but to maintain it through the whole process. As Little and Ray (2005) explain, the commitment starts to decrease as more issues start to arise. When the project seems to be more complicated than they originally thought is when they retracting from project.

Aspects such as socio-cultural and change issues vary from culture to culture and from company to company; each company has its own culture. Authors like Hislop (2005), Jashapara (2004), and McDermott and O’Dell (2001) point out the importance of the process to be sensitive to these different aspects and how failure is commonly caused by a bad handling or omission of them. Projects should take in account the company’s culture and deal with it and not the other way around, the culture dealing with the new system. Companies work in different ways, as Hislop (2005) states, knowledge-intensive firms differ in certain aspects to other companies. Different companies can handle different levels of knowledge, some companies might be ready to handle and intensive KMS project while others will fail to do so. Doing a previous study of the company and its intensive type would serve as a guide and reference to determine the appropriate level of knowledge and change it can handle. These kinds of problems are not taken in account at the early stages of the project, when managers commit to it; later appearance of them decreases the commitment.

A KMS project involves many important aspects that should be taken in account and not just focusing on technology. For example, having the top technology but not dealing with knowledge transfer or codification issues would result in failure. Jashapara (2004) and Bhatt (1998, 2001) agree that a high technological orientation often has lead projects into failure. KMS are more than just technology, many other aspects are vital for the success of the project. As technology plays an important role to the results of the projects it is advised that it should not be the center or base of the project. Focusing on the problem and the solution should be done before thinking or deciding the best technology.

It is important to advice that the use of the IS Design Theory does not guarantee the success of the project but if used properly, it is meant to help the team of the project to terminate with a successful KMS. A full explanation of each principle can be found on the previous chapter, on the section 5.1.

6.2. Critical Review
An IS Design Theory is useful tool for the practitioners and an important piece for the researchers. However, this is not the perfect tool, it also has weakness or disadvantages. In a personal perspective this tool can be quite useful and impact
the results of the design practices. But as mentioned before it does not guarantee success, even more, it does not guarantee that the practices will be improved. This is up to the reader/user, to make it useful and have a positive impact in the practice. The Design Theory needs to be clear and precise, the reader should be able to understand what the author means. In some cases, the author is so familiar with the subject that it might be easy for him/her to take things for granted and not explaining things in the detail it should be, in this case, for the reader. A special care should be put on the redaction of the theory. Another weakness could be the low impact it may have on the reader. Since the tool is short to go through the reader might not take it quite serious or might just give it a quick look, find it interesting, but at the time of the project do not remember about it. In other words, the reader might not remember what he/she read on the design theory and do not remember the things he/she was supposed to follow or to avoid.

Some other tools like life cycles might have a greater impact on the practice since they are a sequence of phases to be followed. This means that the reader might follow it and read it often, to see if the phase is complete and correct and to check what is next. This is not the case of a Design Theory since it suggests principles that can be seen as a guideline for design. The reader might just read it once and not remember all of the points to be taken in account. A Design Theory is a useful tool, but its potential relies on the reader’s ability to recall all the principles through the whole process. If used properly, its impact on the project can be quite significant.

6.3. Further Research

This research represents a first proposal for an IS Design Theory for KMS. The proposal created on this paper is to be revised, improved and/or modified in the future by different researchers. This arises two different issues to take in account:

The first part is about validating the proposal. This study was limited to one case with a single company; therefore it cannot be assumed that different cases will behave exactly the same way as the one studied here. The different findings that arose in this research may or may not show in different companies with different problems and different scenarios. It is important to test this theory in different contexts and situations to assure that the principles are indeed general, relevant and useful. Therefore the validation of the proposal by other/future researchers is needed. This means verifying that each part of the proposal is relevant in general terms and purposes (for the KMS field), proving that they appear frequently, if not all the time, so they are relevant enough to be kept in the IS Design Theory final version. It is also important to mention that since cultural and social aspects are involved, this case may be influenced or impacted by the Scandinavian culture and its issues; some of them may or may not show in different cultures.

The second part is about the completeness of the proposal. Again, this arises due to the limitations of this study to one case. Further research will help improve the kernel theory, requirements and principles, so that it covers more and different issues that did not appear in this research. Also the list of principles may be incremented to cover new issues found in different cases. Many different
studies with different contexts are needed. Studying different situations with
different companies, different cultures, different problems, etc. will generate
more principles and will also help shape or define differently the ones presented
in this paper. Further work, development and testing of this IS Design Theory
should enable us to learn and provide improved guidelines to practitioners to
achieve more effective and successful KM practices.

Socio, cultural and change issues vary from company to company and from
culture to culture, therefore it is important to find and shape the general
principles that can apply to any or most of the cases, and not just to a specific
company or culture. This research is the first step of many others to take that will
contribute the KM theory ground. The generated proposal can and should be
improved with the work of different researchers and with different cases.

Due to the limitations of this dissertation: one single study, size and length of
study, the results are named as a proposal of an IS Design Theory. The
information obtained and the outcome do not reach the level of calling the results
a Theory, which was the original intentions, therefore a better way of calling the
paper is a proposal, which can reach the state of a Design Theory with further
work, further cases, and different perspectives and opinions from different
authors. The gap between this proposal and the theory is quite big and will
require a lot of extra work. The goal is not close but with this proposal represents
one step closer to the many to take.

6.4. Recommendations
As mentioned before, this is a prescriptive tool meant to help the creation of
efficient and successful KMS. I recommend this tool to organizations that are
willing to invest in a KMS and to the teams or people that are about to start
working on a KMS. It is also interesting to researches and anyone interested in
KMS. This tool should be used prior the start of the project. The theory will help
them get a better picture and understanding of what they are going to be dealing
with. It will also help them through the process.

It is important to emphasize that KMS projects should not rely just on the ISDT,
other KMS aspects need to be taken in account. Members and leaders of the
project should also look in different literature to learn more about KM and seek
for help in case they lack experience or are uncertain about the process and
success of the project. The team should not underestimate the project.

Every company, every new project represents a new challenge and with that
new issues. The IS Design Theory tries to summarize the most general and
common issues (found in this case). It is important not to take these issues as the
only ones, but to try to anticipate and to act on time to different issues that may
arise. It is recommended to take in account some other issues mentioned by
Hislop (2005): power, conflict and politics, which did not arise in this project but
may in other ones.

The early stages of the project are critical for the success of it. Fixing things on
erly stages saves a lot of re-work and lets the project continue towards its
intended goals. Finding errors or new issues on later stages jeopardizes all the
work done and can lead into failure of the whole project. It is important to make
a good and complete planning and analysis to foresee and prevent issues that will
appear later on and have a worst impact for the project if not handled on time.
7. Appendices

7.1. Appendix 1: Project Description
File was sent by by Sanna Leo on the 24th of October, 2008.

A&O DESIGN – PROJEKTBESKRIVNING

081124

Bakgrund

Aldén & Olsson AB är en av Sveriges största textilagenturer med huvudkontor i Ålmhult. Vi jobbar med all sorts hemtextil, vilken produceras framförallt i Asien. Våra kunder finns i Norden och är främst stormarknader, postorderföretag och grossister.

A&O’s designbank rymmer idag tusentals mönster och antalet växer ständig. Vi behöver omorganisera och katalogisera filerna för att få en bättre överblick och smidigare hantering.

Nästa steg är att koppla designbanken till vårt ordersystem.

I framtiden önskar vi även kunna länka arkivet till en hemsida där kunder och leverantörer med hjälp av personligt lösen ska kunna titta på ny design eller få info om redan orderlagd design.

Idag är arkivet uppbyggt enligt nedan:

Problem

Idag får vi söka design med hjälp av Windows söksystem. Eftersom inte all design har kategori angivet i filnamnet blir antalet träffar ofullständigt. Filerna är dessutom högupplösta så sökningen tar lång tid och går inte att göra med miniatyrbilder.
Behov

Steg 1
Vi behöver en "bildbank" med lågupplösta designfiler för en snabb sökning och förhandsvisning. Filerna bör vara i ett filformat som passar samtliga användare och "taggas" med olika bestämda sökord.

Steg 2
I vårt ordersystem GARP vill vi kunna länka en "plugg" till en order samt kunna söka i ordersystemet för att kunna hitta och se en viss design eller färgställning. Filerna ska kunna bifogas i mail och printas.

Steg 3
Bildbanken bör byggas upp på ett sådant sätt så att vi i framtiden kan länka den till en hemsida där kunderna med ett personligt lösen kan få tillgång till av oss utvald design. T ex ny design, orderlagd design eller tidigare orderlagda mönster.

Designfilerna bör dopas på ett sådant sätt att man snabbt kan söka en viss kategori.

Förslag på kategorier (som vi använder idag):

- Stripe
- Check
- Dot
- Heart
- Star
- Modern flowers
- Traditional flowers
- Leaves
- Medallions
- Graphic
- Children
- Xmas
- Easter
- Navy
- Beach
- Patchwork
- Paisley
- Assorted

Förslag på sökord (förutom kategori):

- Designnamn
- Kundens designnamn
- Ursprung (designer, leverantör eller kund)
• Kund (som orderlagt designen)
• Leverantör (som producerat designen)
• Senast producerad
• Produkt

**Förväntat resultat**

Med hjälp av en bildbank ska alla på A&O kunna söka och finna design på ett snabbare och smidigare sätt.

Designavdelningen ska, med hjälp av sökord, snabbt kunna se samtliga designs i en viss kategori för att enklare kunna plocka ut kollektioner.

Övriga ska också i sitt arbete i ordersystemet enkelt kunna använda ”bildbanken”.
7.2. Appendix 2: Interview #1

Date: Friday 16th of January, 2009  
Place: Aldén & Olsson AB Head office  
City: Älmhult

Interviewed #1: Sanna Leo  
Design Department

Interviewed #2: Inga Leo  
Design Department

This was the first interview with the company; all previous contact with them was done via email. Previous emails consisted in arranging the first meeting and the project description (Appendix 1), sent via email as well. The interview began with an introduction of myself. I explained them my background, previous and actual studies and talked about my interests for my masters thesis, which in this case were two different topics: KMS and ERP. Following my introduction the interview turned into conversation about the company itself and the current problems.

The company is in the textile industry with customers mainly in the Scandinavian area. They are an agency whose suppliers are in located in China. This means that Aldén & Olsson AB does not manufacture their products; they have different suppliers who manufacture the products for them. They also explained briefly the duties of the Design Department.

- We are in charge of answering the requests of the customers. Once we receive a request, we look for the appropriate designs and prepare them for presenting them to the customer. Once the customer accepts a design we prepare the design for the supplier. We are also in charge of creating new designs.

After that we tried to follow the project description (Appendix 1) that they sent previously. The first point and most important for them was the design bank. They expressed their concerns about the constant growing of the design bank. Currently they deal with thousands of design patterns. These patterns are stored in the hard disk of the computers located in the Design Department (two computers). Them, they explained the problem:

- When we want to find a design, we have to go to the Explorer and use the search tool to find the files for the design we want, the problem is that there are no thumbnails available, so we have to open each folder and then open each file to find the one that we need. It also takes really long time to open each file since they are really large files.

They briefly explained me about the design patterns, how they are sorted in catalogs and what information for each design pattern they have. Later they explained other issues they would like to deal with. Recently they acquired a system for the sales department. This system, between other tasks is in charge of generating the invoices for the customers. They would like that in the future their invoices include thumbnails of the designs. The third issue they want to solve is about the website:

- We would like our customers to access via a website our designs, not all of them but the ones we select for them. We also want this area to be protected by a password.
Basically this part of the interview was explaining in person and in more detail the problems and objectives previously stated in the project description. After having a better view of the company and the problem I explained them how the problems could be solved and briefly gave them an example of what can be done. Of course I stated that this was just a first proposal of the solution that more details, a better study of the problem and the company needed to be done in order to define the solution in a proper way. This was just how I pictured the solution with the information I had at the moment.

For dealing with the first issue, I suggested a search engine with thumbnails available in the search results. I compared it with the image search option in Google. I also proposed them an advanced search option. This would be useful when the search results still throw hundreds or designs. They will we able to narrow their results to a specific category, color, etc.

For the second issue, connecting to the Sales Department System, I explained them that it was out of the scope of the thesis, and that I could not assure it could be done, since I did not know the other system they use and that it should have restrictions for sharing information with it. That it was not an easy task and that it will also required work or help provided from the system provider.

For the website part I suggested creating a restricted area, where users have to login to have access it. There they could search for information and place requests and even follow status of their order.

I also explained them that as my interest are KMS and ERP; this scenario would be good for developing a KMS. Data would be collected both from the activity of the search engine inside the system and also with the activity in the website; what customers look for, requests, etc., also the database containing the design bank will contribute to generate knowledge. I described them how all this information would help them with the design creation process. The system will present them information relevant when they want to create new designs. For example, information about the customer's trends, what have they been searching for on the website.

After presenting how I picture the solution of their problems and the potential features of the suggested system they agreed to continue with the process and start on the project. We talked about what I needed and how I was planning to do it. We agree that the work was going to be done mainly in Växjö but that I would have to come to visit them a couple of times as the project goes on and that minor questions could be solved via email.

The purpose of this interview was introducing myself to the company; hear in person what were the problems they have and what were their expectations of the system. Also to present them what I want to do for my thesis and how I could help them solve their issues. Since it was also the first meeting the purpose was also formalize the thesis project on both parties.
7.3. Appendix 3: Interview # 2

Date: Thursday 19th of February, 2009
Place: Ålén & Olsson AB Head office
City: Älmhult
Interviewed #1: Sanna Leo
Position: Designer
Department: Design Department
Interviewed #2: Inga Leo
Position: Designer
Department: Design Department

For this second interview some questions were elaborated in advance. Some of the questions were:

» Who works in the Design Department?
» Which are the different tasks for each person in the department?
» Who has the contact with the customers?
» Who has the contact with the suppliers?
» Which other departments or personnel exchange information with the Design Department?
» How are the files organized in the computer?
» What information can we have for each design department?
» When does the Sales Department take over of the process?

In this interview they explained in detail how the company works and all the activities involved, as well as who is responsible for what. Three people form the Design Department, just Sanna Leo works there on a regular basis, and the rest of the staff does not work on a full time basis. The activities of the Design Department are independent of the personnel, this means all of them work on all the different activities. The design department has three main activities: reply to the customers’ requests, prepare the designs to be sent to the suppliers, and the creation of new designs. After the customer agrees on a design, the Sales Department takes over the process, and they are the ones who contact the supplier. Information is mainly exchanged with the Sales Department.

After they explained in more detail all the activities we talked about and the current problem they have. The best way to understand better what the problem is about was following the whole processes they have in the department. We simulated the whole process starting from when they receive a request from a customer until they pass the control to the sales department.

First they receive a request of a customer asking for a special type of designs. Then they go and look through printed catalogs to find designs that match the request. This process can take a long time since they have lots of catalogs. I asked them how do they know which designs to choose, they answered:

- It depends, if we already know the customer, we know more less what their preferences are, for example, we know that a certain customer prefers black and white designs, or that other customer does not like some specific characteristics or colors.
I asked them if this happens with all their customers and they said with many but not all of them. The problem is that Sanna Leo is the only one who works there on a regular basis, so she is the one who knows better the customers’ preferences, but even her does not know all the preferences for every single customer. Often, the staff asks Sanna about the customer’s preferences or about the catalogs. They are aware that in the department Sanna is holding the most knowledge about the customers and the catalogs, and if she is gone, this knowledge is gone with her. When discussing this issue, she commented the following:

- I cannot say I am going to work here the rest of my life, if I stop working here, the department and the next people hired will have a really hard time at the beginning, it will take a while until they get to know the customers and find their way through all the catalogs, and this problem is getting bigger each day.

After they find some designs they go to the computer and search for the file on the computer (files are usually named after the design pattern name). They have different versions for each design pattern; they can have different colors of the same pattern or reworks on it. The search results normally include many different folders where they look into until they find the right one. They also mentioned at this part that they have also to check if the design is not restricted, this means that they cannot sell the same design to a different customer in the same area for a certain period. For example, a customer bought a design pattern a few months ago in Stockholm; they cannot offer the same design pattern to another customer in Stockholm for some years. They can find this information by looking in the results, if the file is located in the folder of “uppdrag” then they have to check who is the customer who bought it and when. The sales department provides this information, so they have to constantly go and ask information to the other department.

After verifying that the design is available for the customer who placed the request, they then prepare the proposal, which can be sent via email or by regular mail to the customer. Then the customer replies to the proposal. If the customer agrees on one of the designs they then prepare the file of the design and all the specifications needed by the suppliers for production. Otherwise they start with the selection process and they send a second proposal to the customer. At this point of the process the work ends for the Design Department, the Sales Department takes control over it for the following phases.

After following the whole process we discussed the main issues. One of the issues as they mentioned was the lack of thumbnails when searching for the files on the computers of the department, but this was not the only problem, it was not isolated to just one issue. I commented them that the first problem, following the process sequence, was the fact that they had to go through the printed catalogs. Since they have already all the design patterns digitalized in a computer, searching for them in the computer instead of the printed catalogs will save a lot of time and work. The second problem was that the files were not organized and categorized. Creating a standard for naming and storing the files was needed, as well as different information for each design such as category, supplier, etc. The third issue was that the search results included just folders, which included the files of the design patterns. In order to see the file each folder and file(s) on it had to be open, thumbnails could solve this issue. The fourth issue was having to check if the file was available for this customer, having to contact the Sales
Department to verify if they can use it or not, if they could not this represented searching for more design patterns. All this information could be inserted in the system.

I explained them how a search engine could solve these four issues. Having all the design patterns categorized and with thumbnails available will let the tool (search engine) go through the entire design bank in a fast way and present thumbnails of the results. There will be no need to go to the printed catalogs and then search in the hard disk for folders containing the files. Also the system could include features to filter all the designs that are not available for a certain region or customer, avoiding losing time while looking into designs that cannot be used.

These first series of problems were just about making more efficient the processes inside the department, and as a result the whole service provided by the company. The second part discussed was the website. As mentioned before they were not willing to show all their design patterns in the website. I proposed then using low-resolution pictures with watermarks inside a restricted area. But still they preferred not to make available their entire design bank, even if they could control who could access them. They answered to this proposal like this:

- We are afraid that if they have access to all of our designs they can easily steal our ideas or get our designs and go somewhere else to get them manufactured. We want to limit what they can see and for how long they can see them.

I proposed them to create an account for each customer that will let him access to his profile page. As the customer places a request by phone, email, or even through the website, the Design Department will select the best designs and post them on his profile, they can add and remove the designs whenever they want. They can also set a limited time that the designs will be available, this means that the designs available at the profile of a customer will expire and be removed automatically after a fixed time set by the company. For example, after the designs are available in the profile of the customer, he/she will have just one week to look at them and after that time the system will remove them automatically, so the next time the customer logs in, the designs will not be available or displayed anymore. This solution will let them have full control of what they want to show, to whom and for how long.

After talking about the search engine and the website we moved to the knowledge section of the system. As discussed previously in this interview, the issue of generating knowledge and keeping the knowledge inside the company was still pending. At this moment I had a better understanding about the company, their problems and with this a better idea of the possible ways of solving them. My picture of the solution changed through the process. The possibilities and limitations of the system changed as more data from the company was collected. Since publishing all the designs online was not an option, the proposal of generating knowledge through the customer activity and searches on the website was dismissed. At this time, with the information I had about the company I proposed that the system should generate and store knowledge about the customers. The system will store information about each customer and the designs he has previously bought, creating a history for each customer. That will generate knowledge that will be useful when preparing the next proposal. I explained them how this part of the system will help the company in two different ways. First it will help them (current staff of the department) by improving their activities making them easier and faster, results
will also be improved, this means better designs chosen for each customer. And second it will hold the knowledge inside the organization, helping designers who do not work there on a regular basis and future employees in the department.

Also a statistics option can be available. I explained them we can include certain data into the system (Database) that will help the creation of graphics according different perspectives of parameters. They will be able to get graphics of different types sorted in different order. For example they can check which are the categories that are being sold more the last month, who are the top suppliers for the current year, which customers are buying more, etc. The more information we include in the system, such as customer, suppliers, orders, requests, etc. the more range of graphics will be available. They commented that this section of the system would be interesting for the executives, since they will be able to get different pictures of how the company is going.

After clarifying the problems inside the department and the solution proposed some questions and doubts arose about desired features or characteristics of the system. These issues were more technical or specific about the exceptions and different cases that the system should cover, but the general picture of the system was still the same. I explained them the process to follow. That the next step was doing research for my theory to be prepared for the further stages of the project and that I will be contacting them for questions that will arise on the path.
7.4. Appendix 4: Interview #3

Date: Tuesday 5th of May, 2009
Place: Ålmhult
City: Ålmhult
Interviewed #1: Inga Leo
Position/Department: Designer/Design Department

Following are the details of the third interview which also included a presentation of the prototype and an action plan for continuing the project. This presentation was intended not just for the staff of the Design Department but also for the executives of the company. Unfortunately they were not in town and could not attend. The presentation was made just to part of the staff of the Design Department.

The improvements of the system to the company and the features that it will cover were presented, and then the prototype was presented with different screenshots of the system, and following it an action plan was described. The presentation showed them what is next in the project, what are the activities involved to continue with the system. And to finalize the presentation the pros and cons of the process were presented. This to let them now that they will get benefits from it, but on the way some extra work and difficulties will arise. The purpose of the presentation was to show them how the system would look like so they get a better understanding of what the system is/can do and also to collect more data, suggestions and modifications to the system. The second purpose was to explain them what all the process involves, both the positive and the negative aspects so they can decide if they commit to them and if so, to be prepared.

I also explained them the amount of work that is going to be needed during the project. A constant communication between the developer and the staff of the Design Department will be needed, this meant getting some free time to work into the project. Also the fact that the system will work only if all the data is introduced into the system and constantly updated, this will demand spending many hours introducing all the design patterns and all the information into the system. If the data inside the system is not complete or up to date, the system will not work properly and the benefits will not show. They needed to be aware of all this extra work that the project will demand.

Following the presentation some questions arose. They suggested some changes and/or desired features to the system. They also asked if the system was going to cover this, or include that, etc. All this questions were merely about what the system will do or cover. This helped me collect data for improving the system. It also helped me see that the staff of the Design Department was interested and motivated with the project. They understood the objectives of the system and were participating and contributing to the improvement of it. They were also satisfied with the prototype and mentioned that they did not expect the system to be like that. They really liked the prototype and all the options offered. They said that the executives would like the prototype.

Next the interview turned into the subject regarding the support from the executives to continue with this project. They mentioned that they had support
from the executives to deal with the problems but that continuing the project was not for sure, but possible. Then different questions about the process the company took to decide solving their problems arose, such as:

- Whose idea was to seek for help and solve the problem?
- When did you find out about the problems inside the Design Department?
- When did you first tell the executives about these problems?
- Did you get support immediately?
- What made the executives decide to act on the problem?
- How were you contacted by Studenter i Regionen?
- What happened after the meeting with Studenter i Regionen?
- Is the management fully committed to the project?

They explained me that the problem with the huge design bank has been there for quite some time and that they were aware that something had to be done, also that the problem is growing each week. This problem was discovered by the Design Department which are the ones working with the design bank. The problem was expressed to the executives who agreed that a system was needed to deal with that issue. Although the executives were informed about the problem, they did not fully understand the real reasons behind the problem or the impact or consequences of it. This was because they are not involved in the daily activities of the Design Department; they have different activities and problems to think of and to solve. Unfortunately the problem was never the first priority for the executives and it was left pending for later. The executives never denied the problem or willingness to solve it. But their scarce understanding of the problem, its severity and its consequences, combined with the amount of work and other issues in the company constantly postponed this project.

It was until they got a letter sent by Studenter i Regionen when the process started. A meeting with Diana Unander was scheduled and held in the head office of the company, staff from different departments and the executives attended. They explained the problems in the Design Department and some other issues inside the company. After this, the company elaborated a project description (Appendix 1) to explain their problems and what they needed or expect to be done. The next step was when Diana contacted me and another student with A&O. It was then that we exchanged emails and the first interview was scheduled. Basically the support from the executives started after Studenter i Regionen contacted them and proposed them the idea of working their problems together with thesis project of students from Vänjö Universitet. This idea made the executives to start acting on their issues and start with a project.

They also explained that the executives are supporting the project and willing to implement it, but that they do not have a complete understanding of the problem but are willing to take the project further than the thesis domain and develop the system. Of course they first have to approve it, so the next stage was presenting the prototype to the executives to get their attention and commitment to continue with the process.

I also asked them how their picture of the system changed along the process. They told me that it changed a lot from how the first though the system will be, to the prototype presented. Inga Leo had work experience in another company where they had a search tool for looking designs, so she had more less a picture of the solution. They originally saw the system as a tool for searching the names
of the files easier and with a thumbnail available. But they did not thought about other features or possibilities that the system could have. They also did not think about other issues that the system could solve/improve such as generating knowledge in the company with customer profiles, the statistics section, etc. Their understanding of the problem and of the capabilities of the system changed through the project and they got a best picture or idea with the presentation of the prototype, they found it really useful to understand, to know what to expect from it and to suggest further features or characteristics to the project.

After this interview/presentation they next step was scheduling a meeting with the executives. They were going to ask them and try to find a date the soonest possible.
7.5. Appendix 5: Presentation # 1

Date: Wednesday 27th of May, 2009
Place: Aldén & Olsson AB Head office
City: Älmhult
Interviewed #1: Gert Aldén
Executive

This presentation was originally scheduled with the two executives of the company but one of them had to go out of the city and could not attend. This presentation was modified and improved from the last one made to the Design Department since the interests, concerns, and understandings of the audience are different. The purpose of this presentation was to get the interest and commitment of the management to proceed with the development of the system. In other words selling the system to the company.

In this presentation I started explaining the objectives and the purpose of the system which included better performance of the Design Department which results in an overall improvement of the services provided by the company, better communication to the customers, the ability to reach more customers through a website and the generation and storage of knowledge inside the company. After I briefly explained all the problems and issues found inside the Design Department, the main features of the system were explained followed by screenshots of the prototype, which were also explained. The project was divided into modules and I explained the reasons and advantages for these, which are basically flexibility to add or remove parts/features of the system, this means that all modules are not mandatory. Benefits included faster results; they could start working with each module as it is finished. A schedule by modules was presented. Requirements for developing the system were explained, all the aspects that will induce a cost. To end the presentation I explained that the consequences of not solving this issue and the benefits of developing the system.

During and after the presentation different questions arose. The main concerns of the executive were: the overall cost and time of the project, and the benefits of it. We discussed all the requirements of the system to estimate the cost of the project. He also suggested a couple of changes or features that the system should cover. We also discussed the complexity of the system and issues that might arise.

Gert also explained that some of the concerns about the system were due the fact that they had some bad or better said not completely satisfying experiences in the past with IS. The first project for developing a system for the company resulted much more expensive than originally planned and it took much more time as well. The second system was not designed or specially made for the company; they bought the program from a vendor in Sweden. The problem they had with this system was the complexity of it and its inflexibility to be adapted or modified to satisfy the needs of the company; the system was not designed for agencies, but for other type of firms. Gert wanted to be sure that this project would not fall in any of the previous problems they had before. Gert explained that he is aware of the problem but that is Sanna Leo the one that knows it better.
- I know that we have a problem and that we have to do something about it, it cannot be just left like that. We really want to get this problem solved.

Gert said that he also needed to discuss it with the other executive and that he would like me to present the project to the person who developed the first system for the company. We contacted this person and scheduled a meeting.
7.6. Appendix 6: Presentation # 2

Date: Monday 7th of June, 2009
Place: Aldén & Olsson AB Head office
City: Älmhult
Interviewed #1: Gert Aldén
Executive
Interviewed #2: Stephan
Former System Developer at A&O

The purpose of this interview was to present the project to Stephan, a person who worked previously in the project that developed the first IS for Aldén & Olsson AB. He is familiar with the company, the activities and the problems they have. Therefore Gert was interested to hear his opinion about the project and also that he could come up with some other questions and concerns about the project due to his educational background, which is in the IS field.

The same presentation made to Gert the last time was made again. Different questions arose during and after the presentation. The main questions by Stephan were about the platform that will be used for the system and why they were chosen. Other questions were about possible features, if the system was going to cover them, and other minor suggestions to the system. After getting a complete picture of the project then the conversation was focused to explain Gert about the project. Stephan knows how the company works and which will be the challenges and problems that might arise since he already dealt with them in the past. Basically Stephan advised Gert about certain aspects that he should to take in account.

- Are you going to use the system and all the features? You know we had the problem of implementing features that were never used. Also, do you have the time to fill in all the data into the system? The system will not work if you do not spend some time to put all the data? How do you plan to do this?

Gert answered that he has discussed this already with Sanna and that they know that the system will work only if the data is in it and they will spend some time to do that, he also explained that they do not need all the designs in the system. There are many old designs that are not used anymore, so the priority will be the most recent ones or just from a certain time.

Stephan insisted that this will take some time and they should be prepared to deal with this issue. Then he suggested Gert to think about all the features they really need. He suggested that they should start with the basic module, the search engine, and work with it and then discuss if they need or want more features. This was suggested since they had in the past the problem of features that were never used. Stephan concluded that the project was doable, it was not a really complicated system and that they need to solve the problem anyways. The only advice was to think how many modules they needed and to dedicate time to introduce all the data.

Gert and Stephan agreed to discuss it later the same day. Gert also was going to discuss it with the other executive and with Sanna Leo. He wanted to hear Sanna’s opinion about the system and the different modules to decide if they proceed with the project and to which modules. They were going to send and
email the next week since the other executive was not in town and Sanna was on holidays.
7.7. Appendix 7: Prototype Screenshots
8. References


Matematiska och systemtekniska institutionen
SE-351 95 Växjö

Tel. +46 (0)470 70 80 00, fax +46 (0)470 840 04
http://www.vxu.se/msi/