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Att stödja kompetensutveckling i kunskapsintensiva organisationer

Supporting Competence Management in Knowledge-Intensive Organizations

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Abstract

Due to the evolving nature of technology-related industries and a faster-moving market place, there is a need for knowledge-intensive companies to continually develop in order to stay competitive. The inclusion of rapidly evolving software systems into the production pipeline creates a recurring need for competence development among employees in order to efficiently use the new technology. However, a diminishing propensity for investments that are not directly revenue-generating has made apparent that new ways of supporting organizational competence management is needed.

This thesis report aims to investigate how knowledge management theory can help identifying competence gaps and support competence management in knowledge-intensive organizations. The research is done through a case study involving Ericsson in Sweden and their SAP[1] based Enterprise Resource Planning (ERP) software systems. An empirical study is performed through semi-structured interviews with management and end-users of each examined ERP system module. Existing competence management work as well as competence-related gaps and issues are identified through analysis of the collected data.

The identified competence issues are then analyzed and categorized according to knowledge management theories. Based on this analysis, suggestions are made for a KM initiative meant to address the identified competence-related problems and leverage the company's overall competence management strategy.

[1] SAP (Systeme, Anwendungen und Produkte in der Datenverarbeitung) is a large European software enterprise.

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Sammanfattning

På grund av inneboende rörlighet hos teknikorienterade industrier samt en arbetsmarknad som förändras i allt snabbare takt tvingas kunskapsintensiva företag att ständigt utvecklas för att hävda sig i konkurrensen. Ett sätt att säkerställa ett modernt och effektivt arbetsflöde är att implementera avancerade tekniska system för att styra de vardagliga affärsprocesserna. Dessa affärssystem utvecklas vanligen i korta produktcykler, vilket leder till ett kontinuerligt behov av utbildning hos de anställda för att kunna använda verktygen på ett effektivt sätt. Samtidigt har ett minskande intresse för investeringar som inte är direkt inkomstbringande lett till ett behov av nya sätt att stödja organisationers kompetensutveckling.

Den här rapporten undersöker hur knowledge management-teorier kan underlätta identifikation av kompetensluckor samt stödja kompetensutveckling i kunskapsintensiva organisationer. Studien görs i form av en fallstudie på Ericsson i Sverige med fokus på de implementerade SAP[2]-baserade affärssystemen. Den empiriska delen av studien är en kvalitativ ansats av semi-strukturerade intervjuer med managers och slutanvändare av varje affärssystemsmodul. Existerande arbete med kompetensutveckling samt kompetensluckor och svårigheter identifieras genom en analys av insamlad data.

Dessa identifierade kompetensrelaterade svårigheter analyseras och kategoriseras enligt redovisade knowledge management-teorier. Med utgångspunkt i analysen föreslås en KM-ansats som syftar till att tackla kompetensrelaterade problem och förbättra företagets övergripande kompetensutveckling.

[2] SAP (Systeme, Anwendungen und Produkte in der Datenverarbeitung) är en stor europeisk mjukvarutillverkare.

Preface

Working on this Master's Thesis has been a fascinating process. Not only has my own notion of learning and knowledge changed, but I have also gained insight in some of the organizational processes that make up the foundation of one of the world's most influential telecommunication companies. My hopes are that some of the revelations I experienced while performing the study is communicated to you, the reader.

I would like to thank my supervisor at KTH, Ambjörn Naeve, for his support, insight and immense expertise on the subject matter. I would also like to send my regards and warm thanks to Thomas Jerpseth at IBM and Göran Dahlström at EAB for their unquestionable support, interest and enthusiasm regarding my work.

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Executive Summary

The executive summary presents a short summary of the findings in this report as well as a summary of the recommendations of actions in order to deal with the most prominent competence-related issues. For a more detailed discussion, see the Analysis and Discussion chapters.

- The main problem regarding the competence-related work at Ericsson is identified as *difficulties in communicating information to end users*. These difficulties include information about *how* to deal with a support-related issue, *where* to find the needed support, and *what* training/competence development options are available.
- The most frequent and costly competence-related issues are the how-to problems related to Ericsson Buyer. Ericsson Buyer has a large user base of infrequent users, and in combination with a somewhat non-user friendly interface this generates a large need for support. These how-to problems are categorized as *explicit knowledge* and thus not very cognitively complex.
- Answers to most of the above mentioned user problems are available online, but in various repositories, tutorials, user guides and online documentation. These should all be connected to a joint point of entry to facilitate for the user to find the information he or she seeks.
- There are a large number of options available for employees regarding user training and competence development. However, end users often have little knowledge of the existence of these training options or where to find it. Again, a joint point of entry – a web resource – for everything related to competence management and support – would make this more communicable to end users.
- A web portal initiative for competence management and support would facilitate cooperation between the system owners when communicating changes and competence development efforts to end users.
- Aside of the explicit competence gaps, there are issues more tacit in nature. These involve user attitudes towards SAP-based system-related work. For example, concern is expressed towards end users not taking responsibility regarding staying up to date with system changes in Ericsson Buyer, resulting in unnecessary increases in support needs. Another example is attitude among CLMs (Customer Logistics Managers) regarding order management in CBS (Common Business Solution). Sture Lantz refers to what he calls “order care”, with which he means a deeper understanding regarding the processes surrounding the order, making the CLM taking that “extra step” to optimize order conditions and enable just-in-time delivery.
- Tacit knowledge gaps are harder to deal with as it involves changes in attitude rather than communication of explicit information. The problem could be approached by just recognizing the issue and making end users aware that the problems exist. Efforts regarding CBS could involve education in processes surrounding orders as well as order care best practices.

Introduction

This initial chapter is meant to introduce the reader to the subject treated in this report. It includes a short background summary as well as a description of the purpose of the study, scope of the analysis, the target audience and a brief introduction to the type of systems focused.

Background summary

Due to the evolving nature of technology-related industries and the products and services they offer, there is a need for companies and their employees to continually develop in order to stay competitive. Therefore, competence development has become an on-going process within large parts of technology-driven industry. However, a faster moving marketplace has made company executives less inclined to invest time and money in activities that are not directly revenue generating. As a result, traditional competence development has been given a lower priority in order to minimize productivity down-time.

At the same time, the hardware and software systems used in technology-driven industries are also being developed at a faster rate and with shorter product cycles. In order to stay competitive, companies are forced to adapt to the ever-moving market setting by integrating these new systems in the production pipeline. This integration process creates a recurring need for competence development in order for employees to efficiently use the technology in question. However, the continuous need for competence development does not coincide well with the lack of competence-related investments and may result in productivity loss and stalling support expenses.

The above mentioned paradox makes apparent that there is a need for more efficient ways of managing both operational and strategic competence development. As a result, time and money is invested in knowledge management-related research around the globe, including several international efforts. However, more often than not, the results and practices emerging from this research stay within an academic context and is not put to use in the environment for which they were developed. This is unfortunate since companies that find a way to improve in-house competencies by developing well thought-through practices for knowledge management have a possibility to gain a competitive edge in their respective markets.

Today, as the technology-related industries are recovering from previous years of unfavourable economic conditions, more and more resources are made available for investments, recruitments and organizational development. Areas such as knowledge management and competence development that have previously been overlooked, now have the possibility of gaining a greater focus and help companies evolve into having a more streamlined, efficient and competitive organization.

Purpose of the Study

This master's thesis work aims to investigate how knowledge management theory can be applied in a real-world productive environment as well as some of the possible consequences thereof. Thoroughly investigating best practices for managerial change in operational competence development is however far beyond the scope of this project. In order to keep the report within the boundaries of a master's thesis focus is placed on a singular institution and a limited set of business processes. Moreover, the report focuses the preparatory work (needs assessment and suggestions derived from this) and does not go very deep regarding the actual implementation process.

The report focuses on competence development in knowledge-intensive organizations, with Ericsson being the object of study. By looking at the competence development and competence management processes at Ericsson regarding their ERP (Enterprise Resource Planning) solutions, suggestions can

be made on how to improve corresponding processes and thus achieving a more streamlined organizational workflow.

Approach

The report is based on research data acquired through an empirical study. The study is conducted through semi-structured interviews with both managers and end users of each software system. The gathered data is analyzed and conclusions are drawn from the perspective of research and theories within the field of knowledge management. Additional background information is taken from a previous report on a similar subject written by SAP consultants.

By analyzing the competence-related issues associated with the ERP systems most frequently used at Ericsson, suggestions are put forward on how to improve their competence management process accordingly.

Scope of the Analysis

Several of the ERP systems used at Ericsson are based on a platform developed by SAP called R/3. There are also ERP systems based on other SAP products, such as mySAP Supplier Relationship Management, mySAP Supply Chain Management and mySAP Customer Relationship Management. In turn, Ericsson has their own implementation of each SAP solution and module in order to add needed features and better adapt the software to their organizational needs. On top of the different SAP-based solutions, several of the systems connect to various custom-developed software tools that are also part of the Ericsson IT landscape. Each ERP solution has a user base with a size ranging from hundreds to tens of thousands of users. These users are in turn very geographically spread out, spanning areas such as Europe, the Americas and Southeast Asia. The diverse nature of the user base, both geographically as well as with respect to competence, together with the broad spectrum of software tools present a wide range of usage-related competence issues. In order to reach conclusive results within a limited timeframe, a subset of the IT landscape and user base has been selected for investigation.

There are seven different ERP modules based on the R/3 platform used at Ericsson today. Focus will primarily be placed on EB (Ericsson Buyer), which is a system used corporation-wide and with many non-frequent users. As such, it is the system that generates the most “how to” problems and thus the highest support-related costs. Other ERP systems that will also be considered are CBS (Common Business Solution), MUS (Market Unit Solution) and HRMS (Human Resource Management System). Although the report will include data aggregated from a world-wide usage of the software systems, the empirical study as a whole has been conducted at Ericsson AB in Sweden.

The report focuses on competence development and does not take into account usability-oriented issues; although an HCI (Human-Computer Interaction) perspective would most likely be equally beneficial for the organizational efficiency.

Target Audience

The report is targeted primarily at Ericsson managers, but should be of use for anyone interested in competence-related issues in production environments, as well as how a knowledge management perspective on competence development can help streamline the everyday usage of ERP systems in the workplace. Only a brief technical overview of the systems is covered, and the reader is therefore assumed to be slightly familiar with ERP systems in general and the SAP platform in particular.

Enterprise Resource Planning Systems in Short

Enterprise Resource Planning systems are software products attempting to integrate data and processes existing within an organization into a single system. Typically, these systems are composed of more than one software application and/or piece of hardware equipment to help accomplish a more complete integration. However, a key characteristic of ERP systems is the unified database, which holds the data for all the various system components.

Before the concept of ERP systems, most enterprises had different, local software solutions for each department and business process. For example, Finance would use one software solution while HR and Manufacturing would use other completely different applications. This could impose problems, not only related to usability complications with different interfaces but also due to data discrepancies when data about the same occurrence needs to be replicated among applications.

With an ERP system and a back-end database shared among software applications, data from formerly disparate applications can be combined to simplify business process integration. This also reduces the number of software specialties required within the organization and thus facilitates competence development and reduces support requirements.

Background

The background chapter introduces the reader to the SAP R/3 platform, both generally and technologically. The reader is also introduced to the Ericsson-specific implementations of SAP-based solutions and given brief descriptions of the various software applications that are looked at in the study.

The SAP ERP System (The R/3 Platform)

As mentioned earlier, Ericsson's main ERP software solution is based on the SAP R/3 platform. R/3 is the former name of mySAP ERP, a very widely used software platform developed by the German software enterprise SAP AG, with its headquarters in Walldorf, Germany. R/3 is an integrated software solution for client/server and distributed open systems which was initially launched on 6 July 1992. (Wikipedia, 2007)

The system is designed with an object-oriented approach, where all business components of an organization are instances of so-called "business objects". For example, in R/3 a customer is actually an instance of the customer business object and interacts with other business objects in a pre-defined but customizable way. One of the reasons R/3 has gained such a wide acceptance and global deployment is that it comes with suggested best practices for most major business processes. These processes or suggested "best practices" are in turn customizable so they can be fitted to existing business practices and existing software landscapes. This separates SAP's solutions from many other competitors who offer tools to build new solutions from the ground up rather than providing pre-defined processes. (Wikipedia, 2007)

The R/3 platform is based on a 3-tiered model. First a presentation layer or interface communicates with the user. Underneath the presentation layer is the application layer which houses all the business-specific logic. At the bottom is the database layer which records and stores all the information about the system, such as transactional and configuration data. R/3 works with a wide range of SQL database managers, examples being Oracle, Informix and Microsoft SQL Server. SAP has produced its own programming language called *Advanced Business Application Programming* (ABAP), with which all functionality in R/3 has been developed. ABAP is a so-called fourth generation language (4GL) geared towards the creation of simple, yet powerful programs. R/3 also offers its own development environment, where developers can either modify existing SAP code to suit their needs or create their own functions. (The SAP Fanclub, 2007 and Wikipedia, 2007)

The main difficulty with installing and integrating SAP R/3 (or mySAP ERP) in an enterprise is the deployment process. As previously mentioned, the ERP solution from SAP provides a set of "best practice" business processes, which are to be fitted to the corporate activities. This fitting process usually includes a considerable amount of customized development, not only to integrate the provided processes with the existing business activities, but also to develop and change the suggested processes according to corporate requests. Another difficulty related to the implementation of the software system is the already available corporate information systems that are a part of the existing software landscape. In order to get the SAP ERP system tightly integrated with current solutions, generally a considerable systems integration effort is required. Due to the complexity of this process, acquiring a new ERP system usually involves recruiting specialized consultants capable of deploying the system according to the company's needs and resources. (Wikipedia, 2007)

Today, SAP R/3 (or my SAP ERP) is the world's most widely adopted ERP solution. The software enjoys a 30% market share in financial management applications, 24% in human resources and 34% in manufacturing according to a comprehensive, recent study by Gartner published in June 2006. (SAP AG., 2007)

Ericsson's SAP Implementation

Back in 2000, Ericsson decided to overhaul its worldwide purchasing options. Over time, different business units had developed a number of local purchasing solutions for their own business relations and customers. The fragmented software landscape was leaving room for improvement, and the company was seeing an opportunity to cut costs, increase productivity and streamline its business-support system by introducing a global purchasing process. The goal was not to centralize all buying operations, but rather to create a flexible system that would allow business units to handle their own e-procurement operations, while working with common purchasing processes as well as one global marketplace. The choice of a new software system fell on mySAP SRM and the SAP R/3 back-end, and the system roll-out began in 2002. (SAP AG., 2005)

In order to keep the ERP system up-to-date and comply with demands and requests from the business side of the organization, the applications that make up Ericsson's ERP system are continuously updated. All software development regarding the SAP system at Ericsson is done by IBM as the SAP development partner. The software updates delivered by IBM come at three different levels with different intervals depending on the size of the changes. Every six months, in May and November, a so-called version *release* takes place, which usually includes bigger changes and updates. Examples of such an update can be a complete rework of the user interface or more radical changes that may require planning to implement in the organizational workflow. The next level of updates is called *enhancements*, and they don't occur as regularly as releases. These enhancements have pre-set arrival-dates, approximately once a month, and can include changes such as new functionality or other changes that are not disruptive to the current system usage to the same extent as a release might be. The last level of updates is support packs, which include changes that aren't supposed to be visible to the user. These changes are usually bug fixes, and have arrival-dates once or twice per week. (K Andersson 2006, pers. comm., 5 Dec.)

Out of the different application modules that make up R/3, seven are in use at Ericsson today. The Ericsson ERP applications are all based on SAP software modules but are customized to fit into the organization. As mentioned in the introduction, the systems looked at in this report are Ericsson Buyer (EB), Common Business Solution (CBS), Market Unit Solution (MUS) and Human Resource Management System (HRMS).

Ericsson Buyer (EB)

Ericsson Buyer (EB) is a web-based e-commerce system targeted at end-users. It is based on the SAP product "Enterprise Buyer Professional" and thus it is not an R/3 module. There are about 30 000 Ericsson employees that have access to EB, of which about half actually use the system. EB is deployed globally, and it is used in over 70 countries. It is used for purchases related to everyday operations and not for material targeted at customers outside of the Ericsson enterprise. Examples of orders an employee can make are smaller things such as a new mobile phone, a mobile phone hands-free or pastries for a meeting. However there are also larger orders, such as IT projects and services. Counting globally, there are over 70 000 orders entered in the system every month, which makes Ericsson Buyer one of the largest systems of e-commerce in the world. (M Sjöberg 2006, pers. comm., 22 Nov.)

Common Business Solution (CBS)

Common Business Solution (CBS) is a full-scaled R/3 implementation that is similar to Market Unit Solution (MUS), described below. The examined user group of the CBS system is called Customer Logistic Managers (CLM), a group which specializes in order management. Ericsson has about 190 CLMs in Sweden, of which about 150 operate from Stockholm. Focus in this report is placed on the modules of CBS that constitute the applications used as the core of Ericsson's order management system. The order management at Ericsson is centralized; orders for materials to be delivered come in from all around the world, in different systems or by more traditional means, and all get entered into CBS for processing. CBS is also connected to the above mentioned MUS application, where

orders can be entered directly from different enterprise Market Units. (S Lantz 2006, pers. comm., 13 Nov.)

Market Units Solution (MUS)

Market Unit Solution (MUS) is a global system supporting the common Ericsson processes and targeted at the different Market Units within the Ericsson enterprise. Feature-wise, MUS is very similar to CBS. It is a predefined solution based on R/3 and supports business operations in finance, logistics, sales, project management, customer service, hosted functions and production. MUS is in use by over 100 market units in over 60 countries, and covers a wide array of different users with different functions. (Ericsson AB, 2006)

Human Resource Management System (HRMS)

Human Resource Management System (HRMS) is based on the Human Resources R/3 module and is used at Ericsson in conjunction with two different interface components called ESS and MSS. ESS stands for *Employee Self Service* and is used by all employees at Ericsson. Through the interface the employees are able to change their personal data such as their home address. MSS stands for *Manager Self Service* and allows managers to control and manage such things as salaries, time reports and vacations for the employees of their department. Managers at Ericsson are thus users of both ESS and MSS; ESS for data related to their own employment and MSS for managing their employees. (K Andersson 2006, pers. comm., 5 Dec.)

Of the functional modules available through the Human Resources module, only the time reporting functionality is implemented at Ericsson at this point in time. However, work is in progress for implementing the competence management module for monitoring competence gaps among departments and individuals as well as competence requirements for different positions. (K Andersson 2006, pers. comm., 5 Dec.)

Method

This chapter covers the different research methods chosen for the study as well as reasons for why they were chosen. It also covers a general discussion on validity and reliability aiming to declare how the study reaches academic credibility.

Overview

As discussed in the introductory chapter, the aim of this report is to investigate how knowledge management theory can leverage the effectiveness of competence management in knowledge-intensive organizations. This investigation is done in the form of a case study of a knowledge-intensive organization (Ericsson AB) based on an analysis of qualitative data acquired through semi-structured interviews.

The knowledge base required to perform the analysis has been acquired through an extensive literature study. Literature on knowledge management as well as articles and reports about competence development thus constitute the academic side of the knowledge base. The qualitative study is performed in order to identify the key competence related issues concerning the looked-at ERP solutions. As a complement, an earlier report written on the competence development at Ericsson has been made available to the author in order to enable further assessment of the situation.

Case Studies

A case study is a research method where the researcher rather than examining a large number of phenomena with a limited number of variables instead performs a more detailed, in-depth study of a singular instance called a “case”. Case studies are especially suitable for researchers working alone due to the fact that they enable research of a delimited aspect of a problem during a limited period of time (Bell, 2005). Other research methods would require not only access to a larger research population, but also the possibilities in terms of time and resources to investigate more than one instance.

Bell (2005) elaborates on the previous statement, establishing that all organizations and individuals in a given group have characteristics in common. The purpose of a case study is to highlight these properties, identify interacting processes and show how they affect the implementation of a change or a system as well as the organization’s reactions to it. Bell (2005) states that these processes can be hard to pinpoint in a large quantitative survey but can still be critical to the success or failure of a system or organization. Using other research methods with less in-depth perspectives, variables critical to analyzing competence management and finding competence gaps may thus be overlooked or missed.

Critics of case studies as a research method claim that case-based research often leads to skewed results that are hard to generalize to make fit other cases (Bell, 2005). Due to time constraints and limited resources, a study involving more than one organization would have been unrealistic in this report. Combined with the higher probability of identifying critical variables, this made a qualitative analysis an appropriate research method.

Qualitative Methods and the Interview Guide Approach

The nature of the competence gaps regarding the ERP solutions at Ericsson was largely unknown before conducting the interviews. The previous reports written on the subject do give some

background information, but fail to exhaustively provide an assessment of the current situation. The documents are also somewhat dated. Thus, the main issues associated with each SAP-based implementation need to be pinpointed through a survey. Due to the nature of the matter and in order to evade complications related to not being able to reach a large-enough research population, interviews were chosen ahead of questionnaires as the method by which the survey was conducted.

When using interviews to gather information, unstructured interviews are preferred if the problem is largely unknown to the interviewer (Cohen, 2000). This is due to a more open nature of discussion, where the interviewee has the possibility to raise issues not previously planned by the interviewer. As such, unstructured interviews often lead to more qualitative than quantitative data. Qualitative data are generally useful when the goal is to assess a situation or gain insight into a particular matter, whereas quantitative data is more useful in research aiming to reach conclusions that can be quantified and aggregated (Bell, 2005). For this study, qualitative data was deemed more suitable and unstructured interviews the most fitting method for acquiring the information.

In order to maintain the benefits of an unstructured interview while still focusing on competence-related issues, a method Cohen (2000) calls "Interview guide approach" was used. In an interview guide approach, topics and issues to be covered are specified in advance. An outline for the interview is worked out, while the interviewer still has the possibility to decide the sequence and ordering of the topics during the conversation. Cohen argues that the outline increases the comprehensiveness of the data compared to a completely unstructured interview, while also making the process somewhat systematic across respondents. The downsides of using the approach are associated with the nature of unstructured interviews – important topics or issues that are omitted as well as difficulties comparing results between respondents.

Whatever the issues concerning competence gaps related to the ERP systems are, interviews will undeniably give a subjective perspective from the interviewee's point of view. To get a wider perspective and a more complete assessment of competence-related issues, interviews have been carried out with both managers and end-users of each looked-at software system. This facilitated the identification of issues that were not clearly singled out by management and gave the possibility to compare managerial understanding with end-user experiences. It also provided an indication of how well intra-organizational communication regarding support and education is managed and in what ways it can be improved.

Validity and Reliability

In any research project that includes empirical data, the validity and reliability of the data needs to be assessed to ensure that the work has credibility. The term "reliability" refers to the extent to which the measured results are reproducible at different occasions but under the same circumstances. The definition of "validity", on the other hand, is a little vaguer. It refers to the extent of which a certain method for information gathering correctly measures what it is supposed to measure – that the information collected actually is what is desired. (Bell, 2005)

There are several methods for measuring both the reliability and validity of information gathering. Bell (2005) gives three examples of control measures; *test-retest* (repeating the first test after a certain time interval), *alternative formulations* (repeat questions with the same meaning but using other words, then compare the answers) and the so-called *split-half reliability* (where questions measuring the same construct are randomly divided in two groups in order for a correlation estimate between the groups to be made). However, due to the nature of the empirical data extracted in the study, implementing pre-defined measures of control (generally more suitable for quantitative data) could prove tedious and time consuming. Each knowledge-intensive organization will have its own set of competence-related issues, and even though a qualitative user survey and semi-structured interviews should fit most situations, pre-defining control measures is not necessarily the best way to achieve reliable research data. Instead acceptable reliability and validity can be reached through well-prepared interviews and by choosing the right interviewees. Bell (2005) suggests that by

communicating with individuals external to the study, the researcher can get a second opinion on the prepared interview or questionnaire and thus get help ensuring the validity of the survey.

The control measure used in this report has been a continuous dialogue with Göran Dahlström at Ericsson regarding what issues to focus as well as whom to interview. By making sure the interviewees are well informed about the ERP systems, a loss of validity due to inadequate information is avoided. The results from the interviews were then compared to the conclusions drawn in a previous report written by SAP on a similar subject. Although the designs of the reports differ, a comparison of results can give a hint of the reliability of the collected information.

Performing the Study

As mentioned above, when performing the interviews suitable interviewees from the manager side were selected with help from Göran Dahlström. After each interview, each manager was contacted and asked to help finding a suitable end-user for their respective system. This way both suitable managers and suitable end-users for each SAP module could be found. The exception was the Market Unit Solution system for which there was no manager available to interview. Göran Dahlström presented an end-user of MUS which he deemed suitable for the survey. All in all, eight interviews with Ericsson employees were performed starting November 2006 and ending February 2007.

The interviews were conducted in a semi-formal manner in accordance with the Interview Guide Approach directives (see appendix). During all interviews notes were taken and the entire interview was recorded. Later on the recordings were transcribed to text in order to facilitate analysis of the material. All interviews were conducted at different Ericsson offices in Stockholm, Sweden.

Selection of Interviewees

Considering the scope of the project with its time and resource restrictions, letting the Ericsson-based supervisor choose the interviewees had several advantages. Firstly, there was no time cost for finding willing and suitable managers and end users for the interviews. Secondly, insight in both the organizational hierarchy and ERP-related support problems is required to single out interviewees with the same accuracy as Göran Dahlström was able to do without any additional preparatory research.

However, letting the project commissioner freely choose the people whose collective responses form the base for the research result may also impose some validity and reliability issues. Ericsson is a very large organization, and it would likely be possible to achieve skewed results by selectively picking interviewees with a certain standpoint. Furthermore, it is possible that the results were affected somewhat due to the fact that Göran Dahlström picked interviewees whom he knew more closely, and with whom he therefore had – through previous discussions – more or less synchronized opinions and views. As such, for the research data to be as accurate as possible, the selection of interviewees would have to be done with the objective of achieving results as representative to the real-life situation as possible.

Since the project scope did not leave room for the implementation of further control measures, it was assumed that the objective of the commissioner was coherent with the objective of the research project as a whole. The selection of interviewees was therefore assumed to be reasonably accurate.

Data Coverage and Interpretation

A reasonable coverage regarding knowledge gaps and how to-problems could be achieved by interviewing one manager and one end user for each ERP system module. However, as the systems are definitely perceived differently by different users, specific problems could be more accurately pinpointed by questioning more than one end user for each system. This could be beneficial when designing knowledge management or competence development tools specific to each system module. However, as this report aims to conclude a set of suggestions addressing knowledge management

problems on a higher level, a sufficient set of background data was achievable through the interviews performed.

On the other hand, extracting background data from literature and the empirical study is just the first step. In order to present suggestions based on knowledge management theory, the background data needs to be processed and interpreted. In this step, input from Ambjörn Naeve was an invaluable guide presenting ideas, experience and knowledge on the subject.

Input from other organizations with similar problems or outside experts with know-how regarding the actual *implementation* of knowledge management systems and competence management best-practices could indeed have had a positive effect on the accuracy of the concluded recommendations. Neither of this was available due to time and resource restrictions and was therefore left as a recommendation for future follow-up studies.

Theory

In this theory chapter several Knowledge Management theories are presented in order to facilitate analysis of the empirical data gathered through the interviews. Some ideas about best practices for Knowledge Management initiatives are also presented in order to enable more specific suggestions for improvement.

Introduction to Knowledge Management

The last two decades, academics and practitioners have been increasingly involved in discussions and experimentations related to knowledge and learning. This is however a far from new subject; more than 2000 years ago Aristotle identified different types of knowledge and discussed how they were acquired. What is new is that in recent years the subject matter has moved from an academic and theoretical context into more of a management focus. A majority of larger companies and organizations are involved in knowledge and learning-related activities, and most have personnel explicitly dedicated to these tasks. (Matson and Prusak, 2006)

Knowledge management as a business practice has its roots in the educated workforce that emerged from the Second World War. Due to extensive post-war investments and a large collection of wartime scientific discovery, the first generation of college and university graduates after the war brought something to the workforce that previous generations lacked – higher education. This spawned workers with a higher ability to acquire and apply theoretical and analytical knowledge and as such a possibility for organizations to gain competitive advantage by properly harvesting these abilities. Furthermore, a continuous increase of educated workers created an increasing need for this management of knowledge. This development affected the industry with a momentum that can be considered the genesis of the modern-day knowledge economy. (Frappaolo, 2006)

In the mid 1900s the subject started to get an academic focus and several schools of thought began to emerge. The term "knowledge worker" was coined by Peter Drucker in 1959, in a book called *Landmarks of Tomorrow*. He identified the above mentioned workers of a higher education, and emphasized their high ability to acquire and process knowledge. In 1966, Michael Polanyi introduced the difference between explicit and tacit knowledge, which has become a cornerstone in knowledge management-related research. In the following decades, several important publications have highlighted the connection between organizational performance and knowledge management and served as eye-openers for practitioners and managers alike. By the mid 1990s, managers began to recognize knowledge as a key differentiating factor between organizations. (Frappaolo, 2006)

Defining knowledge management is no simple matter. The term is used extensively in different situations, for different applications and by people of different academic or professional background. In its most general sense, the term does not define a technology, a directive, a business strategy or a culture as it does rather incorporate all these components in different forms and combinations. Frappaolo (2006) argues that it might be this lack of a singular definition that has delayed a more wide-scale deployment of knowledge management. He continues by suggesting the following definition;

"Knowledge management is the leveraging of collective wisdom to increase responsiveness and innovation."

Following this definition the term incorporates all kinds of resources, activities and technologies involved in the various applications of knowledge. However, Frappaolo (2006) notes that it is important to discern three argumentative points from this definition. First of all, knowledge is connected and exists collectively, as a collection of multiple experiences and perspectives. Secondly, knowledge management is a catalyst which should work to leverage organizational performance. Lastly, knowledge works to facilitate responsiveness in situations not yet encountered. Knowledge is

applied in order to address novel issues for which there are no known pre-defined solutions. Information, on the other hand, provides predetermined answers to anticipated stimuli. This, Frappaolo (2006) states, is where knowledge management differs from information management.

Competence Management

As the title of this report indicates, the focus of both the extraction of research data and the analysis thereof will be placed on the management and development of *competence*. Just as with knowledge, there is no single generally accepted definition of the word 'competence'. However, a competence can be seen as the set of knowledge, abilities and skills required to perform a certain task.

In a knowledge-based organization, the management of employee competence usually refers to the mapping and tracking of certain predefined competencies that each employee should possess in order to reach adequate performance levels. In the case of the SAP-based ERP systems at Ericsson, the relevant competencies would be the skills and knowledge required by each individual to operate the systems without the need for support.

Knowledge Categorization and Identification

In order to identify tools and practices to support knowledge management processes, it is essential to categorize the different applications for which knowledge needs to be managed (as is done below in this chapter). However, it is not possible to effectively manage something that is inadequately defined. Therefore a first step in understanding the process of managing knowledge must be to identify the knowledge, audience, environment and other external variables that set the conditions for knowledge transfer in a given situation. (Sanchez, 2003)

Thus, the following pages examine a set of tools and taxonomies aiming to facilitate the process of identifying, categorizing and analyzing knowledge and knowledge-transforming activities. They cover areas from basic knowledge classification to learning mechanisms, learning objectives and learning process localization in organization-wide contexts.

Knowledge Tangibility: Explicit and Tacit Knowledge

As mentioned above, in 1966, Michael Polanyi classified knowledge tangibility in the terms of explicit and tacit knowledge (Frappaolo, 2006). To this day knowledge management researchers and practitioners use the very same terminology. Tacit and explicit knowledge each form one end of a continuum representing the tangibility of knowledge.

Smith (2001) describes tacit knowledge as such knowledge that is being understood without being openly expressed, or "knowledge for which we do not have words". Smith (2001) establishes that tacit knowledge is automatic, requires little or no time of thought and helps organizations make decisions and influence the collective behavior of their members. Frappaolo (2006) defines tacit knowledge as being personal, embedded in individual experience and involving intangible factors such as personal belief, perspective, instinct and values. The elusive shape of tacit knowledge makes it by definition intangible and thus hard to measure and quantify.

Explicit knowledge is on the other end of the tangibility spectrum. It is knowledge as information that can directly be coded, recorded and transmitted. Explicit knowledge can be academic or technical information or data described in formal language, such as manuals, mathematical expressions, copyrights and patents (Smith, 2001). Frappaolo (2006) has a more general definition where he states "Explicit knowledge is knowledge that is articulated in formal language and easily transmitted among individuals, both synchronously and asynchronously".

Figure 1: The tangibility of knowledge, ranging from explicit to tacit. (Frappaolo, 2006)

Due to the less complicated nature of explicit knowledge, organizations tend to focus their technology investments on explicit rather than tacit knowledge. Frappaolo (2006) gives three reasons for this; the first being that explicit knowledge is often conveyed as a standard part of most transaction-based information systems. That is, in systems where information is coded and transmitted, the information is coded as explicit knowledge. The second reason is that explicit knowledge is, as mentioned, easier to grasp, manage and quantify. The third reason derives from the second; there is an inherent mistrust for anything that cannot be objectively measured and quantified. However, most knowledge management practitioners stress the importance of managing tacit knowledge as well. Bhardwaj and Monin (2006) state that there is a need for organizations to explore tacit knowledge as it is the primary source of inspiration for human actions in the workplace as well as a powerful tool for competitive advantage due to its elusive and intangible nature.

The Taxonomy of Educational Objectives

In performing individual tasks, Sanchez (2003) states that people may either learn by doing or learn by analyzing. These two ways of learning creates different types of knowledge: learning by doing creates a practical "know-how" knowledge while learning by analyzing creates an intellectual understanding, a "know-why" theoretical knowledge. These two different levels of knowledge are also seen as a part of "The Taxonomy of Educational Objectives", commonly called "Bloom's Taxonomy" as it was first introduced by Benjamin Bloom in 1956 (Rademacher, 1999). The taxonomy is a tool for analyzing outcomes related to educational activities and concerning cognitive areas such as memorization, thought processes and problem solving. Rademacher (1999) describes the model as designed with cognitive skills sorted in six different categories, denoting the relative level of comprehension complexity. He states that each higher level of comprehension includes the cognitive skills of the preceding lower levels.

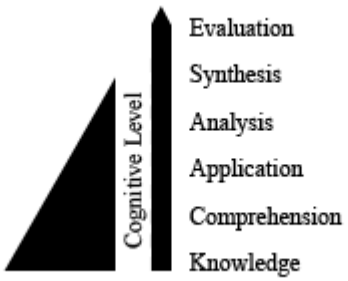

Figure 2: Bloom's Taxonomy: Cognitive Domain. (Rademacher, 1999)

The cognitive skills start with *knowledge*, which might be an unfortunate choice of term given the context of this report. In this context 'knowledge' represents the ability to remember – recalling stored information, bringing something to mind. This skill thus includes memorization of, and the ability to describe or define a phenomenon. Following knowledge is *comprehension.* On this level the individual is capable of grasping the meaning of the material, interpret and explain it, as well as predict outcomes and effects of related actions and processes. The third skill level is *application*, where the individual is able to use – to apply – the information or material to previously not yet

encountered situations. In a real world situation, this application can be in the form of rules, laws, theories and processes. (Rademacher, 1999)

The taxonomy's first three skill levels are relatively concrete, whereas the following three are of a more abstract nature. The fourth skill level is called *analysis*, and Rademacher (1999) describes it as the ability to break down a phenomenon into parts, to understand, organize, clarify and conclude. It is as such a form of higher level of comprehension, where the understanding of the material goes deeper that just basic functionality and includes knowledge of possible sub-mechanisms. Following analysis is *synthesis*, Rademacher (1999) writes, which in short enables the individual to use the previously identified sub-elements to assemble a new whole, to create something original from identified components. The last and highest level cognitive skill is *evaluation*, which involves assessing the values of material based on a pre-defined set of criteria (Rademacher, 1999). Examples of evaluation can be to select the most effective solution or hire the most qualified candidate.

Single Loop and Double Loop Learning

Relatively early work in the field of Organizational Learning was done by Chris Argyris at Harvard University. Argyris (1982) identifies two different types or learning which he calls single- and double-loop learning. Single-loop learning is when a technique, process or piece of information is learned and eventually mastered, but the underlying mechanisms forming the process are not questioned. In the case of individual learning (the individual learning cycle), the material passes through whichever interpretive frameworks and cognitive infrastructures (described below) that are in place and eventually end up as knowledge or competence at the individual's disposal. Argyris (1982) gives a simplified example with a thermostat programmed to keep the temperature of a room at a constant, preset value. The thermostat has "learned" that it's supposed to increase the heat whenever it measures a room temperature below the preset value and vice versa.

Double-loop learning expands on the single-loop learning process by including a function to constantly question the underlying beliefs and assumptions which produce the information to be learned in the first learning loop. Argyris (1982) elaborates his thermostat example, stating that a thermostat with a double-loop learning process would question its orders. This could for example, if it was technically possible, result in a thermostat suggesting lowering the temperature in the room over night or when the room has been unused for a certain period of time. Within an organizational context, this could mean encouraging individuals not only to learn, but also to look for ways to improve established routines and processes.

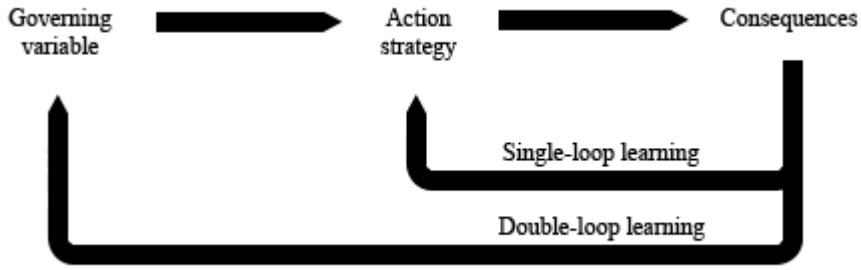

Figure 3: Argyris' model of double-loop learning.

Argyris (1982) writes that a majority of learning done in an organization is single-loop since it's designed to identify and correct errors and keep action within pre-stated guidelines. Most management information systems are designed for single-loop learning, meaning individuals are expected to learn how to use the system in question without questioning the processes controlling the design of the system. Argyris (1982) states that "Most organizations, often without realizing it, create systems of learning that suppress double-loop inquiry and make it very difficult for even a well-designed information system to be effective". To build on this, Argyris (1982) identifies four advantages of having a double-loop learning process.

- A double-loop learning process increases the individual's awareness of how committed errors affect other parts of the organization. A deeper understanding of the mechanisms controlling whichever process induced the error may minimize the risk of error recurrence.
- With a single-loop learning model individuals tend to be unaware that they are unable to *discover-invent-produce* genuinely corrective solutions to problems. A double-loop process increases the awareness regarding to what extent new solutions can be introduced.
- A third advantage is the effect on group dynamics. The ability to question underlying mechanisms tends to increase trust and lead to a higher degree of openness.
- As with intra-group dynamics, inter-group dynamics tends to be less contra-productive with a double-loop learning model.

With double-loop learning the number of problems that can be both identified and solved is increased. It can be a way to strengthen organizational communication by sorting out and underlining weaknesses that could and should be corrected and which would not be singled out with a single-loop learning model.

From Individual to Organizational Learning

The most important property of knowledge aiming to develop organizational competences is whether the knowledge is individual knowledge, shared within a group of individuals or has reached an organizational level. (Sanchez, 2003)

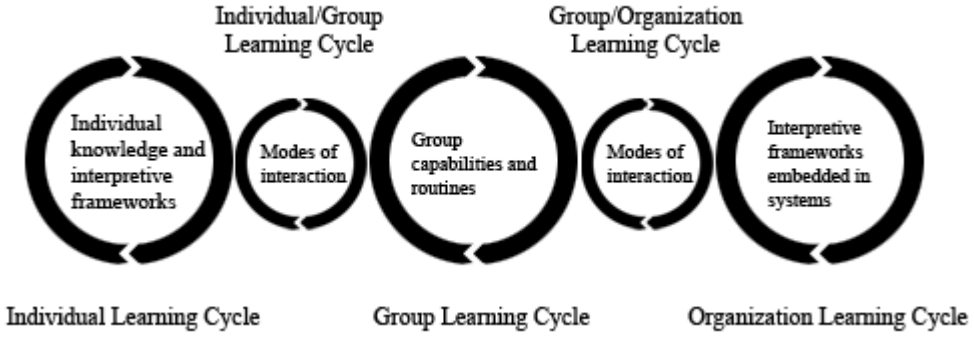

Figure 4: The five learning cycles of the competent organization. (Sanchez, 2003)

From the previous definition, Sanchez (2003) derives five learning cycles that denote the processes involved in organizational competence development. The learning cycles provide a "top-to-bottom" or "bottom-to-top" view of the competence development processes, starting with the individual learning cycle at the bottom and ending with the organizational learning cycle at the top. Between organizational and individual learning resides the group learning cycle. Connecting the three are the individual/group learning cycle and group/organizational learning cycle. As this report concentrates on problems with ERP software solutions regarding *individual* usage, the components that make up the individual learning cycle will be focused.

Interpretive Frameworks and Cognitive Infrastructures

Learning is generally not considered to be just the assimilation of information where the memory of an individual functions as an information repository. This means that *learning* by many is considered to be a more complex process than just the storing of information into the brain. Sanchez (2003) writes that "learning fundamentally occurs in the minds of individuals as they evolve their personal interpretive frameworks for making sense of the world". In other words, when an individual learns, he or she builds on the cognitive processes that determine how to handle sensory input. Merali (2003) elaborates on this, stating that each individual's sense-making process takes place within a *cognitive infrastructure* which affects the shape and development of his or her interpretive framework. This

cognitive infrastructure consists of four main components: self-concept, relationships, The Script and The Schema.

- *Self-concept* resides on a fundamental cognitive level and is closely related to an individual's perception of his or her own identity. It affects what tasks the individual finds attractive, the reasons the individual has for performing and the values he or she tries to realize.
- *Relationships* acts like a content filter, determining how the individual values the information provided. Given a piece of information the relevance depends on the credibility of the information source or information supplier, which is defined by it's relation to the information recipient.
- *The Script* is a set of rules that defines the roles of the participants in the relationships. It is an internal conceptual structure where the individual places him- or herself in a relational network with the surrounding environment.
- *The Schema* is the total cognitive construct which makes up the individual's perception of the world. Herein lays a collection of beliefs and assumptions about self and the surrounding world, on spatial, social, and temporal levels.

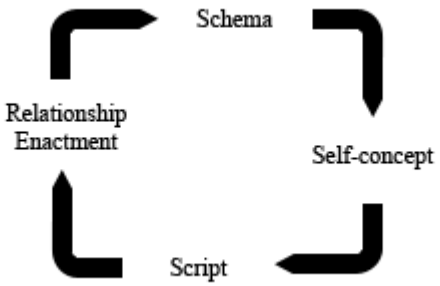

Figure 5: The cognitive infrastructure for intersubjective sensemaking and leveraging of capabilities. (Merali, 2003)

Merali (2003) illustrates the mutual dependence of the components in the cognitive infrastructure by a cyclic model. An understanding of the cognitive infrastructure that effectively controls what information an individual is apt to assimilate into his or her interpretive framework can facilitate an analysis of the different variables related to an individual's learning processes and competence development.

Evolving Best Practices versus Organizational Knowledge Creation

In order to understand where in knowledge management theory ERP systems belong (such as the SAP-based tools in place at Ericsson) the difference between information management and organizational knowledge creation needs to be highlighted. The SAP-based systems are designed to manage information into its unified database accessible across all relevant ERP system modules, eliminating data discrepancies. Moreover, it is also designed to introduce pre-implemented "best practices" into the organization, forcing the users into a pre-defined workflow controlled by the modules' user interface. This way, the organization should be able to streamline collaboration between business units, keeping information organized and administration overhead to a minimum.

Finding the best practices to implement into the ERP system is usually an ongoing process, where the system evolves with the organization, features get added as they are needed and process modifications are developed with some sort of continuously ongoing trial-and-error method. As these best practices develop, the organization adapts itself in a dialogue between individual learning, group learning and organizational learning. The ERP systems evolve in accordance to feedback from groups of individuals, effectively changing the workflows of the organization. This in turn results in new or updated system processes or interfaces that impose new competence requirements on the individual.

New competence requirements created by updated systems impose problems in the form of knowledge gaps with the systems' end users. To cover these knowledge gaps, both employee training and support functions can be implemented. However, the problem is that the covering of these knowledge gaps naturally comes *after* the gaps have appeared, resulting in an organization which is not fully performing at any given point in time. Since the development of the ERP systems is an ongoing process, there will also continuously be new knowledge gaps to cover with training and support.

In knowledge management theory, the creation of *knowledge* in the organization, or organizational knowledge creation, tackles a different type of knowledge synthesis than the one discussed above. Nonaka (1994) states that organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge. Furthermore, Nonaka (1994) states that the knowledge is created via four patterns of interaction: socialization, combination, internalization and externalization. This is sometimes referred to as the SECI model (please note that these terms should not be confused with Frappaolo's use of the words later on in the chapter).

Socialization in this case is the interaction between individuals through things such as observation, imitation or apprenticeships. Combination is combining explicit knowledge through meetings, conversation, information repositories or the like. Internalization is the conversion of explicit knowledge into tacit, while externalization converts tacit knowledge to explicit.

Nonaka (1994) states that organizational learning takes place when all four modes of knowledge conversion form a cycle, so activities in one pattern of interaction trigger activity in the next and so on. The knowledge is created in an upwards spiral, from an individual level to a group level to finally reaching an organizational level. This differs from the synthesis of system processes or the evolvement of ERP-implemented "best practices" both by following different knowledge routes (no vertical cycle) and describing a higher-level, more generalized flow of knowledge creation. In Nonaka's model, new organizational knowledge does not create knowledge gaps on an individual level.

Knowledge Management Application

In order to classify the usage of knowledge management in an organization, Frappaolo (2006) provides a model that divides the knowledge management concept into four main applications: intermediation, externalization, internalization and cognition. These four applications affect knowledge of all types and complexities, ranging from tacit to explicit. Each application has a function of its own but is in turn most efficiently used in conjunction with the other three. Please note that the below definitions of 'internalization' and 'externalization' refer to knowledge management *application*, not to be confused with the internalization and externalization processes of the SECI model, which describes knowledge *conversion*. (Konno, Nonaka and Toyama, 2000)

- *Intermediation* is the connection between an individual and a source of knowledge. It refers to the function of connecting a knowledge-seeker to whichever source is able to provide the knowledge needed. There are two types of intermediation; synchronous and asynchronous. Synchronous intermediation refers to when there is a direct connection between the knowledge provider and the knowledge seeker. Asynchronous intermediation refers to when there is a repository where the knowledge is stored while being "in transit".
- *Externalization* is the process of categorizing knowledge into an external repository according to a classification framework. A structure or map over the knowledge repository is kept to facilitate finding needed knowledge. There are two main components of externalization; the capture and storage of the knowledge into the repository and the organization or classification of that knowledge.
- *Internalization* is the process where knowledge is extracted from a repository according to a request or query from a knowledge seeker. It also includes a filtering process to personalize the knowledge according to the needs of the knowledge recipient. With a close integration to

an externalized knowledge base, internalization helps focusing the knowledge acquired via a request query to better match the needs of the query issuer.

- *Cognition* links knowledge to action. It is the process where the knowledge acquired through the previous three processes is mapped to corresponding decisions and actions. A simple form of cognition is the application of experience in order to find a solution to a problem not previously encountered.

A model based on the preceding key applications of knowledge management assumes that the leverage of collective wisdom in an organization is directly related to knowledge sharing. Frappaolo (2006) writes "… a model that regards knowledge management's primary role as the sharing of knowledge throughout the organization in a way that each individual or group understands the knowledge with sufficient depth and in sufficient context so as to apply it effectively in decision making and innovation".

Applying Technology to Knowledge Management

Even though knowledge management is not primarily about technology, technology has played a major role in facilitating knowledge management practices within the corporation. Without the culture to support it, technological implementations of knowledge management are not likely to give a satisfactory return of investment. However, as Frappaolo puts it, "… given the advances made in technology that can affect and augment these practices and cultures, no knowledge management strategy is complete without a technology component". Depending on the knowledge management application, different technological solutions are available. For intermediation, solutions such as intranets, instant messaging, online collaboration, e-mail or online dossiers are common. Examples of externalization solutions are document management systems and corporate taxonomies. For internalization and cognition, common solutions are search-and-retrieval, agents and decision-support, case management respectively. Common solutions depending on application and knowledge complexity are shown in the diagram below. (Frappaolo, 2006)

	Explicit Knowledge	Tacit Knowledge
Intermediation	Groupware, Intranets, collaboration, Profiling,Instant Messaging, Portals	Communities of practice
Externalization	Document management, corporate taxonomies, categorization, Portals	Mentoring
Internalization	Search and Retrieval, Agents, Portals	Apprenticeship
Cognition	Workflow, Decision-support, Decision-trees, Case management, Portals	Intuition

Figure 6: Application of technology to knowledge management. (Frappaolo, 2006)

There is one solution that is listed at every level of the knowledge application diagram – portals. Portals started to show up in corporate contexts around 1999. They are originally web technology that developed as a response to Internet users' frustration over the massive and unmanageable amount of uncategorized web content. Various companies (such as Yahoo!) delivered organized, categorized and personalized front-ends to the Internet – portals. Corporate portals were quick to follow in order to combat negative challenges of overabundance of information. The major advantage of portals is that they create a "single point of access" which can integrate, within one interface, several ERP, CRM and other localized software solutions. The portal thus provides a single point of access to information sources about existing corporate information systems. At the same time, in order to adjust according to the individual user's information needs, the portal has the possibility of delivering a personalized, function-centred desktop. (Frappaolo, 2006)

Implementing a portal is a complex process that requires a substantial set of architectural elements and components. Among other things, a critical ingredient in productivity enhancement is personalization. If the individual user is able to select categories or channels of content for display in their own view, it gives the portal a new value proposition. In regards to knowledge management technologies, portals are seen as killer applications. A company with a well-developed corporate portal has the possibility of minimizing both workflow interruptions and employee support needs. (Frappaolo, 2006)

Knowledge Management Implementation

Just like there are no two organizations that are exactly alike, no two knowledge management implementations will be exactly the same. However, there is literature that offers suggestions for best practices involving implementation of knowledge management in organizations. The two suggested practices looked at in this report (one very briefly) do have a certain point in common that highlights one of the fundamental values that knowledge management practitioners promote, namely incentives for knowledge sharing.

Wiig (1998) suggests a six-step procedure for introducing knowledge management into an organization with little previous knowledge management experience. These steps focus a strategic, organization-wide deployment of knowledge management with emphasis on building management commitment, planning strategic priorities and identifying desirable benefits. Wiig (1998) also stresses the importance of creating knowledge management-related incentive programs and states that even though implementing a full knowledge management practice requires a long planning horizon, programs of smaller scale can be implemented and benefited from in a matter of months. Frappaolo (2006) introduces an alternative step-by-step guide for introducing new knowledge management initiatives. Although the ten-step guide bears some similarities with the procedure Wiig (1998) presents, due to its less strategic nature it is more applicable for dealing with competence-related issues;

1. *Defining the community*. Even though it might sound obvious, a thorough analysis of for whom the initiative is undertaken is important. Knowledge management solutions are more effective if designed for a particular audience. If the audience is diverse, a single solution can still be constructed, but it should be implemented with different front-ends to match the needs of different user groups.
2. *Defining a strategy and critical success factors*. When the targeted user group or user groups are identified, the next step is to form a clear strategy for the initiative. The strategy should have a strong emphasis on profitability, clearly communicate unique values of the solution and be as unambiguous as possible on what not to do. The strategy must also include a number of critical success factors on which a business case can be built.
3. *Executing a knowledge audit*. A knowledge audit is an assessment of the current state of affairs related to the community for which the solution is developed. Issues to examine are related business processes, current knowledge production and knowledge usage habits. The audit works as a diagnosis to facilitate understanding of constraints, discover current sources of tacit and explicit knowledge and surface opportunities and obstacles for knowledge work.
4. *Estimating an ROI (Return of Investment)*. This is not always needed, but in some companies, a return of investment calculation can help gain approval for the initiative. In such cases, a first step should be to ask management by which metrics they would like to see an ROI.
5. *Determining the right approach to knowledge leadership*. The knowledge management initiative needs some sort of management, especially if it is of a more strategic nature. Frappaolo (2006) stresses the importance of going beyond the knowledge management practice leader and focus on middle and line management.
6. *Identifying and agreeing upon core competencies*. The knowledge practice should revolve around the core competencies of the organization, and not the core products. Competencies might be intangible resources, such as the ability to handle customer relations and therefore

many companies forget this step. This is again more applicable when the aim of the initiative is largely strategic.

7. *Identifying existing used/unused knowledge sources.* Take an inventory of the existing knowledge sources, and which of these the community does and does not use. Also determine the knowledge type of each source as tacit or explicit. When this is done, determine the best ways to organize the collection of knowledge sources.
8. *Determining the quality of existing informal knowledge practices*. Most organizations already have informal knowledge practices, such as user grapevines, interpersonal networks, unofficial meetings or after-hours social groups. Best practices among these already existing knowledge practices should be identified, fortified and encouraged. This step helps in building an organizational culture that supports knowledge sharing.
9. *Building knowledge-sharing incentives*. To further encourage knowledge sharing, aside from having a supporting culture, other incentives should be implemented. Having a knowledge sharing culture without other incentives might lead to a situation where knowledge is shared by request instead of actively and spontaneously. First, a knowledge-sharing metric should be specified – a way to measure and recognize knowledge sharing. Once the metric is established, incentives can be introduced. These incentives do not necessarily need to be monetary, but can be in the form of awards, performance reviews or time dedicated to knowledge sharing[3].
10. *Supplying an infrastructure and building a cyclical practice*. In this last step, technology should be put in place to support the practice. The technology should support knowledge sharing and knowledge discovery in an efficient way. It should serve as a facilitator or enabler to leverage organizational efficiency – not be a solution in itself. Once everything is in place, processes to continually re-evaluate the previous steps should be implemented. This would be the primary responsibility of the knowledge management leader.

Implementing knowledge management practices in an organization requires substantial effort, planning and investment – like any other organizational change. However, as Zack (1999) writes, "Companies having superior knowledge […] are able to coordinate and combine their traditional resources and capabilities in new and distinctive ways, providing more value for their customers than can their competitors". Zack (1999) states that what knowledge does is enabling a company to exploit and develop its traditional resources in a manner that their competitors (lacking the same knowledge) cannot do, thus enabling the company to get a competitive advantage even though the traditional resources in themselves are not unique. As Raub and von Wittich (2004) put it, "[…] the ultimate payoff for those organizations that truly become knowledge-centric may well be worth the effort".

[3] Research shows that recognition by peers is one of the most powerful incentives for knowledge sharing, and that a collective (team-based) reward structure is the most powerful incentive of all. (Gorelick et al., 2005)

Results

The reader is here presented with data gathered from the empirical studies. This chapter includes an assessment of the existing competence development practices as well as the support networks in place at Ericsson. The chapter also covers the identified knowledge gaps and the main competence-related issues regarding the SAP implementations.

Ericsson's SAP-related Competence Development and Support Networks

Regarding competence development and support for the SAP implementations, the different modules share some aspects while other aspects are application specific. Even though there are a handful of shared competence development and support options available, each of the considered SAP modules also have their own unique ways of managing competence. Due to the nature of the information sources, the following paragraphs describe competence management at Ericsson in Sweden, even though this likely bears similarities to how competence management is handled in the enterprise world-wide.

Shared Competence Management

Learning tools shared among the ERP modules consist of classroom training and online tutorials. Outside of the initial educational effort that comes with an application roll-out, the traditional classroom IT-training is structured and managed through a Learning Management System (LMS) – a web portal – called eGate. Through eGate it's possible for Ericsson employees to sign up for pre-set course dates or to declare their interest for a course without a pre-set date. As soon as enough employees have declared interest for a course, a starting date is set and everyone involved is notified by e-mail. eGate is today one of several LMSes at use at Ericsson, but it is the one primarily used by IT and HR and hence it is used for SAP-related training. (G Dahlström 2006, pers.comm., 11 Nov.)

The other training tool which is common among the different SAP solutions is tutorials produced by IBM as a part of the continuous SAP development. These tutorials are called "SAP Tutor" and are created in the form of screen recordings guided by an animated character. Instructions are given by this animated character through text and synthesized speech. The user is also allowed some interaction with the tutorial by the inclusion of simulated work environments. Tutorials are available online and exist for different tasks and processes in each ERP solution. For each roll-out of a new application version these tutors are updated in order to comply with possible interface- or process changes. (G Dahlström 2006, pers.comm., 11 Nov.)

The support networks at Ericsson that have an application-wide span start with the HP operated Service Desk referred to as "first line support". However, the Service Desk is a general IT-related support service, and it is not specialized for SAP-related problems. Issues received by the Service Desk that are related to usage of the ERP system are usually dispatched to the IBM-operated Expert Support or the Ericsson-operated Contact Center. However, employees also have the option to contact the Contact Center directly, without first going through the Service Desk. Directly contacting the Contact Center is advantageous, since the problem has the chance of being solved on-site instead of being dispatched to IBM Expert Support in India. (G Dahlström 2006, pers.comm., 11 Nov.)

EB Specifics

Like the other SAP modules, when Ericsson Buyer is first implemented at a site, local training efforts are made. After this first training initiative, retraining all users after each new version release would be costly and inefficient. Therefore, after each release, a mail is sent out to all potential EB users

containing a video clip with a speaker voice showing exactly what changes that have been made and how to work with the updated system. The length of these video clips are kept under five minutes in order to make them more easily digestible for users. After the mail has been sent out, the same information and video clips are made available on the Ericsson Buyer website. (M Sjöberg 2006, pers. comm., 22 Nov.)

On the support side of things, on top of the previously mentioned call centers, there are so-called User Guides for support-related issues. These User Guides are available via the EB website and consist of crib sheets in the form of word documents. Lately, these crib sheets have replaced some of the SAP Tutors due to the amount of work necessary to keep the tutors updated. (M Sjöberg 2006, pers. comm., 22 Nov.)

CBS Specifics

Competence development related to CBS differs slightly from the other ERP modules due to how the application is used. As mentioned earlier, the examined CBS user group is Customer Logistic Managers, whose specialization is order management in the system. When a new CLM is to be trained (s)he gets to sit with one of his/her peers and watch him or her work with the application. In addition there are e-learning/classroom hybrid courses to train a new CLM for a certain scenario used in CBS (CTC). These hybrid courses start out with an e-learning part to bring all course participants up to a minimum level of competence. This way the following classroom part can keep a higher pace and concentrate on the parts of the training that are not as easily conveyed via e-learning. (S Lantz 2006, pers. comm., 13 Nov.)

The support networks available for CBS also differ from the other ERP modules. For CBS there is still an established super user network that works as a first line support for how-to questions. These super users were pointed out at the application roll-out and work as technical, system support. In case a super user is unable to solve the problem, the issue is escalated to the *process support*. If neither super users nor process support are able to solve the problem, or in case the problem is caused by a system error, the matter is dispatched to IBM Expert Support. (S Lantz 2006, pers. comm., 13 Nov.)

MUS Specifics

As in the case of CBS, when learning how to use MUS, most new users sit down with a peer. As a complement, classroom education covering the basics is also available. However, where competence management with MUS really differs from the other ERP solutions (with reservation for CBS) is with respect to the support system with super users. For MUS there is a well-established super user network for the different Market Units, with different super users having different areas of expertise. As with CBS, if the super users are unable to resolve the issue, it gets dispatched to IBM Expert Support. (M Stenman 2007, pers. comm., 11 Jan.)

HRMS Specifics

Competence development related to HRMS is yet again handled a bit differently. Instead of courses, training is given in the form of seminars. The seminars are short presentations where users are instructed not as much on how to use the system as on what rules, regulations and codes to use regarding time reporting. For each new application version release, the changes are communicated via seminars, e-mail and web-based information. The seminars are held openly, so system users are allowed to drop in when they have time. Additional seminars are held in conjunction with others already booked, non-related meetings (such as staff- or board meetings), where training personnel are given time to demonstrate new functionally. On top of this, extra training is given to secretaries and assistants to create a sort of unofficial super user functionality. Support for the system and help with how-to related problems is given through the unofficial super user network as well as a website containing information, instructions and user guides. (K Andersson 2006, pers. comm., 5 Dec.)

Knowledge Gaps and Competence-Related Issues

No matter how well implemented or well supported a software system is, there is undeniably going to be competence-related problems in connection with its usage. Moreover, this is likely a problem which increases along with system complexity, and a large ERP system – such as the SAP-based applications at Ericsson – will have their fair share of problems related to system usage. A first step in analyzing the competence development in an organization would be to identify the areas needing improvement. In this report this is done through semi-structured interviews with management and end users of each ERP software solution, and the results are presented in the following paragraphs, collected by application.

EB Main Competence Issues

Ericsson Buyer is the ERP solution at Ericsson which by far causes the largest support-related costs. This is not necessarily due to a more complex user interface than the other software solutions, but to a greater extent related to the size of the user base as well as to how the system is used. As mentioned, EB has over 30 000 users with access to the system. Out of these, about 15 000 do actually log in and place orders. The main complicating circumstance is that a large portion of these users are non-frequent users of the system. This means that for many users there may be several months, or even years, in-between orders. Due to the short product cycles of the SAP implementations, the interface is likely to go through a number of changes during that time. Alas, the next time an employee is to place an order, the EB interface may feel new and unfamiliar and thus be the cause of a need for support. Moreover, due to the rare usage, most employees never reach the point when they feel comfortable when navigating the interface and thus may have how-to-related problems which are directly related to the system usability. (G Dahlström 2006, pers.comm., 11 Nov. and M Sjöberg 2006, pers. comm., 22 Nov.)

Another complicating circumstance that is not a system-related competence gap but nonetheless contributes to the high support-related costs is that the existence of Contact Center is relatively unknown. Before Ericsson Buyer was rolled out, an effort was made to communicate the existence of the HP Service Desk to the entire organization. Among other things, mouse pads with the Service Desk phone number was distributed. Unfortunately, this has lead people to call the Service Desk instead of Contact Center when they have how-to-related questions regarding the different ERP software solutions. Since the Service Desk isn't specialized on dealing with issues regarding ERP system usage the problem is often incorrectly dispatched to IBM Expert Support in India resulting in an unnecessary expense for Ericsson. (G Dahlström 2006, pers.comm., 11 Nov. and M Sjöberg 2006, pers. comm., 22 Nov.)

On top of the mentioned competence-related problems, there is expressed concern for an indifferent attitude among employees in Sweden towards training. At local application roll-outs, there have been problems with course attendance and it's not uncommon among employees to not to take on a responsibility to stay up to date with new software releases. This somewhat skewed attitude increases the need for support, since it effectively lowers the average competence levels and thus contributes to escalating error occurrences. Furthermore, the competence issues regarding EB usage in Sweden present some unsuspected characteristics. When usage data from EB is compared with support statistics from Expert Support there is no traceable correlation between the number of orders placed in the system and the number of support ticket requests. The global statistics do however show significant order/ticket correlation. The relation is illustrated in the table below (with normalized values) and a discussion of what might be the cause of this is presented in the discussion chapter. (G Dahlström 2006, pers.comm., 11 Nov. and M Sjöberg 2006, pers. comm., 22 Nov.)

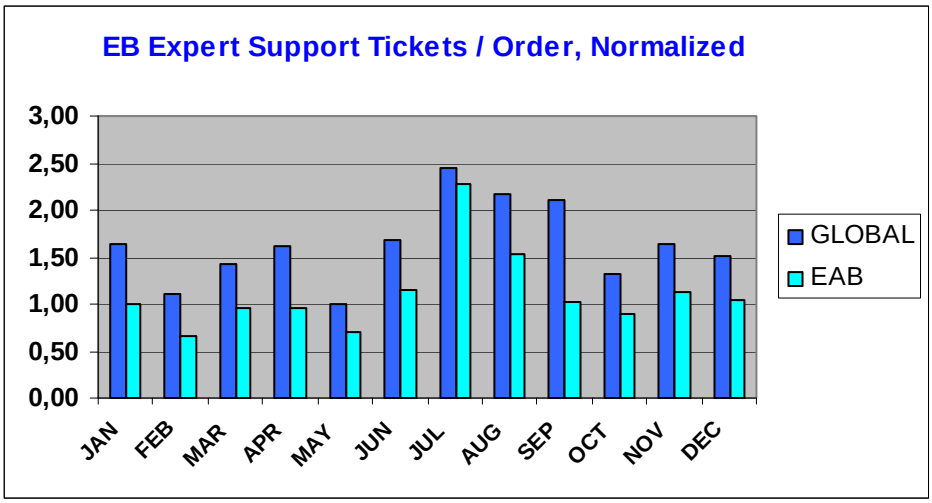

Figure 7: EB Expert Support tickets per order, normalized values. Correlation coefficient: 0.2732 global, -0.0002 EAB.

To help in solving the problems with high support costs and difficulties related to system usage, several efforts have been initiated. For example, a series of usability evaluations are in the works in order to pinpoint the main inadequacies regarding the user interface. On the support side of things, efforts are under way to communicate the existence of the Contact Center and what kind of help and support that is available through which channel. This is done through informants placed at strategic locations as well as SMS-based information being sent out to all Ericsson-registered mobile phones. (M Sjöberg 2006, pers. comm., 22 Nov.)

Another complicating circumstance with Ericsson Buyer are the connections that exists to the other ERP solutions. EB is a complex environment with connections to HRMS, CBS, MUS and an interface going out to the supplier. As such, if something goes wrong with an order, the cause of error might be originating from another system and not be due to the EB user. These error sources – related to invalid master data – is however not easily identified, and EB may be inaccurately blamed to be the cause of this difficulty. (M Sjöberg 2006, pers. comm., 22 Nov.)

CBS Main Competence Issues

The competence problems related to CBS are of a completely different nature than those of EB. This is due to the fundamentally different ways that the systems are used. Since the looked-at CBS users are working with the system very intensively, how-to-related problems are significantly less frequent, and when they do arise are on a more complicated level. Due to the close proximity of peers and co-workers, as well as the existence of super users and process support, most support-related issues are handled internally. When neither support network is able to solve the issue, the cause of the problem is likely a system error and therefore gets correctly dispatched to Expert Support. (S Lantz 2006, pers. comm., 13 Nov.)

However, there are other areas where there is room for improvement. Among the different Customer Logistic Managers, even if there in general is a high level of competence regarding system usage, there are vast differences in attitude towards order management. Sture Lantz (2006) refers to this difference in attitude as either having or not having “order care”. Having order care means taking the extra steps necessary to plan orders, plan purchases and consider other external circumstances in order to achieve just-in-time delivery, to facilitate for both Ericsson and its customers. Employees with a less caring attitude towards order management also tend to make more mistakes. These mistakes can lead to orders staying in the system without getting processed or closed. In some cases, these forgotten orders have been for large sums of money. Leaving them unclosed for long periods of time may cause imbalance in other corporate processes as they may cause financial miscalculations. In order to reduce the amount of errors related to forgotten orders, a project called “Get Clean, Stay

Clean" has been initiated where the system is gone through and forgotten, unclosed orders are cleaned up. (S Lantz 2006, pers. comm., 13 Nov.)

MUS Main Competence Issues

Due to not being able to interview a manager of MUS, there is no perspective of aggregated usage-related issues available. However, due to the similarities to CBS regarding usage and support networks, the competence issues are likely comparable. Even though no manager perspective is available, the end user interview pointed out two areas where there are competence gaps and lacking competence management. To begin with, end users *seem to* have little knowledge of what competence development options are available. Initial training is done internally with peers, but once the user has developed a certain system expertise, there is no well-known alternative for further education. There is a demand for intermediate level and expert training programmes in order to improve efficiency and learn workflow- and process best practices. (M Stenman 2007, pers. comm., 11 Jan.)

Furthermore, concern was expressed with the lack of intuitivism of the user interface and the general system complexity. This is however outside the scope of this report and will therefore not be discussed further. (M Stenman 2007, pers. comm., 11 Jan.)

HRMS Main Competence Issues

Competence-related issues regarding HRMS are generally not related to interaction with the system, but rather related to rules and regulations that are not a part of the interface, such as to which code to use for time reporting. The Contact Center help desk receives approximately 600 calls every month about usage-related issues concerning HRMS, out of which a large part are non-usability related, process-oriented errors like the example above (noteworthy is that statistics concerning calls misplaced to HP Service Desk was not available). In order to minimize the amount of errors of this kind a dialogue is carried out with IBM to concentrate future training efforts around processes rather than around system functionality. At the same time, extensive usability engineering projects are carried out to evaluate and improve the user interface. (K Andersson 2006, pers. comm., 5 Dec.)

Non-System Specific Observations

Through the interviews, a couple of non-system-specific issues related to competence management surfaced. These issues were not related to a specific ERP solution, but rather affect organization-wide competence management work. By addressing these inadequacies, knowledge-related work regarding several of the ERP solutions could be improved.

The first of these issues was general difficulties in intra-organizational communication regarding available training options, support alternatives and competence development efforts. Management with several looked-at software solutions expressed concern regarding general awareness of training and support alternatives, and the MUS end user interview confirmed these concerns rather explicitly. This kind of communicational difficulties may not be easily addressed in large organizations like Ericsson and may also be particularly problematic when it comes to user bases as extensive and diverse as those of the looked-at ERP solutions.

A second issue expressed during the survey, and concerning all IT systems in use at Ericsson, is that the systems are missing a shared terminology. This means that different software systems use different terminology to denote the same function or phenomenon. An example is the term for *competence* (as denoting an individual skill) which in the HRMS Competence Development module could be "competence" while in the SAP R/3 system it could be "qualification" and in a particular LMS it could be "skill". Such Ambiguous concepts may further complicate communicative efforts as well as create steeper learning curves for individuals in contact with more than one ERP system. (H Lundberg 2007, pers. comm., 16 Feb.)

Affecting systems with peer training as a part of their training programmes is a third issue that surfaced during the survey. During peer training, the learning individual sits down with a peer as

(s)he works with the system doing everyday tasks. A natural consequence is that the learning individual adapts his or her peer's workflow and technique, together with possible flaws or recurring mistakes. Therefore, depending on how correctly and efficiently each individual uses the system in question, he or she may or may not be suitable for peer training situations. A possible solution to the problem, which was suggested during the survey, is to have all training done by certified peer trainers. That way a certain quality assurance could be established, and an implementation of control measures for directing workflow towards best practices could be facilitated. (C Qvarngård 2007, pers. comm., 9 Feb.)

Analysis

In this chapter the reader is presented with an analysis of the results gathered through the survey and the empirical study. The previously identified knowledge gaps are analyzed and categorized in terms of knowledge complexity, cognitive skill level and personal interpretive frameworks. The analysis forms a base for the next chapter were the results are discussed in greater detail.

Overview

The analysis of the empirical data gathered through the interviews was carried out in two steps. First, the competence gaps and competence development processes were categorized and named according to the knowledge management theories presented in the theory chapter. This was done to put the material in perspective as well as to supply the tools and the means to support further analysis. The next step was to use the categorized and analyzed material to suggest best practices for knowledge management implementation. The suggestions regarding KM implementation are meant as inspiration or guidelines in order to highlight the type of advantages that are to be expected in case a real KM initiative would be executed.

Learning Cycle Levels

As mentioned in the theory chapter, one of the most important properties of knowledge aiming to develop organizational competences is whether the knowledge resides at an individual-, group- or organizational level. This includes both identified knowledge gaps as well as future competence goals. When it comes to how-to problems such as difficulties regarding system usage, the competence development needed should take place within what Sanchez (2003) refers to as the *Individual Learning Cycle*. This type of problem includes the how-to problems of EB, the more process-oriented issues with HRMS, as well as the development of individual skill levels in MUS. When dealing with individual learning, the critical factors to look at regarding the learning process are the interpretive frameworks and cognitive infrastructures of the learning individuals (more about this below).

Problems at a different organizational level are, in the case of SAP-related competence issues at Ericsson, the more intangible competence issues. For example, the advocated change of attitude towards order management in CBS resides within the *Group Learning Cycle*. Since this “order care” is largely dependant on an attitude among CLMs, it is as much about individual values as it is about a general process practice. Today, there are individual CLMs possessing this advocated order care. However, the goal is to leverage this individual knowledge to be a part of the group’s joint competencies. Sanchez (2003) identifies the critical factors to consider regarding group learning processes to be group capabilities and routines. Indeed, by implementing well-established routines regarding order care some of the problems with careless order management could be avoided. As mentioned in an earlier chapter, this is already done to a certain extent with the “Get Clean – Stay Clean” project.

The same reasoning regarding the leveraging of individual knowledge is applicable for the needed change of attitude towards training and information digestion among Ericsson employees. This problem is however more of a cultural phenomenon spanning the entire organization and thus a part of the *Organizational Learning Cycle*. The main component of the organizational learning cycle identified by Sanchez (2003) is interpretive frameworks imbedded in systems. Sanchez refers to interpretive frameworks – rules, values, directives – set for an organization through implicit means (ubiquitously implemented in systems and processes). By implementing functions, processes and

incentives that encourage training and staying up to date with system functionalities, a gradual cultural change could be achieved.

Identifying Explicit and Tacit Knowledge Gaps

Due to the varying complexity of the knowledge gaps, different ways to deal with the competence issues are needed. As previously mentioned, most organizations tend to concentrate their knowledge-related investments on explicit knowledge due to its more easily quantified and tangible nature. However, when looking at the identified competence issues with the ERP systems at Ericsson, development of tacit knowledge is both needed and explicitly requested. The reader is asked to keep the complexity spectrum in mind while going through the following paragraphs.

Competence Issues Regarding Explicit Knowledge Gaps

Explicit knowledge is knowledge that is easily transcribed and coded, such as technical information, instructions and manuals. Thus, the first type of competence issue to fall into that category is the how-to-related problems with the different ERP solutions. For Ericsson Buyer with its many non-frequent users, explicit knowledge gaps are by far the largest problem. Examples of how-to problems due to competence gaps can be related to how the system works, how to navigate the interface or regarding what G/L account to use when placing an order. This is all information that could be transcribed into textual instructions or into a manual, and thus clearly explicit knowledge. The same type of knowledge gap tangibility is the main usability issue with HRMS. With HRMS, the largest competence related issues are related to time reporting and related rules and regulations, such as to which code to use for different types of overtime. In the same way as instructions could be written down for how to place an order in EB, the knowledge required for correct time reporting is decidedly explicit.

For MUS, the same type of explicit how-to related problems is not as common. As mentioned in the results chapter, general concern was expressed about the system's intuitivism and the complexity of the user interface. This problem could be confronted with more training as it is in effect a result of an explicit knowledge gap, but a more direct approach would be to address the problem with usability engineering evaluations. However, aside from the usability issues, MUS did have other competence gaps that should be classified as explicit. Once users have learned to handle MUS, there is little knowledge of how to further evolve their system usage into being more efficient. Both the knowledge of how to receive further training as well as the training material in terms of best practices, tips and ideas would be classified as explicit knowledge.

Competence Issues Regarding Tacit Knowledge Gaps

When conducting the survey, one major source of tacit knowledge issues was identified. CBS did not at all have the same kind of how-to problems as EB and HRMS. Since the looked-at users of the system are specialized order managers, the pressing issue was not how-to-related but rather involving an attitude among CLMs. An attitude is highly intangible and hard to code or transcribe. As discussed in the theory chapter, Frappaolo (2006) defined tacit knowledge as personal knowledge involving intangible factors such as personal belief, perspective and values. The corresponding CBS-attitude referred to as "order care" by Sture Lantz clearly fits into a classification as tacit knowledge.

Identifying more tacit knowledge issues would not give the same return since the most pressing issues regarding the other ERP systems involved explicit, not tacit, knowledge gaps. However, one problem that did surface during the survey regarding Ericsson Buyer was that management previously had problems with employees not attending training events at application roll-out. Concern was also expressed regarding a general attitude towards application training and towards the information which was sent out in order to inform users about new functionality. If employees changed attitude towards taking in information and keeping themselves updated with new system

functionalities, a large portion of the support-related costs could be avoided. This kind of attitude also qualifies as tacit knowledge.

Summary, Knowledge Complexity

To summarize, the results of the knowledge complexity analysis is shown in the table. Major sources of explicit knowledge gaps are EB, HRMS and MUS. The most pressing issue regarding tacit knowledge gaps lies with the usage of CBS. Concern has also been expressed around a tacit knowledge issue regarding EB, but which might influence attitude towards training regarding other ERP systems as well.

Table 1: Competence issues sorted by knowledge complexity.

	EB	**CBS**	**MUS**	**HRMS**
Explicit knowledge	How-to problems, both system and non-system related		Lacking knowledge of available training, lacking expert training options	How-to problems, non-system related
Tacit knowledge	Inadequate attitude towards "information responsibility"	Lacking order care		

Cognitive Skill Levels

The Taxonomy of Educational Objectives should not only be used for the analysis and categorization of competence gaps. The taxonomy was initially developed categorization of competence *goals*. By categorizing the cognitive level of current knowledge and comparing it to the sought-after cognitive level, the taxonomy can be a powerful tool when planning future training efforts.

The most simple how-to related problems with EB (Ericsson Buyer) and HRMS (Human Resource Management System) are unambiguously explicit and do not require a higher cognitive level of understanding. As mentioned in the theory chapter, the first cognitive skill is called *knowledge* and refers to abilities such as remembering, bringing something to mind. In the case of navigating a user interface or knowing the appropriate code to use for overtime reporting, a relatively low cognitive skill level is satisfactory. A deeper understanding of why the interface is designed the way it is, or why the overtime codes are what they are is not necessary in order to evade how-to related problems. The sought-after cognitive skill in those cases are as such *knowledge* or *comprehension*, and the lack there-of indicates that implemented training efforts *need not* and *should not* go very in-depth, but rather be largely *process oriented*.

Other existing explicit knowledge gaps are the issues regarding MUS (Market Unit Solution). The problem with MUS is two-fold. Firstly, users have a very vague idea of what kind of training options are available. Secondly, there seems to be a lack of further training for employees who already possess basic and moderate application skills. Information about available training options requires the same basic cognitive skill level as the how-to type issues with EB and HRMS. However, when building on already existing application skills, the sought-after cognitive level is higher. A moderate user in MUS has probably reached the third cognitive skill level, *application*, where he or she is able to apply knowledge about the system on situations not previously encountered. What should be sought after in this case are the following three cognitive skill levels, *analysis*, *synthesis* and – in particular – *evaluation*. If the user reaches this last cognitive skill level, he or she is able to analyze workflow, create best practices and effectively choose the most effective solution for any given situation.

Tacit knowledge goals are not as easily quantified in terms of cognitive complexity. However, when it comes to a change of attitude, having a deeper understanding of the processes and inner workings that are affected by user actions is likely to help. With regards to CBS this is valid for both the

application and the surrounding circumstances such as customer relations, costs of delays and benefits of just-in-time deliveries. The knowledge goals should be at the highest cognitive level (evaluation) for the application and at least on the third cognitive level (application) for the above mentioned surroundings. According to the survey results, the usage skill level for the CBS application is generally not the problem, since the CLMs are highly specialized users. However, leveraging the average cognitive awareness regarding processes surrounding the order management may help CLMs understand the value of "order care".

The same type of thinking is applicable for the attitude towards training and information digestion regarding Ericsson Buyer, even though the related cognitive awareness doesn't need to reach higher levels. If EB users were to have basic knowledge (first or second cognitive level) about problems, difficulties and costs related to competence gaps it is likely an improvement in attitude would be observed with the benefits of a diminishing need for user support. Higher cognitive levels would increase user understanding but with the drawback of more extensive competence-related investments.

User Interpretive Frameworks

The interpretive frameworks and cognitive infrastructures of an individual provide the conditions under which the individual processes information to reach new cognitive skill levels. Understanding and considering these variables may lead to a deeper understanding of explicit and tacit competence issues as well as facilitate the design of new knowledge initiatives. This type of cognitive analysis, where the focus of the analysis lies *internally* within the individual instead of *externally* with the competence gaps or competence goals of an application, would require a different type of user survey to be adequately carried out. However, reasoning around the concepts of cognitive infrastructures can still provide useful insights, especially regarding competence issues that are tacit in nature and of a more complex cognitive level.

The tacit competence issues among CLMs regarding order care seem to fit the cyclic model which Merali (2003) uses to describe the cognitive infrastructures within an individual. On a basic level, changing an individual's *self-concept* directly affects the reasons he or she has to perform and the values he or she tries to realize. As it is closely related to the individual's perception of her own identity, communicating the importance of the order management task should positively affect the individual's self-concept in regard to his or her work. The *relationship* cognitive structure determines how the individual values provided information, which in this case would be the incoming order components. Developing a relationship to customers is probably neither feasible nor desirable, but it could be stressed that incoming orders are more than just passing information. *The Script* and *The Schema* are in this case closely tied together, and illustrate the individual's relations to her surrounding environment on social, spatial, temporal and semantic levels. Therefore, one way of motivating CLMs to employ "order care" to a greater extent could be, as previously mentioned, to leverage the awareness of surrounding processes so that the users of the ERP system fully grasp the importance and impact of their own actions. The script and schema are also closely related to group learning cycle processes and may be directly (positively) affected by things such as well-established group routines.

As mentioned above, this kind of analysis is not suitable for explicit knowledge or gaps of a lower cognitive level without a different type of background material. However, interpretive frameworks and cognitive infrastructures should always be considered when planning knowledge management or competence development initiatives – even on explicit levels – as they effectively control individual learning processes.

Suggestions for a Knowledge Management Initiative

Suggestions for a knowledge management initiative need to take into account several aspects of the competence issues, such as knowledge complexity, the sought-after cognitive skill level, interpretive frameworks of affected individuals as well as the needed application of knowledge management. Here the major identified competence-related issues will be gone through and measures will be suggested accordingly.

- *Explicit Competence Issues Regarding EB and HRMS*: The how-to type problems related to the usage of EB and the HRMS time reporting module are highly explicit and not very cognitively complex. In order for users to find a solution to their problem they need to be connected with the information source, the *intermediation* application of knowledge management. The information exists in various repositories at Ericsson today, available through the Contact Center as well as through user guides and online documentation. In order to facilitate the connection between information seeker and information source, an *externalized* user information hub could be formed. From this hub the information seeker would get directed to the relevant information repository, user guide or call center.
- *Explicit Competence Issues Regarding MUS*: As previously mentioned, the competence-related issues identified with MUS are two-fold. The problem with users not knowing what training options are available is of a low cognitive level and shows a need for KM intermediation. So does the lack of intermediate and expert training options, even though the cognitive level is higher and the knowledge therefore not as easily conveyed through non-personal communication. An LMS (eGate) is present at Ericsson today where employees can browse and sign up for IT-related training. However, there seem to be inadequacies regarding communication of available training options. This suggests that existing training utilities could be communicated in a more effective manner. If available LMSes and training alternatives would all be accessible from one single point of access, it would make it more intuitive where to look for competence development. Explicit competence issues of a more complex cognitive level could be addressed through user grapevines, personal profiling or other techniques encouraging interpersonal communication and individual competence development.
- *Tacit Competence Issues Regarding EB and CBS*: The tacit problems regarding CBS and order management are of a relatively high cognitive complexity level. The suggested KM application in this case is *cognition*, an application which has no simple solution for tacit knowledge goals. Suggested measures to be taken are education about processes surrounding the order management processes as well as the importance of order care. This may however be outside of any initial technological knowledge management initiative and rather related to further CLM training. Regarding the tacit inadequacies in attitude towards EB education and neglected responsibilities towards keeping up to date with new information, the situation is equally ambiguous. However, due to the lesser cognitive complexity of the problem, relevant information could be intermediated via a centralized solution which also holds links to user guides and call centers.

The addressed (explicit) competence issues suggest having a centralized hub for all IT-related training and support – a portal. The portal is not a substitute or replacement for any existing system, but rather a complement in order to give employees a single, joint point of entry. From this portal there should be links or connections to eGate, EB documentation, the HRMS website and all other relevant sources of IT training and support. The portal should also include information on how and when to contact each call center in order to avoid expensive Expert Support tickets for how-to type problems. It's important to stress that the portal needs to be heavily *externalized*. That is, it needs to be categorized and ordered so that finding the correct information or resource is straight-forward to the user.

By implementing an initiative that can effectively direct information seekers to the correct information sources, facilitate interpersonal networking and work as a hub for IT training and support it is possible to gain a multitude of advantages. If correctly implemented, the initiative would be very likely to decrease the need for support regarding how-to-related competence gaps due to user guides and information being more readily available. Additionally, the how-to type problems that get dispatched to IBM Expert Support are likely to diminish, resulting in a cost decrease for ITM. Tacit knowledge in the form of general attitudes towards taking in information and keeping up with new releases is more easily managed when focus can be placed on a singular information resource. Moreover, synergies can be found regarding management for different ERP solutions collaborating when sending out information or informing about new releases.

Discussion

The discussion chapter presents a more open, free discussion about the previously concluded analysis and results. The discussion covers areas such as steps of implementation not previously discussed, elaborates on the communicative issues as well as presents suggestions for continued research and work on the subject.

Project Process Overview

The aim of this MSc thesis report is to give an example of how knowledge management theory can be applied in a knowledge-intensive organization. As stated in the introduction, this is done through a case study performed at Ericsson in Sweden focusing competence issues regarding a subset of their SAP-based ERP systems. An assessment of the current state of affairs concerning competence management and education related to the ERP systems has been achieved through a survey consisting of interviews with management and end users of the looked-at systems. The gathered information is then analyzed according to the knowledge management theories presented in the theory chapter.

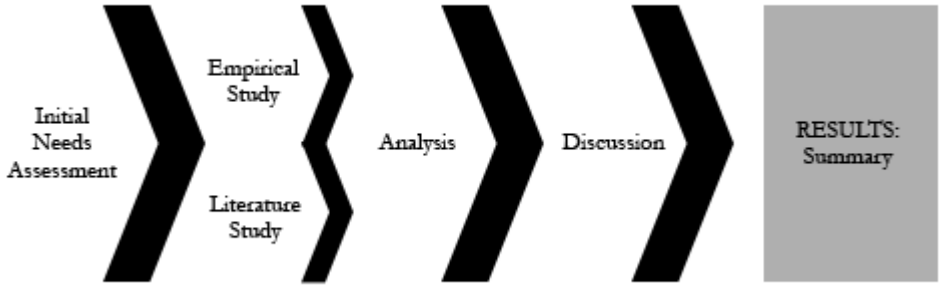

Figure 8: Project process overview.

The above model provides a generalized project workflow suitable for most situations that are similar to those the report attempts to address. The outcome of the initial needs assessment determines in what form the empirical study should be performed, as well as how to focus the literature study. Following is the analysis which categorizes and identifies competence issues as well as possible solutions that are looked at in greater detail later in this discussion chapter. The process culminates in a final set of observations and suggestions presented as an executive summary. Since the research process model provides a simple workflow it should leave room for relatively diverse cases.

However, if the resources provided for a knowledge management implementation project were greater, several of the process steps could be more exhaustive than in this report. The two areas where this is particularly applicable are the empirical study and the final discussion. A more extensive empirical study could identify additional explicit and tacit competence issues which would be assistive when designing a technological solution. The discussion could also involve one or more participants from the looked-at organization and partly be performed as an open discussion in a study group. This also has the advantage of spawning ideas for specific functions or properties of any planned technology implementation.

Another problem with the model is the fact that the literature study and the empirical study are conducted simultaneously. If the literature study preceded the empirical study it could more directly influence the design of the research technique. The problem becomes less prominent when the aim of the empirical study is establishing an overview or identifying previously unknown issues, as the research technique will be less focused in either case.

Identified Competence Issues Discussed

The competence issues identified regarding ERP system usage at Ericsson are of both an explicit and a tacit nature. The most pressing issues are the explicit competence gaps related to Ericsson Buyer, since they contribute to the highest support-related costs. At a first glance, these issues appear simple enough to comprehend and address. However, a closer look at usage-related statistics suggests otherwise. As discussed in the results chapter, a comparison between EB usage in Sweden and support tickets filed to IBM Expert Support in India show some unexplained characteristics. There is no distinguishable correlation between the number of orders placed in EB in Sweden and the number of Export Support errands.

The reasons for this odd circumstance are unclear, especially since there is a noticeable correlation when looking at international support statistics. One explanation, or at least a contributing factor, may be the so-called “auto alarm” function in Ericsson Buyer. This automatic functionality creates a “User Guidance” ticket with Expert Support when there are certain halts detected in the order flow. These tickets are thus not submitted by end users and therefore somewhat more detached from usage statistics. Another possible explanation is that the number of support tickets is more directly related to the number of unique users in the Ericsson Buyer system, rather than the number of orders placed. If EAB in Sweden centralizes most EB-placed orders to secretaries and assistants, the number of orders may change while the number of unique system users is relatively constant.

Aside from the above oddity, most circumstances around identified competence issues seem well-known, comprehended, and are – to a large extent – being addressed. The solution presented in this report is not meant to replace any other efforts or initiatives undertaken, but is rather meant to supply yet another (well-needed) complementary angle to combat competence-related problems. The report also serves an overview-creating function and includes competence problems with more than one software system aiming to provide more of a top-down perspective on the situation.

Comparison of Results with Study Performed by SAP

In 2005, an extensive study on the training and educational processes regarding SAP-based software solutions at Ericsson was done by two consultants from SAP Sweden. The report focused on an operational perspective and suggested changes both regarding training programmes and on an organizational level. Even though the SAP-performed study covers areas not looked at in this report, some of the findings as well as suggestions are strikingly similar. For example, one of the concluded results of the SAP-performed study is that end users are often unaware of where to find training. The study also states that the wide variety of LMS solutions makes it hard for end users to find the correct training or the relevant tutorials. This is coherent with both the results of the MUS-oriented survey as well as conclusions drawn from EB- and HRMS-related competence issues. (Kleppesto and Thörnblom, 2005)

Even more interesting is one of the suggested changes in the SAP-performed study. For the support networks, the study suggests a first-line support consisting of a web-based resource connecting all available training courses, SAP Tutors, exercises, work instructions and business process flows. This resource is suggested to be available through an easy-to-navigate browser interface. The suggested web resource bears remarkable similarities to the portal suggested in this report. Moreover, as a part of this first-line support, the SAP-conducted study suggests channels for user collaboration and chat. This is similar to what is suggested in this report regarding the explicit competence problems of a more complex cognitive nature. (Kleppesto and Thörnblom, 2005)

The present study from a KM perspective has identified and looked at a subset of the issues addressed in the report written by SAP. However, both reports have identified problems regarding communication of available training and support. Both reports have also suggested a similar solution to the problem. The SAP-performed study was not used as a reference during the survey or during the analysis of results. The conclusive coherence between the reports could therefore be seen as a hint that the study has attained a certain degree of reliability.

The Cost of Competence Requirements

As has been mentioned previously in the report, from an organizational perspective the knowledge required to operate the SAP-based systems at Ericsson is more properly viewed as competencies.

The reasons to implement IT systems with static, pre-defined workflows is that in theory the organization should be able to streamline collaboration between business units, keeping information organized and administration overhead to a minimum. However, this is only true when the loss in productivity due to competence gaps together with the cost of implementing the system is lower than the increase in overall efficiency. An expensive integration together with high support and training costs may lead to the ERP system implementation being an unproductive business decision.

This emphasizes the importance of cheap, efficient, and easily accessible training and support for the end users of the systems. It may be particularly true for the systems where most competence gaps are in the form of how-to-problems. An easily accessible knowledge repository that can guide users through the most mundane of tasks for the different systems would effectively lower competence requirements and thus minimize the recurring competence gaps.

Connecting all training and support resources at Ericsson to a single point of access may seem like a good place to start, but why has this not already been done? One reason can be that training efforts coming with new releases of the different ERP systems have not been fully coordinated. The systems have had different owners or managers and different ways of communicating changes and updates to their respective end users. Another reason can be that training and support functions have previously been separated. Like mentioned, the training has been to a large part separately managed by system owners while the support functions have been centralized. A fully centralized training *and* support resource would require restructuring of a number of processes, and it may not have been the most obvious solution.

Focusing Knowledge Management Efforts

As has been mentioned and iterated throughout the report, explicit knowledge is easier to code and transmit to- and from individuals than is tacit knowledge. Therefore, explicit knowledge of low cognitive levels should be the most easily dealt-with competence issues (as opposed to tacit knowledge, such as attitudes or corporate culture). It is therefore not surprising that most companies concentrate their technological knowledge management efforts on explicit knowledge problems. In the case of competence issues related to ERP system usage at Ericsson, not only are the explicit knowledge gaps the easiest to address, but they are also the most frequently occurring issue as well as the largest support-related cost. The question on where to focus knowledge management efforts has in this case a very straight-forward answer – *explicit competence gaps of low to intermediate cognitive levels*.

Most of the explicit competence issues are in some way related to problems with communicating information to end users. These communication problems can be related to *where* to get online support, *how* to get the support or the *advantages* of online support as opposed to asking a colleague or calling the help desk. They can also be regarding training (both e-learning and classroom training) or of a more tacit nature as the value of order care or feeling responsibility towards taking in information sent out by management. In a large enterprise such as Ericsson, the constant flow of information forces employees to filter out that which does not seem urgent at the time. E-mail messages get categorized and forgotten in folders, links and attachments disappear along with their carrying message. Later, when the information is needed, chances are it has been forgotten, lost in an archive or deleted. The same goes for finding online training or support. A slightest ambiguity regarding where to look or whether the information is available or not has a considerable chance of making users choose alternate ways of finding a solution to their problem, such as asking a colleague, calling the helpdesk or neglecting the problem altogether.

In order to address these issues, efforts should be concentrated on facilitating communication. The suggested solution of providing a single focal point for all IT training and support not only makes it

easier for management to concentrate efforts of communicating changes, novelties regarding application releases or new training alternatives – it also makes it easier for end users to instinctively know where to look for training and support. On top of this, a portal as a joint focal point for all IT-related activities may create possibilities for further synergies not yet identified. However, one issue briefly discussed earlier that would become increasingly imperative with tight system integration is the importance of having a shared terminology among systems. Using different terms to denote the same phenomenon may increase confusion and lessen the communicative benefits of the portal.

Further KM Implementation

As seen in the theory chapter, Frappaolo (2006) provides a 10-step guide for KM implementation projects. It is not only a guide for how to implement technological solutions, but rather a step-by-step guide for building a knowledge management culture within an organization. Some of the steps have already been discussed in this report. The community for which the KM initiative would be undertaken has been defined as the users of the ERP system, which in effect constitute a majority of all Ericsson employees. Steps three and seven, executing a knowledge audit and identifying existing used/unused knowledge sources, have also been glanced at through the empirical study. Lastly, step ten has been briefly looked at through the suggested portal initiative.

Knowledge-related Incentives

One important step that has been more or less overlooked in this report is the building of knowledge-sharing incentives. The IT infrastructure at Ericsson may however not be a suitable environment for implementing full-scale knowledge-sharing in its more traditional sense. Inter-personal knowledge-sharing in the form of user grapevines or discussion forums may be beneficial for users of CBS or MUS who want to share tips and suggestions for best-practices. However, where incentives really could help is in changing an attitude towards the available e-learning and online training resources. As Frappaolo (2006) states, having a knowledge sharing culture without other incentives might lead to a situation where knowledge is shared by request instead of actively and spontaneously. By implementing incentives to encourage employees to continuously stay updated and improve their level of competence with the software systems they are involved with, there would be a smaller need for support and a possibility of productivity gains.

As mentioned in the theory chapter, these incentives need not be monetary, but can be in the form of time dedicated to training, system competence certificates or an automatic update of employee skill levels in their electronic profile in the upcoming MUS competence management module. By having this last incentive, employees would get credit for all e-learning courses/classroom training completed. However, as Hans Lundberg suggests, for this to be effective, all courses need to have some sort of system to verify the competence of the attendants after course completion. A standardized way of measuring acquired competence (like with courses in an academic context) has the possibility of increasing both employee interest and facilitate competence planning for managers. However, support-related resources such as user guides would not benefit from these incentives, since the knowledge they provide is not as easily quantifiable and recordable.

Double-loop Learning

As mentioned in the theory chapter, the last step when implementing a knowledge management initiative would be to put a cyclical practice in place. Frappaolo (2006) refers to a cyclical practice as the process of continually reevaluating the suggested steps of implementation. This primarily refers to a reevaluation process from a management perspective. However, an alternative way of implementing a continuously reevaluating process would be to implement systems of double-loop learning. Again, in a large enterprise like Ericsson it might not be advantageous to incorporate a culture of continuously questioning practices and processes. On the other hand, when it comes to training and usage of ERP systems, integrating functionalities for providing feedback regarding courses or system usage is much more feasible.

Feedback functionality integrated with e-learning and user guides – perhaps as a part of a centralized training and support portal – provide end users the possibility of sending in suggestions regarding improvements, changes or experienced problems. For example, this kind of end user feedback is today integrated in the help functionalities of several Microsoft software products, such as the Office suite. Except for providing valuable suggestions for system improvements, it also provides the possibility of making end users feel more involved in decision processes regarding training and system functionality. This may increase end user interest and provide an indirect way of addressing the tacit problems related to attitudes towards training and ERP system-related information.

Suggestions for Continued Work

Further Research Regarding a Technical KM Implementation

The conclusions drawn in this report are based on an analysis of information gathered through a very limited set of interviews. Moreover, the interviews covered only a handful of the software systems in use at Ericsson. In order to get a more complete assessment of competence-related problems regarding a wider spectrum of systems, a more thorough survey would have to be conducted. However, if a more complete survey would be undertaken, chances are that even though additional explicit knowledge gaps could be identified, the same conclusions would be drawn. An initiative addressing communicational problems should be a solution positively affecting a wide spectrum of problems.

Continued effort is probably better invested in a closer look at the suggested steps of implementation. Especially note-worthy are step 2, “Defining strategy and critical success factors” and step 7, “Identifying existing used/unused knowledge sources”. As stated in the theory chapter; when the targeted user group or user groups are identified, the next step is to form a clear strategy for the initiative. The strategy should have a strong emphasis on profitability, clearly communicate unique values of the solution and be exceedingly unambiguous on what not to do. By including a set of critical success factors, values of the initiative are more easily communicated and design goals of the actual solution are facilitated.

In step 7, an inventory of existing knowledge sources is suggested. In our case that would be a complete list of all resources containing user guides, tutorials and support as well as training information and LMS functionality. After assembling all relevant information sources, they should be categorized in a logical and intuitive way. A well thought-through categorization has the possibility of making the end product easy to navigate, as well as forming a basic template for the system design.

Addressing the Problem from Two Angles

When dealing with a problematic situation with a recurring problem there are practically two ways to approach a solution. The first is applying counter-measures in order to combat the symptoms/consequences of the problem, lessening the negative effects and balancing up the situation. The second approach is to address the source of the problem, aiming to decrease the problem occurrence frequency. For illustrative purposes and as an example, consider the problem of having a headache due to dehydration. One solution to the problem – like the first type of solution mentioned above – would be to temporarily remove the pain using Aspirin or equivalent medication. This would deal with the effects of the dehydration (the headache) while leaving the source of the pain unaddressed. Another solution to the problem would be to drink more water. Drinking more water would not give a short term pain relief but would lessen the risk of having continuous problems. The most effective solution however would be to tackle the problem from both angles. By taking a prescription-free pain killer as well as drinking more water one would get both quick relief and decreased risk of a recurring headache, and would thus be addressing the problem with both a short term and a longer term solution.

Applying knowledge management theories and practices in order to deal with competence-related issues regarding ERP systems can be seen as a way of dealing with the consequences of having implemented a technically advanced software solution. The need for support and training is caused by end user difficulties when interfacing with the system. This is of course to some extent unavoidable, since creating a completely intuitive interface while still keeping the system powerful and flexible is practically impossible. However, the source of usage-related problems can be partially addressed by improving the ERP systems' ease of use. Due to several of the Ericsson-implemented SAP-based systems being based on an aging software platform (SAP R/3) the user interface is not very usability-oriented. Most of the systems, both R/3-based and others, have been developed with an emphasis on technical functionality instead of intuitiveness. This leaves a substantial room for improvement, and the possibility of radically decreasing support- and training needs through a reengineering of the user interfaces.

An analysis from a Human-Computer Interaction (HCI) perspective would most likely provide valuable insights into how to improve system usability and thus decrease the need for support and training. A suggested first step could be for Ericsson to collaborate with a student writing a Master's Thesis report with an HCI specialization. The report could evaluate the current state of affairs and suggest improvements for one or more ERP systems. Ericsson Buyer could for example be a suitable platform to analyze due to its extensive usability-related problems and web-based user interface (a web-based interface should be easier to modify as well as facilitate the creation of prototypes).

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Appendix

List of Acronyms Used

B2B; Business-to-Business. *A marketing strategy which involves the transaction of goods or services between businesses.*

CBS; Common Business Solution. *A full-scaled R/3 implementation in use at Ericsson. Feature-wise similar to Market Unit Solution (MUS).*

CLM; Customer Logistics Manager. *A role at Ericsson handling order management in CBS.*

CTC; Contract-to-Cash. *A certain scenario when handling orders in CBS.*

EB; Ericsson Buyer. *A web-based e-commerce system targeted at end users, based on the SAP product "Enterprise Buyer Professional".*

ERP: Enterprise Resource Planning. *ERP systems attempt to integrate all data and processes of an organization into a unified system.*

HRMS; Human Resource Management System. *An Ericsson-specific implementation of the SAP R/3 HR-module. A part of the SAP landscape at Ericsson.*

KM; Knowledge Management. *A range of practices used by organisations to identify, create, represent, and distribute knowledge for reuse, awareness and learning. The theory chapter in this report treats a set of KM-theories.*

LMS; Learning Management System. *A software system that handles management and delivery of online learning content to users.*

MUS; Market Unit Solution. *A global system supporting the common Ericsson processes and targeted at the different Market Units within the Ericsson enterprise.*

SAP; Systems Applications and Products in Data Processing. *A global software company with headquarters in Walldorf, Germany.*

Interview Guide Approach Discussion Topics

Below are the discussion topics specified in advance for the interviews performed according to the interview guide approach specified by Cohen (2000). The interviews were held in Swedish due to all participants being native Swedish speakers. By performing the survey in their native language, the interviewees were free to express themselves as they saw fit and thus avoiding potential language barriers.

Interviews with Management

The interview questions with Kenneth Andersson regarding HRMS are presented here as an example. Each interview with management had the same set of discussion topics that were. The interviews did of course evolve in different directions depending on the issues each interviewee considered the most important.

Interview with Kenneth Andersson regarding Human Resource Management System (HRMS) (Swedish)

- Vem är Kenneth Andersson? Vilka är dina ansvarsområden och din koppling till HRMS?
- Vad är HRMS och hur används det i organisationen?

- Var används det och i vilken utsträckning?
- Hur ser utbildning/kompetensutveckling ut i samband med HRMS? Vilka verktyg finns tillgängliga för utbildning/kompetensutveckling?
- Hur ser de kompetensrelaterade problemen ut med HRMS? Är problemen av någon specifik natur?
- Vad är folks generella uppfattning om kunskapsluckor relaterade till de affärssystem som används på Ericsson?
- Vad är Kenneth Anderssons uppfattning om kompetensluckor relaterade till SAP-verktygen (och mer specifikt till HRMS)? Vilka är behoven av kompetensutveckling? Vad har man att vinna på en generellt högre kompetensnivå bland användarna?

Interview with Kenneth Andersson regarding Human Resource Management System (HRMS) (English)

- Who is Kenneth Andersson? What are your administrative areas and what is your connection to HRMS?
- What is HRMS and how is it used in the organization?
- Where is it used, and to what extent?
- How is education/competence development handled regarding HRMS? What tools are available for education/competence development?
- What are the main competence-related problems with HRMS?
- What are the users' general opinion regarding competence gaps related to the ERP systems in use at Ericsson?
- What is Kenneth Andersson's opinion regarding competence gaps related to the SAP-based ERP systems in general (and HRMS in particular)? What are the needs of competence development? What advantages would a higher level of competence among users bring?

Interviews with End Users

The interviews with end users also covered a shared set of discussion topics. The only exception was the interview with Mona Stenman regarding MUS, which had the management set of topics. This was done since no management personnel of MUS was available to interview during the project.

Discussion Topics for End User Interviews (Swedish)

- Vem är <respondenten>? Vad är dina ansvarsområden och din koppling till <affärssystemet>?
- Hur fungerar utbildning kring <affärssystemet>? Hur utbildas ny personal, och vad finns det för vidare utbildningsalternativ tillgängliga?
- Upplever <respondenten> att denne har en god bild av vilka utbildningsalternativ som finns tillgängliga, eller vet hur denne lätt kan få reda på vad som finns tillgängligt?
- Hur fungerar support kring <affärssystemet>? Vilka supportsystem finns, både i form av personlig kommunikation och i form av elektronisk support?
- Upplever <respondenten> att denne har en god bild av vilka supportalternativ som finns tillgängliga, eller vet hur denne lätt kan få reda på vad som finns tillgängligt?
- Vad upplever <respondenten> kan göras bättre gällande utbildning och support kring <affärssystemet>?

Discussion Topics for End User Interviews (English)

- Who is <the respondent>? What are your areas of responsibility and your connection to <the ERP system>?
- How does competence management related to <the ERP system> work? How is the competence development handled for new employees and what alternatives are there for additional competence development?
- Does <the respondent> find that he/she knows what competence development options are available, or if not, how he/she could with little effort find out what is available?
- How does support regarding <the ERP system> work? What support systems are there, both in the form of personal communication and online support?
- Does <the respondent> find that he/she knows what support options are available, or if not, how he/she could with little effort find out what is available?
- What does <the respondent> think could be improved with regard to education and support related to <the ERP system>?