Possible benefits from a Knowledge Management System

- Attitudes towards the use of a knowledge management approach at a small department

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Abstract

Assets of today's organizations consist part in the form of immaterial assets. These immaterial assets often have the form of employees and their knowledge, which put a demand on effective means of communicating and organizing knowledge within an organization. To capture, facilitate, store, and communicate knowledge, several types of systems can be used. We have done an inductive case study of a small department within a large organization in the telecom industry to see if a small department could gain any benefits from implementing a knowledge management system. Our findings suggest that there are both negative and positive consequences that could arise from the implementation of a knowledge management system. However, we argue that the benefits are higher and a small department could limit interdependencies which can lead to less people involved in solving each problem, lead to users relying on the system and the knowledge within the system, shorten the learning period for new employees and finally lead to a system where knowledge is comprehensible and has a consistent high quality.

Keywords
Knowledge Management, Knowledge Management Systems, Culture, Work teams.

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1.　　Introduction

The purpose of this chapter is to introduce the research process undergone in this study, which is further elaborated in chapter 2. First, an overview of the changes in focus and the overall process will be explained followed by a description of the problem area surrounding the research question that has been guiding our study.

1.1　　The research process

In the starting blocks of our research process, a problem surrounding the use of information systems as a mean of communication and collaboration was presented to us by a small department handling IT computer support in a large global organization. In order for us to get an initial understanding of the systems used by the department, we made a literature review and identified the problem area as relating to groupware systems. To study the use of these types of systems, we started out conducting a pre-study with one IT support technician and the team leader to identify the systems used within the department at the time. At this point, the study still had a deductive approach where previous research was guiding the collection of empirical data. The research question that was guiding our study at the time was "How can a team benefit from a groupware system that supports central information sharing and administration?". The result from the pre-study was that there were numerous systems supporting the department and that collaboration via IT was done through email systems, messenger services and via telephone. The interesting parts of the analysis of the pre-study were that communication per se was not an issue, but rather the storing and sharing of solutions to encountered problems within the department. This lead to a shift of focus from 'systems aiding communications' to 'how solutions to encountered problems are stored and communicated'. Since we no longer were certain that our study was about groupware systems, we switched our research strategy to an inductive approach. This meant that we wanted to study the issues existing in the department, and therefore the department was now viewed as a team to be able to identify the softer parameters of the technicians working within the department. Soft parameters include social interactions, attitudes, and system usage among others.

After our switch of research approach, we conducted interviews with eight technicians, which in numbers represented half the technicians within the department. Focus of the interviews was on the attitudes towards usage of current systems, social interaction for solving encountered problems, and storing the solutions to encountered problems. From our analysis of the data collected in the interviews, we identified a number of topics that later functioned as a guide for our literature review of previous research. To validate the data collected in the interviews, we later on had a workshop. Since the team/department did not have a sufficient system for handling solutions to problems they encountered on a daily basis, we chose to focus on knowledge management. This study therefore focuses primarily on how the department for IT support could benefit from a knowledge management system, which leads us to the description of our problem area.

1.2　　Problem area

Knowledge management can be found in many different areas such as economics, informatics and data warehousing (Schönström, 2005). Teams with many individuals face problems such as group dynamics, how to create routines and how to uphold them. These factors need to work together (Desouza, 2003). Much research focus on how to manage knowledge in large

organizations and little focus on how to manage knowledge in small organizations as well as on what needs to be done differently compared to large organizations. This is interesting because many of the theories about implementing knowledge management in large organizations may not be applicable in smaller organizations. If that is a fact, then there has to be research on what has to change so that smaller organizations also can benefit from knowledge management (Moffett and McAdam, 2006). Curley (1998 in Moffet and McAdam, 2006) believes that because there is such a high interest in implementing knowledge management in organizations today there should be more studies conducted in the area of small organizations. In an organization, a knowledge culture can be present which through its techniques and tools challenge the employees to share knowledge within the organization (Davenport and Prusak, 1998 in Moffet and McAdam, 2006; Oliver and Kandadi, 2006; Alvesson and Kärreman, 2001). However, how these tools and techniques take form in organizations can vary. Large organizations may have more resources to develop and maintain a knowledge management system than small organizations. A reason for the less successful implementation of knowledge management systems in small organizations is that the process of storing information is time consuming. Time is something that small organizations often do not have because the employees often have one or maybe two key roles and they do not have the time for routines like storing knowledge (Moffet and McAdam, 2006). In our study, we consider the small department studied as a small organization, because of its independent nature. This leads us to a question surrounding a possible use of a knowledge management system in a small department where the knowledge within the system is intended primarily for the specific department.

1.3   Research question

How could the small IT support department belonging to a large organization benefit from a knowledge management system?

Because many knowledge management systems implementations successes are dependent on the user's attitudes and motivation, we also have to ask one additional question to be able to answer how the small department could benefit from this type of system:

> What are the attitudes towards a future implementation of a knowledge management system in the team working at the small IT support department?

1.4   Purpose

This thesis seeks to identify how the small IT support department could benefit from a possible implementation of a knowledge management system.

1.5   Delimitations

In this study, we only chose to look at what issues to be considered when implementing a knowledge management system and not what a possible technical solution would look like. Further, our aim has not been to go into the technicalities of each system but to present the team's subjective views of how they experience the systems. We will discuss the routines that the interviewees suggest exist within the team, but not go into the formalized business processes since they were not expressed in the data we have collected.

1.6   Writing up the study

In the process of writing up the study, the target group or audience is important to identify prior to writing up a study (Creswell, 1998; Kvale, 1997; Seale, 1999; Yin, 2003). The target group for this study is the academic community with special focus on the examiners. However, employees at the university, fellow students, and the case company are also an important target group. Depending on the target group, the study needs to have different layout and rhetoric's (Seale, 1999). This leads to the discussion about aesthetics in the final report. We have tried to achieve a report where our standpoints and we as authors are visible in the way the scientific findings are presented (Seale, 1999). Throughout the research process, our focus has changed many times but we always had the final report in mind, which kept us on track, which Kvale (1997) recommends.

In the case study report, which is applicable to this study, a thorough description and explanation of the case and its context have been made in order for the reader to get a clear picture of the case at hand.

Since we used an inductive approach in our case study we have decided to write the thesis in a chronological order, the chapters will represent our early, middle and late phases of our study (Yin, 2003). We have in addition used Creswell's (1998) overall rhetorical structure for case studies; we will first describe purpose and problem followed by chosen methods. We will thereafter describe the case and its context and our findings from the data collection. Our conclusions from our findings and theory will then be included in the report. These two structures fit well together and they are both recommended for reporting case studies (Creswell, 1998; Yin, 2003).

The reason for writing the thesis in English is that it is the corporate language in the company studied.

1.7   Disposition

Since this study was first conducted in a deductive manner and then switched to an inductive approach, it must be explained how the thesis is disposed. We have started explaining the changes undergone in research strategy, and therefore the disposition has a slight unconventional nature. This is since the report is a story of how our study has developed, we have chosen to write it in a chronological order with the only difference that the second chapter accounts for a summary of the methodological choices made. In the third chapter, we present our analysis of the empirical data collection, which contains data primarily from the interviews, questionnaire and workshop, but also accounts for informal meetings and the pre-study. The third chapter concludes with a summary of topics that we identified on which the fourth chapter containing a literature review is based. In the fifth chapter, the topics covered in the literature review is applied to the empirical findings in discussion form followed by a synthesis of the positive and negative aspects of a possible implementation of a knowledge management strategy together with an implementation of a knowledge management system for handling solution of problems encountered by the team.

1.8   Thesaurus

The terms "department", "small department", and "team" refers to the object studied with the reservation that team is used in a context involving humans and department relating more towards an organizational unit.

2.   Method

In this chapter, our methodological choices will be accounted for. We also discuss the ethical considerations relevant for this study.

2.1   Research Design

When we first started, this study had a deductive approach, which means that we first found theory on which to ground our empirical findings and that the theory controlled our collection of data (Bryman, 2001). However, when conducting interviews with the team in focus, we soon realized that they mentioned problems we had not noticed at first. Our focus then had to change and our direction changed to an inductive approach where our empirical findings were controlling our theory. This is a rough description of what an induction process can look like, which also shows our way of working: observations/results → theory. An inductive study is qualitative and interpretative according to Bryman (2001).

The model below shows the steps that are included in a qualitative study (Bryman, 2001), which also can be defined as trying to explore a social or human problem (Creswell, 1998). The definition fits very well with the purpose of our thesis and the model is a good way of describing how our process has been throughout our study.

1. General research questions

2. Choice of relevant places and persons to observe/interview

3. Collect data – Pre-study and Interviews

4. Interpret data

5. Conceptual and theoretical work

6. Report about results and conclusions

5b. Collect further data – Questionnaire and workshop

5a. Specify research – questions
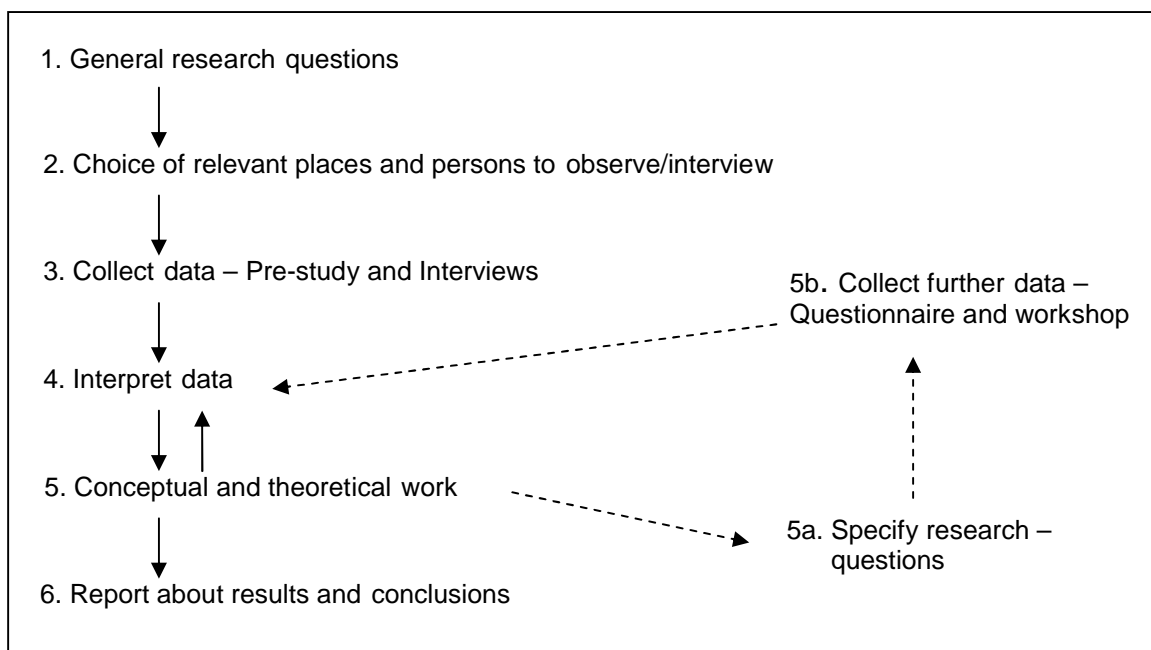
Figure 2. 1 Our inductive research approach (modified from Bryman, 2001)

Our case study included a team within a large international company. A case study can be defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003, p13). Our purpose with this study was to identify how the small IT support department could benefit from a possible implementation of a knowledge management system. For this, a case study was a good way for us to understand the team and their real-life world as Yin (2003) expresses it. We further argue that this is a case study

because we studied this team in a limited time frame and place (Yin, 2003). We have done our study during a period of two months and the location has been at the IT support department. To be able to do a case study, we needed to interview the team and find out what their situation is today and why the situation has surfaced. In other words, in this case study the team was the case to be studied and the question we wanted to answer was: "How could the IT support department belonging to a large organization benefit from a knowledge management system?". We also wish to emphasize that the case study is one view or perspective of a single case at one setting in a specific point in time (Creswell, 1998; Yin, 2003). What this leads to is that this case may or may not be generalizable in a broader context, but can perhaps strengthen previous findings within the same field or discover new questions that can be the basis for further studies.

2.2   Collection of data

We have used interviews as mean of data collection. Interviews are something that Yin (2003) recommends if a case study is to be done. The interviews were done early in the process, however we needed to complement them and therefore decided to do a questionnaire shortly after the interviews. Later in our process, a workshop was carried out to collect further data. Several informal meetings have also helped us to validate the data collected throughout the research process. All of our sources have been fruitful for our study, not only because each technique gave us additional information, but also because it gave us an opportunity to validate our interpretations of the data (see chapter 2.7). Each step in our data collection is further described below.

2.2.1   Pre-study

To be able to understand the problem presented to us by the IT support department, we decided to do a pre-study. In this study, we wanted to interview not just the team leader but also a member from the team to see if they shared the same opinions about current problems. The pre-study consisted of two interviews of about thirty minutes each. We decided on a few topics to discuss on beforehand but had no precise questions. The purpose was to be able to create questions for our interviews later on. We also did this in order to practice on interviewing and to be prepared for different situations that can occur during an interview, for example to do follow up questions if needed (Yin, 2003). Another reason for doing this was to be sure that we did not use words and a language that our interviewees did not understand and that our questions not were too complicated (Kvale, 1997).

Our pre-study gave us a lot of information on what we understood to be the problem for the team. This new information allowed us to narrow down the focus before our real interviews. We also decided on not to ask questions in too many different areas.

2.2.2   Interview guide

The development of a guide for interviews was part of our planning process. The theme for our interviews was the topics we wanted to cover, but we also included specific interview questions. This guide was made when we still were working with our first research question and our approach was deductive. The guide focused on questions about current systems and the organization. These questions were chosen because we thought that the problem presented for us was caused by organizational issues and because of how the current systems are used today which still was applicable to our revised research question. We chose only to develop one interview guide that has been refined throughout the interview process (Kvale, 1997). With our interview guide, we wanted to answer the question: What do we need to know to be

able to answer our research question (Bryman, 2001). This meant for us that we had to understand what our interviewees thought were important and our questions had to be focused on our research question, but it also had to be seen out of the interviewees perspective. This was a bit easier for us to do after our pre-study, which gave us an understanding of what the team in focus thought was problematic.

When we developed our interview guide, we also thought of the basic facts that every guide needs to consider according to Bryman (2001); we lined topics in a natural sequence, we formulated questions that would answer our research question, but we did not make them too specific and we did not use any leading questions. Finally, we made sure to ask background questions like how long they had worked within the company and so on. We did this because we believed that the answers would be different depending on how long they had worked within the company and that was important for us to know when we analyzed the transcripts. The interview guide can be found in Appendix 1.

2.2.3   Interviews

To get as much information as possible about the team, their routines and their systems we did qualitative interviews. By this, we mean that they were semi-structured and open-ended (Bryman, 2001; Yin, 2003). We wanted the interviewees to give rich answers and our interviews to be more of a discussion than a strict interview (Yin, 2003). We used our interview guide but we did not have a set of specific yes and no questions that had to be answered. Each interview was unique which means that sometimes topics and questions were answered before we even had mentioned them. This led us to change how we asked our questions depending on what already had been said and depending on the interviewee and the situation. The interviews were of flexible nature as explained by Bryman (2001) and Kvale (1997).

For our interviews, we were asked to book conference rooms at the company. These rooms were located close to the interviewees' workplaces. In the actual interview situation, we had to consider a few practical issues. We had to, for example think of the comfort of the person being interviewed and we tried to make the interviews more like a discussion and by that make the interviewee more relaxed. By doing this we hoped that there would be an atmosphere where the interviewee felt secure enough to speak freely about his or hers experiences and feelings on a certain subject (Kvale, 1997).

To make our interview situation friendlier to our interviewees we tried to ask as much "how" questions and not "why" questions as that may seem questionable and may put the interviewee in a defensive position (Yin, 2003). To avoid making the interviewees confused by both of us asking questions, we divided the work between us. The first day and the four first interviews were conducted by Olof. The second day, the last four interviews were conducted by Åsa. Both of us were present during the interviews and when one of us was in charge, the other could still ask follow-up questions. We also tried to make a clear separation of roles between the interviewees and us (Kvale, 1997), which we succeeded in doing, mainly because we never had any previous encounters.

To be sure of that nothing had been misunderstood and that nothing was unclear to us, we did follow up questions. We interpreted what they just had said with our words and asked if that was correct. This was a way of enhancing the quality of our interviews (Kvale, 1997; Seale, 1999). However, both of us had little experience of interviewing which resulted in that some of our follow up questions became leading questions.

Each interview lasted for twenty to thirty minutes and where all done in two days. Each interview was recorded on our computer after being informed about the confidentiality of the recording and then giving their consent to this. They were directly transcribed so that we would not lose any relevant information. While we still had most of the information fresh in our minds, it was much easier to make the transcriptions (Kvale, 1997).

The interviews were performed in Swedish because the mother tongue of all interviewees was Swedish.

2.2.4   Questionnaire

A few things were still uncertain for us after the interviews, especially how many systems the team used and how often they used them. To be certain that we had all the correct information and that there were no misunderstandings, we sent out a questionnaire (Appendix 2). The questionnaire was sent to the eight technicians we interviewed and to the two technicians we interviewed in our pre-study. Altogether, ten invitations to the questionnaire were sent out and we received a total of six questionnaires with all of the questions answered. The questionnaire had questions about their systems, how often they used them, and if the systems were trustworthy and that the information was reliable. Sending out the questionnaire was a way for us to complement our qualitative study with a quantitative method (Miles and Huberman, 1994). This was a way of enhancing the reliability and a way to make sure that our interpretation of the data was correct (Seale, 1999).

Our invitation to the questionnaire was sent anonymously to everybody without any last date to answer. The invitations were sent via email with a link to the questionnaire. When the questionnaire was answered, it was sent via a remote server to our First-Class accounts. By doing this, the answers were anonymous to us (see 2.6). Within one day, we had two answers. When only two out of ten had answered after two days, we decided to send out a reminder. After the reminder, we got four answers that gave us in total six answers.

2.2.5   Workshop

After our literature review we wanted to have a further discussion with four of the technicians in the team to discuss the problem areas we had found and to have a discussion on their attitudes towards today's' systems. Together with the team leader, we chose the four after the interviews which where chosen because we thought they had interesting ideas about how things could be solved and improved in their team, expressed by them during interviews. The workshop began with us presenting our findings from the interviews and two graphs based on the questionnaire, which had the purpose of confirming that we understood their point of view of the problems from the interviews. We then wanted to show what we thought were the problematic areas, which was done by going through a flow chart that we had designed. When this was done, a discussion followed on different solutions and what they felt that they could do or contribute with if a new system was to be implemented. The workshop was not recorded, but notes were taken. These notes were later on typed into a digital format. The workshop was also a way of enhancing the quality of our interviews (Seale, 1999). Our questions and flow chart can be found in Appendix 3.

2.2.6   Informal meetings

Throughout our research process, we have been in contact with the team leader at the department studied primarily via email. Contact has been made both from us and from his part. Our purpose was to give the team leader updates of how our study was coming along as

well as asking short questions regarding certain details for the final report. We also had two informal meetings where we updated him of our progress and where we asked for additional information and raised the request for a workshop, which was granted without any complications. During these two informal meetings, we made notes of what was said to ensure we comprehended the information that was given to us.

2.3   Selection

Our study involved a team of sixteen technicians. Out of these sixteen, we decided to first do two pre-study interviews; one with the team leader and one with a technician who had been there for eighteen months, which was one of the senior technicians. This choice was made because we wanted to know what those who had been working there the longest thought of the work environment and about the current systems. We thought that a recently hired person could not give as detailed answers as those with more experience could. When we later on did the interviews with the team, we wanted to have all varieties: those who were very new to the company and those with a long work experience. Another choice was also to do as many interviews as possible. Due to heavy workload, nine was the most interviews we could get. Our only selection was to have a variety of work experience within the company and it was then up to the team leader to choose nine technicians for us to interview. Since the team leader chose interviewees from our preferences, this could be seen as a choice of convenience (Bryman, 2001). We thought however that a variation of work experience within the team was a representative group for our study.

We chose to send our questionnaire to the ten technicians we had interviewed. We did not want to send the questionnaire to all of the sixteen technicians in the team because we thought that would have been confusing to those who had not been interviewed. Furthermore, this was an additional information check after the interviews and could not be seen as a separate information source in that way.

When it was time for our workshop, we wanted to have a discussion with four or five of the technicians we previously had interviewed. All ten of them would have been a too big group and that could have led to a less rich discussion. The team leader and we chose the four technicians who participated.

2.4   Method for analysis

2.4.1   Qualitative data

We recorded the interviews on our laptop. The advantage with recording on the laptop was that a microphone was not visible for the interviewees to distract them. However, because of this there were sometimes difficult to hear what the interviewees said if they were talking quietly. When we transcribed our interviews we had to listen to the recording many times to be sure that we wrote exactly what they had said (Bryman, 2001).We decided to only write what they said and not write laughter or other expressions, just word for word what had been said.

For analyzing the interviews, we used an ad hoc approach, which enables the use of multiple analysis techniques (Kvale, 1997). To analyze our interviews we printed out the transcripts and categorized the answers according to the following questions:

- 1. What systems do you have for sharing and searching information that helps you solve problems in your everyday work?
- 2. Do you use all the systems described in your everyday work?
- 3. What do you think is positive with the systems you use?
- 4. What do you think is negative with the systems you use?
- 5. Do you have any systems or tools that support collaboration within the team?
- 6. What steps do you take when you encounter a problem on a customer's computer to find information about possible solutions?
- 7. Do you feel that you get support and trust the systems that are used for collaboration and spreading information?
- 8. Do you feel that there is something missing in the systems used today?
- 9. Can you describe how you are organized within the team?

These questions were the basic structure for our interviews, but the answers were often intertwined between the questions. Below is an example, which is translated from Swedish to English by us of how we categorized the data:

Åsa: What do you think is positive with the systems you use?

Respondent F: Emmm... Yes, it is *simple to handle* (3). So…*it is so to speak not that complicated* (3) if you are searching for something you always find something. But, well, *it does not always work to a 100 %* (4). There is always some shortage, *but they are looking up how one can improve and stuff* (8).

To be able to condensate long answers we used the meaning condensation analysis approach (Kvale, 1997). From the categorization, we further made the categorization of answers into three categories; descriptions of how the team work (team), description of systems (systems), and attitudes towards how the team work and how systems are or should be used (attitude). These categorizations were made to be able to create the basic structure in our presentation of empirical data as well as the layout for our discussion. Below is an example of how this was done:

Åsa: Do you use any other systems?

Respondent H: *Yes, we have a team site on the intranet* (1) (Systems). It is a lot of information there. *Maybe not so logical and well organized* (4) (Attitude-system), *but we are trying to put information there like for example all the printers around here and information about where they are, ip – number, and some service/support if we need to call Canon to handle our case* (1, 2, 5) (Team).

These approaches to data analysis were used due to the need for a condensed representation of the interviews and the ability to uncover hidden meanings within the interview transcripts (Kvale, 1997).

2.4.2   Quantitative data

In our quantitative data collection, a questionnaire was used which involved three types of variables; the first question, "How often do you use the following systems" had a range from "every day" to "never" which indicated that it can be categorized but it does not have a clear distance between the categories and therefore it consists of ordinal variables. Ordinal

variables should also be visualized in a column diagram (Bryman, 2001). See table 2.1. The visual representation of this table can be found in chapter 3.

Table 2.1. Question regarding the frequency of systems used.

1. How often do you use the following systems?	Evers day	3-5 times per week	1-3 times per week	Less than 4 times per month	Never
Intranet					
Work Task Mgmt System					
SW installation ordering system					
Sharepoint					
Document Handling System					
Outlook					
Office Communicator					
Formsystem					
Internet (Google)					
Server share					

The second question and third question, "How do you rate the trustworthiness of the information in the following systems?" and "How effective would you rate the spreading of information within the team?", has a range from 1-5 with equal distance between the categories and therefore consists of interval or ration variables. These types of variables are suitable for histograms and means (Bryman, 2001). See table 2.2 and 2.3. We used this data to create a mean for the level of trust the team have to the systems they use in order to have the ability to uncover if there was any significant resemblance between the interviews and the questionnaire. A graph over the means can be found in chapter 3.

Table 2.2. Question regarding the trustworthiness of information in systems used.

2. How do you rate the trustworthiness of the information in the following systems? (5 = highest 1= lowest)	1	2	3	4	5
Intranet					
Work Task Management System					
SW installation ordering system					
Sharepoint					
Document Handling System					
Outlook					
Office Communicator					
Formsystem					
Internet (Google)					
Server share					

Table 2.3. Question regarding the effectiveness of information spreading within the team.

3. How effective would you rate the spreading of information within the team? (5 = highest, 1= lowest)					

The fourth question, "Do you have any suggestions on how the spreading of information could be facilitated within the team?", was not designed for measurements other than relationships and it cannot be ranked. Therefore, this is a nominal variable (Bryman, 2001), and is suitable for comparison to the interviews and workshop. This question only generated four very short suggestions that had been brought up during the interviews and was therefore disregarded.

2.4.3   Reduction

From the beginning, we scheduled nine interviews. At the day for our interviews, one of the technicians who were scheduled to meet us could not attend because of illness. That left us with eight interviews. Even though one more interview would have been good for us, we do not believe it has affected our results in a serious way. There are sixteen technicians working in the team and we interviewed eight of them

Our questionnaire was sent out to ten technicians and we only got answers from six of them. Here we believe that our questionnaire is not that reliable because of the big loss of answers. It is still more than 50 %, which is good according to Bryman (2001), but we would have liked all of them to answer to enhance the reliability. This is however something that we corrected during our workshop. During this, we asked them if what we had interpreted out of the interviews and questionnaire was understood correctly, which it was.

2.5   Ethic quality

In our data collection, the primary source of data was interviews. Before, during and after the interviews we took necessary precautions to ensure that our ethical conduct was in line with the norms of the research community. According to Israel and Hay (2006), there are two ethical considerations to be made; informed consent and confidentiality. Before our interviews were conducted, we told the interviewees the purpose of the study and what the final product would be. After that, we politely asked the interviewees if they would agree to being interviewed and taped, and that the interviews would be confidential in the way that their names and other sensitive information would not be included in any interview transcripts. These three steps taken correspond to the three levels of consent and in part the principle of confidentiality proposed by Israel and Hay (2006).

The questionnaire was sent anonymously to everybody via email, which contained a link to the questionnaire. By this, we mean that they could not see to whom we had sent the email. In the email, we told them that the questionnaire was anonymous and that it would be used to give us additional information for our thesis. We would also further argue that informed consent should not only be viewed as a form of goodwill towards the interviewee, but also as a process that will ensure a higher degree of validity in the research because it shows that you as a researcher reflects on the choices that are made (Seale, 1999).

The part of confidentiality that was not touched on at the times of the interviews is the confidentiality around the company studied. According to Israel and Hay (2006), trade secrets are important to address. Trade secrets that become public can seriously hurt the company and therefore certain precautions were taken. What we did to address this was to discuss the issue with the team leader of the team studied. The team leader, however, did not have any objections for us to use the company name and the name of the team, but we have chosen not to use it since the study might result in sensitive conclusions and certain characteristics that

could lead to a loss of competitive advantage for the team and the company. We had also already discussed confidentiality with the interviewees where we stated that no names would be revealed. Confidentiality is not however limited to just the object studied, but also to the collaborating researchers and the research community as a whole. Here it is a question of actions that could hurt other researchers if confidential information is revealed (Israel and Hay, 2006; Sieber, 2001).

The protection of collected data is also an ethical question. In order to keep the confidentiality agreement made with the interviewees and the company, the data has to be protected (Israel and Hay, 2006). Information in this study have many forms including digital, written, and recorded information and the information have to be protected accordingly (Creswell, 1998). The steps we took to ensure that the collected data was kept safe was only to print data in paper form after it had been stripped of data that could identify the company and certain individuals. Regarding digital information, which is the largest portion of data, it has been stored on computers protected by password. We know that this is not a foul proof way of securing information, but sufficient for the sensitivity of our collected data.

Another dilemma is that the team leader gave us the names for our interviews. This could be seen as that they did not do this voluntarily (Israel and Hay, 2006). All technicians have been very helpful and told us they agreed on our interviews because their problems need to be solved but this could be seen as non-voluntarily interviews.

There were also social vulnerabilities we had to consider in our thesis. Our transcripts from the interviews will not be shown to anyone within the company and they will not be in an appendix when the thesis is published. This is a way of protecting the interviewees from any social vulnerability. This is a team where everybody knows each other very well. If any one of team members has stated something that the rest of the team might feel is wrong concerning the team or the company, this person can be rejected by the team. To avoid this, our examiners and we are the only one who has access to the transcripts (Sieber, 2001).

We also had to consider the social vulnerabilities when we chose four out of ten people for the workshop (Sieber, 2001). When we did this, we knew that there could be some negative consequences followed by this. We did not want the team leader to believe that those who were not selected did a bad interview and consequently they were not chosen for the workshop. Instead, we made sure that he understood that everyone did a good interview and gave us a lot of useful information. However, a few respondents had good ideas that we wanted to discuss further, and this was the reason for choosing them to the workshop.

2.6   Scientific quality

An important aspect of research is bias. Although this is a phenomenon that cannot be eliminated, it can be limited as long as you are aware of that everybody is biased and that bias is everywhere (Hammersley and Gomm, 1997). Another way for us to eliminate bias was to be sure that all of our findings and all of the theory were grounded and not based on our own opinions. We had to keep in mind that we could not say anything without being able to ground it in something (Hammersley and Gomm, 1997). The authors further sees research as a researcher's interpretation of a phenomenon, which means that all scientific conclusions have a certain degree of bias, and the authors argue that reflexive thinking and methodological precautions are steps that should be taken to limit bias. This was something that we had to consider since we interpreted all interviews in what we believed to be the right way. One way

for us to avoid the interpretation to be biased was that we discussed it with four of the interviewees in the workshop. This was a good opportunity to validate our interpretations. Since bias is common in qualitative work just because of the interpretation, we did a second validity check and used multiple methods for collecting data. This helped us to have a higher degree of validity and reliability (Norris, 1997). In this thesis, we have used interviews, questionnaires and a workshop just for this reason. The use of multiple methods for collecting data can also be seen as triangulation, which according to Seale (1999) can lead to higher validity.

Our aim in this study has been to try to keep a critical stance towards both our personal perceptions of the people involved in the study as well as the systems studied. By doing this and reflecting upon the responses and findings, bias can in many cases be avoided and a certain degree of validity can be achieved. We are however aware that bias is present due to our background in informatics and the view we have of the world. Throughout our research process, we have also been suggested literature from various sources within the Department of Informatics and opinions about our work have been raised from the study object. These sources of bias are very important to address, and to limit these sources of bias we have tried to find our own path by critically taking on the perspectives of sources in the literature and data collection.

As a final precaution, we did what Seale (1999) mention as the strong validation, which was to send the finished report to the team leader and the company for which the case study is being done. By doing that, the team leader could see how we had interpreted him and the rest of the team and they had a chance to give response to our work and again tell us if something was wrong in their eyes.

Hammersley and Gomm (1997) also mention that there can be external pressure that can influence our work and us. In our case, we had to be aware of that there could be pressure from the company for which we did our thesis. To keep a high quality in the report we needed to have high validity (Norris, 1997). There are different kinds of validity (Maxwell in Norris, 1997) and especially one was important for our study. Since we have described the physical environment for the case, the people who have participated, settings and other things that have mattered to our study it was of importance to be certain of that our description was valid. Therefore, we have as explained before, on several occasions checked with the technicians if our interpretations and descriptions are correct.

3.   Empirical findings

In this chapter, a rich description of our gathered data is presented. First is an introduction to the respondents followed by a short description of the company and how the department and team operate. Next, the systems used by the team and the system usage are described. Finally, the attitudes towards a system for handling information is described followed by a synthesis of the chapter where the main research areas are identified as a basis for the literature review.

3.1   Respondents

The respondents in our interviews all work within the IT support team with similar work tasks. The technicians are divided into buildings where either one or two technicians are assigned to each site. They also all have previous experience working as IT support technicians, through either helpdesk services or hands-on problem solving. The team leader and respondent Ingvar was the two people involved in the pre-study, all eight of the respondents were involved in the interviews, and respondent Arne, Bertil, Hans and Ingvar were present at the workshop. An organizational chart can be found in Appendix 4.

Team leader
The team leader, who sometimes is referred to as the Dispatcher, has worked within the team for three and half years and is responsible for dividing the different types of work tasks between the technicians on a high level. The division of labor is primarily communicated to the helpdesk which is the unit dispatching the work tasks to each building. The team leader has a similar background in IT support as the rest of the team, but is responsible for prioritizing work tasks, updating the SharePoint team website, and other work of strategic and administrative nature.

Respondent Arne
The first technician interviewed is a male and had been working within the team for about a month at the time of the interview. He has around ten years of experience with professional IT support in various organizations. He was also involved in the workshop and works at building two.

Respondent Bertil
Respondent B is a male and has the same work tasks as the other team members with the addition of setting up software development platforms and RDE machines. He has worked within the team since January 2007. He was also involved in the workshop and works at building five.

Respondent Calle
The third interviewee is a male and had worked in the team for about six months when the interview was conducted, but had four weeks prior to the interview switched work site to building one.

Respondent Daniella
This respondent is a woman and shares work of software and hardware IT support with the rest of the team and works in departments 1 and 2 at building two. She has been working in the team since July 2006, and has over ten years of IT support experience.

Respondent Erik

Respondent E had at the time of the interview worked within the team for one year and is a male. With addition to working on the patent solution the software developers within the company produces, he work on the same tasks as the rest of the team, and he works in building three.

Respondent Fredrik

This male has been working within the team for over two years where he is involved with IT support for software developers, and is assigned to building three.

Respondent Gustav

This person was at the time of the interview one of the newest contributions to the team with only five weeks on the job. His main work task is client computer IT support, but he also sets up various servers in building three and six.

Respondent Hans

The last interview was done with a male working at building five. He has been working within the team for about a year and sees himself as the long arm of the helpdesk. He was also involved in the workshop

Respondent Ingvar

This respondent was involved in the pre-study and the workshop. The respondent is a male and had been working within the team for 18 months at the time of the pre-study. He is assigned to departments 3 and 4 at building two.

3.2   Context description

The team that was chosen for this study work at a small department for IT support within a large international company. Sixteen employees work within the team and fifteen of them are consultants employed at an outsourced helpdesk department who in turn were recruited from various consulting firms (Appendix 4). The primary work tasks of the consultants include set up of computer environments, hardware and software installations and solve other various computer problems that may occur within the company that the helpdesk cannot solve. All consultants work more or less independently, having a designated building or a department within a building for which they are responsible. Information about encountered problems and solutions are frequently communicated between the members of the team. They are also encouraged to specialize in an area within which the team work, which has raised awareness in the group about who to turn to when certain problems arise. The team of sixteen people alone take care of all of the employees at this big company. There is a lot of work to be done and more to come since the company is expanding. A few of them have been working in the team for almost two years while others have recently been hired and are very new to the company.

When a new person joins the team, he or she will for the first two or three weeks work alongside a senior technician. By doing this, the new consultant will learn how the team operates and the different procedures that needs to be followed in their work. Almost everybody has different routines and ways of handling problems and there are therefore many different ways of taking care of things and share information within the team. There are no

specific routines to follow except closing each work assigned task in the work task management system.

Whenever there is a problem with computers at the company which helpdesk cannot solve, the support team solves the problem and documents the specific help provided. For example can the documentation hold information about the client such as what kind of problem he or she has, what the solution was and if the support team has leant any computer or other device. This documentation, or work log as the technicians prefer to call it, is then used to close the task in the work task management system. In some occasions, the documentation is also shared with the rest of the team via email.

Since everybody is working independently and they are in different buildings, they try to meet up at lunchtime to discuss the day and eventual problems. Every Friday they also try to meet and have breakfast together. When the team members are in the office, they work in an open office environment consisting of cubicles. They all believe it is a good team and that they work well together. If they should stumble over a problem they cannot solve, they usually call someone in the team first to get help. They believe that their knowledge is of value to everyone and that they have to share it with the others to get the work done.

The team leader explained in one of our informal discussion sessions that there had been problems with group dynamics previously, and that some team members had been switched. Now it seems that the team members have well functioning dynamics, but Daniella recognizes that it takes a special type of personality to fit into the team. The way people are employed is also a bit confusing. The team members are all consultants and employees of the helpdesk, which in turn hire them from a consultant agency. Daniella expresses the concern as to whom she actually reports.

3.2.1   Systems used by the team

To give an overview of the systems used by the consultants at the IT support department, these sections will describe each of the systems brought up during pre-study, interviews, questionnaire, and workshop. The systems will not be accounted for chronologically as it is merely a descriptive summary of the functionality and use.

One system that support communication and is widely used is the Office Communicator, which bare many similarities to Microsoft's Messenger. It is a real time chat tool, which is syncable with Microsoft Outlook. The technicians use this software to communicate with other members of the team when they are out on work assignments. The team members use this tool primarily to ask for help and guidance for quick fixes that does not require much work. As explained earlier, people within the team seek to specialize themselves within an area, and with an awareness of these specializations team members know who to contact via the Office Communicator instant message system. This tool is often used in conjunction with telephones when solving problems.

Another system that supports communication but has a different response time is the Microsoft Outlook email system. This system is used widely within the group and throughout the organization. Outlook is used for everything from asking questions about encountered problems to an individual or the entire team, to emailing "Friday fun" messages. The system also includes an address book, which is used to retrieve phone numbers and locations of people within the organization. The technicians use Outlook to build a knowledge database of

solutions to problems by using an archiving function supplied with the software. The problem here is that this information is not shareable and thus only helping one individual within the team. Therefore, this system can be seen as a system that supports facilitation of knowledge although only to the extent that it directly assists one team member.

The system that supply the team with work tasks is best described as a work task management system. When work tasks are received by the helpdesk, which is also the first line support, these tasks are entered into the system and distributed to the technical support team. Each task within the system consists of a problem description that is based on a statement from the user that experiences the problem. According to the technicians, these descriptions vary in accuracy and it is common that the problem described does not match the actual problem that should be solved. When a problem is solved, the task has to be closed in the system. In order to do this, the technician enters the solution to the problem and sometimes attaches the work log for further depth in the description of the solution. The system also has a search function where users can search for tasks related to a problem. This search function is however limited and often generates a large number of results and is therefore not often used. Another system that is also used in the same manner as the work task management system is merely a system for ordering installation of software on client computers. These installations are usually done remotely where an acknowledgement is required to start the installation process. It is just in the cases of manual installation, the IT client support is contacted for these types of tasks.

Microsoft SharePoint is a system that supplies the team with updated information about upcoming events, out of office alerts, phone numbers, and routines. This system is internally labeled as a team portal or team web where the dispatcher is the primary source for maintenance and updates. SharePoint contains a lot of static information such as work routines, lists of computers available for lending, and contact information for external manufacturers and partners. Apart from this static information is also a page for announcements and upcoming events that is important for the team to know. Such information includes top management meetings that have to be prepared for, sick leaves, and important tasks that needs to be prioritized. This system primarily uses one-way communication for information sharing.

The team also has a share server, which contains primarily updates, fixes and patches for various software. The share has however grown to a point where it is difficult to find what you are looking for and there is sometimes outdated information. The technicians only go here when they know that a solution to a problem exists on the share. Various documents are also available on the server share that is important to the solution of a range of problems. This share can be seen as a primitive repository for knowledge, but is not effectively searchable and managed.

The final internal system within the department is a document handling system, which can be seen as a knowledge base or repository for documents. This system has revision handling and the usage is unevenly spread throughout the organization. The team does not use this system on a regular basis mainly because of its time consuming nature. Documents that are of importance for the team are more often placed on a server share or emailed out to the members than placed in the document handling system.

The organization also has an intranet portal where team members go to find phone numbers, work places and other relevant information about where find the machine where problems are to be solved. The intranet also holds a lot of other information concerning the entire company.

It has become exceedingly overwhelming and information is hard to find unless you know what you are looking for and exactly where to go.

There is also one other primary source of information, namely the Internet. For many team members, Google is an important source of information. The search engine is used in their work primarily to search for solutions to encountered problems, but the use is also unevenly spread throughout the team. As explained above, there are numerous systems that support knowledge facilitation and management, but given the limited ability to search the systems for relevant information, they can be seen as ineffective and do not support the team in an effective and efficient manner.

The systems described above can be divided into four categories:
- Systems that support communication
- Systems that dispatch work tasks
- Systems that supply updated information about upcoming events, out of office alerts, phone numbers, and routines.
- Systems that support facilitation of knowledge

Below is an overview of the systems used within the department (Table 3.1).

Table 3.1. Overview and categorization of systems used.

System	Function	Category
Office Communicator	Person-to-person chat tool.	Systems that support communication.
Microsoft Outlook	Person-to-person and person-to-group email system.	Systems that support communication.
Work task management system	Dispatches and handles work tasks. Can be used to search previous cases.	Systems that dispatch work tasks
Software installation ordering system	Orders are placed in the system and dispatched to the team if manual installation is required.	Systems that dispatch work tasks
Microsoft SharePoint	Communicates information important to the team via bulletins, announcements. Also contains information about external service partners.	Systems that supply the team with updated information about events, phone numbers etc.
Intranet	Intranet portal for entire organization. Is used for searching information about telephone numbers, seating, etc.	Systems that supply the team with updated information about events, phone numbers etc.
Server share	Storage space for documents, patches, software etc. useful to the team.	Systems that support facilitation of knowledge
Document handling system	Repository for knowledge used throughout the organization.	Systems that support facilitation of knowledge
Internet	World wide web. Used for searching solution to encountered problems.	Systems that support facilitation of knowledge

3.2.2   System usage

The systems used by all technicians every day are the work task management system, Outlook, and in five out of eight interviews, Communicator was said to be used. The SharePoint team site is not used by everybody, but three of eight respondents mentioned it and we would assume that all are aware of its existence since the dispatcher posts information important to the team on this site. The intranet was mentioned by four out of eight and is primarily used as a mean of getting information about clients, where they sit, phone numbers, and user ID. What really came through in this question was that the Internet, and primarily

Google, has a broad use within the team for finding solutions to problems. One other system that was said to be used by two out of ten technicians is the document handling system. When in the interviews asked a question regarding the positive and negative aspects of the systems they use, five out of eight respondents quickly went on explaining the negative aspects of the systems. The diagram in figure 3.1 shows how each of the systems mentioned above is used within the team.

Comparing the chart to the interview results, we can see that the intranet is used by everyone every day. This can have to do with the type of question that was asked in the interview and the fact that it is not a system that explicitly helps the team in solving problems, it might just aid in finding information about the person experiencing the problem. The major difference between the interviews and the questionnaire was that the Internet is not used by more than one of six respondents. We believe that this have to do with "Internet" not being one of the choices in the questionnaire. The use of the document handling system, work task management system, and Communicator corresponds fairly well between the interviews and the questionnaire (Figure 3.1). The document handling system was mentioned in the interviews, but all but one respondent complained about its structure. We later found out at the workshop that the reason for the limited use was that it only had been promoted within the team for about a month. Whether it will be used in the future or not, the respondents were unsure.
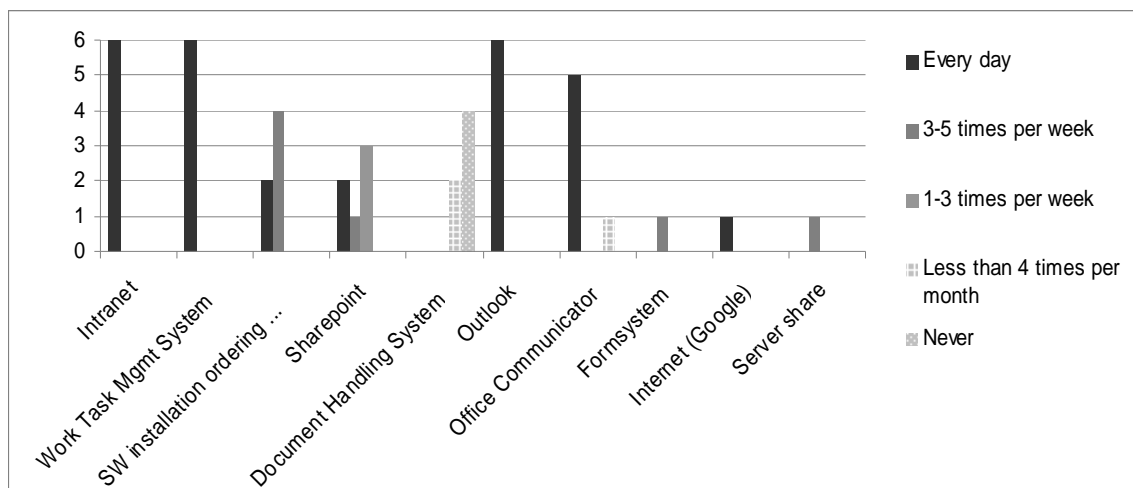

Figure 3.1. Diagram of system usage.

As stated above, there are a number of systems used in an IT technicians every day work. These systems form a unity, but they do not communicate with each other. For example, Bertil suggested that the database in the work task management system could be more integrated to one of the teams systems, but this solution poses a problem according to the discussions in the workshop. Since the work task system is not owned by the IT support team, changes in the system are difficult to be accepted.

The types of systems that the technicians support also vary from building to building. In building three for example, support is done on software development environments, which differ from building two and three where standard laptops are the primary focus. This leads to certain information only being useful for each building and a formal system for facilitating knowledge becomes unnecessary. However, there are similar problems occurring all over the organization as each employee has their own laptop with the same operating system, Microsoft Windows XP. This was not something we could tell from the questionnaire as this

was aimed to get an overall picture of the system usage within the team and not within certain buildings.

3.3   The change of perspective

In the pre-study, we identified usage of SharePoint, Outlook, server share, Internet, and the work task management system, which enabled us to get a perspective of the system usage within the team. Both the team leader and respondent I however expressed their concern about the lack of strategy for administrating and handling information and limited trust towards the information in the systems used within the team. This led us to question our assumptions about groupware that was our initial perspective. Although as we initially were not sure that our assumptions were incorrect, our eight interviews were based on a modified version of our interview guide to see if we would get the same indications from the rest of the team. From the interviews, we further identified the Communicator, intranet, software installation ordering system, document handling system, and Formsystem. The interviews showed that the opinions about a lack of strategy and limited trust for the information in the systems were shared with the rest of the team. At this point, it became apparent that our study was not about groupware, but started leaning towards handling, storing and sharing knowledge. However, the data collected before this change in perspective was still applicable to the new research question due to the similar questions being asked in pre-study and interviews.

3.4   Attitudes towards a knowledge management system

What was evident from the pre-study and interviews was that a strategy for administrating information about solutions to problems and perhaps a new system for handling, storing, and sharing information was needed. Therefore, we felt a need for a forum where a few technicians could discuss the positive and negative aspects of a knowledge management system and how the knowledge within this type of system should be handled, which resulted in a workshop. It was not however without concern that possible solutions were proposed. Arne and Bertil strongly argued during our workshop that technicians are not the type of people that are good at documentation. Below is a summary from the interviews, questionnaire, and workshop of the attitudes towards a knowledge management approach within the team.

The IT support team studied considers themselves a team that is welded together, that communication within the team works well, and that they are a motivated group of people, which was especially evident from Arne and Daniella. From what we have observed, this is plausible. People seem relaxed among each other. According to the findings in the interviews and survey, Outlook and Communicator are the systems that have high trustworthiness of information (see figure 3.2), which would suggest that the team members trust each other since it involves direct communication. The work that is performed by the team requires a degree of analytical skill, and since the work tasks do not vary much within the team, the members of the team state that they speak the same technical language. Much information also stays within the team, especially in their Outlook email archives. Since there is, or at least has been, a certain degree of team members pursuing other job opportunities and new people coming aboard, this information is scrapped every time a person leaves. However, it now appears that the team work well together and each respondent feel motivated and comfortable within the team. It was not in all cases explicitly stated, but we got a general feeling that they enjoyed their work.
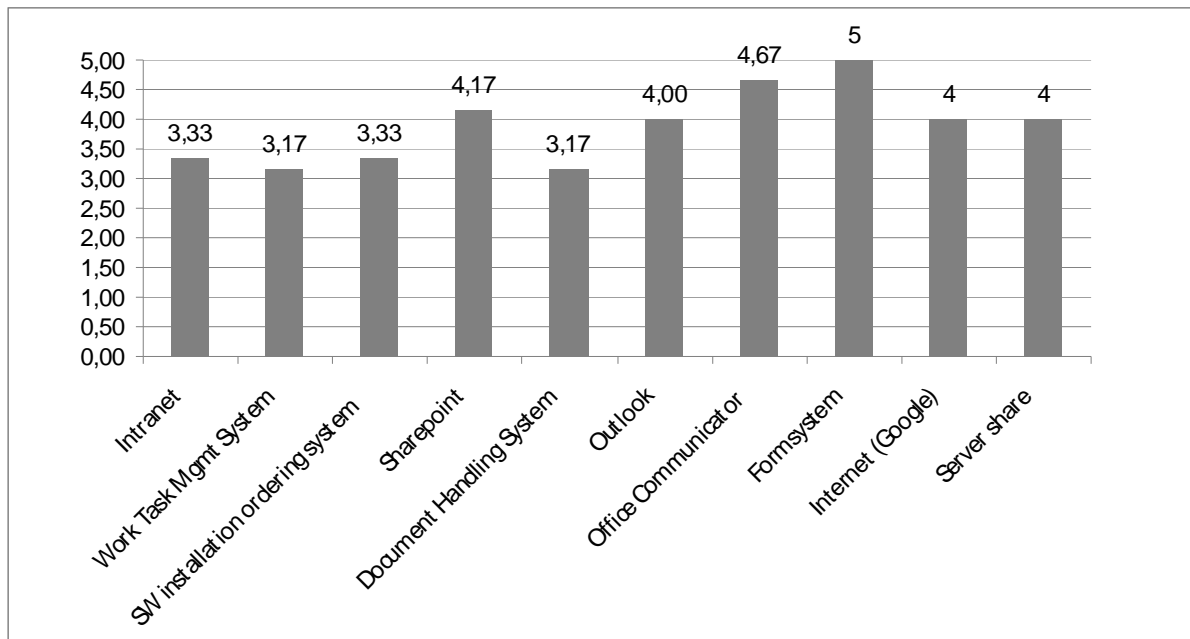
Figure 3.2 Means over trustworthiness of information in systems used by the team.

When it comes to solving the work tasks delegated to the team, each team member has their own way of solving problems. Hans raised his concern about this where he argued that "…solving a problem the same way is quality", but he also said that "…solving problems fast is also quality". This would suggest that there is an ambiguity in how the team should go about their problem solving. This was evident in the workshop where both Arne and Bertil argued that solving problems fast is quality.

Another issue that was raised was the limited descriptions surrounding the problem that sometimes comes in via the work task management system. Between the IT support team and the computer users there is the helpdesk, which in some cases lead to confusion. The descriptions of the problems a user experiences is not always the right problem according to Fredrik. In these cases, it leads to time being wasted because of the intermediary helpdesk. In addition, the communication between the team and helpdesk is not optimal and information that could be of use for the two parties stays within each department. The solutions described in the work task management system are often described in the form of "what was solved" instead of how the problem was solved which is crucial to the technicians. The problem solutions that are entered into a system should be owned by a technician according to the discussions in the workshop. It was also apparent that any team member should be able to add additional information, which is not possible in the work task management system today. Another interesting finding about the system was that the system is the most frequently used, but the system that the technicians know least about when it comes to functionality.

There is also an absence of formal routines for handling and sharing information. The only routine we came across that is in place is the use of the work task management system where a solution to the problem has to be entered into the system in order to close the work task. Hans feels that both the management and certain technicians do not take this problem seriously, and with the stressful environment, the work task management system is filled out inaccurately which leads to the information being of limited use to the technicians. However, there is a culture of sharing useful information within the team. When someone finds a solution to a common problem, this solution is usually sent to the team via Outlook. At the

workshop the respondents stated that Communicator is often used if the problem is clear and the technician know whom to turn to.

At the workshop, it was clear that there are voices proclaiming the implementation of a knowledge management system, but there were also reservations. One of the prevalent concerns was that technicians in general are very bad at documenting their work, and therefore a person specially assigned to enter solutions to encountered problems is needed. During the discussion, we all felt that the pros overweighed the cons. However, finding an assigned person to do the work who had knowledge in the IT support area could be hard to find which all agreed to. The respondents felt that there is a lot of double work today when two people have to be involved to solve one problem. In the workshop, respondent Arne said that it can take up to 30 minutes to get hold of the appropriate team member to solve a problem or make searches in the systems to get correct information. Moreover, when the appropriate technician is found, both of them work with the same task. A positive aspect of such a system would be when new consultants join the team. Today, new employees work side by side with an experienced consultant and is given simple problems until they are familiar with the organization. In the workshop, it was stated that the first one or two weeks are usually a blur where they cannot remember much. If a system with solutions to problems exists, the respondents argued that it would aid the new employees' learning curve and know where to search for relevant information.

3.5   Synthesis

To give an overview of the interesting parts of the empirical data collected, this section will provide a summary of the chapter to highlight the scientific areas that will be the basis for the continuation of this thesis.

Face-to-face and person-to-person communication is the most widely used within the team and it is clear that the members in the team are not fully satisfied with the systems they use today. The functionality that seems to be lacking is primarily some form of database system or similar that can facilitate solutions to problems that the technicians encounter on a daily basis. In order for us to get a clear understanding of these types of systems, we further need to explore previous research within the area of knowledge facilitation and knowledge management. We also believe that trust, whether it is in the systems used, the information the systems contains, or trust between the people in the team, is an important aspect to develop further, as it might be a cornerstone on which a team and its environment is founded.

What also needs to be explained is how the members of the team work together and what drives them to work together as a team. This would involve digging into the literature surrounding groups and teams, what constitutes a team, and how different types of teams work. Connected to this is also the question of culture. We wish to touch upon different aspects of culture, such as organizational culture and knowledge culture to further explain why and how the team function as it does. When explaining the cultural aspects of the team we also hope to gain a deeper insight as to why these people function together the way they do. This literature review will also touch on the concept of communities of practice, which might explain the cultural aspects and why the team members share their knowledge.

4.   Literature Review

In this chapter, the theories that can explain our empirical findings will be accounted for. The first two parts brings up the theories surrounding work teams and culture, followed by communities of practise, knowledge, and finally knowledge management and knowledge management systems.

4.1   Work teams

During the last two decades, the fastest growing form of organizational structure has been the work team organization. This is a consequence from the change of perspective within our economy. In the past, organizations were more focused on production where the value was in the forms of physical assets, where loyalty and seniority was the factors for rewards. Today, this view has transformed to a customer focus where an organizations' value is immaterial assets in the form of knowledge, and rewards are based on results. The fact that this has changed has led to a need for a new type of organization; an organizational form where the previous hierarchy is flattened and decisions are made throughout the organization that results in a higher degree of flexibility (Lind and Skärvad, 1997).

Teams within a work team organization can according to Lind and Skärvad (1997, p. 52ff) have different goals. Consequently, teams can be categorized into the following:
- Project teams
- Quality teams
- BPR-teams (Business Process Re-engineering)
- Operational work teams
- Virtual teams

Of the team types above, those of interest for explanation of the empirical findings in our study are primarily operational work teams and virtual teams that will be explained further in the next section.

Operational work teams derive from the concept of "lean production" which originally is a production- and work philosophy. This philosophy is founded on principles of minimizing waste in production, consistently improving work processes and quality, tracking and eliminating errors, just-in-time production, building process supporting information systems, utilize multifunctional teams, decentralize responsibility to the multifunctional teams, and integrate control- and support functions in the multifunctional teams. The basis in this philosophy is that a maximal number of tasks and maximal responsibility is given each team. The teams should in turn be multifunctional which in reality means that they should be able to work a variety of tasks within its domain. Since the teams are multifunctional, they should also be able to rotate between work tasks. In order for this type of teams to evolve, competence development is a necessity, which would suggest that effective operational work teams are learning teams (Lind and Skärvad, 1997).

The other applicable team type is the concept of virtual teams. This type of team is characterized by teams using information systems to collaborate and communicate. Compared to other team types, virtual teams are not dependent on being at the same place with the other team members, but can work separately connecting themselves to a joint network where voicemail, email, and video conferences are the dominant means of communication. For the team members, a familiarity with the different involved systems is important for the team to

reach its full potential (Lind and Skärvad, 1997). The virtual team also depends on the commitments of its members since the organization is less structured than conventional forms organizations. Therefore, it can be important to create a community within the virtual team organization (Lemken et al., 2000).

We have chosen only to describe the above two types of teams because of the fact that the object studied is not involved in projects of the kind that requires a formalized organization for them to be carried out in a professional manner, and the same goes for quality teams. When it comes to BPR, this is not done within the team, but from a separate unit within the organization.

Table 4.1. Differences between role differentiated, role integrated and role complementing teams. (Freely translated from Lind and Skärvad, 1997)

Type of team	Role differentiated	Role integrated	Role complementing
Dimensions of organization			
Relations and role constellations	Sequential relations - work serial, independent and differentiated	Collaborative relations - work parallel, partly dependent and integrated	Mutual relations - work parallel, close dependencies and complementing
Information about rules and situations	From rules - independent	From team leader	From each other
Work norms	Do your job in a good manner - perform	Do your job and be a team player in a good manner	Do you job and be a team player, cover you team members and be prepared for continuous adaptations.
Demands on communication/collaborative training	Limited	Important	Very important
Leadership tasks	Create team roster - switch players	Game planning - fast re-arrangements	Affect the flow of the game - integrator
Follow-up and reward systems	Individual	Both individual and collective	Collective - genuine team effort
Flexibility	Low - but high exchangeability	High - but relatively small space for improvisation	Very high - but high demands on chemistry within the team

Regardless what type of team organizations use, all teams have certain characteristics. Lind and Skärvad (1997) propose a typology of teams (see table 4.1). The three different team types; role differentiated, role integrated, and role complementing primarily focuses on the degree on which the team members have to collaborate in their work. Role differentiated team have a high amount of sequential and independent work tasks which require control. Here, qualifications, competencies, and skills are not equally divided among the team members and they all have their own specializations. This high degree of specialization makes the team

highly dependent on each team member. Moving to the role-integrated team, this type still requires a certain degree of specialization among the team members, but they are required to integrate and collaborate during the work process. Often, this collaboration is planned but it can also change during the course of work putting a demand on responsive leadership. It does not necessarily require a fully functioning chemistry between the team members, but still demands high communication skills. The final team type, role complementing, can be compared to doubles in tennis where both team members are specialized but have high interdependency. The collaboration in a role complementing team is very intimate and flexible which requires functioning personal chemistry and consensus. Because of the high demand on chemistry and joint training, it is difficult to replace members in a role complementing team (Lind and Skärvad, 1997).

The authors argue that this typology is useful when creating a team, but we would further argue that it could be used for analyzing an already formed and functioning team.

4.2   Organizational Culture and Knowledge Culture

The concept of culture can be viewed through a variety of perspectives. Culture as a general term will be used in this study to introduce the concept, while organizational culture and knowledge culture together with organizational trust are the concepts used for explaining our empirical findings.

In today's competitive environment organizations actively try to change their organizational culture. This might not only have the purpose of steering people towards a unified goal, but also to influence how people work, interact, collaborate, and share information with their colleagues (Oliver and Kandadi, 2006). Culture is however difficult to define because it is used in a variety of scientific disciplines which stretch from collective behaviors and patterns to symbolism and rituals (Alvesson, 2002).

Lemken et al. (2000) defines organizational culture as "patterns and shared values and beliefs that over time produce behavioral norms adopted in solving problems" (p. 3). This does not fully align with Alvesson's (2002) view who takes on organizational culture as an umbrella concept (also Alvesson and Kärreman, 2001) where ways of thinking about cultural and symbolic phenomenon includes values, assumptions, meanings and symbolism into the concept of organizational culture. Alvesson (2002) views culture as central for understanding behavior, social events, institutions and processes within an organization. Alvesson further implies that organizational culture is "…shared orientations within an organization or another group" (2002, p. 4) where orientations can take form of the four concept stated above. The step from culture to social structure is not far, he further argues, they are merely different abstractions of the same phenomena. "Culture describes social action as depending on the meaning it has for those involved, while social structure describes social action from the point of view of its consequences on the functioning of the social system" (Alvesson, 2002, p. 5). However, culture and social structure does not always have to exist in harmony. If routines are changed that does not match the cultural patterns, friction can occur. Therefore, studying social structure is not the same as studying culture. Behavior (as a cultural phenomenon) is therefore based on the shared values, assumptions, meanings and symbols of a collective (Alvesson, 2002).

Another cultural phenomenon is subcultures. A subculture (in an organizational context) is a subset of organizational members that identifies themselves as a group within the organization

and that take actions based on the collective understandings of the group (Hatch, 1997). Basically, a subculture is a culture within a culture based on the same factors as described in the previous section.

Culture, and primarily organizational culture, can be further broken down to the type of culture we wish to use in this study, namely knowledge culture. According to Oliver and Kandadi (2006) the existing literature in the knowledge management area views organizational culture and knowledge management as inseparable (also Alvesson and Kärreman, 2001) even though there is unclarity of how to influence and develop knowledge culture in organizations and little empirical research done in the area. The study done by Oliver and Kandadi (2006) addresses ten attributes, which they argue can influence, and aid in the development of a culture around knowledge in organizations. Not all will be addressed here, but only the parts relevant to this study. Some of the finding the authors made is that:

- Specialist positions can aid in the development of knowledge culture such as knowledge management analysts or coordinator roles and people within strategic management, process analysis, change management, knowledge portal development and human resources were identified. These people have the means and expertise to develop and integrate knowledge management activities into the core processes of an organization.
- Management plays an important part in creating a knowledge culture by addressing knowledge as a crucial part of the organization.
- When people are brought together either voluntarily or by decision from higher instances, cultural like behavior emerges. These groups, or Communities of practices, are said to be breeding grounds for knowledge culture, both formal and informal communities.
- It is vital to allocate time for the development and facilitation of knowledge in order for the knowledge culture to emerge. In some instances this meant allocating certain people for facilitating knowledge, and in other setting aside time for others to generate knowledge.
- Connected to the previous is the development of routines and development/re-engineering of business processes for capturing knowledge when it is generated. However, the findings suggest that this change of routines and processes should be incremental (crf. Alvesson, 2002) to ensure the development of a jointly shared culture around knowledge.
- The infrastructure for communication is also important to consider in the knowledge culture. The technical solution discussed in the article is the knowledge portal, which is seen by interviewees as imperative for the knowledge culture to emerge.
- Finally, physical attributes for sharing, developing, and storing information is important. The physical attributes constitutes the shared spaces where people can come together to share and generate ideas. For example, an open workplace can create an informal way of communicating and generating ideas, which can aid in the creation of a knowledge culture.

Lemken et al. (2000) further argues that this cultural development towards sustained knowledge transfer can be aided by the involvement of all members and levels of the organization when developing common goals, values and procedures. The authors findings suggest that transparency about ongoing activities and open participation among all members can lead to the mutual trust that is a requirement for knowledge transfer. When introducing technology for knowledge transfer and management, a culture around this media should be

created which could lead to an organizational memory. This corresponds to the findings of Oliver and Kandadi (2006). The work by Skerlavaj et al. (2007) also shows a correlation between an organizational learning culture and organizational performance, especially in the non-financial performance field.

Another interesting aspect of organizational culture is its relation to organizational trust. According to the findings of Jennex (2006) people in an organization that had high organizational trust tended to be more open with their sharing and transfer of knowledge than people in organizations that had low trust. Organizational trust also seems to affect the level of creativity for these organizations. High trust enables sharing and facilitation of knowledge, which further leads to increased knowledge among the members and in turn increased creativity.

4.3   Communities of Practice (CoP)

The focus in learning organizations today has gone beyond that knowledge has to be documented. The focus is today on what ways knowledge can be shared, discussed and innovated (Mittendorff et al. 2006). Much knowledge in organizations is implicit/tacit and is difficult to convert into explicit knowledge. Nevertheless, this knowledge is of importance to learning organizations. Communities of practice (from now on CoP) are groups of people who can share and develop explicit and implicit knowledge together in order to help them in their work.

According to Wenger (1999, in Pavlin, 2006) CoP joins three components; knowledge, people and experience. CoP is based on a number of people that share knowledge with the help of some kind of tool or method (Pavlin, 2006). The knowledge is the domain that brings people together in a community and the domain is based on people with common topics, problems and issues that they share in their daily work. Wenger et al. (2002) describes CoP as an expertise that brings people together and that they all share a special commitment. The community also shows how they should organize the knowledge. Wenger et al. (2002) believes that this commitment is what makes it more than just a group of friends. Wenger further argues that when the three components work well together they make an ideal knowledge structure that develop and share knowledge. What is special with these communities are that they are full of expertise and they help to channel their knowledge and effort to those who needs it (Smits and de Moor, 2004). In a learning organization, CoP is a key element and the knowledge a key asset of the CoP. For it to be as successful and efficient as possible, it is important to have structured processes for knowledge management. From the beginning, CoP was groups that emerged naturally but today many CoPs' are formed by organizations as a knowledge management strategy (Mittendorff et al. 2006).

4.4   Knowledge

How organizations share knowledge is important today, and if dealt with in the right way, knowledge can be a competitive advantage (Inkpen 1996 in Joshi et al. 2004). The knowledge has to be transferred and used in a successful way in order for the organization to have a competitive advantage. It is important for the organization to understand the value of knowledge and how to use it. If done successfully, the organization will be a learning organization (Szulanski 1996 in Joshi et al. 2004). In other words, the knowledge transfer plays a big part in a learning organization. The knowledge transfer process has five components: source context, recipient context, knowledge context, relational context and

situational context. Only the source, recipient and knowledge context are interesting in this study and therefore only those three will be further explained.

The source and recipient context has attributes of the knowledge that can make the transfer of knowledge easier or hinder it. The source context has one dependent variable; credibility. The credibility concept has in turn two dimensions: trust and reputation. Research in knowledge has found that trust is an issue in knowledge transfer. The reputation is used to evaluate and screen the value of the source's knowledge. It is therefore important that the knowledge source is credible and trustworthy in order for the recipient to use the knowledge (Joshi et al. 2004).

The knowledge context is the nature and the characterization of the type of knowledge. The knowledge context also has one variable: Information systems development (ISD) related capability. This variable focuses on that the knowledge transfer is dependent on the wealth of the source's knowledge base. Researchers believe that the more competent an employee believes himself to be, the more knowledge he will transfer. The knowledge within the team also has to be relevant for the project. If one employee in the team has related knowledge to the project, it is more likely that he will transfer more knowledge to his team members (Joshi et al. 2004).

As described above, knowledge, if used in the right way, can be a competitive advantage for an organization. This is not only because the organization is a learning organization but also because the organization can be more effective. If an organization has a place where they can assemble their knowledge, the employees can go back and find relevant information instead of searching for the same information and do the same work once again (Land et al. 2001).

Knowledge can be either explicit or implicit according to Land et al. (2001). Explicit knowledge is easy to share and communicate, it is also formal and because it is static and public, it is often easy to identify the knowledge through its source. According to Dingsøyr and Røyrvik (2001), there are many information systems that support the collection and transfer of explicit knowledge in organizations. Implicit knowledge is less formal and static than explicit knowledge and it is not as easy to share and communicate as explicit knowledge (Dingsøyr and Røyrvik, 2001). Implicit knowledge is also known as tacit knowledge and can be defined as "we know more than we can tell" (Polanyi's definition in Hodgkin 1992, p. 3). Implicit/tacit knowledge is of a more qualitative nature. When someone wants to solve a problem, he or she uses implicit knowledge to find a solution. This implicit knowledge is stored knowledge, which can be both explicit and implicit. The stored knowledge and the solution are different depending on who is solving the problem. Implicit knowledge is therefore difficult to understand and to transfer (Dingsøyr and Røyrvik, 2001).

Implicit and explicit knowledge can also be individual or collective and the knowledge is different, depending on which it is (Land et al. 2001). Implicit-individual knowledge is built on practical experience according to Land et al. (2001). As described above, the solution of a problem is individual and based on previous knowledge, experience and skills. The problem solving is therefore unique and subjective. Implicit-collective knowledge is implicit knowledge that is shared within the team. This knowledge is important in order for the organization to keep on learning and improve. It is often common in teams that each member is specialized in one specific area and has a special role in the team (Land et al. 2001). By doing this, the knowledge is heterogenic and distributed among the team and if the environment is dynamic, the knowledge will keep on changing in the team.

4.5   Knowledge management

Knowledge management is about how an organization can be more effective and productive by storing and organizing their knowledge (Artail, 2006). As showed in figure 4.1, an organization can have many types of knowledge that can be managed and shared and ultimately result in an organizational memory (Lemken et al. 2000).
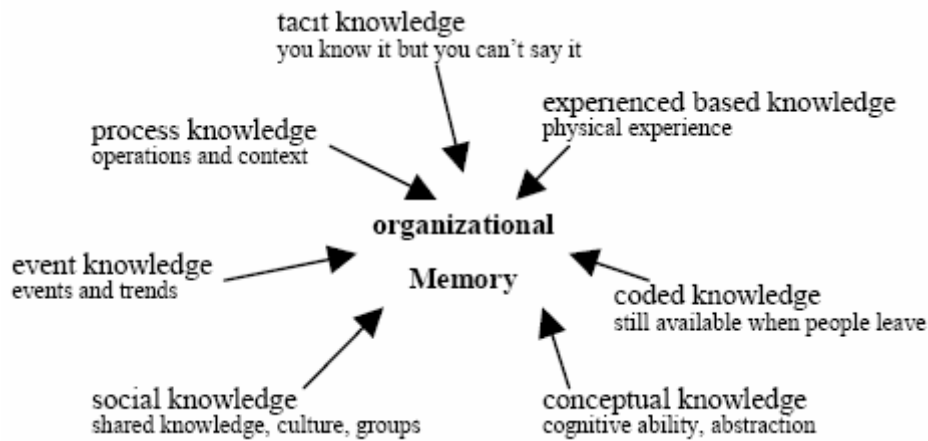

Figure 4.1. Different types of knowledge in an organization. (Lemken et al. 2000)

Many researchers focus on how knowledge can be stored and used in a good way. What many miss is that the biggest problem is how to store implicit knowledge. The difficulty with implicit knowledge is that it has to be converted into explicit knowledge first to be able to store it. The problem is then how to do this without loosing too much of the implicit knowledge (Land et al. 2001). Another problem is to get hold of the implicit knowledge. An employee's solution of a problem can sometimes be anything but technical; it can for example be because of organizational issues and the same goes for why the problem was caused in the first place. Sometimes it is because of bad technical solutions and sometimes it has to do with the organization. If the problem is due to organizational issues it can be difficult to find out what went wrong. Employees can be afraid of sharing their experiences because of possible negative consequences (Land et al. 2001). Today's tools do not always support implicit knowledge, only explicit knowledge which makes it even a greater problem to convert the knowledge into explicit.

Unfortunately, implementation of knowledge management has not been successful so far. Many organizations believe that the knowledge sharing is not working when the knowledge has to be transferred from one part of the organization to the other (Desouza, 2003). One of the reasons for not working is, according to Desouza (2003), that although the information technology might be good it cannot motivate employees to share knowledge. Therefore, the problem is not the technological solution, but the organizational culture and how the employees can be encouraged to share their knowledge with others. If the knowledge management system will be successful, the employees first have to be motivated (Desouza, 2003).

Desouza (2003) found in his research on different organizations four common problems with knowledge management. The first is that software engineers are afraid of being experts. By this, he means that software engineering is a profession where you always have to be updated about new techniques and tools in order to be successful. By using a knowledge management system the employees would be dependent on "old" knowledge and would not get as much opportunities to keep updated as before. Another reason is that they fear of being expert in

just one area, which can lead to the person working only in this area and not being able to develop in other areas. Desouza (2003) also found that the employees want to be hired for projects for their willingness of wanting to learn and explore new things and not because of their previous knowledge.

The second problem is how to convert tacit knowledge into explicit knowledge. When someone wants to share his or her knowledge, it can be difficult to articulate it and store it in the right place in the knowledge management system. Knowledge is also dependent on its situation. How one problem was solved at one time may not help when the same problem has to be solved again. One problem can evolve out of many different circumstances (Desouza, 2003).

The third problem Desouza (2003) found was that many executives wanted a knowledge management system and expected their employees to use it, but they did not use it themselves. The employees then thought of the system as a luxury and not as something they actually had to use. Along with this, training is also essential. If the employees do not get an introduction to the system and their executives do not use it, then they will not either. The employees need to get directions from their executives.

The fourth and last problem is that executives have a tendency to push their employees to use the system. They try too hard, and because of the pressure, the employees will not feel motivated to share their knowledge. The best way according to Desouza (2003) is to let the employees get to know their new system and the technologies behind it and then they will use it in an effective way.

Parekh (2005) identifies three minimum steps that need to be considered before deciding on the use of knowledge management within an organization:
- Establish what knowledge that needs to be managed
- Identify the people and create/modify a process to facilitate the capture and sharing of knowledge
- Create or implement formal systems for organizing the knowledge into an accessible format.

We feel that these three steps have been brought up earlier in this chapter, although perhaps in a different context. They are, however, important factors to consider and are therefore justifiably included in this section.

4.6   Knowledge management systems

A knowledge management system provide access to the sources of the knowledge, create depth and width of the knowledge flow by making links available to the knowledge's sources, support the development of the individual and the organizational competencies, make search and retrieving tools available to the employees, collect, store and share knowledge and help the employees incorporate the knowledge (Alavi and Leidner 2001; Shin, Holden and Schmidt, 2001 in Rao and Osei-Bryson, 2007).

Knowledge management system can for example be information systems that manage organizations knowledge. It is an information technology based system that will support the organizational knowledge management behaviour (Ong and Lai, 2007).

There are different ways of storing knowledge. An organization can for example use a digital library such as databases (Alvesson and Kärreman, 2001). With this library, the organization uses both the internal and the external knowledge and makes it accessible to everybody. This can be seen as a technocratic way or solution of the knowledge management problem. Another way is knowledge management as a community. This community encourages diversity in the organization and wants to share that diverse knowledge within the organization. If an organization uses this approach, there are four challenges for them to consider according to McDermott (1999).

1. What would a technical solution look like that makes knowledge accessible to employees and help them think together? (Technical issue).
2. What would a community look like that share knowledge and maintain the diversity in the organization? (Social issue).
3. How can an organization create an environment that supports and values knowledge sharing? (Management issue).
4. How does and organization make the employees share knowledge with each other and have an open mind to other ideas? (Personal issue).

According to Hansen et al. (1999), there are two ways of implementing knowledge management; codification or personalization. Personalization is about socialization whereas codification is more about behaviour. The personalization strategy states that knowledge is shared through dialogues and people-to-people interaction. Here, knowledge and its source will not be separated because they are dependent on each other to be able to share the right knowledge. The codification strategy is about codifying individual knowledge, put it into databases, and make it accessible to every user. The organizational knowledge each employee has will be extracted and stored in the database. The knowledge in the database can then be used to help employees who have lesser skills in some areas. This can sometimes be used by organizations as a way of keeping their costs down by hiring less educated people who often are cheaper than educated, more expensive workers (Hansen et al. 1999).

5.   Discussion

In this chapter, the theories from the literature review are applied on our empirical findings. It will begin with a discussion of how the team operates and functions together followed by a discussion that focus on the attitudes raised about the systems used within the department of IT support. The next part will emphasize the interesting parts about knowledge and knowledge management.

5.1   Context

The team members that have been studied are independent in the way that they have clear boundaries of what they do and what their function is within the company. They solve a variety of problems connected to client computers, servers, hardware, software etc. The members of the team all have knowledge and experience within IT support and they are encouraged to specialize in a specific area such as UNIX, email services etc. According to the literature, this type of team can be classified as an operational work team because of its multifunctional nature (Lind and Skärvad, 1997). The team often communicates via email, communicator and telephone because they are located at different sites. Hence, this team can be partly classified as a virtual team because of their use of computer mediated communication channels (Lind and Skärvad, 1997). The team members primarily work independently at each site but have a lot of communication with the rest of the team. In some cases more than one person are required to do the job. This can be explained by the typology of team roles proposed by Lind and Skärvad (1997). We would argue that the team is role integrated where collaborative relations and parallel work is one of its key identifiers. The flexibility in the team is also fairly high since the team members can choose which work task they want to work on at each given time and have to adapt to the changing flow of work tasks. The team members are also difficult to replace, since it takes time to make a new team member independently efficient. The team is also welded together and all respondents give a clear signal that they enjoy working within the team. According to Lind and Skärvad (1997), a role-integrated team does not necessarily require a fully functioning chemistry within a team but there is a high demand on the members' communication skills. This could mean that the team would function even if there were clashes between people. Since there were no indications that clashes are apparent, this leads us to the conclusion that the team is good at communicating and functions well together. However, almost everybody mentioned in their interview that it was very important that a new person blended in well in the group, which leads us to the conclusion that the team still feel that personal chemistry is important for the team to function properly, even though much of their work is independent.

The team functions well today, but there have been issues in the past which has affected the team and their work and it was therefore decided to replace some of the team members. When a new team member is brought on, there are no formal introduction routines. This might be why there is a lack of routines in storing knowledge. Since the problems regarding team dynamic have been solved, the focus is now on how to create routines for knowledge management.

In our study, we found that the team members often prefer to use face-to-face and person-to-person communication as opposed to making searches in a system to find solutions to encountered problems. If the technicians encounter a problem that can be easily identified but on which they have no knowledge in how to solve, the technicians usually use the Communicator or telephone to contact the person who he or she believes has the solution. The

technician usually has an awareness of unusual problems that have been encountered within the team and these are usually spread at lunch breaks, the breakfast on Fridays or in conversations. We argue that the openness for sharing solutions have to do with the culture of the team. Since the team members all have similar background in IT support and a high interest in the field, they possibly have a similar standpoint in the importance of sharing useful information. However, it might be the case that when new members are molded into the team, the senior consultant that shows the new member around stresses the importance of sharing knowledge. The team also has an open office policy where people sit in a landscape of open cubicles. According to Oliver and Kandadi (2006), the open spaces are important for enabling the sharing and generation of ideas, and also in aiding the creation of knowledge culture. We argue that there is a strong knowledge culture present within the team, but the team has no effective means of storing this knowledge and no routines or processes present which, according to Oliver and Kandadi (2006), is needed for capturing and facilitating knowledge.

In our interviews and workshop we discovered that although the team members views the email system, telephone and Communicator as the primary means of getting hold of the right information, this often poses problems. Sometimes when a technician receives a work task it can take around 30 minutes to chase down the correct information or waiting for a person to send this information which means that two people are involved in a task that was meant for one. Although this is a problem, we argue that it shows a high degree of organizational trust, and this was also evident in the questionnaire where Outlook and Communicator have high trustworthiness of information. According to Jennex (2006), people in organizations that have high organizational trust are more willing to share, transfer, and facilitate knowledge than people in organizations that have low organizational trust. This would mean that there is a strong basis to build on within the team, and that a system for facilitating knowledge might be accepted without too much opposition. However, our empirical data show that the workload is consistently high; the technicians themselves believe they are bad at documenting their work, and they actually do not want to write documentation. This might pose a problem for capturing and storing knowledge. The work by Oliver and Kandadi (2006) showed that it is vital to allocate time for development and facilitation of knowledge, which indicates that there might be problem in motivating people to capture and store knowledge if a knowledge management system is implemented.

The interviews, questionnaires and workshop have all revealed information that fits well in the definition of what a community of practice is. The knowledge is of importance in the department, knowledge is shared with others in the team in order to help them in their daily work. They share problems and issues and they have an expertise and a special commitment to their work. All of these are factors that distinguish a community of practice (Wenger et al. 2002). Further, knowledge management can be seen as a community, as described in the literature review. The community encourages diversity and to share knowledge within the organization (Alvesson and Kärreman, 2001). When storing knowledge, one approach can be to look at knowledge management as a community. Since the team fit well within these relevant factors, this approach is what should be considered if a knowledge management system in the future is implemented. Some issues need to be dealt with first in order for the system to be successful as described in the literature review. These issues are important when designing a technical solution. We already know what the community looks like, but we also argue that the team would benefit if the helpdesk also will have access to this system. Nevertheless, the main focus will be on the team and what they believe will motivate them to use a system. The most critical factors to consider are then the management and personal

factors; how can an organization support and value knowledge sharing and how does an organization motivate the technicians to share knowledge and to have an open mind to other ideas (McDermott, 1999)? This can be linked to the strategies for implementing knowledge management; personalization and codification. We argue that the team today has a personalization strategy since most of their knowledge transfers are shared though face-to-face and people-to-people interaction (Hansen et al., 1999). For a successful community of practice sustain within the team, there has to be structured processes for knowledge management (Smits and de Moor, 2004). Well-structured processes can also lead to a successful implementation and use of a knowledge management system, which we argue can be done by implementing a codification strategy for knowledge management (Hansen et al., 1999).

5.2   The Systems

After our interviews were transcribed and the questionnaire compiled, we made an analysis and depicted the workflow (Appendix 3). This flow chart was later showed at the workshop and it was confirmed that we had understood the way the team operates when searching for solutions. The problem areas identified all had to do with the current systems used by the members of the team. Today, the team has eight systems where information about solution to problems can be found. After comparing the systems to the trustworthiness of the information in each of these systems, it was evident that only Outlook, Communicator and SharePoint had high trustworthiness, whereas the work task management system and the document handling system, which are the systems where stored knowledge can be found, achieve average score. We argue that this has to with the lack of useful information and also that much of the information is not entered by the team and is therefore not trusted to the same extent as the systems where information is managed within the team. It can also have to do with the structure of information, where the work task management system and primarily the team's share server lack a structure, which is easy to use, and access knowledge. This corresponds to the findings of Parekh (2005) where the organization of knowledge into an accessible format is of importance. Since there is a border between the job functions of the team and helpdesk, there is also a difference in the culture of sharing and handling knowledge. Our findings show that the communication between the two departments is lacking and the detail in cases that come through the work task management system vary in quality. This would explain why the questionnaire shows a lesser degree of trust toward the information in the work task management system.

The systems used today are far from perfect according to the technicians we have interviewed. One problem we reacted on was that the system most used is the one they know least about. During the interviews different information regarding the work task management system came up and all respondents had experiences of the system. This became even clearer during the workshop when one after the other said that they did not know about the full functionality or for what the system could be used. This system also had the lowest level of trustworthiness of the systems used by the team, which also change the way the technicians use it since they constantly have to validate the information within the system. This system is the one system they actually have to use everyday. Desouza (2003) discuss the challenges when implementing a knowledge management system. One of the challenges is to let the users get to know the system in their own way. By doing this, they will get to know all the functions and the technology behind it which hopefully will lead to an effective use of the system. When someone starts working in the IT support today he or she works side by side a senior technician for about two weeks. During these two weeks, he or she will get to know how the

work is being done by this technician. When they later start working on their own, they will do their work in a similar way as the senior technician according to respondent A. They do not get any education on how to use the systems and the functionality of the systems except just how the senior technician used the systems during those two weeks. This might be why they do not have the knowledge about their systems today and why they do not use them to their fully extent. If a knowledge management system would be implemented, this is something that has to be considered to help the team get the right knowledge about the system and all the functionality behind it, which can lead to the team benefiting from the system. This can also be one of the reasons for changing their attitude against documenting knowledge. By doing this, the learning time for a new technician in the team might be shorter. Today it takes them a lot of time to get to know all of the systems and the routines, time that they do not have.

Something that technicians mentioned during the workshop was that they needed to know the advantages with a potential system in order to use it. The advantages are the important factors that would motivate them to use it. Motivation is one of the factors that make an implementation of a system successful, and by making the team understand how they can benefit from a system and how it can make their daily work easier (Desouza, 2003).
In the workshop, the advantages that were mentioned were that the quality of their work would be higher, they could probably work faster and thereby solve more problems and most important, it would be easier for them to find relevant information. Some of the problems they have to solve on a daily bases are simple. If the solution to these problems are accessible to everybody, including the helpdesk then perhaps the team can be released from these problems and focus on the more difficult ones. An issue we raised in the workshop related to the consultancy part of the technicians employment where we asked if they had any fear of being replaced. The responses given to this question was clear from all four participants that they did not fear this, as they possessed a large amount of knowledge that is hard to replace.

Another way to motivate the technicians to use the system is that the knowledge in it is relevant. During the workshop, it was several times said that it is important that the knowledge in the system is described in detail, that someone needs to own the knowledge and that everybody should be able to add their own knowledge about a case. This could be connected to Joshi et al. (2004) and Desouza (2003) who both mention the importance of relevant and trustworthy knowledge in a system. What also was discussed during the workshop was that if they believe the system to be trustworthy and contain information that is relevant, then they would use it. This would lead to that they slowly would change their routines and the usage of the other systems would be less used.

5.3   Knowledge

The technicians working at this department have several times told us how much experience and knowledge they have about computers, hardware, and software, which is mentioned in the literature as implicit knowledge (Dingsøyr and Røyrvik, 2001; Land et al. 2001). All this knowledge is needed to solve their every day work. When they first started working at the IT support, they had a deep knowledge about certain IT support areas, but in time, they have realized that there is a need for that extra knowledge to solve the problems in their daily work. The extra knowledge that exists within the team is shared verbally when a new technician joins the team. All of the technicians we have interviewed has mentioned the problem that they could not remember anything their first week on the job and that they all needed some kind of help to get the extra knowledge they needed. This is what Land et al. (2001) and Joshi

et al. (2004) mention being a problem; How do you convert implicit knowledge into explicit? This team possess a large amount of relevant implicit knowledge, which they all mention they want to share with the rest of the team, but they are reluctant to document and write. They see themselves as doers; they solve the problems, they do not write about them. Another problem explained in the literature review is that the explicit knowledge is not being documented either, this is a problem we also found with the team. One of the reasons for not documenting is because they do not feel they have the time to document, another reason is their attitude against documenting. They are dependent on learning from others in the team and often learning from findings via Google. This means that they often spend a large amount of time searching for the right knowledge for their problem. If they knew, they only had one place to look at and where they also would find the relevant knowledge then perhaps their attitudes against documenting would change. What the team also has mentioned is that the place where they store and share their knowledge is not trustworthy, as discussed previously. In addition, the information in these systems is not always trustworthy either. Joshi et al. (2004) mention this as one of the most important reasons for people to even consider sharing information. The source needs to be reliable if knowledge should be transferred.

The team has problems with their knowledge management and all of these problems are mentioned in the literature review. These problems are very common and the reasons for why knowledge management systems often fail. All participants in the workshop mentioned that they would like to have a system where the basics have already been set by someone. They do not want to start from the beginning. They also just want the most common problems to be stored and not all cases. This is something that Joshi et al. (2004) mentions as one of the reasons for motivating a person to use a knowledge management system; the knowledge in it needs to be relevant for the project they are working on. If this could be realized then perhaps some routines could make them use the system.

Converting implicit into explicit knowledge is as explained before a problem today. In their work task management system, the technicians have to write about the case and the steps taken to solve the problem. The problem here as the technicians sees it, is that they write what they did, but not how, which is the relevant information for the team. They need the solution, not the problem. In this case, it is a balance of writing about the problem and then the solution. One of the technicians mentioned that it is very important to differentiate the way of solving the problem and the solution of the problem. The team members are problem solvers and they need the solution and not the problem. This is something that Dingsøyr and Røyrvik (2001) discuss about implicit and explicit knowledge. A solution of a problem is unique because it is solved based on one persons knowledge and experience. Another person might have solved it in a different way based on his or her knowledge and experience. In the workshop, one discussion was about the quality of solutions and that everybody has their own solution of a problem. One person in the team thought that quality is that everybody solves one problem in the same way. The rest of the technicians thought the opposite: that it is good that everybody solve problems in their own way. This broadens their knowledge and therefore broadens the scope of how many problems they can solve with the help of others in the team.

5.4   Final discussion

As we have discussed in this chapter, several possible benefits could emerge from an implementation of a knowledge management system. A successfully implemented knowledge management system could in the context of the studied department:

Context
- Remove interdependencies, which makes people in the team rely less on team members having to transfer the correct knowledge.
- Lead to effective use of the system, which could lead to the same number of cases being solved in less time.
- Shorten the transition time for new employees.
- Motivate people into using the system.

Systems
- Give the users more trust in the system than they have in the systems for storing knowledge used today.
- Decrease usage of the systems that have limited trust might.

Knowledge
- Contain useful, detailed, relevant and structured knowledge that is managed by the team, which can lead to stored knowledge with consistent high quality that the team members trust.
- Lead to a consistent quality in cases solved.
- Lead to easy tasks being solved by the helpdesk if the knowledge is shared.

The possible benefits mentioned above are primarily benefiting the department as an organizational unit. However, we have also identified certain areas where a knowledge management system could lead to the following negative consequences primarily for the technicians in the team, which in turn affects the department:

Context
- The team is welded together partly because the team members rely on each other due to lacking functionality in the existing systems for storing and sharing knowledge. A knowledge management system could potentially replace these dependencies and divide the team.
- Routines for documenting knowledge are perceived as negative by the technicians that participated in the workshop. Therefore, a knowledge management system that requires documentation of knowledge could take away the enjoyment in their work.
- The awareness of the different specialities within the team could potentially decrease which can pose problems should a difficult problem arise.

Knowledge
- The technicians gain knowledge from information outside the organization. If a knowledge management system is implemented it can lead to their learning curves stagnating because less knowledge finds its way into the team.
- There are different opinions about the quality of solutions. Is quality solving problems in the same way or solving problems in different ways?

The benefits can only be achieved if a knowledge management system is successfully implemented. To be able to achieve a successful implementation, we would argue that the department today have a personalization strategy for managing knowledge and therefore the knowledge culture must be changed. For a knowledge culture to transform, the process of managing knowledge must be re-engineered. Today, there is no formalized process for managing knowledge, as it is a part of the intangible knowledge culture that exists within the

team. This knowledge management process has the form of silent consent between the team members of how to share and store knowledge. We argue that this intangible process is due to the size and close personal connections among the team members, which allows them to exchange knowledge in an unproblematic manner. This process is ultimately a result of the united attitudes towards knowledge management within the team as it has been transferred from generation to generation of technicians. If the attitudes can be changed, a knowledge management process can be established and thereby the knowledge culture can be adapted to the new system, a codification strategy for managing knowledge can be achieved which is a long-term solution for creating an organizational memory.

6.   Conclusions

From our discussion, we have concluded that for this small department to gain benefits from a knowledge management system, a successful implementation is required. For that to be realized, the following areas need to be addressed:

- The department must create new routines for capturing and managing knowledge.
- The team must transform their personalization strategy into a codification strategy for facilitating knowledge.
- The team members need to be motivated into using a knowledge management system.

Since the company is growing, it will most probably lead to more technicians being brought onboard and others leaving the team. If a knowledge management system is successfully implemented it could lead to an organizational memory and bring a long-term solution to the management of knowledge.

Therefore, a successfully implemented knowledge management system within the department can:

- Limit interdependencies, which can lead to less people involved in solving each problem.
- Lead to users relying on the system and the knowledge within the system.
- Shorten the learning period for new employees.
- Lead to a system where knowledge is comprehensible and has a consistently high quality.

However, the negative aspects of a knowledge management system should be considered, where we have identified the following:

- A knowledge management system could remove interdependencies, which can affect the department's overall problem solving capabilities when undocumented problems are encountered.
- Documentation is a routine the technicians want to avoid. If the task of documentation is forced on the technicians, it can lower the motivation to use the system.
- A knowledge management system could limit the flow of external information from sources such as the Internet, which can lead to the technicians' learning curves stagnating.

Although there can be negative consequences from the implementation of a knowledge management system, we argue that the benefits are higher due to the possibility of a creation of an organizational memory. The small department could thereby benefit from implementing a knowledge management system. However, if a knowledge management system is implemented, there must be an awareness of the problems that could emerge.

6.1   Implications

Since this study only involves the perspectives of a single team, which has not yet implemented a process for knowledge management as well as a knowledge management

system, generalizations are difficult to make. However, what was evident is that benefits and negative consequences are not unlike those of larger organizations as explained in the literature.

Relating this study to general research, we are aware that further interviews and possibly more quantative empirical data should be collected to strengthen the system usage and trust. The technicians claim that documenting is not their favorite tasks, but we argue that these observations might not be representative for how these people actually will work if a knowledge management system is implemented.

6.2   Further studies

This thesis has identified several hypothetical benefits if implementing a knowledge management system within a small department. It could be interesting to study if these benefits would be realized with a successful implementation. If the department studied decides to implement a knowledge management system, it would be interesting to see if the attitudes towards documenting knowledge would change and how the team develops. Since the department studied is specialized in solving IT related issues, studies of other types of work teams are interesting to see if perceived benefits and negative consequences are consistent with this study.

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Appendix 1 – Interview guide

Inledning
Presentera oss och varför vi gör intervjun, samtycke och konfidentialitet. Inled lite mjukt.
1. Vilka är dina arbetsuppgifter?
2. etc.

Användning av system
4. Vilka system har ni för att dela och söka information?
   a. Vilka system använder du för att dela och söka information?
   b. Vad anser du vara positivt med de system du använder dig av och varför?
   c. Vad anser du vara negativt med de system du använder dig av och varför?
5. Scenario hur söka info, dela med sig och strukturera
6. Vad saknar du i dagens system?
7. Hur ser du på stödet du får av de system för informationsspridning ni har idag?
   a. Tycker du att de här systemen stödjer dig i ditt arbete?

Organisation
8. Vet du hur informationen administreras?
9. Kan du beskriva hur ni är organiserade på IT Support?
10. Tror du att er organisationsstruktur påverkar informationsspridning och informationshantering inom IT Support?
    a. Finns det andra faktorer som påverkar detta? (Personalomsättningen t.ex.)

Allmänt
11. Har du förtroende för de system som används för informaitionsdelning?
    a. Varför?

Bakgrund
12. Hur länge har du jobbat här?
13. Vad har du jobbat med innan du började här?

Appendix 2 - Questionnaire

1. Hur länge har du arbetat inom IT Support?

2. Hur ofta använder du följande system i ditt arbete:

a) Intranet
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

b) Work Task Management System
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

 c) SW installation ordering system
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

d) Sharepoint (Team site)
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

e) Document Handling System
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

f) Outlook
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

g) Office Communicator
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

h) Annat (V.g. specificera)
 Varje dag
 3-5 gånger per vecka
 1-3 gånger per vecka
 Mindre än 4 gånger per månad
 Aldrig

**3. Hur tycker du tillförlitligheten av den information som finns i följande system är, d.v.s kan du lita på och använda den information som finns i systemet?
(5 = högst tillförlitlighet, 1= lägst tillförlitlighet):**

a) Intranet
 1 2 3 4 5

b) Work Task Management System
 1 2 3 4 5

c) SW installation ordering system
 1 2 3 4 5

 d) Sharepoint (Team site)
 1 2 3 4 5

e) Document Handling System
 1 2 3 4 5

f) Outlook
 1 2 3 4 5

g) Office Communicator
 1 2 3 4 5
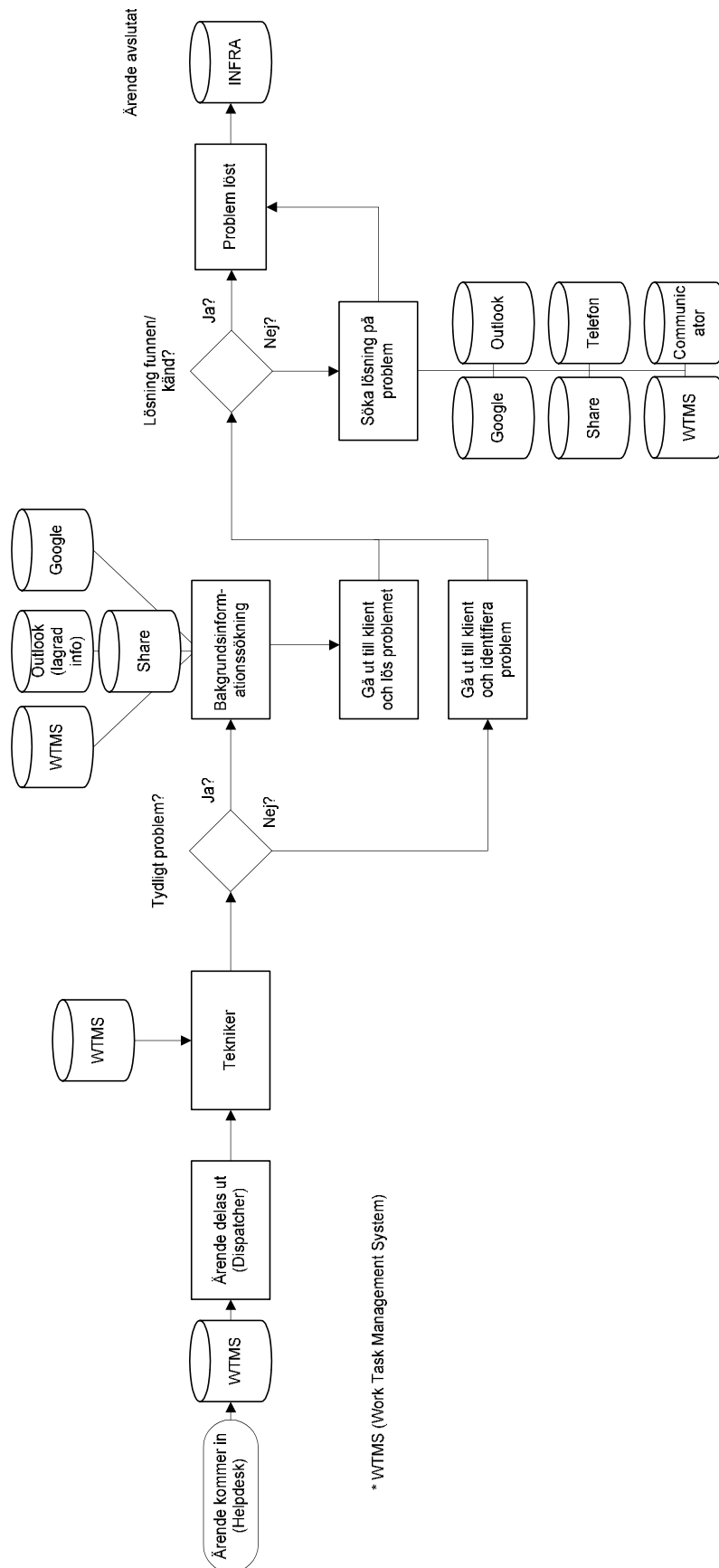
 h) Annat (V.g. specificera)
 1 2 3 4 5

4. Hur effektiv tycker du spridningen av information är inom IT Support? (5 = mest effektiv, 1= minst effektiv):
 1 2 3 4 5

5. Har du några förslag på hur informationsspridning skulle kunna underlättas eller samarbete göras mer effektivt genom användandet någon form av IT?

Appendix 3 – Flowchart and questions for discussion

Ärende avslutat

INFRA

Problem löst

Lösning funnen/ känd?

Ja?

Nej?

Söka lösning på problem

Outlook

Telefon

Communic ator

Google

Share

WTMS

Google

Outlook (lagrad info)

Share

WTMS

Bakgrundsinform- ationssökning

Gå ut till klient och lös problemet

Gå ut till klient och identfiera problem

Tydligt problem?

Ja?

Nej?

WTMS

Tekniker

Ärende delas ut (Dispatcher)

WTMS

Ärende kommer in (Helpdesk)

* WTMS (Work Task Management System)

Diskussion kring möjliga lösningar

- Vad ska systemet stödja?
    - På vilket sätt stödjer det IT Support?
    - För och nackdelar?
    - Kräver det förändringar i nuvarande arbetssätt/rutiner?
- Hur kan rutiner/arbetssätt förbättras?
- Hur kan informationssökning effektiviseras?

Appendix 4 – Organizational Chart