HELSINKI METROPOLIA UNIVERSITY OF APPLIED SCIENCES

Master's Degree in Industrial Management

Master's Thesis

KNOWLEDGE AND INFORMATION SHARING IN GLOBAL TECHNICAL SUPPORT TEAMS

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PREFACE

Companies need people who question the status quo and have motivation to make the change happen. Knowledge management is a new challenging field and it has many interesting aspects. First, it is interesting to question the status quo and see what part knowledge management plays in team communication. Secondly, the people and their interaction are fascinating to watch and thirdly, the connection to the company's performance adds a business aspect to this mainly human issue. When I received an opportunity from my former supervisor to write my thesis about knowledge sharing it sounded like a challenge that I really looked forward to. From a professional point of view, it is really refreshing to have challenges outside the field of technical engineering and I feel that it helped me to grow as a person and a professional when I stepped outside my comfort zone.

I would like to thank my former supervisor in ABB for giving me the opportunity to explore this interesting topic in this thesis. This has been an interesting journey, which has required a lot, but has also given me experiences, insights and knowledge. I would like to thank colleagues in my company for taking part to the survey and managers for taking the time to be interviewed. The conversations were interesting and provided more insight to the topic.

As a Master's student in Industrial Management I would like to thank my instructor Marjatta Huhta for her contribution and guidance on this project and also the lecturers at Metropolia University of Applied sciences for their interesting topics during the autumn semester. The conversations we had and the insights they gave to the students are priceless.

Last but not least, I would like to thank my wife and two children for their patience during the studies, which have taken a lot of my time, the time that we could have spent together instead.

Helsinki, April 28th 2010

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ABSTRACT

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The study explores knowledge sharing between two global technical support teams, located in China and in Finland, and seeks to look for ways to improve knowledge sharing in multicultural collaborative networks. The theories of knowledge management projects, cross-cultural barriers and organizational learning are used to study the challenges of knowledge sharing in the global setting. Knowledge management generally emphasize the creating of knowledge, collecting and sharing it and creating, supporting and integrating various information systems to enable the effective use of knowledge in organizations to generate economic wealth, create value, or improve performance.

The case study method is applied in the thesis. The conceptual framework of the study is built on literature on knowledge management and organizational learning. The practical part of the study entails open interviews with the management and a questionnaire for the team personnel.

The outcome of this study gives a proposal for the company on how to enhance the knowledge sharing between two global teams. The proposal includes elements of knowledge sharing technology, knowledge promoting culture, resources and incentives needed to achieve these goals. The outcome supports the company strategy on collaboration and provides help for the managers to practice more effective knowledge management.

Key words: knowledge management, communities of practice, knowledge sharing

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Tässä työssä tutkitaan tiedonjakoa kahden globaalin teknisen tuen tiimin kesken. Tiimit sijaitsevat Suomessa ja Kiinassa. Työssä pyritään etsimään tapoja, joilla tiedonsiirtoa monikulttuurisessa yhteistyöverkostossa voitaisiin tehostaa. Teorioita tiedonhallinnasta, kulttuurieroista ja oppivista organisaatioista käytetään tutkittaessa tiedonjakoa tässä globaalissa ympäristössä. Yleisesti tasolla tiedon hallinnassa keskitytään tiedon luomiseen, keräämiseen ja jakamiseen, tiedonhallintaympäristön luomiseen ja tukemiseen sekä eri tietojärjestelmien yhtenäistämiseen, jotta organisaatioissa olevaa tietoa voitaisiin käyttää tehokkaasti hyväksi tuloksen tekemisessä ja kilpailukyvyn parantamisessa.

Tässä työssä tutkimustapana käytettiin tapaustutkimusta. Teoreettinen viitekehys muodostuu tiedonhallinnan ja oppivan organisaation teorioiden pohjalta. Käytännön osuudessa käytetään apuna yrityksen johtohenkilöiden avoimia haastatteluja ja kyselyä tiimin henkilöstölle.

Tämän työn tuloksena esitetään ehdotus siitä, miten yritys voi parantaa tiedonkulkua kahden globaalin tiimin välillä. Ehdotus sisältää elementtejä tiedonjakamisen teknologiasta, tiedonjakoa kannustavasta kulttuurista ja resurssien ja kannusteiden määrittelystä. Näiden avulla tiedonjakamista voidaan tehostaa. Työn tulokset tukevat yrityksen strategiaa yhteistyön parantamisen osalta ja auttavat yrityksen johtoa harjoittamaan tehokkaampaa tiedonhallintaa.

Avainsanat: tiedonhallinta, käytäntöyhteisöt, tiedon jakaminen

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1 INTRODUCTION

ABB Induction machines have three technical support teams located in Finland, China and Italy. The teams include both electrical and mechanical engineering experts. The customers for the technical support team's services are global and local ABB sales offices. The Finnish team gives technical support mainly to the sales of induction motors, which can be manufactured in Finland or in the factories that manufacture the same products. The Italian team gives technical support to the machines that can be manufactured in Italy and furthermore, the same Italian team does also the order related designing of electrical motors, which is not the case in the other two teams. The Chinese team is a global technical support team that gives support to the same products that are supported also by the Finnish and Italian teams. The design tools and the working queues (Lotus Notes database) are the same for all of the teams. The Chinese team has been trained by Finnish, Italian and Swedish experts and the team works in Shanghai, China. The team leader is a Finnish expatriate but the team leadership will be passed on to a Chinese person in summer 2010.

The problem for the case company is that the knowledge is not sufficiently shared and a global platform for knowledge sharing has not been established. The Finnish team has a long history of being an independent and a local team with strong ties towards R&D, design and manufacturing departments. Induction motor manufacturing and technical support have been terminated in Sweden and the Italian team is now responsible for those products. New global teams are created, production and technical support moves to a new country and knowledge becomes dispersed. All this creates new challenges for knowledge management and knowledge sharing.

The purpose of this study was to find out how the teams shared the information, both locally and globally, define how the information and knowledge could be shared more effectively in the future and explore some cultural differences that might affect the knowledge sharing behaviour. The research question was:

How to share information and knowledge in multicultural collaborative networks?

The teams should be able to perform equally well, therefore it is important to share the knowledge and learn from each other and create a learning organization for global technical support teams. The main focus of the thesis will be the interaction between Chinese and Finnish teams, due to the fact that the Italian team has not yet been finally formed and the Chinese team has to be able to take care of the whole ABB induction motor product portfolio. The Finnish team also has a very limited need for interaction towards the Italian team and vice versa.

The study is qualitative research including interviews of the Chinese and Finnish team leaders and managers that have been involved in creating the knowledge sharing environment of the new organization. Additionally a questionnaire was given to and filled in by the Chinese and the Finnish employees, who have been working in technical support in the past few months. The outcome of the study aims to recommend a solution to the management of the technical support teams on how to keep the teams in the same level of knowledge, improve the sharing of knowledge and to improve the possibilities for each team to perform on a high level. Recommendations can also be applicable for knowledge sharing between R&D and technical support teams and furthermore for creating a knowledge platform to be utilized across the case company’s sales and marketing, design and R&D organizations.

2 RESEARCH METHOD

This section discusses the method and the work flow of the research. First the basics of case study research method are described, followed by the flow of this research. Finally the validity and reliability issues are discussed.

Case study is a method that focuses on understanding the dynamics in a context. Generally case studies are preferred, when “how” or “why” questions are to be answered (Yin 1995: 6). Usually the first step in case study research is to determine and define the research question and then select the cases and determine the data gathering and analysing techniques. Next the data collecting is to be prepared, data to be collected and finally evaluated and analyzed. The final step is to prepare the report.

In this study the case was selected in advance by the case company. The case in this study is the knowledge sharing between two teams, one in Finland and the other one in China. The underlying assumption was that the knowledge sharing is not working as efficiently as the case company needs it to work. The research question was this study is formulated as follows:

How to share information and knowledge in multicultural collaborative networks?

Qualitative methodology can be applied when investigation is conducted by participant observation in the actual life situation, as defined by Miles and Huberman (1994: 7). In this research different teams and groups and their interactions were studied. The researcher observed the Finnish team’s knowledge sharing methods and interactions between the Chinese and Finnish teams and some of the findings came from the personal knowledge and observations gathered from the background of being a part of a technical support and design engineering teams in the case company and making the qualitative research perspective suitable. In addition to direct observations, the case study relied on in depth interviews and a questionnaire as a primary data source.

Since the case had already been selected the next step was to determine the research method and research design in the next section.

2.1 Research Design

As stated in the introduction, the purpose of this study was to define how to create a learning organization for Global technical support teams, define cultural differences that needs to be taken account while interacting, find out how the teams were now sharing the information and learning, define how to share information and knowledge in the future.

The theoretical framework consists of relevant literature review and includes also the best practices for knowledge sharing. In addition some secondary data such as internal documents, Intranet web pages and company news letters were used to explain the internal situation in the case company.

In the second part of the report the findings from the management interviews are presented and the third part includes the findings from the questionnaire to the team members. Finally, the proposal for improved integration is presented. See Figure 1.

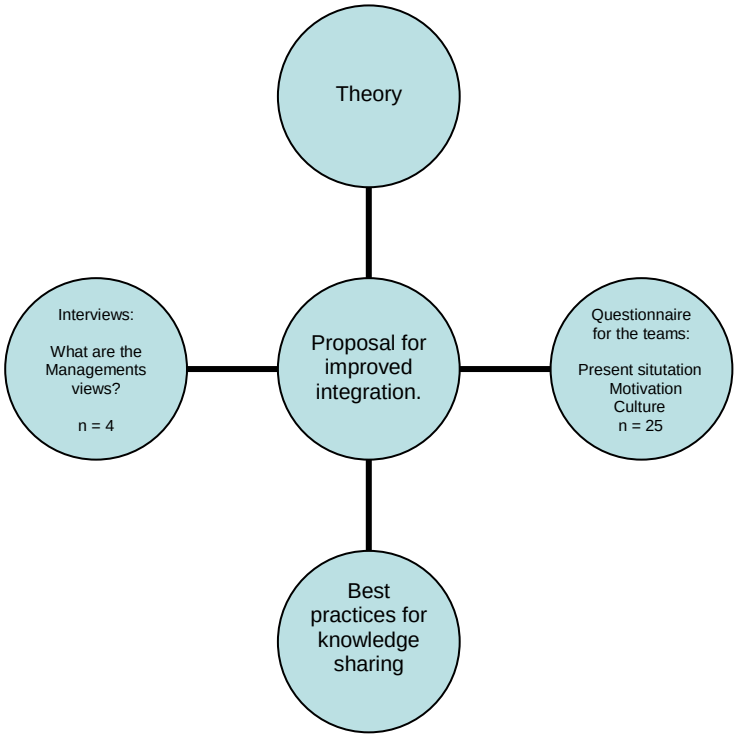

Figure 1. Research design

As illustrated in the figure 1, all aspects of the study are interconnected. The outcome, proposal for improved integration, is formed by using the relevant

theories, known best practices for knowledge sharing, interviews towards management and the answers gathered from the questionnaire.

2.1.1 Interviews

Four interviews on knowledge management with a General Manager, R&D Manager, and the Team Leaders of both the Finnish and the Chinese team were conducted. In June 2010 the current Finnish expatriate team leader of the Chinese team will take over the position of the head of the Finnish team and also the supervisor of the new Chinese team leader. Both of the Team Leaders were interviewed at the same time, because this seemed to be the most suitable solution under the circumstances. In depth interviews were conducted during January and February 2010 in Helsinki. All interviews were recorded and during the interviews notes were taken. The questions were sent to the interviewees beforehand and the questions were used as the guiding principals during the interviews. The interviews were recorded by the author using the notes from the interviews and the recordings made during the interviews.

The following questions were used as a baseline for the open in depth interviews:

- What do you see as the main challenges for knowledge sharing between Global technical support teams?
- How is the knowledge sharing planned to be done in global technical support teams and how is it supported by the organization?
- How the level of knowledge is planned to be kept in the same level between geographically and culturally dispersed teams?
- How does the technical infrastructure support knowledge sharing between global technical support teams?
- What are the knowledge targets for a new team in China, how are those measured?

Interviews aimed to find out the current status and the strategy for knowledge sharing from the management point of view and to find out the concerns and needs that the management had towards knowledge sharing.

In addition, the objective was that the interviews could show the management mindset towards the knowledge management and have an impact on the proposed solution. As can be seen, the interview questions are partly structured and partly open, both based on the stated research question. Open questions create an opportunity for the subject to raise issues they find important and this is essential, because it is possible that the case company does not have a knowledge sharing strategy in place.

2.1.2 Questionnaire

A web-based questionnaire for technical support team members in China and in Finland was also carried out. Before sending the final version of the questionnaire a pilot version was sent to the team leader of the Chinese team and according to the feedback and the way the pilot answers seemed to fit into the purpose of the study, the questionnaire design and questions were altered. The questions are mostly to be answered on the scale illustrated in Figure 2. to give the attendees enough options and not to limit the answers too much.

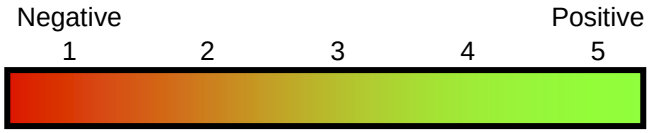

Figure 2. Scaling in the Questionnaire

Some questions were to be answered as “Yes” or “No” to reveal if the issue at hand was used or not. When suitable, the answers to these questions are presented in percentage form to show, for example, how common it was to use a specific method for knowledge sharing. The data gathered from the questionnaire answers was presented in excel-form and the analyzing and data evaluation was first done by looking at the overall situation and than separating the answers by the team locations and furthermore, if necessary, by for example age or area of expertise to find divergences. The most significant findings are explained in Chapter eight.

Finally a solution on how to keep the teams in the same level of knowledge, improve the sharing of knowledge and to improve the possibilities for each team to perform on a high level was prepared by combining the relevant theory and the known best practices to the case company’s current situation,

as analyzed based on the management interviews and the questionnaire to the teams.

2.2 Validity and Reliability

Qualitative analysis is a creative process and depends on the insights and capabilities of the analyst, Patton (1999: 1190) notices. In this study a combination of interviews, questionnaire, observation and document analysis was used, hence the time frame and the researcher's narrow training in specific fields set limits. The researcher in this study is a Bachelor of Science in Electrical Power Engineering with six years of work experience in the case company, in order phase designing and in the technical support team. The researcher has worked closely with almost all of the questionnaire attendees as a colleague and also trained some of them, but his present job is in the sales and marketing department and the contacts towards the questionnaire attendees is very limited.

The validity of this study can be defended based on the fact that the questions in the questionnaire were designed to reveal the situation in knowledge and information sharing in the teams studied and the questionnaire measured what it was intended to measure. Even though companies have their own cultures and people in different countries have their own, and those have an effect on the suggestions made in this study. The two teams studied have total of a 25 members and some of the questions in the questionnaire were deeply related to the case company, therefore broader interpretation cannot be drawn from the answers. Some of the questions were of a more common type, but the number of respondents obviously limits the validity, even if the response rate was 100% and full coverage.

The interviews were conducted in Finnish since all of the interviewees were Finnish speaking. All interviews were recorded and during the interviews notes were taken. The questions were sent to the interviewees beforehand so that the interviewees had time to prepare themselves. The questions were used as the guiding principals during the interviews and also to check the consistency of findings. The interviews were related to the study by the author using the notes from the interviews and the recordings made during the interviews. The recordings from the interviews have been checked and

approved by the interviewees to make sure that there were no misunderstandings due to a different language or the interviewers own interpretations.

The questionnaire was prepared in English which is not the native language for any of the respondents. There is a possibility that some of the questions have been misinterpreted or misunderstood. The multiple choices in the questionnaire can lead to a situation where the attendee accidentally selects a wrong answer, furthermore the mood and the feelings of the respondent can affect and if the same questionnaire would be conducted again, the answers could be different.

3 KNOWLEDGE AND INFORMATION MANAGEMENT

This chapter defines knowledge management and provides an overview of successful knowledge management projects. The famous Johari Window, which is a model for describing the dynamics of human interaction and communication and can be applied to describe the state of an organization's knowledge, is introduced.

Some of the barriers to knowledge management success and cultural aspects are introduced based on Voelpel's and Han's (2005) study of managing knowledge sharing in China and Bechina's and Bommen's (2006) study that investigated knowledge sharing and learning mechanisms in a Scandinavian consulting company.

3.1 Knowledge Management

Knowledge management (KM) has many definitions in literature. KM refers to a multi-disciplined approach to achieving organizational objectives by making the best use of knowledge. KM focuses on processes such as acquiring, creating and sharing knowledge and the cultural and technical foundations that support them. Ahmed, Lim and Loh (2002) propose that KM is:

> The coming together of organizational processes, information processing technologies, organizational strategies and culture and learning to the benefit of the company. (Ahmed et al. 2002: 12)

By embracing different kinds of projects proposed by Davenport et al. (1998), Rowley (1999) came up with a compact definition:

> Knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives. The knowledge to be managed includes explicit, documented knowledge and tacit, subjective knowledge. Management of this knowledge entails all the processes associated with the identification, sharing and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories, and to cultivate and facilitate the sharing of knowledge and organization learning. Organizations that succeed in knowledge management are likely to view knowledge as an asset and to develop organizational norms and values, which support the creation, and sharing of knowledge. (Rowley 1999: 417)

Ahmed et al. (2002) point out in reference to Grant (1996) and Hall (1993) that only 10% of organizations' knowledge is explicit, but the knowledge management is mostly concentrated on that, because tacit knowledge is much more difficult to manage. Managing tacit knowledge involves extraction of personal knowledge which is difficult to express and communicate. Individual experience, judgement and intuition are deeply embedded into tacit knowledge as well as personal beliefs, perspectives and individual's value system. Gaining competitive advantage through knowledge management is heavily dependent on how organization manages its tacit knowledge. (Ahmed et al. 2002: 11)

Definitions of knowledge management generally emphasize the creating of knowledge, collecting and sharing it and creating, supporting and integrating various information systems to enable the effective use of knowledge in organizations to generate economic wealth, create value, or improve performance.

Concerning the different categories of knowledge and many definitions of the different terms, it is necessary to define the terms in this study. *Data* by itself has little relevance or purpose, but it is important for organizations for the creation of information. *Information* is a message, it has sender and a receiver and the meaning is to change the way the receiver perceives something and data becomes information when its creator adds meaning. (Davenport & Prusak 1998:2-4)

Knowledge is broader, deeper and richer than data or information. It is an asset which is not easily definable and concrete. Davenport's and Prusak's (1998: 5) definition is that "knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of those who know. In organizations, it often becomes embedded not only in documents or repositories but also organizational routines, processes, practices, and norms." Furthermore Davenport, De Long and Beers (1998) noted that knowledge, unlike data, is created in the human brain and that data and information are often transferred electronically, but knowledge seems to travel through human networks (Davenport et al. 1998: 56). Allee (2003: 264) defines knowledge

as a familiarity, awareness, or understanding that is gained through experience.

Knowledge worker works primarily with information or develops and uses knowledge in the workplace. Knowledge worker can interpret information and define problems and identify alternatives using expertise and insight to solve those problems. Knowledge workers produce and distribute ideas and information rather than goods or services, they are employed because of their knowledge of a subject matter, rather than the ability to perform manual labour, Serrat (2008:1) defines.

Ahmed et al. (2002) define two types of knowledge. The first type of knowledge is *tacit knowledge*, which is knowledge that is very difficult to describe or explain; it is usually transferred by demonstration, rather that description and encompasses such things as skills. Tacit knowledge is work-related practical know-how that is learned informally on the job and it is impossible to describe all aspects that lead to a successful performance. Jashapara (2004) defines that tacit knowledge is more than a “know how”, it can include intuitions, hunches and insights and it is deeply embedded in a person’s values and beliefs and the values that support the transfer of tacit knowledge are care, love, trust and commitment, where care is characterised by mutual trust, empathy, access to help, lenience to judgement and courage. Jashapara (2004) suggests that organisations can cultivate care by implementing for example incentive schemes which encourage the care-related behaviour, using mentoring programs that encourage members with knowledge to share it and facilitating social events to improve organisational relationships. (Ahmed et al. 2002: 10; Jaspahara 2004: 200-201)

The second type of knowledge is *explicit knowledge,* which is easily written down or codified. It is relatively easy to articulate and communicate and it is easier to transfer between individuals and organizations. Knowledge in organizations can be divided into three, where the first two are the same as described before; the third is cultural knowledge, according to Choo (2002). Cultural knowledge consists of the beliefs and shared assumptions of an organization’s goals, capabilities, customers and competitors. Knowledge work in an organization requires the integration of the three types of knowledge and knowledge work engages personal intuition and insights in

the exercise of tools and techniques. Furthermore, knowledge work takes place in a social setting where such an engagement has meaning for both the individual and organization. The more integrated the three types of knowledge are, the more chance the organization has to gain unique advantage over competitors by knowledge management. The advantage is twofold, it is hard to imitate and it gives organization the capacity to deal with new and difficult problems. (Choo 2002: 263-268)

The work of a technical support engineer is knowledge work in every sense, they use their expertise and insights to solve a problem or problems that are too complicated and multidimensional to be solved with computer programs and they quite often need a network of experts or knowledge acquired from the earlier solved problems to be able to solve the new ones. By combining knowledge, information and data from many sources support engineers produce a solution for the problem the customer has.

3.2 Johari Window of Knowledge

The famous Johari Window is a model for describing the dynamics of human interaction and communication and was introduced in 1955 and can be applied to describe the state of an organization's knowledge (Choo 2003: 259-261). The tables illustrate the four quadrants corresponding to the original four panes (open, hidden, blind and unknown).

We Know What We Know	**We Know What We Don't Know**
• Mature organizations in stable environments • Information is organized, accessible • Knowledge is codified, sharable	• Organizations moving into new environments • Information needs are clear, well-defined • New knowledge to be created, discovered
We Don't Know What We Know	**We Don't Know What We Don't Know**
• Mature organizations in dynamic environments • Information is hidden, dispersed • Knowledge is tacit, unrecorded	• Organizations set in their ways or beliefs • Information subject to tunnel vision • Knowledge gaps exist, but unrecognized

Table 1. Windows of Knowing (based on Choo 2002:261)

Table 1 illustrates where and in what form the knowledge and information can be in organizations. The case company's position in these windows is on the left side: the organization is in a mature state and some of the

knowledge is codified, organized and accessible (We Know What We Know). On the other hand the organization operates in a dynamic environment; knowledge is hidden, tacit, dispersed and unrecorded (We Don't Know What We Know).

We Know What We Know	**We Know What We Don't Know**
• Provide Information Access • Facilitate Knowledge Sharing • Intranets, Portals, Taxonomies, Benchmarking	• Directed Information Seeking • Promote Knowledge Creation • Competitive Intelligence, R&D, market research
We Don't Know What We Know	**We Don't Know What We Don't Know**
• Information Auditing • Knowledge Mapping • Communities of Practise, Knowledge Networks	• Environmental Scanning • Knowledge Discovery • Scenario Planning, Futures Search, Dialogue

Table 2. Windows of Knowledge Management (based on Choo 2002:261)

Table 2 illustrate the four quadrants of knowledge management and the case company's position in these windows is also on the left side: the organization should concentrate on providing access to information and facilitate knowledge sharing (We Know What We Know) and create communities of practice and do knowledge mapping (We Don't Know What We Know).

Hagel III and Brown (2010) also criticize the existing knowledge management systems in their blog writing. The best ones can capture and institutionalize the knowledge of the firm, but most part of the repositories and directories remained fragmentary and the resources do not get used. People are reluctant to put what they know into the database and seeking and finding the knowledge needed is often difficult. Knowledge managers' quest to capture what the firm already knows has hindered the fact that the real value is in creating new knowledge, rather than simply "managing" existing knowledge. (Hagel III & Brown 2010)

Creation spaces, relying on shared network platforms, provide tools and forums for knowledge creation while at the same time capturing the discussion, analysis, and actions in ways that make it easier to share across a broader range of participants. Knowledge management traditionally has focused on capturing existing knowledge inside the company and the systems rarely extend beyond the company borders. Creation spaces

instead focus on mobilizing and focusing participants in a broader way, as Hagel III and Brown (2010) point out.

3.3 Successful Knowledge Management Projects

To be able to understand how to successfully share information and knowledge in multicultural collaborative networks, it is practical to study the findings from the knowledge management projects that have been successful.

Davenport, DeLong and Beers (1998) studied thirty-one knowledge management projects in twenty-four companies to find out what makes a knowledge project successful. Projects included many different types of knowledge varying from R&D to sales and to production. In the following the findings from their study are introduced.

3.3.1 Objectives

Davenport et al. (1998) found four types of objectives and some of the projects tried to achieve all at once, while most had one primary objective

1) Create knowledge repositories, which could include external, internal or informal knowledge.

2) Improve knowledge access to facilitate the transfer of knowledge from one individual to another. It was recognized that it is difficult to find a person with knowledge and transfer the knowledge to the one who needs it.

3) Enhance knowledge environment and create an environment conductive to effective knowledge creation.

4) Manage knowledge as an asset and to be able to measure it and furthermore treat knowledge like any other asset on a company's balance sheet. (Davenport et al.1998: 44-48)

To define a successful project Davenport et al. (1998) used similar indicators that are used for assessing other business change projects. The indicators included growth in resources and growth in volume of content and usage, the likelihood of a project to survive even if particular individual or two would be gone and evidence of financial return. Eighteen projects were defined as

a successful and five were unsuccessful, eight were too new to be determined to either category. (Davenport et al. 1998: 48-49)

3.3.2 Factors Behind Successful Knowledge Management Projects

The first of the four most important factors for a successful knowledge management project is to have a knowledge friendly culture. This means that people have a positive orientation to knowledge and they are willing and free to explore, and knowledge creation and use is encouraged by the executives, furthermore people are not afraid that sharing knowledge will cost them their jobs and they are not inhibited in sharing knowledge. According to the studies conducted by Davenport et al., in some cases sharing positive knowledge was considered to endanger the value and maybe even the job of the people sharing the knowledge. And people were also reluctant to share information about mistakes, failures and other negative issues, even though other people could have learned from those. Creating a knowledge friendly culture is very difficult, if it does not already exist. If the culture does not support the knowledge sharing, the technology, knowledge content or project management cannot help to make the effort successful. (Davenport et al. 1998: 52-53)

Again, in their studies Davenport et al. found out that creating both technological and organizational infrastructures to support the knowledge management were considered as one of the main issues. Technology infrastructure, such as adequate computing and communication tools and skills to use those, should be in place and additionally organization needs to establish roles and groups with skilled members to serve as resources for the projects. It needs money to create the new roles and it was often found difficult. Some companies had a team of “coaches” to support the new projects and get them up and running and to create value from the technology with the end users. (Davenport et al. 1998: 51)

The motivation to share, create and use knowledge is critical success factor for all knowledge sharing projects. Finding effective motivational tools to increase participation in knowledge-sharing systems is a challenge. To encourage knowledge sharing, the incentives should be long-term and tied into general evaluation and compensation structures, furthermore the incentives or other motivational aids has to be sufficient enough to motivate. If short-term incentives are used those should be highly visible. Motivation

should be focused on those who share the knowledge and also on those who barrow it. (Davenport et al. 1998: 53-54)

According to Davenport et al., strong management support was crucial if the knowledge management project aimed for transformation, but not so crucial in efforts to use knowledge for improving individual functions or processes. Support from the management includes sending messages, that the project is critical for the company's success, provide funding and resources for infrastructure and making clear what types of knowledge are the most important for the company. It is not necessary but it would help if a senior manager, who must advocate for knowledge management, has also a personal orientation to the subject. (Davenport et al. 1998: 54)

An additional important factor according to the findings by Davenport et al., was a link to economic performance or industry value, which can be direct benefits e.g. money saved or earned or indirect like enhanced customer satisfaction or reduced cycle time. Because knowledge management can be expensive it is important to show how it is linked to economic performance or how it gives a competitive advantage to ensure support from the firm. (Davenport et al. 1998: 50)

Also a clear purpose and language was found important in the studies conducted by the same researcher because the interpretations of terms such as "knowledge", "information" and "learning organization" have many definitions. The language in knowledge management is more probing and invites to debate and there are a lot of uncertainties, where business normally gives an impression of being fact based. (Davenport et al. 1998: 53)

Multiple channels for knowledge transfer was also an important factor and successful projects recognized that using various value adding channels to transfer knowledge in a different way is essential, in addition face-to-face contacts to build trust and support knowledge sharing behaviour should not be underestimated. (Davenport et al. 1998: 54)

Having a flexible knowledge structure to enable easy and efficient access to the relevant knowledge was also found to be important for successful projects. (Davenport et al. 1998: 51-52)

Some of the same factors can be found also in other studies. Allee (1997) notices that in knowledge management, as well as in any form of business, there must be a way to assess whether one is on course. Measurements help gauge and manage knowledge assets and support continuous improvement. Measuring knowledge is challenging, but companies have managed to build processes to measure intellectual assets. Learning and productivity can be measured by using “knowledge scorecards”, and some companies’ measure elements of intellectual capital. (Allee 1997: 74)

Furthermore, Srinivasan (2005:3) from IBM Global Services points out that Knowledge Management (KM) implementation should be localized and made suitable for a specific country. Practitioners should have management support and not over-promise. KM initiatives should start from a small scale and the progress should be monitored, problems are easier to solve at this stage. After the stabilization KM can be implemented organization wide. KM requires determination and perseverance and practitioners should not expect immediate returns on investment.

Müller (2007: 10) also studied the exchange of knowledge and best practices and the lessons learned from his study were that the focus must always be on the user community and not on the application. The user community should be kept motivated and continuous support and attention from the top-management should be ensured. Self-explanatory application with an intuitive usability and a state-of-the-art look-and-feel should be provided and bulky manuals and time-consuming trainings as preconditions for successful use should be avoided. Multiple communication channels, e.g. several web entry points, discussion forums, RSS feeds, e-mail notification, download to Excel makes the system easier to use and adds the value for a user. The users should be allowed to interact with the application according to their personal preferences. Easy reusability and immediate benefit from the content found in the database in the users' daily work is important. "Content that matters is king!" - Contributions of colleagues directly involved with first-hand knowledge (e.g. execution of customer projects, implementation of solutions, carrying out of services) are extremely valuable.

3.3.3 Summary on Successful Knowledge Management

Based on the previous sections the different factors that can lead to a success in a knowledge management project are summarized in Table 3.

Factor	Responsibility		
	Management	**Technology**	**Employees**
Knowledge friendly culture.	X		X
Technological and organizational infrastructures to support the knowledge management.	X	X	
The motivation to share, create and use knowledge.	X		X
Strong management support.	X		
Link to economic performance or industry value.	X		
Clear purpose and language.	X		
Multiple channels for knowledge transfer.		X	
Flexible knowledge structure.		X	

Table 3. Important factors for successful knowledge management

Some factors can be taken care of by the management, IT department of the company or by the employees. Some factors have more than one responsible party as illustrated in Table 3.

3.4 Barriers to Knowledge Sharing

There are barriers that can prevent efficient knowledge sharing. Hofstede (1980) produced prominent research on culture and the findings were that there are several cultural issues that can also have an effect on knowledge sharing behaviour. Scandinavian or European (Finnish) and Asian (Chinese) cultures are different and even opposite in several aspects, for example individualism in Scandinavia and collectivism in China, difference in power distance and short-term and long-term orientation. These can be either barriers or enablers for efficient knowledge sharing, but cultural issues cannot be underestimated.

Some of these barriers are introduced based on Voelpel's and Han's (2005) study which focused on the Siemens ShareNet system in China. Siemens ShareNet was acknowledged as the best practice knowledge management system in the Voelpel, Dous and Davenport (2005) study further presented

in Chapter 5. Some findings from Bechina's and Bommen's (2006) study that investigated knowledge sharing and learning mechanisms in a Scandinavian consulting company are also presented.

3.4.1 Language Barriers

The official language of the platform used by Siemens ShareNet is English. The English language skills of Chinese graduates' in general have improved and a certain number of Chinese employees of Siemens do understand English well. Nevertheless, some of them are reluctant to write contributions. First, because they have little experience of writing English and few opportunities to do so, making contributions is therefore very time consuming. Although there are ways to express symbols and common technical terms, some problematic issues are more complex to explain than others are. Second, the fear of losing face due to poor English also prevents some Chinese employees from contributing actively to the knowledge base. This issue will be further discussed in the next section. (Voelpel & Han 2005: 58)

3.4.2 Cultural Barriers

Voelpel's and Han's study's findings indicate that the ''concern for face'' and ''ingroup/outgroup distinction'' are the two cultural aspects that negatively influence Chinese employees' knowledge-sharing behaviour. The Chinese culture strongly emphasizes ''face saving'', thus employees who are highly sensitive in respect of ''face saving'' and feel insecure with their ability to write English, are reluctant to make contributions. They are afraid that grammar and spelling mistakes can harm their ''face'' in the company. Voelpel's and Han's research shows that the current Chinese contributors are mainly middle and upper management levels that usually have decent English language skills. ShareNet participation by the lower management level was very limited. (Voelpel & Han 2005: 58-59)

The second cultural aspect that could negatively influence knowledge-sharing behaviour is the strong behavioural difference towards ingroup and outgroup members. The long and violent history is a fertile ground for the cynicism and the people usually think that strangers are not trustworthy until proven otherwise (Graham & Lam 2003: 85). The people with knowledge are more willing to share it with their ''ingroup members.'' This leads to the

implication that a strong trust based company culture and tight cross-division interaction would be able to overcome the tendency to consider other divisions or departments as outgroups and can thus accelerate the knowledge-sharing behaviour. Voelpel and Han point out that this is in accordance with the study conducted by Politis (2003), which suggests that the interpersonal trust dimension of faith in peers is in general a key factor for knowledge acquisition and knowledge sharing. (Graham & Lam 2003: 85; Voelpel & Han 2005: 58-59)

In the case of only the two teams, one located in China and one in Finland, and in this context, where the Chinese team is mostly receiving knowledge and has significant trust towards the Finnish team, which they are used to work with, been trained by and in which their current team leader is from, there should not be an ingroup / outgroup distinction- However, if the knowledge sharing system were to be extended beyond these two teams, then this could become a real issue.

3.4.3 Unreliability of Incentive System

Many interviewees in Voelpel's and Han's study of knowledge sharing in China did not consider material incentives as decisive for their motivation to use the knowledge sharing system; the existence of incentives is highly symbolic with regard to the employees' knowledge-sharing behaviour. When the company in the study stopped redeeming shares for prizes due to financial reasons, the enthusiasm to use the knowledge sharing system dropped sharply. Voelpel and Han assume that there were two negative consequences: First, the dynamics of the knowledge-sharing system will be disturbed to a certain extent. More effort will be required to re-establish the preceding well-established knowledge-sharing culture. Second, the reliability of the incentive system is important from a psychological perspective. Consequently, the credibility and acceptance of the company's future innovative management initiatives might be hampered. (Voelpel & Han 2005: 59)

The findings from Bechina's and Bommel's study were that proper rewards and incentives have an important role in knowledge sharing and including such mechanisms will encourage employees attitudes toward knowledge sharing. Furthermore, Bechina and Bommen point out that a knowledge

worker is more likely to participate in knowledge management activities if recognized or even rewarded. (Bechina & Bommen 2006: 114)

3.4.4 Operative Barriers

Problems that arise from the interviews and observations of the Bechina's and Bommen's study were that company had informal networks of people to share knowledge, but those communities were seen as close clusters that were small islands of expertise. The management had pushed knowledge repository building to overcome "reinventing the wheel" and to save time. There was no evidence that people would look for, find or contribute the information to repository. The reasons were: misplaced information, people in the same location tend to rather ask from each other, scepticism to share knowledge, contributing was seen as strenuous and time consuming activity, codification of knowledge was seen as a strong burden. But the lack of time was seen as the major claim. (Bechina & Bommen 2006: 112-113)

The knowledge sharing system in Voelpel's and Han's study was considered to be too complicated from the operative and technical perspective. Some users suggested that it would save time if one could be alerted via e-mail when a new reply to one's request had been posted. This would have made the system more convenient. Finding the right information was perceived as time consuming. Further detailing of the topic-related structure could lead the knowledge searcher directly to the relevant information category. Some new users could also give up using the system because learning how to use the system efficiently was time consuming. (Voelpel & Han 2005: 59)

3.4.5 Miscellaneous Other Barriers

In Voelpel's and Han's study a number of interviewees also emphasized that ShareNet offered very little assistance to newcomers in integrating themselves into their new job since the knowledge posted is sometimes too specific for inexperienced employees to use. Interviewees also mentioned that they sometimes doubted the information's reliability. ShareNet was a relatively open platform, thus the accuracy of the contributions cannot be guaranteed. Mostly these concerns were not related to technical topics, but to whether the posted information was in accordance with official company policy. One therefore needs to be acquainted with the company's exact

strategy and policy before answering a customer's request, since these policies may differ between regions and divisions. (Voelpel & Han 2005: 59)

Open office facility and more than one team located in the same space enables cross-team communication that can lead to a faster solution to a question at hand. On the other hand open office can be considered as a hindrance because of the interruptions and people exchanging thoughts can slower the working pace and can be rather time consuming; also the noise from the background (telephone conversations) can make it difficult to concentrate and be seen as a source of inefficiency. In the study conducted by Bechina and Bommen, it was noticed that when managers shared the same facility with knowledge workers the communication and moves between employees were reduced creating a quieter environment with less interaction. (Bechina & Bommen 2006: 113)

3.5 Cultural Aspects for Knowledge Sharing in China

In this section the cultural and personal aspects that affect the willingness to share knowledge in China are introduced. Voelpel's and Han's (2005) Siemens ShareNet case key findings from knowledge sharing in China and personal and cultural factors based on Huang's, Davison's and Gu's (2008) study and Graham's and Lam's (2003) article are presented.

3.5.1 Individualism versus Collectivism

Individualism and collectivism refer to the relative emphasis that a member of a society place on individual self-interests vs. those of the group. Chinese are identified to be highly collectivist (Hofstede 1980) while Finnish employees are typically individualists. Important in a collectivist mind is the possibility to learn and to improve, to have good working conditions and possibilities to use knowledge and capacities. Voelpel's and Han's case study affirmed that one of the factors positively influencing the knowledge-sharing behaviour of Chinese employees was collectivism and Voelpel and Han note that this is in line with the previous results from Hofstede (1980, 1991) and Schwartz (1994). Based on their results, Chow et al. (2000) investigated the impact of cultural dimensions, i.e. individualism and collectivism. Chow et al.'s results suggest that in comparison with US nationals, Chinese nationals have a relatively high willingness to share

knowledge, even knowledge that involves a conflict between self-interest and the collective interest. (Voelpel & Han 2005: 58)

3.5.2 Confucian Dynamism

Confucian dynamism, which largely shapes the Chinese culture, emphasizes long-term consequences and objectives. Among the appreciated values of Confucian dynamism, ‘‘personal steadiness’’ and ‘‘respect for tradition’’ support knowledge-sharing behaviour best. Voelpel and Han’s study supports this argument, since ‘‘gaining peer respect’’ and ‘‘building on reputation’’ were frequently mentioned motivators for making a contribution to ShareNet. (Voelpel & Han 2005: 58)

3.5.3 Mianzi (Face) and Guanxi

A person’s reputation and social standing rest on saving face. Mianzi means “Face” or social capital and causing Chinese to lose face is disastrous, (Graham and Lam 2003). People try to remain their face to gain recognition and respect before others, and the face that a person has depends on the personal efforts such as hard work, usefulness to the society, wealth and reputation (Huang et al. 2008). During the social interaction the amount of face people has is constantly changing, Huang et al. (2008) identifies three kinds of behaviour referring to Chu (2006): avoiding losing face in advance, retrieving face after the event and gaining face. (Graham & Lam 2003: 90; Huang et al. 2008: 454-455)

The Chinese tend to put more energy in keeping the good relationships with the people around them and social relationship webs are important (Huang et al. 2008). Good guanxi depends on a strict system of reciprocity; favours are almost always remembered and returned (Graham and Lam 2003). Reciprocity is the willingness to build good relationships through knowledge sharing and guanxi orientations refers to the extent to which people pay attention to guanxi (Huang et al. 2008). (Graham & Lam 2003: 86; Huang et al. 2008: 455)

Guanxi orientation has an important role in knowledge sharing based on Huang et al. (2008). The Chinese people tend to maintain good relationships and they will treat their colleagues in a friendly way and hope to create a harmonious atmosphere. The importance of helping others to facilitate a smooth relationship makes them ready to share knowledge and skills. The

knowledge items which are shared are not critical items and although they would like to get critical items from others, they will not ask people who know because it might cause embarrassment. Face saving has a negative effect on the intention to share knowledge and face gaining has a positive effect. The suggestion is that managers should communicate more with their employees and find ways how to compensate their loss, if knowledge is shared. Furthermore managers could try to make employees more committed to the organization so that to contribute the knowledge would be seen as a form of organizational citizenship behaviour. Extrinsic reward does not have as great effect on attitude as has image and sense of self-worth. Motivating toward knowledge sharing should be based on non-monetary rewards. Creating and maintaining a harmonious atmosphere is also a very important factor as well as the issue how to augment the positive effect of face gaining and diminish the negative affect of face saving. Face gaining through knowledge sharing could be encouraged by giving more non-monetary incentives and face saving behaviour could be reduced by encouraging activities such as brainstorming and writing a working diary. (Huang et al. 2008: 465-466)

The Chinese culture supports knowledge sharing and the case company has also encouraged the knowledge sharing behaviour in the Chinese team. The company culture in Finland is rather different and the cultural change management needs to be pointed towards the Finnish team. Jashapara (2004:232-233) points out referring to Kilmann (1984), that if the prevailing norms are knowledge hoarding rather than knowledge-sharing, the company should consider the widely accepted framework that involves five stages:

- Surfacing actual cultural norms
- Articulating new directions
- Establishing new cultural norms
- Identifying gaps in cultural norms
- Closing gaps in cultural norms

The leadership and commitment from senior management is vital according to Jashapara (2004:233). Leaders have a power to influence the employees, for example placing certain topics continually on top of the meeting agendas

will show that the topic is important, furthermore the way leaders use their time shows the employees how important the topic is.

3.6 Conclusions on Knowledge Management Perspective

Knowledge management is not only managing the knowledge itself, but it also facilitates an environment for the people to interact and share their thoughts, problems and solutions. Knowledge management can also give more meaning for the job and make the people understand how they can benefit the company in a more extensive way. Through this enhanced interaction between people in organization the profitability will follow. The next section will discuss how the individuals and the company can benefit from knowledge management.

4 ORGANIZATIONAL LEARNING

Chapter 3 outlined the nature of knowledge and its sharing in a multicultural context. This section introduces how learning takes place in organizations as single and double loop learning. This section also provides an overview of possibilities and benefits of creating and fostering communities of practice.

4.1 Learning in Organizations

Globalization and complexity lead to a situation where the organizations that discover how to tap people's commitment and capacity to learn at all levels in an organization will truly excel, as Senge (1994: 4) points out. Furthermore a learning organization actively promotes, facilitates, and rewards collective learning and organizational learning takes place as a by-product of normal work. Organizational learning is a social process, involving interactions among many individuals. Thus, a culture that learns and adapts as part of everyday working practices is essential.

According to Allee (2000), corporate know-how is important at strategic levels to sense the environment and challenge management assumptions. The most relevant focus areas in the sharing of knowledge and know-how are considered to be at the management level and at the operational level. For example, at the management level, day-to-day decision-making requires that people talk candidly, share their experience and insights, and find meanings together. At the operational level, replicating best practices throughout the company quickly and effectively can lead to greater efficiencies, lower costs and a higher quality of goods and services. (Allee 2000: 2)

Single and double loop learning in organizations

In single loop learning the feedback from processes is utilized to avoid similar mistakes in the future, furthermore single loop learning can solve the problems, but does not reveal why the problems originally arose. Double loop learning includes systems that have the same abilities to monitor and correct the problems and it can additionally determine what the appropriate behaviour is. Double loop system requires a questioning of its own assumptions, values and risks and changing the terms of its own organizing.

Double loop system, in this sense, can be associated with the idea of a self-organizing system. In double loop learning the system becomes intelligent enough to define its own operating criteria, its behaviour and itself, in double loop learning the system learns to learn. Choo (2002: 21) points out that organization should time to time engage in double loop learning so that the basic assumptions and norms could be re-examined. Double loop learning is increasingly being seen as taking place throughout organizations and as the learning diffuses the new organizational order emerges from internal dynamics of the organization rather than at the behest of top management. (Hatch 1997: 371-372)

Jashapara (2004) explains single and double loop learning through an example where diminishing sales could be corrected by pushing the sales people to work harder (single loop) or by looking at the underlying assumptions and perhaps finding that the products are not what the customers are expecting and correcting that issue could help the sales to increase (double loop). Furthermore Jaspahara defines double loop learning as exploration behaviour where company takes risks, plays with ideas, experiments, discovers and innovates and single-loop learning as exploitation behaviour, where the company refines the existing processes and emphasizes the efficiency goal; both are important depending on the context and what the driving force in a competitive environment is. (Jashapara 2004: 66)

This view of organizational learning and especially the double loop learning model can be reflected upon the next section where the communities of practice are discussed. Wenger argues that the community can benefit the most out from the learning and furthermore points out that rather than assuming that knowledge is the property of management and the workers are the implementers of this knowledge, it assumes that knowledge is the property of the practitioners, and the role of management is to make it possible for practitioners to act as managers of their knowledge. Jaspahara (2004: 205) proposes that communities of practise can allow members to think outside the box and question the organisational routines, but this will not necessarily mean that radical innovation or double loop learning will be the outcome.

4.2 Communities of Practice

Technical teams are communities of practice; therefore this section looks into the nature of communities of practice. The term community of practice was first introduced by Lave and Wenger in early 1990's. So the term is relatively recent, even though the phenomenon it refers to is age-old. For example, tribes learning on how to survive can be seen as communities of practice.

> Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger et al. 2002:4).

The ability to promote best practices, develop people's professional skills, and help companies to retain talented workers are the strengths of communities of practice. (Wenger 2001: 40). Interaction between people help to learn how to do things better, avoid the situations where wheels are re-invented and give confidence in one's approach to problems.

Business results and knowledge results are the two results from the work of an organization. Business units apply the business results to serving customers. Communities of practice manage the knowledge results from the work of their members and feed this knowledge back into the organization. To coordinate the management of knowledge and integrate it into business processes, a company must have such processes as technology for information flow, interpersonal connections, document repositories and institutional and cultural norms of paying attention to knowledge in order. These processes are important enablers, but to be able to manage knowledge a company must be able to involve practitioners actively in the process. The practitioners have the best understanding of what needs to be documented and in what form and what should be left as tacit understanding. Knowledge of any field is too complex for any individual to cover and this is why practitioners must interact with colleagues and benefit from the stimulation. (Wenger 2004:1-5).

Communities of practice can benefit the organization and the members of the community. The short-term value for the organization is in improved business outcomes and the long-term value is that the organizational capabilities can be developed. For the members in the community the short-term benefit is that participating improves work experience and the long-term

value is that it fosters professional development. Table 4. illustrates some of the short and long-term benefits for organization and community members.

Table 4. The short and long-term benefits for organization and community members (based on Wenger, McDermott and Snyder 2002)

	SHORT-TERM VALUE	**LONG-TERM VALUE**
	Improve business outcomes	**Develop organizational capabilities**
BENEFITS TO ORGANIZATION	• Arena for problem solving • Quick answers to questions • Reduced time and cost • Improved quality of decisions • More perspectives on problems • Coordination, standardization, and synergies across units • Resources for implementing strategies • Strengthened quality assurance • Ability to take risks with backing of the community	• Ability to execute a strategic plan • Authority with clients • Increased retention of talents • Capacity for knowledge-development projects • Forum for "benchmarking" against rest of the industry • Knowledge based alliances • Emergence of unplanned capabilities • Capacity to develop new strategic options • Ability to foreseen technological developments • Ability to take advantage of emerging market opportunities
	Improve experience of work	**Foster professional development**
BENEFITS TO COMMUNITY MEMBERS	• Help with challenges • Access to expertise • Better able to contribute to team • Confidence in one's approach to problems • Fun of being with colleagues • More meaningful participation • Sense of belonging	• Forum for expanding skills and expertise • Network for keeping abreast of a field • Enhanced professional reputation • Increased marketability and employability • Strong sense of professional identity

Allee (2003: 89) points out that it is possible to waist a lot of money in technology, if nobody uses it. Improving organizational intelligence is

basically a human question and the technology should support the right kind of conversation and connections. Often knowledge management initiatives fail because of the organizational culture where leadership and employee involvement interventions are overlooked (Jashapara 2004: 7). Once the technology is in place the company just needs to get people to use it. The problem in most cases is that people do not even know that some knowledge sharing system exists, do not know how to use it, or do not have time or interest to participate. What people need is time, space and budgets to meet and collaborate. Learning communities can be an advantage when recruiting new people, have an affect on job rotation and career development processes. This will mean a change across whole organization in such things as reward systems, recognition, job definitions and relationships. (Allee 2003:89-90, 93)

Three elements of a community of practice were introduced by Wenger et al. in 2002. A few years later Wenger (2004) defined a doughnut model of knowledge management that binds strategy to the performance through the learning cycle. This model is illustrated in Figure 3.

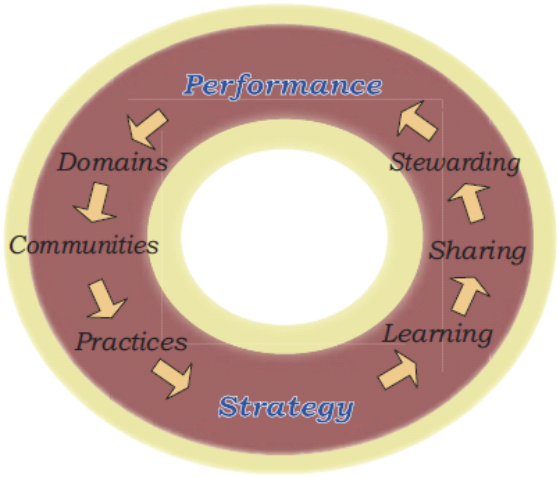

Figure 3. Doughnut Model of Knowledge Management (based on Wenger 2004)

The first element in Wenger's model is Domain, which means the area of knowledge that needs to be discovered. Domains for the global technical support teams in ABB induction motors would be knowledge from the field of electrical engineering in induction motors or knowledge of mechanical engineering in the same field. Membership in a community implies a commitment to the domain, and therefore a shared competence that

distinguishes members from other people. Without commitment to a domain, community is just a group of friends, Wenger et al. argue. (Wenger et al. 2002: 29-33)

The second element is community and this is the group of people for whom the domain is relevant. The people inside the community interact and develop relationships that help them to share knowledge and solve problems. Members of a community of practice do not necessarily work together on a daily basis, but they engage in joint activities and discussions, help each other, and share information. (Wenger et al. 2002:33-37)

The third element is practice, which is the set of socially defined ways of doing things in a specific domain and includes a variety of knowledge types: rules, principles, tools, lessons learned, best practices and heuristics. Both tacit and explicit knowledge is included. These can range from concrete objects such as a specialized tool or a design program, to less tangible displays of competence, such as an ability to interpret the change in the calculation results as indicating a specific problem. The practice also includes standards, knowledge bases and repositories that members share. It also embodies a way to behave, a perspective on problems and ideas, a thinking style and even an ethical stance. This can be seen as a common way how all the designers utilize the tolerances while using a design tools and interpreting the results. Practice can be defined as a mini-culture that binds the community together. (Wenger et al. 2002:37-40)

4.2.1 Learning

Practitioners learn constantly on the job. They invent new solutions, refine their skills, and learn from mistakes. They receive customer feedback, experience unexpected pitfalls inherent in well-established approaches, and discover new opportunities. All this learning needs to be captured into refined practices that incorporate the lessons of the field. (Wenger 2004:5)

The role of the community then is to make sure learning does not remain either local or incidental. This is why practitioners cannot be knowledge managers by themselves. Company-wide communities make learning available to all concerned. They make sure that the learning from various locations within and beyond the organization is synthesized and integrated, and then remembered and distributed. Of course, one common way to do

this is to document the lessons learned and "best" practices that arise from projects into a "book of knowledge", but documenting is not the only form of memory and distribution channels available to communities. (Wenger 2004: 5-6)

Best practices and solutions that arise from the technical support teams could be reviewed by specialists, so that the applicability across the context is verified. Knowledge sharing platform used by a technical support teams could be reviewed by R&D or technology centre specialists. The voice of the practitioner lends credibility to knowledge across the community.

4.2.2 Sharing

Communities of practice create value by improving the performance of the members when they apply their knowledge in the performance of their job, Wenger (2004: 6) points out. Furthermore it is likely that members will be confronted with problems that some members have already found solutions to, Jeppesen and Laursen (2009:1582) note. Sharing the knowledge thus prevents the wheel from being reinvented and helps keeping the quality in the same level, no matter which member of the community answers to the question.

Because practitioners can at once belong to their communities of practice and to their work teams, they are the direct "carriers" of knowledge. If a new solution is proposed in their community, they can apply it to their work. If they discover a new solution in their work, they can share it with their community. Such multi-membership avoids many of the hand-off problems that arise when specialists manage knowledge for others to apply. This is why it is important to have the practitioners themselves be in charge of managing their own knowledge, no matter how much assistance they receive in the process. (Wenger 2004: 5).

This can easily be reflected to some of the case company teams, work teams have members that can be members of a specific community and when they find a new solution in their work team they can make it available for the community. For example the Global OEM team has electrical and mechanical engineer and they belong to this work team and they also should belong to a community of practice in their specific domain to be able to benefit the community and organization on their part.

Online communities can use posting which makes the problem information widely visible and allow members with solution, already within reach, to become solution providers. Discussion typically in online communities of practice concern novel problems which are “ahead of the archive”, thus to be able to provide a solution an updated knowledge base is necessary. (Jeppesen & Laursen 2009: 1582)

4.2.3 Recognition

The willingness for an individual to share the knowledge can be questionable, knowledge is power and why would anyone share it. But in a knowledge economy, keeping the knowledge is not necessarily the best way to benefit from its power. Reputation is a crucial asset and if the community serves as a platform to build a reputation, than knowledge sharing is also a source of power. Recognition can come from two sources, from peers and organization. Peer recognitions are community-based feedback and acknowledgement mechanisms that celebrate community participation. Organizational recognition takes place in performance appraisal for people who take on community leadership giving opportunities for career path development. (Wenger 2004: 7).

4.2.4 Role of Lead Users

Jeppesen and Laursen (2009) found out in their study that lead users tend to enjoy revealing their knowledge to other users. People who were recognized as lead users, and also conducted boundary-spanning, were more prone to like the sharing of knowledge in the online community. Furthermore, the study revealed that lead users tend to span the boundaries of the community more than users in general. Peer recognition was seen to be a positive motivator as well as “fun” motivator, which was not so significant. The reason why online communities of practice can in many cases be innovative communities in their area of practice is because the lead users span the boundaries and have a high level of sharing inside the community. If the lead users are preoccupied with activities at the centre of their fields, they will not be exposed to new ideas that have not been already accepted and known in their field or community. Managers and community moderators must realize that trying to identify and retain lead users is crucial. How to motivate users to make contributions and also identify the key players and to create

incentives for users to stay on contributing is the real challenge. (Jeppesen & Laursen 2009: 1587-1588)

4.2.5 Stewarding

According to Wenger, sponsorship role in communities of practice is not the same as in a traditional management. Reporting relationships are not the same, an executive can see that a community can deliver value and makes sure that the community has the resources it needs to function, and furthermore ensures that its ideas and proposals find their way into the organization. Therefore the executive's role is to act as a bridge between the hierarchical structure of a formal organization and the horizontal structure of communities. Sponsorship structure should enable the communities to thrive and have an impact on the performance of the organization. This includes high-level executive sponsorship as well as the sponsorship of line managers who control the time usage of employees (Wenger 2004: 7).

There are certain functions that belong to the role of sponsorship, according to Wenger:

- Translating the strategic imperatives into a knowledge-centric vision.
- Legitimizing the work of communities in terms of strategic priorities.
- Ensuring sustained success by channelling appropriate resources, make sure that the insights and proposals from the communities can affect the way business in conducted.
- Negotiating accountability between line operations and communities, meaning for example who decides which "best practices" to adopt.(Wenger 2004: 7)

The KM doughnut model is not a project; it is a way of life for a knowledge organization. Community development takes time and commitment, and community-based knowledge initiatives can only reach their full potential with committed sponsorship that promotes a sustained focus on capability development.

Communities usually need some organizational support to function optimally and the support structure should have few explicit roles, some of which are

recognized by the formal organization and resourced with dedicated time. Support structure needs direct resources for the nurturing of the community infrastructure including meeting places, travel funds, and money for specific projects. Support structure includes also technological infrastructure that enables members to communicate regularly and to accumulate documents

Organizations that have used communities in a systematic way have put together a small "support team" of internal consultants who provide logistic and process advice for communities, including coaching community leaders, educational activities to raise awareness and skills, facilitation services, communication with management, and coordination across the initiative.

This Wenger's approach to knowledge management is a substantial transformation of organizations because it turns traditional Taylorism on its head. Rather than assuming that knowledge is the property of management and the workers are the implementers of this knowledge, it assumes that knowledge is the property of the practitioners, and the role of management is to make it possible for practitioners to act as managers of their knowledge. (Wenger 2004: 6-8) This observation is central for understanding how technical teams need to be identified as.

4.3 Summary on Learning in Organizations

In case of the globally dispersed technical support teams of this study, creating a community of practice is probably the most suitable way to collect, store and share tacit and explicit knowledge. The view of Wenger et al. on the communities of practice is based on the organizations needs and gaining benefit for the organization and the members of it. This view allows membership only for experts inside the organization, but concerning the open innovation models and creation spaces that Hagel III's and Brown emphasize, the community could include other participants outside the organization to gain the benefits of a broader field of expertise, furthermore customers are not included in Wenger's idea of a community, but in a long run they could and should take part also. Communities of practice can play a significant part in knowledge organizations by creating the foundation, where to build the structure to gain competitive advantage through knowledge management. The next section introduces some cases where a knowledge

management system has been implemented and problems that occurred and how the systems have benefited the companies.

5 BEST PRACTICE FOR KNOWLEDGE SHARING

Siemens ShareNet was identified as the best practice for coping with the organizational and cross-cultural challenges in creating a global knowledge sharing system in the Voelpel, Dous and Davenport (2005) study. In this section the five steps to create a global knowledge sharing system based on the experience of Siemens ShareNet is introduced.

5.1 Concept of Knowledge Sharing

Siemens decided to create a knowledge management system that networks 17 000 sales and marketing employees. The aim was to enable the local teams to profit from the experience of a team anywhere in the globe if the local team had a similar kind of deal. This was supposed to increase the quality and speed of a bid. The idea was to create a system that not only handles the explicit knowledge but also helps to externalize the individuals' tacit knowledge. This solution is referred to as a "codification" strategy where the firm's knowledge is organized into reusable assets that are stored in a formal knowledge management system and the knowledge is shared. (Voelpel, Dous & Davenport 2005: 11)

The most successful sales persons were gathered and they mapped the solution-selling process. This team identified and established the structure for organizing the knowledge content. To overcome the blocks of traditional, repository-based knowledge management systems, the new system had to be designed to integrate components, such as a knowledge library, a forum for urgent requests, and platforms for knowledge sharing, including community news bulletin boards, discussion groups for certain topics, and live chat rooms. (Voelpel et al. 2005: 11-12)

The most important component is the knowledge library, which was composed of thousands of knowledge bids. These bids would be constructed to categorize the experience gained from ongoing and completed projects. Project team participants would enter the details of each bid by means of web-based entry forms. The second most important component is the "urgent request" platform where a user could place a question and other users regularly browse through the questions to see if they had and answer. (Voelpel et al. 2005: 12)

The first ShareNet version was developed with the help of an external web-development company and pilot projects in selected countries were carried out to gain cross-cultural insights from the users who were far from the headquarters and who would have to rely on the system the most. The team wanted to avoid the usual practice of rolling out initiatives from headquarters to the rest of the company across the globe. (Voelpel et al. 2005: 12)

Managers from every country were gathered to elaborate on their operation procedure. This opportunity to consider the views of managers and employees from all the countries was crucial for the success of the conception phase. It ensured that the system would benefit from the integration of a rich source of cross-cultural competencies at an early stage, which would serve as a cornerstone of the subsequent global rollout. (Voelpel et al. 2005: 12)

5.2 Global Rollout of Knowledge Sharing System

It was observed at Siemens that knowledge is context sensitive, which means that the management of cross-cultural flows is the key to the global leveraging of knowledge furthermore creating mutual trust between cross-cultural knowledge-sharing partners is a prerequisite in that respect. ShareNet managers were selected to represent their local company and promote the initiative within their regions. These had to be people who were intrinsically motivated by the idea that a knowledge-sharing system would yield benefits. They were assigned to supervise local level usage, but also tackled many of the urgent requests at the start of the initiative. This international group of ShareNet managers was a major cornerstone for leveraging the knowledge-sharing idea globally. They served as the nucleus in their local organizations to convince people who had not known much about the value of sharing their knowledge before. Bringing together the expertise and cultural assumptions of both headquartered and local ShareNet managers emerged as an appropriate way of handling the rollout cross-culturally. Consultants were employed to provide support in each of the countries represented to organize and manage conferences, and to interface with the ShareNet managers once a country's system was running. They also monitored the network and its contributions for quality and bid feedback, where suitable. (Voelpel et al. 2005: 12-13)

The global editors were ultimately responsible for the quality of the content. They had to ensure the clarity and usefulness of contributions, and review ways in which entered solutions could be understood and reused efficiently. The fact that the users recognized the direct value that they obtained from the system for their business problems also helped to overcome language and cultural problems as many employees still did not dare to post a question in a forum where several thousand people could see their grammar or spelling mistakes. The lack of proficiency in English and other cultural particularities became more evident in China. The whole ShareNet system was fully funded by the headquarters and users could just simply log on and start using the system. This made it easy to start using the system, users did not need to get the signature to spend money to use ShareNet and people in some remote offices could get easy access to knowledge and get connected to all the other technical people working in the same field. (Voelpel et al. 2005: 13-15)

5.3 Expanding Knowledge Sharing System

The challenge was to get people to collaborate and continually contribute to and rely on ShareNet. ShareNet managers recognized that receiving direct recognition motivates more than receiving some reward and they decided to focus on users themselves. A web-based incentives system, where users receive “shares”, which were actually bonus points, for entering knowledge bids into the library, for reusing the knowledge, for responding to urgent requests, and for appraising one another’s contributions, was developed. Later an award system, where shares could be redeemed for various gifts, prizes or trips to knowledge exchange partners was introduced. Eventually this led people to share their knowledge without reference to business needs and neglecting their actual jobs. (Voelpel et al. 2005: 15-16)

The number of users also has a strong effect on the quantity of contributions, hence to the value of the network. Metcalf’s law proposes that:

> The value of a network increases as the square of the number of users on the network. (Buckman 2004: 99).

The growth of the number of contributions significantly accelerated and quality problems started to occur. The rating measure for users themselves to evaluate the usefulness of a contribution was established. Users gave stars and got shares for doing that. If users wanted to redeem the shares the

global editors evaluated the contributions and ratings before authorizing an appropriate award. After some time only few users converted shares into prizes, managers speculated that the knowledge had become its own reward and by redeeming the shares a user would relinquish the status of possessing a high number of shares. This confirms the insight that employees need to establish themselves as experts by gaining formal or informal status through multiple postings and contributions to the community. (Voelpel et al. 2005: 16)

The success in sales and marketing department made the knowledge sharing system interesting for other divisions as well. The R&D organization adapted the system recognizing that the knowledge in R&D is more specific and complex; it is also “sticky“ and harder to transfer than in other organizational units. R&D ShareNet team wanted to proceed carefully and they did not launch a campaign to promote the system. Between February and May 2002 only 50 knowledge bids were posted and the reason might have been the lack of marketing effort but the issue might have been the protectiveness and “shielding mechanism”. The organizational culture in the R&D department was less supportive for knowledge sharing than in the sales and marketing department. There was a lack of values such as trust, empathy, lenient judgement and courage that knowledge friendly organizational cultures have. For improving the knowledge sharing process Bechina and Bommen (2006) also identified several indicators that play an important part. The indicators were trust, motivation, incentives, culture, attitude of the sender and receiver, mood, opportunistic behaviour, shared knowledge and its quality and relevance, transfer speed and environment. (Bechina & Bommen 2006: 113-114).

The trust is a two way issue. The users must trust the knowledge they use and they must trust that the knowledge the user shares is used in a right way. Buckman Laboratories has a statement on trust:

> You have to be able to trust the information that you receive to be the best that can be sent to you, and those that send it to you have to be able to trust that you will use the information in an appropriate manner. (Buckman 2004:20)

These barriers of trust within the organization were harder to overcome than geographical or language barriers. R&D people already had their own

informal networks and the ShareNet team had to communicate cultural values such as openness and trust and point out the personal benefit of knowledge sharing. It was realized that the developers were the owners of the knowledge and even though writing an answer does not yield any immediate benefit it will do so after a certain period of time. The engineers outside headquarters recognized the system's strengths faster then engineers inside headquarters. The best incentive to bring knowledge transfer into action is its value for the knowledge receiver, Voelpel et al. (2005) conclude. (Voelpel et al. 2005: 16-17)

5.4 Consolidating and Sustaining Performance

During the economic downturn around year 2002 the reorganizations and personnel reductions hit the ShareNet system as well. The users also adopted their contribution behaviour during the crises and new entries in the knowledge library and discussion forums decreased dramatically. This did not affect the urgent requests which were still at the same level as before, the reason might have been that updating library was time consuming and did not give any immediate benefits, but the urgent requests helped problem solving directly. Performance and value discussions of ShareNet led the team to try to demonstrate the system's worth (cf. Figure 4). The ability to demonstrate the benefits facilitates top-management support and the budget necessary for further operations. Country managers were asked to provide details and documentation of every case where Siemens had truly obtained earnings by using ShareNet system. After these investigations and compilation of the savings and business opportunities, ShareNet team found out that from 1998 to 2002 the system had generated approximately 5 million Euros, however some indirect items, e.g. opportunity costs and the time employees spent to find knowledge from databases and to answer urgent questions, were not included. (Voelpel et al. 2005: 17-18)

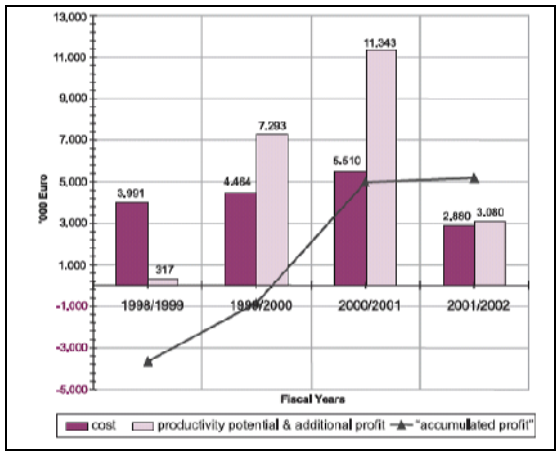

Figure 4. Siemens ShareNet Business Case (adopted from Voelpel and Han 2005:56)

Although ShareNet shrunk to operational minimum during the downturn, the system had shown that it still could create value for the company and gain its users acceptance. It seems obvious that launching a new project during economically bad times would be difficult, dedicating resources to build momentum into the systems took place in economically favourable times in the Siemens ShareNet case and this helped it to survive through difficult times. (Voelpel et al. 2005: 18-20)

Maintaining a knowledge sharing system costs a lot, because supervision can only be automated to a certain point and therefore personal resources have to be dedicated. Sharing of tacit knowledge, which is one of the most important drivers of innovation, through virtual medium has its limitations and when transferring specific, contextual (sticky) knowledge, strong ties and rich mechanisms, like face-to-face contacts is still required. Therefore personal knowledge networks, to provide rich mechanism for strong ties, should be introduced. (Voelpel et al. 2005: 20-21)

5.5 Summary of the Best Practice Example

Key findings in the Siemens case are that technology has a major contribution, but there is a need for support personnel and this generates costs and that knowledge sharing needs support from the management and it is essential to prove the benefits for the company. In the end, the users are in the key role, and acceptance of the system can be gained if the system proves its value to the users.

The value of Siemens ShareNet is obviously in a different level (thousands of users), compared to the case company's technical support teams (n=25). The principles and the methods used in the Siemens case can still be applied to a smaller number of users, in some levels. The number of possible contributors and users of knowledge and information inside the technical support teams is not very high; therefore if the value was to be increased, the network should be expanded beyond technical support boundaries.

6 CASE COMPANY

The case company, ABB, is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 120,000 people.

ABB has five strategic imperatives and among those there is “One ABB” and it has been identified that we need to leverage our scale better through collaboration and sharing of our best practices and expertise. One of the ABB’s missions is to attract talent as follows: “ABB is committed to attracting and retaining dedicated and skilled people and offering employees an attractive, global work environment.” (ABB Web 2010)

The ever changing challenge in induction motor business has led the once local activities of the technical support team to turn more and more global. The feeding factory was to be located in the same building and problem solving and getting feedback from the designers and manufacturing was relatively easy for technical support engineers. The efforts to keep the profit margins in an appropriate level and to keep the promised lead-times towards customers, while the demand of the motors inclined and the competition in pricing was getting tougher, led to the situation where manufacturing in Finland was no longer sufficient. To stay in business, while competitors were manufacturing machines in low cost countries, and seeking a competitive advantage through outsourcing and offshoring forced the case company to build factories in India and China. This brings new challenges in manufacturing, sales and marketing but also to knowledge management. In the past it was enough to share the knowledge and best practices with the neighbouring colleagues or during a break or a random hallway conversation. Now the colleagues of the Finnish technical support team members work in foreign countries far away from Finland have different cultures and languages and different time zones. And it is most likely that in some period of time, there could be a need to establish more teams and start to share information and knowledge with them as well. Also the employee turnover makes efficient information sharing even more important.

History

The ABB Induction Machines technical support organization was developed to support the local sales companies and factory sales managers. ABB Induction machines sales people use tools such as Cuusamo and DriveSize to select a machine from the electronic catalogue, according to the customer request. If for some reason the machine selection tools do not give a suitable solution, the next option is to send the request to a factory for further investigation.

Lotus Notes based working queue (Quotation Database) was introduced in 2004, before that all the requests for a quotation were e-mail based. The drawback of the Quotation Database was that it was very much factory orientated and local, only the people in Helsinki factory could use it. In 2008 second generation of Quotation Database called Machines Sales Support database was introduced. This enabled multiple support teams to be added under the same database and a working queue system and furthermore the local sales companies now have people with a permission to place the request to the Machines Sales Support (MSS) queue independently. Some users still need to send the request first to the Sales queue, where factory sales managers and engineers can first try to solve the problem, but if the solution cannot be found the request will then be added to the MSS queue.

MSS has a possibility to evaluate performance by lead times, sort the request in the database by the problem specified and by a designer or team. The process has now a statistical feature that shows how long it took to accomplish a request placed in the queue. Six-sigma has also been used in the ABB Induction Machines Technical Support team, aiming to improve the technical support process efficiency and effectiveness. Six-sigma is effective in cutting costs and improving profitability. It is a powerful tool, when used in a right place.

The goal for technical support is to give a suitable solution, with a price, for a specific problem in a specified time. The Machines Sales Support (MSS) lead time is specified to be 3 days, starting from the moment the request is entered into the Lotus Notes MSS queue. Customer satisfaction or the technical quality of the designs is not yet measured by any means. Designers in Finland take the request that is the first one in the queue, but

Chinese designers are currently selecting the request according to the personal knowledge and capabilities of the designer.

The teams have very little interaction with each other and knowledge sharing is not technically supported by the organization. Electrical designers in China are going to have two contact persons in Finland and mechanical designers in China already have two contact persons in Finland. The Finnish and the Chinese technical support team leaders have two official meetings per year.

Knowledge management in local business units

Local business units have figured out their own systems for knowledge sharing, for example India has launched Knowledge Management Portal to serve as a repository of basic technical knowledge to enable personnel working in different functions of various BUs and regions of ABB India to carry out their work more efficiently and effectively. The objective is to help to build competency of the existing personnel and to help new entrants to become effective faster.

In the system the Engineering and Development Manager (EDM) of each business unit is also knowledge manager of the business and has the responsibility to manage the knowledge portal of the respective business unit. However, contributions are invited from all employees as this is important in building the repository. If somebody would like to share the knowledge that he or she has acquired during the course of work, or a document which might help in the business or in serving the customers better, he or she needs to submit an entry. The entry has to be in the form of a word document in a template. The entry has to be forwarded to the EDM in the business unit and the entry received will be reviewed by the EDM and accepted depending on its usefulness and applicability. (ABB Intranet 2010)

This kind of a hierarchical system is difficult to use and this might have caused the amount and the quality of the content within the system to be very limited. People who would like to share knowledge have to fill in forms to be sent forward to the managers for selecting the suitable content for the system. It could be advisable to rethink this system and make some improvements.

After having briefly described the company in question and its operations in the countries of interest, the study will now proceed to introducing the findings based on the in-depth interviews of the four managers in ABB.

7 FINDINGS FROM INTERVIEWS

Four managers were interviewed during January and February 2010 in Helsinki. Two team leaders were interviewed at the same time and two managers were interviewed individually. The questions were sent to the interviewees beforehand and the questions were used as the guiding themes during the interviews.

7.1 General Manager

The mission to create a Chinese technical support team was given to a Finnish team leader. The team leader's challenge was to create a well performing professional technical support team, from people who had not yet been graduated and who had practically no work experience. The target was that after the training and learning from doing the actual job, the team could perform the same way as the Finnish team does and this had been acknowledged to be a very challenging target.

The knowledge sharing was planned to take place through the Finnish team leader located in China, who had also trained the team and is constantly following their work. The plan was that this person would act as a mentor to the team members, and furthermore as a bridge between Finland and China and help the Chinese team members to carry out their daily work. Collaboration between team members within the Chinese team was encouraged so that if an individual did not know the answer, the team would first try to solve the problem together and then ask help from the team leader. If this did not help, the problem would then be moved to the Finnish team to be solved.

It was recognized that there was no process for knowledge sharing in place and that might cause some problems in the future, at least after the departure of the Finnish team leader and the leadership responsibilities having been transferred to the new Chinese team leader. The challenge to keep the teams on the same level was planned to be done by methods of training and sharing the minutes of meetings that holds information about the latest news from the Finnish team. Microsoft SharePoint 2007 was used by some of the people in the case company, but there had not been

discussions how to utilize the new features in Microsoft SharePoint 2010 selected to be the common platform for the case company.

Furthermore, knowledge sharing, in the field of technical support, was considered to be an important factor due to the fact that the case company constantly creates new local engineering teams all over the world to support the local sales. If there were a good way to share knowledge it would help leveraging the knowledge from the teams with more experience for the common good. The benefits the company could gain from efficient knowledge and competence sharing have been recognized. The General Manager of the case company was not worried about the knowledge leaking outside the organizational borders, most of the knowledge that would be shared is useful for the designers and people who use the case company design and motor selection programs, but not that useful for people outside the company. Furthermore, the benefits from knowledge sharing are far greater compared to the possible disadvantages.

Knowledge sharing takes place all the time between people and that knowledge does not benefit others if not documented and shared. The idea would be that everything that someone shares should also be documented, therefore all questions and answer should be directed to some channel, which is open for all the employees so that the questions and the knowledge can stored and re-used.

Knowledge sharing should be a part of personal targets for the people in technical support teams and the case company is now able to measure the performance, and therefore also able to demonstrate the possible benefits of a knowledge sharing. Furthermore it was recognized that it takes time to get the results. Contributing to the system is time consuming and this most likely affects the performance at the beginning. (Vepsäläinen 2010)

7.2 R&D Manager

The problems placed for technical support teams cannot be solved with normal design tools and programs; hence a great amount of knowledge is needed. Most of the knowledge is inside of people's heads as tacit knowledge, and it is difficult to extract that knowledge and re-use it. There is also a concern about the way people will use the knowledge, and the rules must be clear for all, so it is possible to trust that the people use the

information in a right way. That might not be a problem in the technical support teams' case, because the team members are professionals of their own field and know how to apply the information for the case at hand. But it might be dangerous if the information were available for people who do not understand the context of the knowledge and how to apply it to the case at hand.

The team members in Finland generally have a long history both in technical support as well as in order related designing and it is easier to get support from the other organizations in Finland compared to the situation in China, this also makes it easier for Finns to collect personal knowledge. Furthermore the Chinese team has a good level of knowledge, but it is difficult to say if it is on the same level with the Finnish team.

In Finland, the experience of the employees and the culture that emphasizes independent decision making, and the fact that decisions are made intuitively and case-by-case, sometimes without exact rules, is in contradiction with to the Chinese orientation towards authorities and rules, which are both highly valued and needed. The Chinese team members generally do not have such a long experience from the actual work and therefore the specific knowledge needed in the job has to be taught by someone. The Chinese team could end up being the team that gets and applies more knowledge than contributes. The cultural aspects of the Chinese employees need to be taken into consideration, the face is very important and it might be a restrictive issue to when sharing knowledge. The language difference does not seem to be a problem, though it was recognized that it is challenging to find an employee that has both technical and language skills in place. Job rotation in China might be an issue, and training the new employees to the same level can be a challenge.

The Chinese team needs to be able to do the same job as the Finnish team does. During the first two years the knowledge sharing has been planned to happen through the Finnish team leader located in China and after the expatriate period the Chinese team leader will be in close touch with the Finnish team leader. Also training from Finland to China is organized to keep the Chinese team on the same technical level. For knowledge sharing, the teams can use Lotus Notes, where designing instructions can be found, also Sametime, which is a Lotus Notes based instant messaging tool, and e-mail

are used for communication. Knowledge management and knowledge targets are not defined and measurement does yet not exist. (Kinnunen 2010)

7.3 Global Technical Support (GTS) and Technical Support (TS) Team Leaders

The team in China was established to support the growth in global business and to enable the fast response times towards customers. The employee costs in China are significantly lower compared to Finland and this made it possible to establish a quite large team already at the beginning. The sales organization in China also needed more support and the local support team helps the sales department to solve more requests and being in the same time zone was also seen as a benefit.

> The target of this team is to be an independent sales support which can act like a factory sales support. To be able to reach this target the team needs continuous support from all GPG factories. (Machinews 2008)

The target for the team was not set in a more specific way than the one stated above. Metrics for performance measurements are the number of request answered and the answer delivery time. Those metrics are monitored and compared to the same metrics in the Finnish team, but the results are not yet comparable, because the Chinese team selects the request according to their capabilities to solve the specific problem, while the Finnish take the first request in queue. According to the team leader the target “to act like a factory sales support” has been accomplished very well and the team is now ready to work in the same way as factory technical support does. The long distance makes keeping the knowledge on the same level challenging. Helsinki factory has agreed to give training twice a year to the Chinese team and keep the global team up to date on the technical features and new ways of working that has been applied in Finland.

Support from Helsinki factory

The actions agreed upon for the continuous support from Helsinki factory towards the new local Chinese GTS team leader, who officially takes the lead in June 2010, and the team are described next. This section is based on the official internal instructions and the style of the writing is left as it is in the documents and therefore for instance the abbreviations are not described.

Team meeting with GTS:

- Once per month
- Minutes of meeting in English, cc. to TS Team leader
- Agenda will be discussed and agreed during the orientation in Helsinki.
- Latest news from factories etc.

Training:

Continuous training of the group to maintain and increase the competence level of the team members. The competence level achieved by intensive 2 year ABB training program must be kept as minimum requirement.

Monthly training session about issues that the GTS TL considers to be improved / maintained / are new.

- New design criteria from factories to be implemented.
- New program releases, training the GTS to be able to work with the new features.
- Handling errors in Quotation process.

Keeping up the training clock to GTS :

- Plan and execute visits from factories (FIDRI, ITIND) with the Technical Support Team Leader
- Training at least 2 times / year

There is also a technical description of the support from the Finnish Technical Support (FIDRI TS) to the Chinese Global Technical Support (NAS GTS) available and the purpose of that document is to define and clarify the support principles from FIDRI TS to NAS GTS. The content of the description is as follows and the style of the writing is left as it is in the documents:

How to select a Request from the queue

As a basic rule, NAS GTS selects from the FIDRI TS queue only the type of request, they can solve independently or together with other NAS GTS team members.

Also cases that come from NAS Sales areas (JP, KR) that cannot be solved by NAS GTS will be sent to FIDRI TS (Top Drives, Difficult AMB replacement machines, etc.)

When selected, if some questions arise:

First step => discussions together with all team colleagues, solution should be found through teamwork

Second step => only after that contact FIDRI TS.

How to contact FIDRI TS

As basic rule, all questions that require an answer, which will be more than one sentence, will be sent by e-mail. Lotus Notes instant messaging tool Sametime is not to be used for long technical discussions and snapshots or files should not be forwarded through Sametime. Sametime is meant for short and quick questions such as:

“Is the Terminal box available as stainless steel?”

But if the same question is “Is … available, what is the price, delivery time and manufacturer”, then the questions should be sent by e-mail.

When sending an e-mail

When sending an e-mail, (or “Sametime” as well) - the designer must include the following information at the minimum:

- Reference number
- Position number

Reference and position number are included in the Subject field in the Lotus Notes message. This way the numbers are also easier to track from the

Lotus Notes mails in the future, if needed. By sending e-mail the technical discussions will be saved for later use. Whereas with the Sametime all the useful information will be lost.

Cases that will be moved to FIDRI TS

If the work done by FIDRI TS will take a half hour or more to answer the questions or solving the problem, FIDRI TS designer will move the case to FIDR TS, and when doing so also informs the NAS GTS designer. This rule applies also to the “multiple” small questions regarding one particular Request.

When the Request is marked i.e. ready, also the NAS GTS will receive the answer and then have access to the technical solution for later use.

Process evaluation

The support instructions mainly concentrate on the working ways and the principles on how the Chinese team members select the works from the queue. The structure is such that the traceability of the answers given from Finland is ensured and the time usage of the support teams has been paid a special attention. The Chinese team leader is kept informed about the latest news from Finland, and the collaboration between team leaders is based on the official training that is determined to take place twice a year. There are no rules on how to share informal information, the best practices and the information that is hard to codify into official instructions.

7.3.1 Information Sharing in Finnish Unit

The Finnish technical support team works in an open office facility and based on the observations and findings on day-to-day work, interaction and knowledge sharing take place in hallway conversations and by talking to an expert sitting close by or through instant messaging and e-mail messaging to experts from other departments. Information storing is sometimes done by writing the information into a personal book of knowledge for further use and e-mails are also kept in personal folders for the same purpose. This information collected is impossible for others in the local or global teams to utilize. The Finnish team also collects and stores the e-mail answers from other experts for specific problems to a local network drive in PDF-form, these answers can be reused by others in the team, but finding the

information can be challenging. Stored files are not checked by the original contributors and in some cases the contributor does not even know that the information is saved somewhere and furthermore it is not constantly verified that the knowledge stored is still up to date while the materials, design methods, design limits and practices change. The files are usually stored using date in the title and an explanation of the content.

This practice of information collecting and sharing also leads to a situation where the same questions can have several different answers depending on the expert who answers and the same questions can be asked several times from different or the same experts and stored several times. It also takes a lot of space in e-mail servers, because the information is usually kept in several places and spread through e-mails to the team members. This same practise is used in China and the information that is collected in Finland is not available for the team in China. The situation is the same for the information collected and stored in China.

In Lotus Notes the case company has databases for material information and material descriptions as well as design instructions, the intranet also has a library function where material information and for example dimension drawings can be found.

A knowledge library where some design information is stored exists, but the usability is not were good. Only one person has a licence to add information into the library and the content is not updated regularly. Most of the content is in Finnish, which makes it local information storage (cf. Figure 5). The content is highly technical and useful for people who design the solutions, but not that useful for people in other parts of the organization, for example in the Sales and Marketing department.

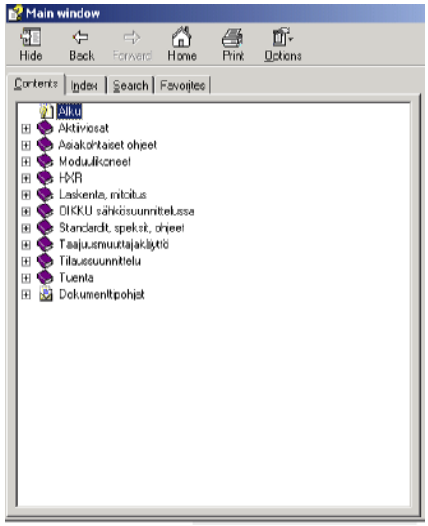

Figure 5. Snapshot of a knowledge bank in Finland

Process evaluation

The information sharing process in Finland is based on strong ties between individuals and the information is not stored in a place where it could be easily retrieved. There are no rules on how to share information and the sharing of knowledge depends on the individuals' own perception of the usability and importance of the information for others.

7.3.2 Information Sharing in Chinese Unit

There were no actions agreed on the behalf of management on how to share knowledge between teams in Finland and in China. The knowledge sharing practice came from the established way of working in Finland and there was no other specified way defined how to share the information except hallway conversations and team meetings. It was left to the team leader to decide the best practice on how to collect, store and share knowledge. The team leader acts as a mentor towards the team members and possesses the relevant knowledge for the daily work.

The Chinese team has developed independently a knowledge sharing software which includes knowledge database and easy access to formulas and equations commonly used in daily work (cf. Figure 6). The software was developed for internal use to collect information and practices from factory support teams and knowledge that the team itself had gained from doing the actual work with the help of the team leader. The team actively updates and

adds information and practices into the database and constantly uses it. This is not supported nor used in any other locations outside China.

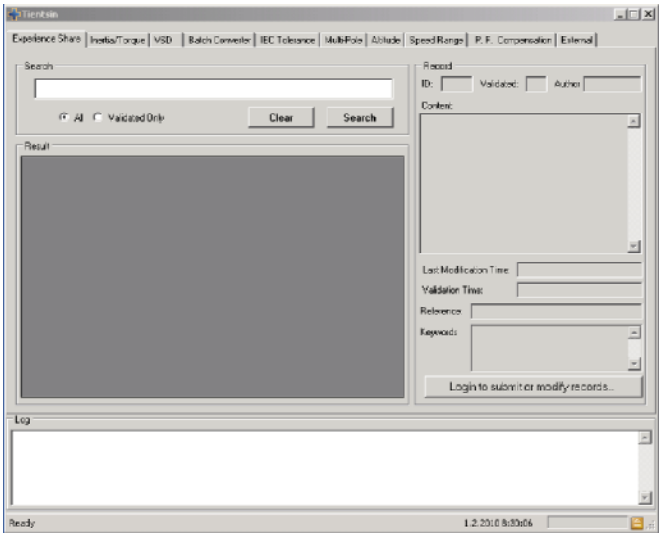

Figure 6. Snapshot of a knowledge bank in China.

All the documents and information is stored in English, according to the team leader, the Chinese team members do not seem to have barriers for using English in communication. The team members are highly motivated and the team is well connected. Team work and solving problems together is supported and encouraged, this has been the way the team has been working from the beginning.

When the Chinese technical support team members ask support from factory for specific problems via e-mail, the answers are collected and stored to a local network drive in PDF-form, where it is not available for teams outside China. (Keisu and Forss 2010)

Process evaluation

The current knowledge sharing system in China has helped the team members to do their work and thus proved its value to the team members. But the link and measurements between the knowledge sharing system and performance or the value adding effect for the company are not defined. The team leader has a significant role on contributing knowledge and the number of contributions can diminish after the team leader leaves for Finland. The knowledge entered into the system is still mainly based on the knowledge from the people who do not use the system and this is not good. The information might have been translated several times before entering to the

system and the origin of the information is unclear. Saving information into several places in different forms is not recommendable. If there is knowledge sharing system, all the knowledge could be shared through that.

This chapter aimed at reporting the content of the interviews in a concise form. Next, the findings based on the answers to the questionnaire sent to 25 employees with the Machines Sales Support team are introduced and analysed.

8 FINDINGS FROM THE TECHNICAL SUPPORT PERSONNEL

The questionnaire was sent to 25 people who have been working on the Machines Sales Support (MSS) queue during the autumn of 2009 and all of them answered the questionnaire. The work load in MSS has been quite high and some people from other organizations have been ordered to help the Technical support teams. Therefore some of the Finnish order phase design team members were included to the target group of the questionnaire; in addition to people who do solely technical support work on the MSS queue.

The questionnaire was designed to show what the present situation in knowledge sharing was and give an overview on how the team members share, find and store information. The aim of the questionnaire was also to show what kind of barriers might be ahead, if some kind of knowledge sharing system was be initiated. Also the challenge on how to get people to share their knowledge and what would motivate them to do this were topics in the questionnaire. Furthermore, the replies to the questionnaire hopefully show some of the differences between the Finnish and Chinese teams concerning the need for a knowledge sharing system and willingness to use one.

The questions were mostly to be answered on the scale of 1 to 5 as illustrated in Figure 2. Some questions were to be answered as “Yes” or “No” to reveal if the issue at hand was used or not. When suitable, the answers from the questions are presented in a percentage form to show, for example, how common it was to use a specific method for knowledge sharing.

8.1 Team Formations

The questions that give an overview of the team member’s background concentrated on age, work experience and technical domain. The age distribution is shown in Figure 7.

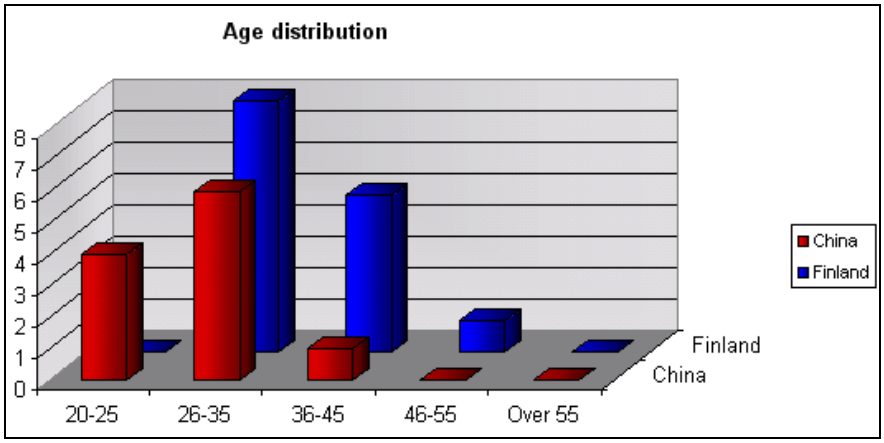

Figure 7. Age distribution

There were 11 people in the Chinese team and 14 in the Finnish team. The people in the Chinese technical support team were younger than those in the Finnish team; 36% percent of the Chinese are 20-25 years old, while all the Finnish team members were older than 25 years. The majority of the team members in both teams were 26-35 years old.

The respondents were also asked about their working experience, cf. Figure 8.

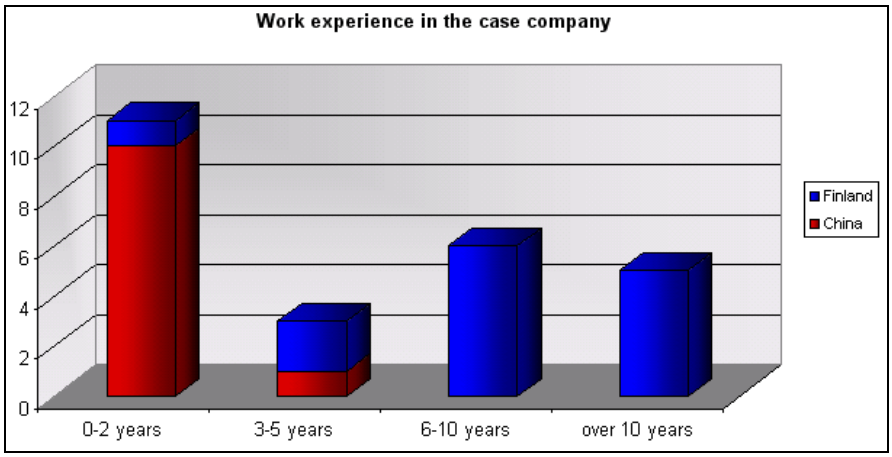

Figure 8. Work experience in the case company

People in the Finnish team had a lot more experience as can also be seen in Figure 8. Most of them had been working for the case company for more than 5 years. The Chinese team members generally had less than 3 years of work experience.

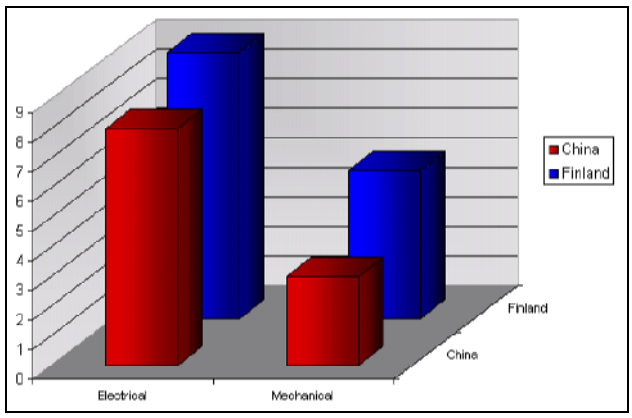

Figure 9. Technical domains in Finland and in China

There were more experts on the field of electrical designing in the teams and in China there were relatively more electrical experts than mechanical experts. See Figure 9.

8.2 Sharing, Finding and Using Knowledge

It is important to know how people currently share and find knowledge and that was asked in the questionnaire, furthermore it is possible that people do not even know the existence of some of the knowledge sharing systems. The answers show how regularly attendees use specific tool for sharing and finding knowledge. In addition to the tools that were pointed out in the management interviews, the selection of options was based on the tools that are commonly used in the case company for knowledge sharing. There were also open fields after the questions to be filled in, if the selectable options did not include a suitable choice for the attendee.

8.2.1 Knowledge Sharing Systems

The situation when the enquiry was carried out was that 91% of the Chinese respondents share and use the knowledge and all were aware of the knowledge sharing systems. The situation in Finland was not that good, 64% of respondents shared and used the knowledge and 14% were not even aware of the knowledge sharing systems.

The Chinese team used their local internal knowledge sharing system (Tientsin) more than the Finnish team did theirs (PIEOhjeet). And the teams were not using the other team's local knowledge sharing systems. In Finland

the MSS database and Cuusamo were additionally utilized to share information and also asking for assistance from the person closest.

8.2.2 E-mail and Sametime

E-mail was the most widely used way for both teams to ask for information and that information was often saved into a person's local mailbox. The interview of the Chinese team leader revealed that a lot of information from e-mails in China was stored into the local network drives in PDF-form, and that information is not easy to find later. Sametime is Lotus Notes based instant messaging tool and it was also used to find information in both teams, one can save the conversation history in a sametime, but the knowledge is hard to find when needed afterwards and impossible for others than the receiver and the sender to do so.

8.2.3 Manufacturing and Testfield Data

The Finnish team also relied on manufacturing and testfield data more than the Chinese did as shown on Table 5 and Figure 10.

	ALL
Discussions with local colleagues	4,6
P-instructions	4,5
Personal "book of knowledge"	3,7
Manufacturing data	3,7
Information collected into local network drives	3,6

	Finland
Discussions with local colleagues	**4,6**
P-instructions	**4,4**
Manufacturing data	**4,4**
Test field databases	**3,4**
Information collected into local network drives	**3,3**
Informal instructions	**3,3**

	China
P-instructions	**4,6**
Discussions with local colleagues	**4,5**
Personal "book of knowledge"	**4,3**
Motor&Machines Specifications	**4,2**
Information collected into local network drives	**4,1**
Tientsin	**4,1**
Discussions with supervisor	**4,1**

Table 5. Where do you find information for your daily work?

The reason why the Chinese team did not use the manufacturing and testfield data was that the team did not have access to the Finnish databases containing this information. Furthermore, the work experience of the Chinese team members and especially the work experience in order phase designing was significantly shorter compared to the Finnish team members, who might have noticed the importance of manufacturing and testfield data for ensuring the manufacturability and quality of the solutions. Additionally, the searching for such data is time consuming and when the efficiency is measured and the measurement is the time that it takes to offer a solution and not the quality (meaning the hit rate and manufacturing costs vs. cost of the solution offered) the efficiency and effectiveness of the work in the Finnish team might be lower compared to the Chinese team.

8.2.4 Working Practices

The difference in the working practices can be seen in Table 5. In addition to discussions with local colleagues, the official instructions (P-instructions) were often used in both teams. The Chinese team seemed to rely on P-instructions and instructions in Motor&Machines Specifications database even more and this can be related to the importance of having clear instructions, which is typical for the Chinese employees.

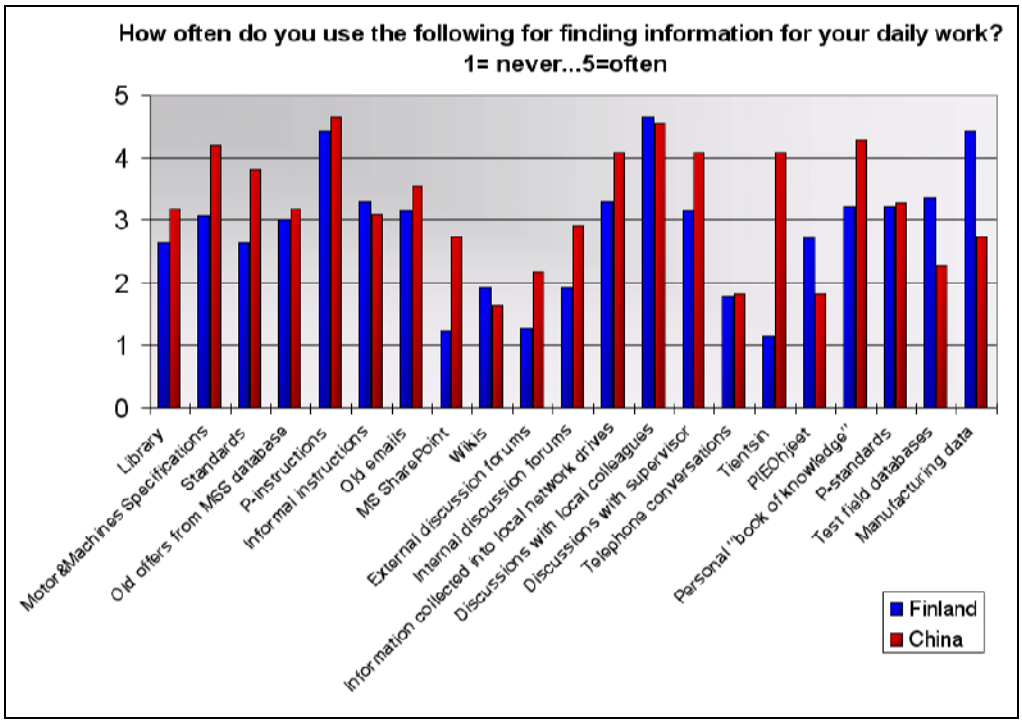

Figure 10. Information searching

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Figure 10 shows which company specific or common tools people used and how regularly they were used in daily work. The conclusion is that the Finnish team relied on manufacturing and test field data, while the Chinese team relied more on official instructions. This also confirms the perception that the Chinese team had a higher need for official instructions to perform in daily work, while the Finnish team members based their decisions on experience from the past and intuition on how to apply that on the case they were working on. The Chinese team members also seemed to have a higher need to get access to information. Members on both teams have information stored on the personal books of knowledge. The Chinese team members seem to have more knowledge stored in personal files; even though they have a working knowledge sharing tool perhaps all the information cannot be codified to a form to suit into their knowledge sharing system. This also means that knowledge is still stored in several places and not accessible to all.

The most unusual ways to find information mentioned by the respondents were external discussion forums, Wikis, telephone conversations and MS SharePoint. This shows that team members do not use social media applications for information searching and that MS SharePoint was mostly used in other parts of the organization but not among the technical support teams.

8.2.5 Information Sharing

There were several tools and places where to share information. To find out how team members shared the knowledge the findings from the interviews were used to form the options in addition to the commonly known ways to share knowledge. This question was answered as “Yes” or “No”. Also the language of the shared knowledge was asked and how the knowledge sharing systems have helped the team members to accomplish their daily work.

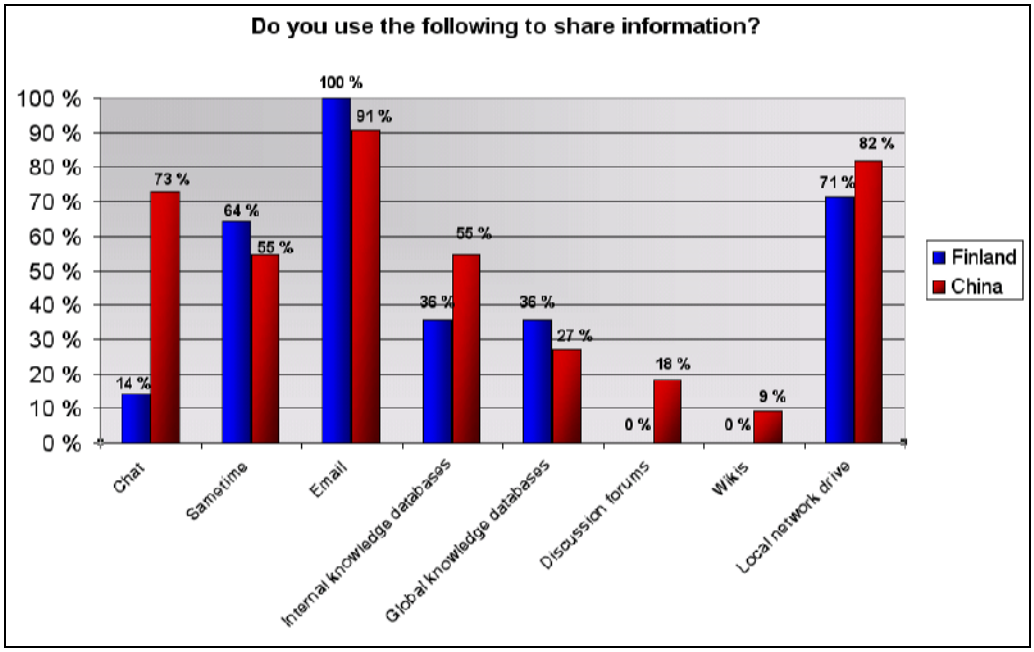


Figure 11. Information sharing

Figure 11 shows what percentage of the team members used a specific tool or a place to share knowledge. Information sharing happened in both teams mostly through E-mail and network drives. The most common way was to send an e-mail to local team members if something new came up, or some problem had been noticed. Sametime discussions were also used in both teams. Discussion forums and Wikis were not commonly used, although it seems that the Chinese team is more used to social media applications and many of them used chat. The age difference between the members in the Chinese team and in the Finnish team might be one of the reasons for this. Additionally, the greater need for knowledge and difficulties to get access to it might have caused the Chinese team members to pursuit the knowledge from all possible sources.

8.3 Storing Knowledge and Information

People in both teams stored the knowledge in a similar way. The most common way was to add something (excel file to calculate something or draw a specific curve, technical information etc.) into a local network drive and print out a paper copy to be stored in a personal folder or additionally write the information down to a “personal book of knowledge”. Paper copies were also often printed out from the official P-instructions and stored into a personal folder. Sometimes challenging cases and solutions had been saved

into local drives and in some cases information had been added into Adept or MSS notes field. E-mails were also commonly stored and the information is found from those. In some cases there was nothing stored, just the information in the memory of the people involved in solving the problem.

Common for all of these ways to store knowledge and information is that it is not easy to find and search what one needs and that the information was not always available for everyone who might need it; people cannot know who might be the carrier of the relevant information and there can be situations where the best answers remain unheard. Furthermore, the information is not interactive and it is difficult to update the information, when someone has something to add or correct. The information stored in network drives does not show the author and there are no agreed format how to store the knowledge and information.

8.4 Culture for Knowledge Sharing

The Chinese team members were more open and willing to use knowledge sharing systems, the team was committed to find, share and re-use the knowledge. They had a working local knowledge sharing system, which has proved its value to team members; hence they understood the benefits of knowledge sharing. Questionnaire results from the Finnish team revealed that the culture for knowledge sharing was not on the same level with the Chinese team. Next steps would be to close the gaps in actual cultural norms between the Chinese team and the Finnish team by clearly articulating new directions to the Finnish team. Management involvement and interest towards knowledge sharing will help to establish new cultural norms. The benefits are listed in Table 3. Those can be applied to make people understand the benefits for the individual, for the community and for the company.

8.5 Motivation

Motivation to share knowledge is an important factor and it is also possible that some people do not like to share the knowledge they have. The possible motivators were selected according to the findings from the theory and those selected are usually the most common motivators for knowledge sharing. See Figure 12 for percentage values of the answers.

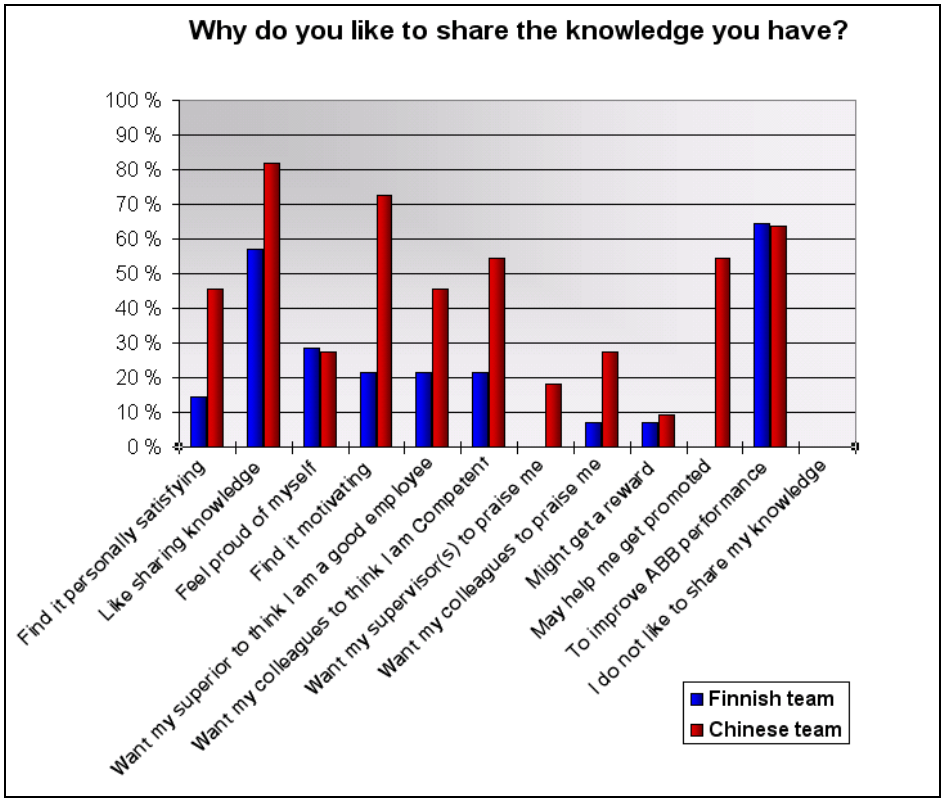


Figure 12. Why to share knowledge

There is a difference in what motivates the Chinese and the Finnish team members to share their knowledge. The Chinese culture and also the culture in the Chinese team seem to have a significant influence on the attitudes. The following sections describe the situation in each team.

8.5.1 In China

People in the Chinese team liked sharing the knowledge and found it motivating. To improve the case company performance was also one of the main reasons for knowledge sharing. Furthermore, the Chinese believed that it could have positive influence on their career. The culture of face gaining can be seen in the answers, because it was important for team members to be recognized as a competent worker by colleagues, which was more important than having recognition from the supervisor. The culture of “face” might also have a negative influence on knowledge sharing behaviour according to Voelpel et al. but this team might have had a different situation, since all the members were in the same line concerning the education and work experience, thus knowledge, and had been working together since the forming of the team. Maybe people in the Chinese team were not so afraid of revealing their shortcomings.

8.5.2 In Finland

People in the Finnish team liked to share knowledge to improve the case company performance and because they liked to help others by sharing their knowledge. Other possible reasons to share knowledge were not so widely valued or recognized.

Other issues that were pointed out in the open field question “Why do you like to share the knowledge you have?” by the team members in both locations:

1. “Help colleagues” and “Like to help other people”
2. “To make teamwork efficient”
3. “through the knowledge sharing, I can communicate with other colleague”
4. “Save time, easier to have access to the information”
5. “To reduce own workload, information can be obtained without bothering me”
6. “To make designing to be more easier and to avoid bad designs for factory.”

The Chinese team members found significantly more positive aspects from knowledge sharing compared to the Finnish team. On average the team members in China had selected 5 reasons to share knowledge, while the Finnish team members had selected on average less than 3 positive motivators. This can have a negative affect on the knowledge sharing culture in Finland.

8.6 Barriers for Knowledge Sharing

The questionnaire revealed several possible barriers that make the knowledge sharing difficult or prevent team members from sharing their knowledge. Some of the assumptions that were pointed out in the relevant theories and former studies in the field of knowledge sharing were not that significant in the case of these teams.

8.6.1 Platform

An open question for additional information about the barriers that make the sharing of knowledge difficult was filled in by several attendees. Below are the typical barriers from the questionnaire answers.

1. “Lack of an official and common platform.”
2. “There is no global network drive we can use.”
3. “Too many different places to save the knowledge.”
4. “Explaining and documenting in English.”
5. “Takes time and effort to document information.”
6. “Make everyone to trust the information”

The biggest barrier for knowledge sharing was the lack of a common platform. In China there is also a concern about the speed of access in Internet connections and this could cause problems in knowledge sharing systems. The Chinese team had confidence in their local knowledge sharing system and their problem was the lack of a common and official system. There were also too many different places to store information and it was difficult and time consuming to find the information. Furthermore, there was no global network drive which could be used to store the knowledge.

8.6.2 Language

The personal language skills and confidence of using English for knowledge sharing were evaluated by the questionnaire attendees in the scale of 1 to 5. The Finnish team evaluated their personal skills in English to a slightly higher level (3.6) compared to the Chinese team (3.3), but the Chinese team had more confidence in using English in knowledge sharing (China 4.2, Finland 3.7). The Chinese team was more used to knowledge sharing and particularly using English as the main language in knowledge sharing and this could have given the confidence. Half of the Chinese technical support people had some knowledge stored in Chinese, while in Finland everyone had knowledge stored in Finnish. English was the main language for knowledge sharing in China, but not in Finland. This has to be changed and

all the knowledge, in other language than English, must be translated and stored.

Some of the previous studies had noticed that the English skills of the Chinese had been weak and there had been doubts about their confidence in sharing knowledge in English. The Chinese team in this study seemed to have more skilled people in the area of the English language and it was not seen as a major barrier for knowledge sharing.

The Finnish team might have had more difficulties sharing their knowledge in English and furthermore almost all of the knowledge existing in various places was stored in Finnish. The English skills were on a relatively good level so using English for knowledge sharing was not seen as a major barrier for the Finnish team either, but it made the knowledge sharing more difficult.

8.6.3 Finding Information

The question was how easy it is to find knowledge stored by a local colleague or colleague from another location. The answers are shown in Figure 13.

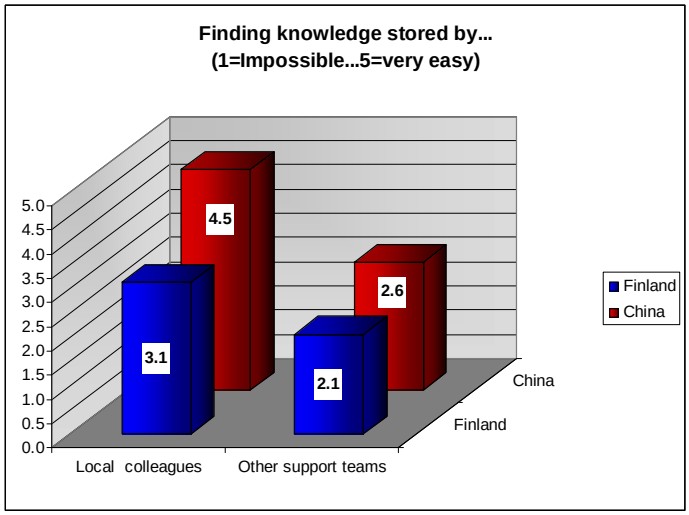


Figure 13. Locating knowledge

Figure 13 shows how the information shared by local colleagues was quite easy to find in China while it was rather difficult in Finland. Both teams had the same difficulties when there was a need to find information outside the local team.

Moreover, the team members in the Chinese team had a feeling that using knowledge sharing systems helped them to finish the jobs (4.3) and they could also finish the jobs faster (4.5), but in Finland the situation was opposite; using the knowledge sharing systems helped to finish (3.8) the jobs, but made it slower (3.6). This shows that the way to work in Finland was not as efficient as in China.

8.6.4 Encouragement

To find out how the knowledge sharing is encouraged and supported by the management the questions about the level of support from the supervisor was asked.

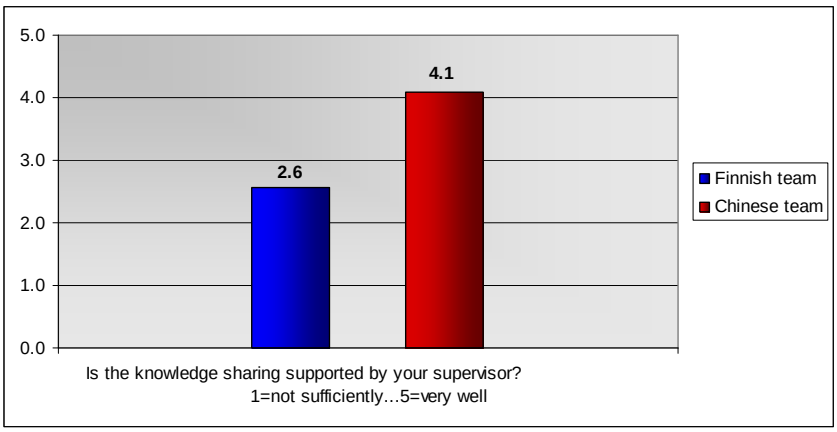


Figure 14. Support for knowledge sharing

Figure 14 shows how knowledge sharing was supported by the supervisor in China. The support in China was considered to be very strong, especially among the Chinese electrical designers, who scored the question as 4.5 while the mechanical designers' score was 3.3. The overall score in China was 4.1. In Finland the knowledge sharing was not encouraged by the supervisors and the overall score was only 2.5.

The team leader has a significant influence on this and the way the Chinese team has been taught to work and share information is visible in these answers.

8.6.5 Rewarding

Rewarding is often used to support knowledge sharing behaviour. The question whether knowledge sharing is sufficiently rewarded was asked to

find out if the team members felt that sharing of knowledge was rewarded enough or not. The answers can be seen in Figure 15.

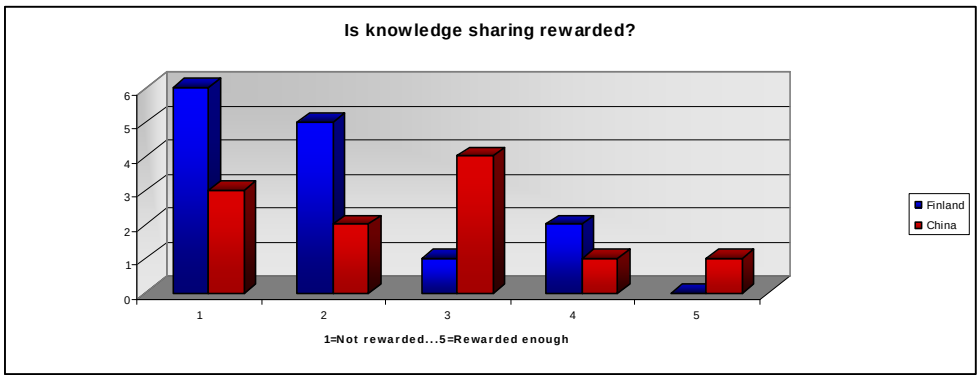


Figure 15. Rewarding of knowledge sharing

Figure 15 shows how recognition or rewards from knowledge sharing were not commonly received in either Finnish or Chinese teams. There was no link between knowledge sharing and personal targets for an employee, and furthermore there were no official rewards or recognition for the employees who shared or used the knowledge. The answers reveal, if the attendees felt that the sharing of knowledge was sufficiently rewarded. If the attendees did not expect any rewards, it can mean that “not rewarding the knowledge sharing” is still enough. This has a link to the question “why do you like to share the knowledge you have” and according to the answers, the possibility to get some reward was one of the lowest motivators and was selected by only 8% of the attendees (cf. Figure 12). This is in line with Voelpel’s and Han’s study on Siemens ShareNet case, which found out that material incentives were not decisive for employees’ motivation to share knowledge, and the existence of incentives was highly symbolic. But stopping the material incentives due to financial reasons made the enthusiasm to use knowledge sharing drop sharply. Bechina’s and Bommel’s study on the other hand came to a conclusion that rewards and incentives had an important role in knowledge sharing and including such mechanisms would encourage employees’ attitudes towards knowledge sharing. Furthermore Bechina and Bommen point out that a knowledge worker is more likely to participate in knowledge management activities if recognized or even rewarded.

The Finnish team scored “Is knowledge sharing rewarded enough” as 1.9 and for the Chinese team 2.5. The Finnish team members thought that knowledge sharing was not rewarded enough, but only one attendee

selected possible reward to be a reason or a motivator for knowledge sharing. The Chinese team members were slightly more satisfied with rewarding, even though the team leader was not aware of official rewards or monetary benefits from knowledge sharing. Knowledge sharing has been a normal way to work for the Chinese team members since the beginning of their careers and they have a working knowledge sharing system, it is possible that the rewards in the answers might be related to the face gaining culture.

8.6.6 Time

To have dedicated time to do knowledge sharing is very important. It shows that the management considers knowledge sharing to be important for the company and thus a part of an employee's normal work related responsibilities. Knowledge sharing is time consuming and it helps if the employees are encouraged to use some part of their time to share knowledge. Whether the employees can use enough of their working time to share knowledge was asked, the answers are shown in Figure 16.

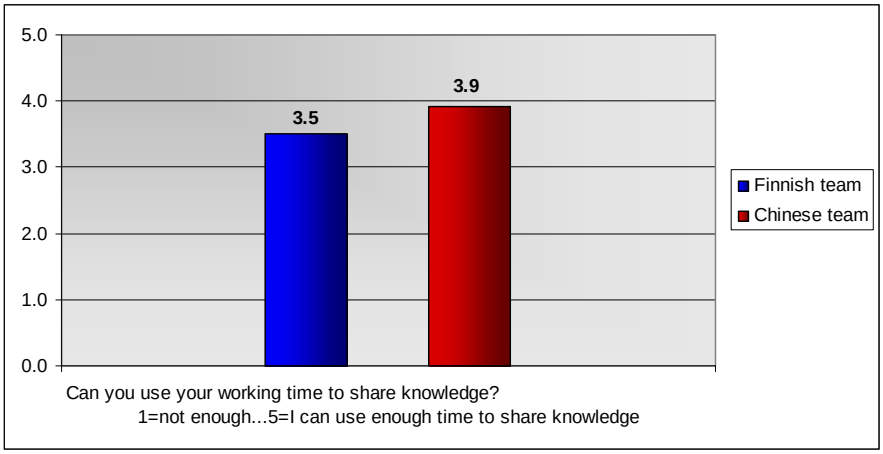


Figure 16. Time to share knowledge

People in both teams thought that they have at least some time to do the knowledge sharing, though the score in the Finnish team was lower (3.5) than the Chinese (3.9). The sharing of knowledge in Finland was not prohibited, but it was not encouraged either. Furthermore, there were no rules as to how much time team members can and should use for knowledge sharing and it was up to the team members own perception of the time usage and prioritization. This is related to the encouragement from the management and the supervisor. If the knowledge sharing is not seen as

an important part of an employee's daily work, there is no dedicated time to do it either.

8.6.7 Trust

Trusting the knowledge others have shared is an important issue. And also to trust that the knowledge shared is used in a proper way. A question, do you trust the knowledge others have shared, was asked. The answers are seen in Figure 17.

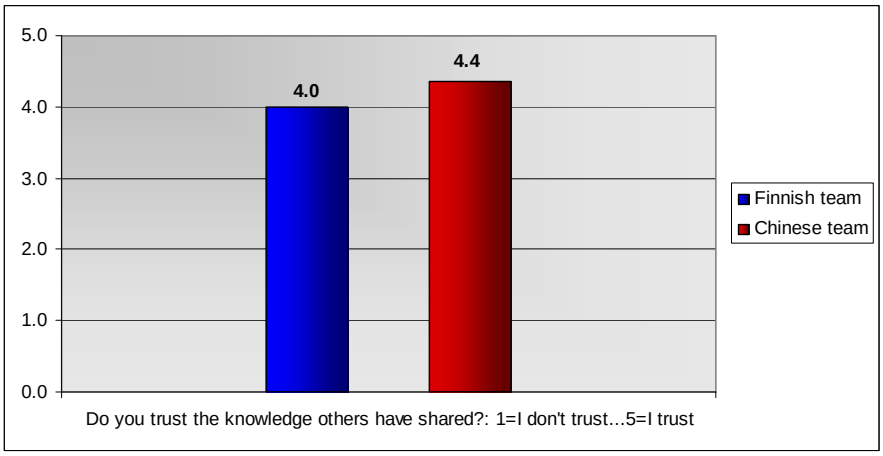


Figure 17. Trusting the knowledge that others have shared

Figure 17 shows that both teams generally trusted the knowledge stored in systems, the Chinese team trusted slightly more and this is natural as the team was receiving and using the knowledge more when compared to the Finnish team, and also having a lot less experience. The Finnish team practically did not use any knowledge from the Chinese team, since they were not even aware how the Chinese team shared knowledge and it was not possible to use the Chinese network drives in Finland. Thus the trust issue in the Finnish team is, at this stage, relevant only for the knowledge shared inside the local team and the local organization.

Some ideas on how to make the knowledge more trustful were pointed out in the questionnaire answers.

1. There should be a validation system for knowledge that is stored. It could be arranged so that the knowledge is checked, commented and confirmed by the supervisor or by other designers.

2. More explanation and order numbers or other basic data of solution should be written in and also what related instructions were used, because there is always a risk that the information becomes out of date (for example when the design rules have been updated).

3. Date when the information is added and the name of the contributor should be mentioned, this helps to contact the person if something needs to be clarified.

4. Official instructions should be made about the knowledge stored.

8.6.8 Conclusions on Findings of Knowledge Sharing

Technical support team members work is knowledge orientated. An employee must use personal insights and information from the systems and combine the knowledge with data from various sources to come up with the solution that he or she considers as the best for the customers problem. Every problem also has multiple solutions and it is up to the expert's personal view to make the choice.

The situation today in the case company is that the Chinese team is already ahead of the Finnish team in knowledge sharing, though the creation of knowledge sharing infrastructure has not been actively supported by the top management and the resources have been limited to an individual's personal interest on the subject. The reason why the Chinese team has a better system and a culture for knowledge sharing could be that the new team, with young people having a very limited work experience, still has enthusiasm and curiosity to develop the practices, improve the performance, gain personal knowledge and appreciation and learn more. They have also been encouraged to work together from the beginning and their team-culture has developed to the direction, where knowledge sharing will be a normal part of everyday work. The Chinese national culture of collectivism and gaining face also plays an important part in the knowledge sharing culture.

On the other hand the Finnish team has been working in the same way for a long period of time and does not see the possibilities in improving the situation or the benefits of sharing information, though discussions and conclusions during development days and employee satisfaction surveys reveal that knowledge sharing is one of the key points that needs to be

developed. Some attempts have already been made, but the resources have been limited and support from the top management has been quite invisible. Proposal for improved integration

The barriers to knowledge sharing can be categorized into seven factors based on the questionnaire replies of the Chinese and Finnish teams and the management interviews

The first barrier relates to the Technical platform. The teams found that there was no common platform that both of the teams could use, and this was the biggest barrier for knowledge sharing in the global context.

The second barrier relates to Finding the Information. This problem is basically a result of a missing common platform. And therefore the search for a global knowledge is practically impossible. Local information could be easily found in China, but not in Finland. The Chinese successfully use their own knowledge sharing system (Tientsin) to store and find knowledge, but in Finland the local system for knowledge sharing (PIEOhjeet) was seldom used and the knowledge was mostly stored in e-mails and network drives, thus hard to find.

The third barrier relates to Language. Codifying tacit knowledge in a foreign language is going to be equally challenging and time consuming for both teams, maybe a little more so for the Finnish team.

The fourth barrier relates to Encouragement and Culture. Knowledge sharing is not encouraged in Finland. The Finnish expatriate team leader has been able to create an atmosphere and a culture for the Chinese team, where the team members felt encouraged to share and use the knowledge. The same culture should be remained after the leadership is transferred to a local team leader and the same values, visions and ways of work could make the knowledge sharing to be reality in Finland as well.

The fifth barrier relates to Rewarding. Monetary rewards are not expected, but recognition in some form for knowledge sharing and re-using should exist.

The sixth barrier relates to Time. Team members were used to help, if somebody asked something, but there were no rules or dedicated time to perform knowledge sharing systematically.

The seventh barrier relates to Trust. Trusting the knowledge was not considered to be an issue, team members trusted that others would use the information in a right way and understand the context, furthermore the information that others had shared was generally considered to be trustful. This might be a barrier from the management point of view and there are some concerns on what knowledge can be shared and to whom.

Having now discussed the theory behind knowledge management and knowledge sharing, the findings from the interviews and questionnaire answers, the next chapter will present proposals as to how to improve the knowledge sharing between two technical support teams.

9 PROPOSAL FOR IMPROVED INTEGRATION

With the given barriers in mind, this study gives a few suggestions on how to improve the current situation in knowledge sharing between two globally dispersed technical support teams.

9.1 Practical Implications

Practical implications can be condensed into four categories which together with suggestions as to how to improve the current situation are presented in the following

Culture

By the examination of two teams, the Chinese and the Finnish, knowledge sharing has been identified as a cultural factor where the Finnish and the Chinese culture differ. Knowledge sharing culture exists in China but the culture in Finland needs special attention. According to the interview and questionnaire input, the culture in the Finnish team is more knowledge hoarding when compared to the Chinese team and people in the Finnish team do not see what the personal benefits of the knowledge sharing could be. It is possible that people think sharing the knowledge they posses might eventually cause harm to them. The culture in the Finnish team could be further studied to reveal the underlying obstacles for knowledge sharing. Kilman's framework could then be utilized:

- Surfacing actual cultural norms
- Articulating new directions
- Establishing new cultural norms
- Identifying gaps in cultural norms
- Closing gaps in cultural norms

Wenger's, McDermott's and Snyder's (2002) model of the short- and long-term benefits for organization and community members in Table 4 can be used to explain the team members why to share and re-use knowledge. The Finnish team understands that knowledge sharing can help to improve the

ABB performance and this should be used as a main argument to support the culture of knowledge sharing. Showing the people that knowledge sharing is the company's objective and will benefit the company and the teams in the long run and strong support from the management and having knowledge sharing on top in the meeting agendas will eventually change the attitudes and culture. It is recommendable that the Finnish team members, in addition to the official visits by the contact person, would visit the Chinese team and spend some time there working with the local team as a team member. This would help to build the necessary strong ties and make the knowledge sharing more effective. This could also help to transfer some of the Chinese cultural characteristics that have a positive influence towards knowledge sharing to Finland. Video meetings with both of the teams present in the local meeting rooms could also help to build the team spirit and these events could be used to point out the importance of team collaboration and serve as an additional forum for knowledge sharing.

Technology

The situation in knowledge sharing can be enhanced by integrating the systems so that the same practices will be utilized in both teams, this should be done before the teams drift too much apart from another. The current system that the Chinese team has developed is neither sufficient nor useable in the long run and it is not officially supported or used by the Finnish technical support team. This will only create more silos in knowledge sharing and it is not feasible to be expanded beyond the teams. Furthermore, as Microsoft SharePoint 2010 has been selected to be the global platform for the case company and it is a suitable for team collaboration, the technical support teams should select Microsoft SharePoint 2010 as their main platform for collaboration and knowledge sharing. If it turns out to be impossible to implement this, then the Chinese knowledge sharing system should be taken as a base platform to be improved and developed to serve as an official knowledge sharing tool for the teams. But this is not further discussed here since the assumption is that Microsoft SharePoint 2010 is going to be used

Microsoft SharePoint 2010

Every person in the team should create a personal site and people profile. Without this the information, much of the interaction that is the cornerstone of social computing cannot occur. This helps to create strong ties, since everyone can read something about each other and thus get to know them a little. When everybody lists their skills and expertise it is possible to leverage people search to locate subject matter experts. The Team Site must be created and it provides a site for Global teams to create, organize, and share information quickly and easily. It includes a document library and Web Parts that render lists such as announcements, calendar, member contacts, and quick links. It can be extended to provide additional facilities, such as team wikis, picture libraries, or even surveys. All the content from the Chinese local knowledge sharing system must be moved to this global platform as well as the content in the Finnish systems. Most of the content in the Finnish system is in Finnish and must be translated into English, and the same applies to the Chinese teams' information collected in Chinese.

Team sites are a central resource for the staff. While My Sites focuses on individuals to help them become more productive and publish the content they have created; team sites are spaces which encourage group collaboration and communication. The team can access information on individual or multiple sites, and "project managers" or "site owners" can manage permission access to sensitive project or team information. This means that information, to which a user does not have access, does not appear in the search results, so the user is not aware of its existence.

Incentives

Some of the literature and studies introduced in this thesis suggest that knowledge sharing should be rewarded with money or by other benefits, but some sources point out that recognition does not have to be in a monetary form.

The questionnaire answers give an impression that monetary rewards are not as important as one might think. The possibility to gain benefits by sharing knowledge is not seen as an important or motivating factor. But the sharing of knowledge should though be rewarded and recognized in other ways, this would also made it clear for all that knowledge sharing is what the

company wants. The rewarding should be team specific and have to be decided case-by-case. The Chinese team should have different measurements and rewards than the Finnish team and the measurement and rewards would to be updated regularly to enable the knowledge sharing to be constant and effective.

The Finnish team will be the team that shares the knowledge more than uses it, and the team members should be rewarded for their contributions. The knowledge is mostly tacit and it is a going to take time and efforts to share it. The knowledge sharing system does not yet exist and will be practically empty at the beginning and without the valuable content it will not gain the momentum among users. The key persons with the most knowledge should be identified and the incentives to support their knowledge sharing behaviour should have a special attention. The targets and measurement for knowledge sharing and re-using need to be introduced and this can be based on the number of actions (contributions and re-using) in the knowledge sharing system, combined with the evaluation of the value of the shared knowledge. This evaluation could be organized so that the people using the knowledge give grading for the usability and value of the knowledge, since they are the experts on the matter.

The Chinese team, which is still mainly using the knowledge instead of contributing, should not be rewarded with money. They can benefit from knowledge sharing by gaining more knowledge for themselves and adding their personal value for possible promotions or for other career objectives. They also have a strong need to be recognized as experts in their work community. This will motivate them to share the knowledge and re-use it, and the visibility and recognition for contributing and re-using the knowledge supports this behaviour. There could be a small story in the company newsletter or in the Intranet, where the best performers are introduced and this could be a source of an organizational and peer recognition. A good reward could be a trip to Finland to work for a few weeks with the Finnish team, this would also give face-to-face time with colleagues in Finland, a chance to update personal knowledge and be a source of a respect from peers in China.

The knowledge sharing and also re-using should be selected into the yearly targets for the employees in their Performance & Development Appraisal

(PDA's) and knowledge sharing and re-using must be measured as well. Also the link between knowledge sharing and direct benefits such as money saved or earned or indirect such as enhanced customer satisfaction or reduced cycle time should be measured, for example the number of the finished jobs in Machines Sales Support queue before the knowledge sharing system in operation and after could be one way of measuring. Knowledge management will cause some costs and it is important to show how it is linked to economic performance or how it gives a competitive advantage.

Resources

Team members need be trained to use SharePoint 2010 and all its features. The training for both teams should be organized and a possibility to ask help in urgent questions or problems should be provided to ensure that the technical platform is not going to be the bottleneck in knowledge sharing. It is not enough if the team leaders will be trained, but the people who do the daily work are the key, they need to be trained and motivated to share and re-use the knowledge.

At the beginning there could be dedicated resources to help the team members to share their knowledge and keep the people motivated. People have a lot of information stored in network drives, e-mails and personal books of knowledge and some people need help in translating the information into English. If the codification is too difficult and time consuming and there is no dedicated time to do it and sharing of the knowledge is not sufficiently rewarded, the efforts towards high quality content in the knowledge sharing system, thus value for the users and for the company, will diminish.

9.2 Managerial Implications

There are some issues that need managers' attention, actions and decisions. Nothing will happen overnight and a lot of work and patience is needed to get the desired results. Managerial implications can also be condensed into four categories and those are presented next.

Culture – knowledge sharing priority

A cultural change to support knowledge sharing for ABB Induction Machines Technical Support team needs to be established. The Chinese culture and especially the culture in this Chinese technical support team have the right ingredients to support the desired knowledge sharing patterns. In this point the Finnish unit should be paid special attention with what can be learned from the Chinese practice.

The national culture and individualism in Finland plays an important part when creating and redefining the knowledge sharing culture. People are open to share the knowledge with the people they have strong ties with, but to share the knowledge globally is another issue. The people might have concerns on how the sharing of their personal knowledge will affect their position in the company and will it possible endanger their jobs. Awareness building and pointing the positive aspects is important.

Strong support is needed from management to show the right direction and the importance of knowledge sharing across countries. The importance of knowledge sharing should constantly be brought up in the meetings. The new Chinese team leader should continue with the same patterns introduced by the Finnish expatriate team leader.

Technology decisions

Technology for knowledge sharing should be decided upon. This study recommends the use of SharePoint 2010 as the platform for team collaboration and knowledge sharing, because it can deliver the same features as described in the Siemens knowledge sharing case. SharePoint also has the scalability that is needed, if the knowledge of technical support teams is to be utilized more widely. It is decided on the behalf of ABB Global Web Management that the ABB Group will move on to SharePoint 2010 and the SharePoint system owner for ABB Finland suggested this to take place in Q3/2010 in Finland. The managerial efforts should be focused to enable the use of this system with technical support teams and to get the necessary training and constant support for the people in both teams. Furthermore, the Chinese team have concerns about the speed of access; this should be confirmed to be adequate to enable the smooth operation of the system in China.

Measurement

Knowledge sharing measurements need to be initiated and knowledge sharing should be set to be one of the targets in Personal Development Assessments (PDA). For example the amount of the finished jobs in the Machines Sales Support queue before the knowledge sharing system in operation and after could be one of the system performance measurements that also contain a link to the business targets. The number of contributions to knowledge sharing system and the re-using of the knowledge could be one of the personal knowledge targets for the employees. Through the measurements, a link between knowledge sharing, strategy and performance can be developed. Behaviour can be changed by setting the goal, changing the measurements and defining the rewards.

Funding and resources

A budget for resources should be decided to improve the knowledge sharing efforts. The codification efforts of the Finnish team should be rewarded and money is also needed to create strong ties and face-to-face contacts with the teams as the most effective steps to improve knowledge sharing on a permanent basis. Therefore budget for travelling and working abroad is needed and working in Finland would serve as a reward for the Chinese team members. Working in China is not considered to be a reward for the Finnish team members, but it would give new perspective for knowledge sharing and therefore it is recommendable that also the Finnish team members would spend some time in the Chinese premises. Knowledge sharing is time consuming and this is why the work of these communities of practice in terms of strategic priorities should be legitimized.

It might not be enough if the support is in the hands of an IT department. They can help with a number of technical problems, but the knowledge management on the team level could be organized differently. There could be a need for a dedicated resource, for example knowledge manager, whose responsibility is to motivate, support and help the people in the teams and also help the managers to set the most suitable measurements and incentives and follow up the progress of the knowledge sharing and be responsible for adjusting the systems according to the feedback from the field.

10 DISCUSSION

Senge wrote that seeing something from a distance is to understand what it really is, in his book about systems thinking on The Fifth Discipline (Senge 1994). It might be useful for every organization sometimes to stop for a while and think what the source of its competitiveness is now and what it will be in the future. Manufacturing of bulk products in Finland for global markets is probably never going to be as profitable as it is when outsourced to a lower cost country, or it will take a long time until the prosperity spreads enough and low cost countries will lose their grip of cheap labour. Though in some cases we have seen that China is already too expensive and manufacturing has been moved to a new lower cost country.

Creating new technical support teams, without having a clear instructions and codification of the work is difficult, furthermore offshoring the crucial asset is always a risk and if systems were not clear in the first place, and if there was no clear measurements, the offshoring becomes even more difficult. As Aron and Singh state, “what a firm doesn’t measure, it can’t offshore well” (2005: 138).

The source of a competitive advantage in technical support teams in this new global context is not only making the process lean, but also enabling the global utilization of the locally created knowledge. The case company has put a lot of effort into make the work on the factory floor efficient and cost effective and measuring the process performance as accurately as possible. But using the same techniques and principles to knowledge work is a new challenge.

Knowledge workers need to collaborate and share their visions and ideas with peers, this will make the knowledge valuable, thus inevitably enhance the process efficiency as well. This is where knowledge management is needed and the benefits come from more efficient use of time, because the answers to the questions that arise can be found faster. The quality of the answers will be more stable, because everyone has access to the same information. The solutions invented and used in one location can be replicated, thus avoiding the reinventing the wheel phenomenon. The case company has a broad base of skilled employees with a lot of knowledge and to leverage the scale of the company, a company wide knowledge sharing

system is a must. Knowledge management can be a source of a competitive advantage, which should not be underestimated.

It has been recognized in the case company that this is a time of tight budgets, cost cuts and savings; nevertheless it might also be a time to think how one could use the scale and knowledge embedded into the people in the company with even higher effectiveness. It is obvious that this cannot happen by itself, but a huge amount of work is to be done to change the culture and ways of work. This also means that resources have to be pointed and there has to be funding in place. In this point of view the timing is not favourable for a knowledge management project.

This study has given a proposal on how to keep two global technical support teams on the same level of knowledge, improve the sharing of knowledge and to improve the possibilities for each team to perform on a high level. It is practical to start a knowledge sharing system on a small scale and try it out with a small number of users. The obstacles are easier to tackle at the beginning and the needs for system development and also the needs of the user community can be closely monitored. In the long run, a working knowledge sharing system could help the organization to establish a culture that can be a source of a competitive advantage. The next step would be to define the knowledge sharing between R&D department and technical support teams and further expanding the use of knowledge platform across the case company's sales and marketing, design and R&D organizations.

People in the same domain (specialists in electrical or mechanical designing of induction motors) should be mapped quite soon and they should get involved in knowledge sharing and re-using through this common knowledge sharing system. In this way a network of experts (Community of Practice) can be created and as discussed earlier in this thesis, the number of individuals in these two teams is small and if the value of a network is to be increased, the number of the users on the network must be increased

Access to a knowledge sharing system could be given to the customers in some level as well; customers could easily find answers to the questions that have already been answered somewhere in the case company and also find additional information about the case company's products and services by themselves. Sales and marketing people could utilize the system by getting

quicker answers to urgent questions that take too long to answer through working queues, and this would make the information available for everyone and possibly avoid the situation where the wheel is being re-invented. This could also be used as a feedback channel towards designers, so that customers (end customers and sales office employees) could give feedback from projects and quotations they have received.

11 CONCLUSIONS

It was noticed that knowledge management is a human issue and it is the people who are the key for successful projects. Technology enables people to share their knowledge more effectively, but technology does not solve the problems in the minds of people. Therefore it would be up to the leaders to establish the desired practises in knowledge sharing.

The research question was:

How to share information and knowledge in multicultural collaborative networks.

The conclusion for improved information and knowledge sharing between two global teams is to concentrate first on the knowledge sharing platform. When that has been selected and functional the next step is to get people involved. In this case the Finnish team was the team that holds most of the knowledge and at first the knowledge sharing would be on their responsibility. Special attention should be placed on supporting the knowledge sharing culture in the Finnish team. The new team leader in the Finnish technical support knows how the successful knowledge sharing culture was created in China and the lessons learned from his expatriate period there can be utilized to create the same culture to the Finnish team. Strong ties between people are important and collaboration between teams helps to create a culture where trust exists and knowledge sharing can happen. Also resources and rewards to support knowledge sharing and re-using could be introduced. Measurements for knowledge sharing and re-using would help to define the rewards and link the knowledge sharing and performance of the teams.

For the company the benefits of this improved knowledge and information sharing lies in the enhanced customer satisfaction and reduced cycle time, because the answers to the questions that arise can be found faster. The quality of the answers will also be more stable, because everyone has access to the same information. The solutions invented and used in one location can be replicated, thus avoiding the reinventing the wheel phenomenon.

In the business world the companies' target is to grow and make more profit, which means that also new engineering teams might be needed in the near future and the current ways to work should be made more effective. When looking at the big picture, improved knowledge and information sharing helps if new global engineering teams are established and if the knowledge sharing system is expanded organization wide the benefits for the users and for the company will increase.

REFERENCES

ABB Intranet (2010). *ABB Inside BU India.* [WWW document] http://in.inside.abb.com/cawp/gad00539/0c7e8f00d91fe1f26525719a002a7aa8.aspx (Accessed 20 January 2010)

ABB Web (2010). ABB Web. [WWW document] http://www.abb.com/cawp/abbzh252/5f47d0088b5396dec125702a004c96b0.aspx (Accessed 8 April 2010)

Ahmed, P. K., Lim, K. K. & Loh, A. Y. E. (2002). *Learning through knowledge* management. Oxford: Butterworth-Heinemann. 324 pp.

Allee, V. (1997). 12 principles of knowledge management. *Training and development*. November. 71-74.

Allee, V. (2000). Knowledge Networks and Communities of Practice. *OD Practitioner*. Fall/Winter 2000. 1-15

Allee, V. (2003). *The future of knowledge: increasing prosperity through value networks*. Amsterdam: Butterworth-Heinemann. 294 pp.

Aron, R. & Singh, J. V. (2005). Getting offshoring Right. *Harvard Business Review.* December 2005. 135-143.

Bechina, A. A. & Bommen, T. (2006). Knowledge Sharing Practices: Analysis of a Global Scandinavian Consulting Company. *The Electronic Journal of Knowledge Management.* Vol.4(2). 109 – 116

Buckman, R. (2004). *Building a Knowledge Driven Organization*. New York, NY.: McGraw Hill. 264 pp.

Choo, C. W. (2002). *Information Management for the Intelligent Organization: the Art of Scanning the Environment.* Third Edition. Medford, New Jersey: American Society for Information Science and Technology (ASIS&T).325 pp.

Davenport, T. H., DeLong, D. W. and Beers, M. C. (1998). Successful knowledge management projects. *Sloan Management Review*. 39(2). 43-57.

Davenport, T. H. and Prusak, L. (1998). *Working knowledge. How organizations manage what they know.* Boston: Harvard Business School Press. 199 pp.

Graham, J. L. & Lam, M. N. (2003). The Chinese Negotiation. *Harvard Business Review*. October 2003. 82-91.

Hagel III, J. and Brown, J. S. (2010). *A Better Way to Manage Knowledge.* http://blogs.hbr.org/bigshift/2010/01/a-better-way-to-manage-knowled.html (Accessed 25 March 2010)

Hatch, M. J. (1997). *Organization theory: modern, symbolic, and post-modern perspectives*. Oxford: University Press. 387 pp.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values.* Newbury Park, CA: Sage.

Huang, Q., Davison, R. M. and Gu, J. (2008). Impact of personal and cultural factors on knowledge sharing in China. *Asia Pacific J Manage*. 451-471.

Jashapara, A. (2004). *Knowledge management: An Integrated Approach*. Edinbugh Gate, England: Prentice Hall. 324 pp.

Jeppesen, L. B. and Laursen K. (2009). The Role of Lead users in Knowledge Sharing. *Research Policy.* 38. 1582-1589.

Keisu, P. and Forss, K. (2010). *Global Technical Support Team and Technical Support Team Leaders Interview.* Helsinki. 22.1.2010.

Keisu, P. and Kytäjä, J. (2008). Internal Machinews. *Introduction of Global Technical Support.*

Kinnunen, E. (2010). *R&D Manager Interview.* Helsinki. 16.2.2010.

Miles, M. B. and Huberman, A. M. (1994). *Qualitative data analysis, a sourcebook of new methods.* Sage. Newbury Park, CA.

Müller, J. (2007). Global Exchange of Knowledge and Best-Practices in Siemens Building Technologies with 'References@SBT'. *Published in the Proceedings of the 2007 International Conference on Knowledge Management (Vienna, Austria, August 2007). World Scientific.* 55-64.

Patton, M. Q. (1999). Enhancing the Quality and Credibility of Qualitative Analysis. *Health Services Research*. 34:5 Part II (December). 1189-1208.

Rowley, J. (1999). What is Knowledge Management? *Library Management*. 20(8). 416-419.

Senge, P. M. (1994). *The fifth discipline : the art and practice of the learning organization.* New York, NY.: Doubleday/Currency. 423 pp.

Serrat, O. (2008). Managing Knowledge Workers. *Knowledge Solutions*. October 2008 (12). 1-3.

Vepsäläinen, H. (2010). *General Manager Interview.* Helsinki 19.2.2010.

Voelpel, S. C. & Han, Z. (2005). Managing knowledge sharing in China: the case of Siemens ShareNet. *Journal of Knowledge Management*. Vol 9(3). 51-63.

Voelpel, S. C., Dous, M. and Davenport, T. H. (2005). Five steps to creating a global knowledge-sharing system: Siemens's ShareNet. *Academy of Management Executive*. Vol 19(2). 9-23.

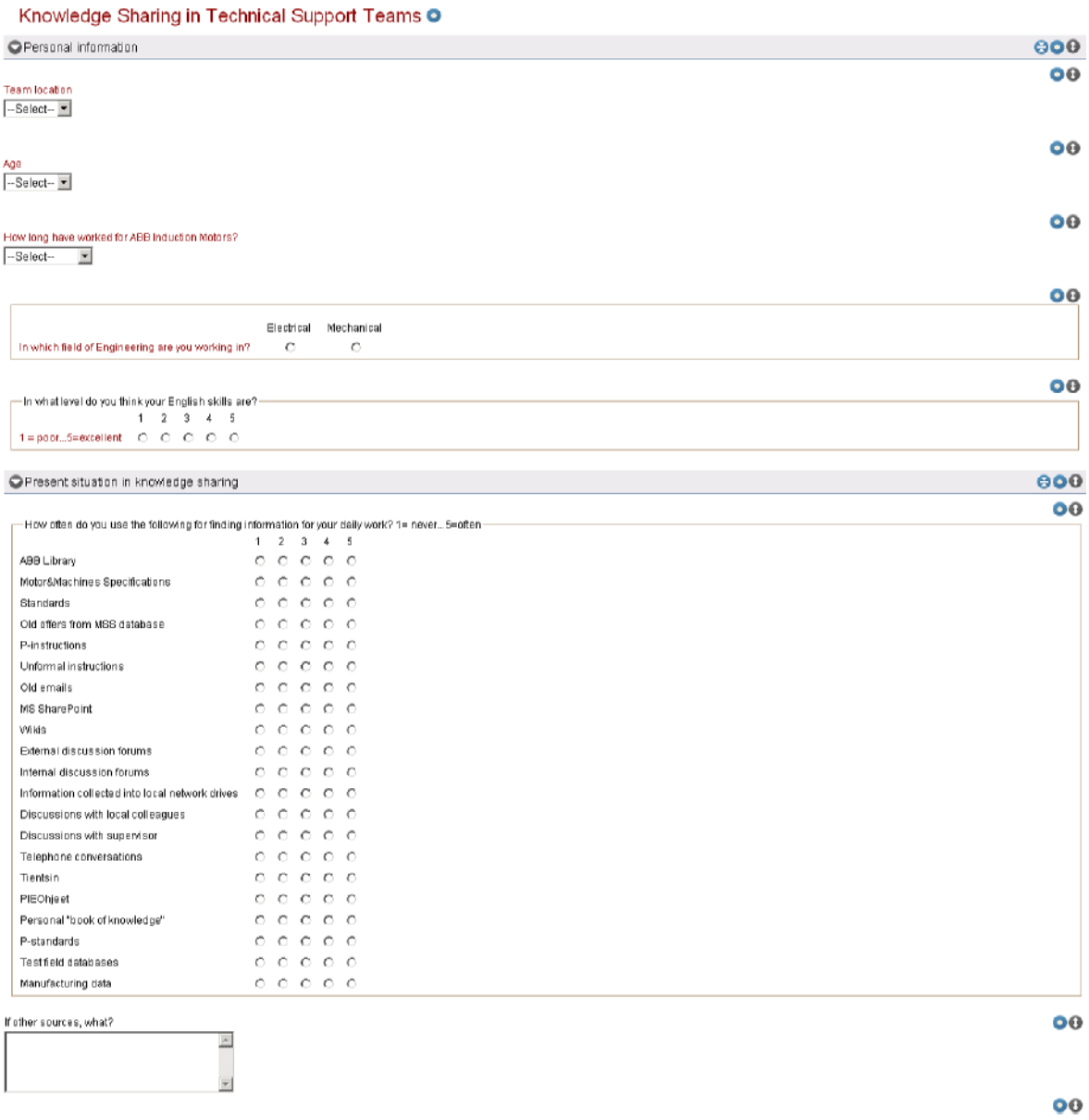
Wenger, E. (2001). Organically grown. An interview with Ruth Palombo Weiss. *T+D Magazine*, June Issue. 40-42.

Wenger, E., McDermott, R. & Snyder, W. M. (2002). *Cultivating communities of practice : a guide to managing knowledge.* Boston, MA.: Harward Business School Press. 284 pp.

Wenger, E. (2004). Knowledge management as a doughnut: shaping your knowledge strategy through communities of practice. *Ivey Business Journal*. January-February. 1-8.

Yin, R. K. (2002). *Case Study Research*. Volume 5. Newbury Park, CA: Sage. 181 pp.

Questionnaire to technical support teams



Knowledge Sharing in Technical Support Teams

Personal information

Team location
--Select--

Age
--Select--

How long have worked for ABB Induction Motors?
--Select--

	Electrical	Mechanical
In which field of Engineering are you working in?	○	○

In what level do you think your English skills are?

	1	2	3	4	5
1 = poor...5=excellent	○	○	○	○	○

Present situation in knowledge sharing

How often do you use the following for finding information for your daily work? 1= never... 5=often

	1	2	3	4	5
ABB Library	○	○	○	○	○
Motor&Machines Specifications	○	○	○	○	○
Standards	○	○	○	○	○
Old offers from MSS database	○	○	○	○	○
P-instructions	○	○	○	○	○
Unformal instructions	○	○	○	○	○
Old emails	○	○	○	○	○
MS SharePoint	○	○	○	○	○
Wikis	○	○	○	○	○
External discussion forums	○	○	○	○	○
Internal discussion forums	○	○	○	○	○
Information collected into local network drives	○	○	○	○	○
Discussions with local colleagues	○	○	○	○	○
Discussions with supervisor	○	○	○	○	○
Telephone conversations	○	○	○	○	○
Tientsin	○	○	○	○	○
PIEChjeet	○	○	○	○	○
Personal "book of knowledge"	○	○	○	○	○
P-standards	○	○	○	○	○
Testfield databases	○	○	○	○	○
Manufacturing data	○	○	○	○	○

If other sources, what?

Do you use the following to share information?

- [ ] Chat
- [ ] Sametime
- [ ] Email
- [ ] Internal knowledge databases
- [ ] Global knowledge databases
- [ ] Discussion forums
- [ ] Wikis
- [ ] Local network drive

f you use something else to share information, what?

lease discripe how and where you store knowledge

In which language is the knowledge and information stored?

- [ ] Chinese
- [ ] Finnish
- [ ] English

Have you had a situation where you were able to finish the job because of the information found from knowledge systems?

	1	2	3	4	5
1=never...5=often	○	○	○	○	○

Have you been able to finish the job faster because of the information found from knowledge systems?

	1	2	3	4	5
1=never...5=often	○	○	○	○	○

Have you encountered a situation, where you know that the information is somewhere, but you can not get it?

	1	2	3	4	5
1=never...5=often	○	○	○	○	○

Have you been unable to finish the job, because you can not find the information needed?

	1	2	3	4	5
1=never...5=often	○	○	○	○	○

How well you know how other support teams are sharing knowledge?

	1	2	3	4	5
1=Not at all...5=very well	○	○	○	○	○

Is it easy for you to find knowledge stored by local support team colleagues?

	1	2	3	4	5
1=Impossible...5=very easy	○	○	○	○	○

Is it easy for you to find knowledge stored by other support teams?

	1	2	3	4	5
1=Impossible...5=very easy	○	○	○	○	○

Importancy

Is the knowledge sharing supported by your supervisor?

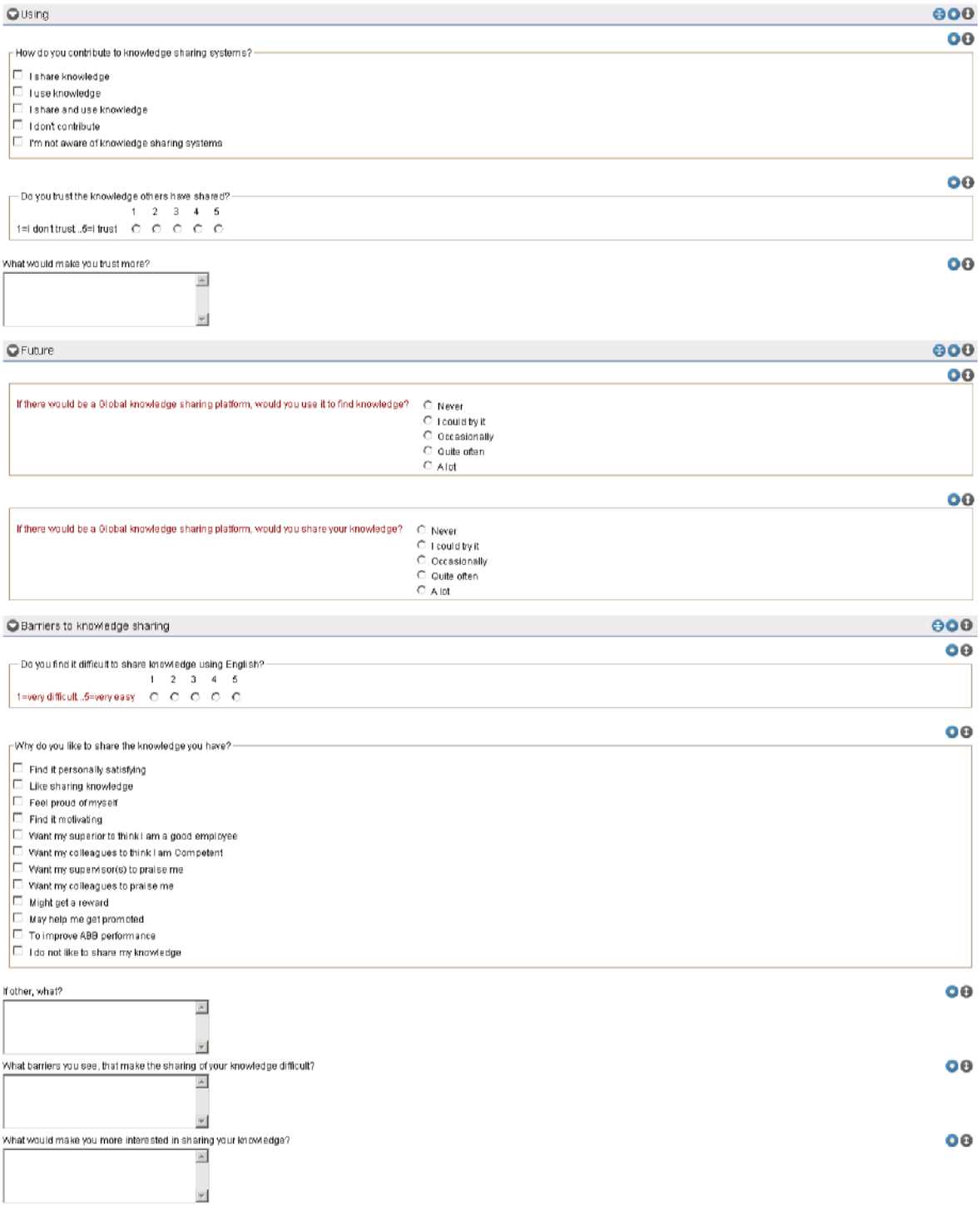
	1	2	3	4	5
1=not sufficiently...5=very well	○	○	○	○	○

Can you use your working time to share knowledge?

	1	2	3	4	5
1=not enough...5=I can use enough time to share knowledge	○	○	○	○	○

Is knowledge sharing rewarded?

	1	2	3	4	5
1=Not rewarded...5=Rewarded enough	○	○	○	○	○



Using

How do you contribute to knowledge sharing systems?

- [ ] I share knowledge
- [ ] I use knowledge
- [ ] I share and use knowledge
- [ ] I don't contribute
- [ ] I'm not aware of knowledge sharing systems

Do you trust the knowledge others have shared?

	1	2	3	4	5
1=I don't trust..5=I trust	○	○	○	○	○

What would make you trust more?

Future

If there would be a Global knowledge sharing platform, would you use it to find knowledge?

- ○ Never
- ○ I could try it
- ○ Occasionally
- ○ Quite often
- ○ A lot

If there would be a Global knowledge sharing platform, would you share your knowledge?

- ○ Never
- ○ I could try it
- ○ Occasionally
- ○ Quite often
- ○ A lot

Barriers to knowledge sharing

Do you find it difficult to share knowledge using English?

	1	2	3	4	5
1=very difficult..5=very easy	○	○	○	○	○

Why do you like to share the knowledge you have?

- [ ] Find it personally satisfying
- [ ] Like sharing knowledge
- [ ] Feel proud of myself
- [ ] Find it motivating
- [ ] Want my superior to think I am a good employee
- [ ] Want my colleagues to think I am Competent
- [ ] Want my supervisor(s) to praise me
- [ ] Want my colleagues to praise me
- [ ] Might get a reward
- [ ] May help me get promoted
- [ ] To improve ABB performance
- [ ] I do not like to share my knowledge

If other, what?

What barriers you see, that make the sharing of your knowledge difficult?

What would make you more interested in sharing your knowledge?