



SCHOOL OF ECONOMICS
AND MANAGEMENT
Lund University

Department of Business Administration
Master Thesis

Project: **Knowledge**

A two-sided perspective on
knowledge transfer & knowledge creation

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Preface

Reaching our goal, our study started off on a rough path with deliberations on which view point to choose and proceed from. Well chosen, the work flow has proceeded along the natural way with interesting findings that has led us on the right pathway. Though, we could not have reached the same results without the help of several entities.

Primarily, we would like to thank our main case company, along with the three mirror companies, who provided us with essential information. We also wish to thank our advisor Leif Edvinsson, who through the progressive development of our study has given us support, advice and guidance for us to succeed with our writing. Furthermore, our advisor assisted us in providing necessary contacts of prominent researchers today through the incredible amplexness of his personal network.

Lastly, we would also like to give our appreciations to each other. The composition of our three different mindsets has brought this master thesis to new heights through discussions for alignment, encouragement and words of wisdom in pressed situations to reach a further depth in the analysis. The strength of a tight and cohesive group has filled this period with interesting, meaningful discussions and worthwhile insights.

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Sammanfattning

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Handledare:	Leif Edvinsson
Nyckelord:	Knowledge transfer, Knowledge creation, Intellectual capital, Project-based organisations, High-tech industry
Syfte:	Vårt syfte är att förstå och beskriva hur ett projektbaserat, kunskapsintensivt företag i den högteknologiska branschen skapar och överför kunskap, sett från två perspektiv.
Metod:	Vår kvalitativa fallstudie har en explorativ karaktär, då tidigare studier inom vår exakta positionering är frånvarande, vilket gör att vi använt en abduktiv ansats. För att få mer underlag till vår studie har vi undersökt tre andra företag för att spegla dessa mot det empiriska underlag vi utvunnit från vårt fallföretag.
Teoretiska perspektiv:	Vi ser en klar distinktion mellan olika forskare som antingen ser kunskap som ett objekt eller som en process. Vi redogör därför för teorier, som antingen fokuserar på skapande eller överföring av kunskap, inom båda perspektiven. Dessutom går vi igenom teorier för KM i projektorganisationer.
Empiri:	Uppsatsen utgår från empirin som består av information som vi fått fram genom sex intervjuer med medarbetare på vårt fallföretag samt två intervjuer på vart och ett av våra tre ”spegel-företag”.
Slutsats:	Uppsatsen kommer fram till att KM ses från båda perspektiven i alla fyra företag. Genom detta finner vi implikationer för hur vårt fallföretag skulle kunna fortskrida med KM i framtiden.

A bstract

-
- Title:** Project: Knowledge. A two-sided perspective on knowledge transfer & knowledge creation
- Seminar date:** Thursday, June 7, 2007
- Course:** Master thesis in Business Administration (15 ECTS), major in Strategic Management
- Authors:** Lisa Bogentoft, Charlotte Carlin & Maria Sundin
- Advisor:** Leif Edvinsson
- Key words:** Knowledge transfer, Knowledge creation, Intellectual capital, Project-based organisations, High-Tech industry
- Purpose:** Our purpose is to describe and understand how a project-based, knowledge-intensive firm in the high-technology industry creates and transfers knowledge, seen from two perspectives.
- Methodology:** Our qualitative case study has an explorative approach since earlier studies within our positioning are absent, thus we look at KM abductively. To gain more depth to our study, we mirror our findings from our case company with data collected from three additional organisations.
- Theoretical perspectives:** We see a clear distinction between researchers, either seeing knowledge as an object or a process. Thus, we review theories from both sides, either focusing on the creation or transferring of knowledge. In addition, theories on KM in project organisations are accounted for.
- Empirical foundation:** The study is based on the empirical foundation which consists of the data received through six interviews with employees at our main case company and, additionally, two interviews at each of our three mirror companies.
- Conclusion:** The study found KM being seen from both perspectives in all four firms. Through this, we found implications for how our case company could proceed in the future.

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1 Introduction

Knowledge - This ambiguous concept has conquered the western business world but no one can really define or understand it. Still, this has not stopped people from trying. But, really, will we ever reach a unified view of what knowledge is? And is that really what we hope to accomplish?

1.1 Background

Many authors have acknowledged the shift from the early half of the 20th century's industrial economy to the knowledge economy of today (Alvesson, 2004; Due, 1995; Drucker, 1993 & 1969; Bell 1974). People in Western Europe and North America today generally have a higher level of education than before and many work tasks nowadays involve more knowledge than manual labour. The use of knowledge has come to be seen as something which produces substantial economic benefit for organisations. Previously important factors of production, like land, labour and capital, have become secondary in the sense that they are, to a large degree, dependent on knowledge. Accordingly, provided there is knowledge, these other factors become more obtainable. The significance of knowledge in organisations has been shaped by a shift in the general environment in which firms operate. Globalisation is a key contributor, alongside substantial and high-speed developments in technology. Thus, knowledge has become the most essential production factor contributing to the wealth of nations today. (Dean & Kretchmer, 2007; Drucker, 1993)

This claimed importance of knowledge brings along an emphasis on reviewing outdated ways of working. Organisations that earlier were considered manufacturing companies, now highlight other parts of the organisation as their core business. In business society today, more emphasis is placed on R&D departments and many organisations single out their employees as their biggest competitive advantage (Alvesson, 2004; Bartlett & Ghoshal, 2002). Hence, knowledge, knowledge management (KM) and intellectual capital (IC) have become popular areas of research, although there have been several contesting definitions of these concepts (Alvesson & Kärreman, 2001).

Knowledge is found in all organisations, but the significance of knowledge is pretty much dependent on the firms' claims of being knowledge-intensive or not. As a result, some businesses are considered more knowledge-intensive than others and one example of this is the

high-technology industry. High-tech organisations are often characterised by highly qualified individuals with a high degree of autonomy (Alvesson, 2004). Since knowledge quickly become obsolete in this highly dynamic industry, it is important to not just acquire knowledge but to also create and transfer knowledge (Rogers, 2001).

1.2 Problem discussion

1.2.1 Intellectual Capital

Knowledge intensive companies must take many matters into account while striving toward effective performance. One way to improve effectiveness in performance is to look at the intangible assets. According to Edvinsson (2005), IC is the parallel to financial value and is created by people interacting (human capital) with for instance R&D processes (organisational capital). He further states that, without investments in intangible assets, innovation will not take place (Edvinsson, 2002). The theory of IC has been around for years in practise as a form of common sense. It is today a fact that most knowledge-intensive firms have a higher value than what is shown on their balance sheets (figure 1.1). That the market value exceeds the book value has earlier been disregarded in accounting. Although valued at zero on the organisation's balance sheet, important assets are the underlying cause of high market values. These assets have earlier been thought of as too subjective to measure and it has been taken for granted that they would eventually turn into something that can be fitted into the traditional accounting systems. Recently, several authors have recognised the need for these assets to be estimated and valued (Marr et al, 2003; Edvinsson, 2002; Edvinsson & Grafström, 1998; Edvinsson & Malone, 1997; Roos et al, 1997). Balance sheets do not display an organisation's history, traditions and philosophy (Edvinsson & Malone, 1997). Consequently, in the knowledge economy of today, it has become clear that 21st century concepts of value can not be accurately understood through 15th century techniques (Edvinsson, 2002). Firms often ignore their history, leading them to repeat mistakes, when only looking at traditional finance and accounting. If organisations could effectively manage their IC it could aid them in building corporate memory. (Edvinsson & Grafström, 1998)

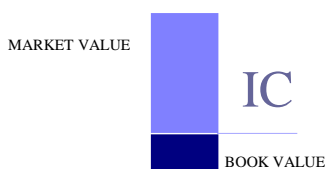


Figure 1.1 Definition of intellectual capital. Edvinsson & Grafström, 1998; p25

Management of intellectual capital

In order to obtain value and competitive advantages, organisations need to manage their IC effectively. Marr et al (2003) provides a five-step model for effective management, starting with the identification of key IC resources followed by the visualisation of the impact of resources on organisations. The third step is to develop performance indicators to measure if assumptions that have been made are accurate. The next step, to cultivate, nurture and extend the IC, is where KM comes into play. KM is said to be the tool which allows organisations to preserve and develop their IC. When successfully implemented, KM contributes to the growth of IC. The last step in the IC management model is internal and external reporting of performance. (Marr et al, 2003)

It is clear that successful IC management is contingent upon effective KM. KM is viewed as a key concept in IC management, which is why we find it interesting to continue this study focusing on KM.

1.2.2 Knowledge Management

In 1995, researcher Midler acknowledged a growing transition towards project-forms in many industries, which have led to fundamental changes in the way companies organise and develop processes and products. In the past several years, project-based forms of organising have mounted in attention due to the outlook on projects as being fast and flexible, leading to an effective organisation of intellectual resources and special competencies (Atkinson et al, 2006; Sapsed et al, 2005; Sydow et al. 2004; DeFillippi & Arthur 1998; Hobday 1998; Midler, 1995). Both in the companies' strategies and on an operational level, the usage rate and the importance of projects have increased; typical examples are product development and system development projects. (Söderlund, 2002)

Projects in high-tech organisations result in several outputs, the most obvious being the actual product or service developed. In addition to this intentional output, projects result in knowledge, specified into three types: technical knowledge (partly existent in the product), procedural knowledge and organisational knowledge. These types of knowledge concerning, among other things, communication and collaboration in projects is perhaps not intentional but still a reality that needs to be recognised. Consequently, efficient KM is required in order to enable project organisations to learn from their experiences. (Kasvi et al, 2003)

In practise, there are a number of problems within the area of KM and the following difficulties could be the reasons why some project organisations choose to disregard KM.

The problem of sharing knowledge in projects

Ruuska & Vartiainen (2005) discuss problems occurring when transforming or sharing knowledge. One problem is how to prevail the “reinvention of the wheel”, in other words, how to preserve the knowledge from one project to another (Ruuska & Vartiainen, 2005). Since projects consist of temporary constellations of people, a lot of the knowledge acquired within a project is dispersed when the project ends. In addition, during the time it takes for a project to reach its finish line, the initially obtained knowledge has changed along with some of the original project members. (Kasvi et al, 2003) A secondary problem that reveals itself here is how to keep the communication among project members of dissolved or completed projects in order to keep learning. (Ruuska & Vartiainen, 2005)

There is also a problem of motivating the employees to actually share the knowledge they possess. There is a cost involved for the person sharing information and knowledge with others and, normally, a person will not give away information without expecting something in return. This “price” is influenced by several factors, for example how important knowledge sharing is for the employee’s own goals, for the group goals, for his own recognition or for his own learning. Thus, the organisation must consider these trading aspects, when establishing an environment that encourages knowledge sharing. (Barachini, 2007)

Problems with knowledge sharing can also be influenced by the attributes of the work itself. Knowledge work can be too focused, which can result in the project-team ignoring surroundings of the project. Also, if the work has to be done fast the time to stop and reflect over what is learned and to document the experiences diminishes. (Sydow et al, 2004) Project members working with fast-moving tasks do not always have the time or motivation to write down detailed reviews. This results in a loss of knowledge from the beginning of a project and only the process and the end-product are documented (Kasvi et al, 2003). Finally, autonomy in work can result in that individuals or project teams store knowledge which becomes inaccessible for members in other projects and for the firm in general (Sydow et al, 2004). Autonomy and empowerment also leads to knowledge fragmentation when projects are completed (Jarvenpaa & Ives, 1994).

The problem of dependence on key personnel

Since knowledge in the company often is the future contingency for success (Edvinsson, 2002), an important task for most knowledge-intensive organisations has to be to enable the employees to improve their knowledge and competencies. In this way the organisation strengthens their human capital. However, organisations have to avoid getting too dependant on their employees who retain special competencies, as the possibility that they change jobs is always present. (Edvinsson & Malone, 1997) This paradox goes along with the fact that organisations need to

offer their employees personal development in order to compete with other employers in hiring the most qualified people, but still not make the employees too attractive to other potential employers (Larsen, 2006).

The problem of converting human capital to structural capital

Keeping in mind the terms mentioned above concerning IC, while reflecting over the practical problems just discussed, it is easily recognised that these problems basically come down to two things. The first is the challenge of converting human capital into structural capital. Human capital is dependent on the physical and psychological health of the employees. Consequently, human capital must rest, can have a bad day and can only be in one place at a time. And of course, there is the risk that the employees choose to leave the organisation. On the contrary, structural capital is available 24 hours a day and is accessible for a lot of people and in different places at the same time. Therefore, it is of immense importance to the company, to convert as much of the human capital as possible into structural capital. That one plus one becomes two is not satisfying the companies of today. Through the systematic transformation of employees' knowledge into structural capital, organisations can obtain a multiplying effect that makes it possible to reach results far beyond the equation. (Edvinsson, 2002)

The other challenge is to transfer the human capital from one employee or project to others. In order to decrease dependence on certain employees, management must create a setting where this type of face-to-face knowledge transition is possible (Nonaka, 1994).

As a result, effective KM is needed in high-tech, project-based organisations. Managing human and structural capital in the best possible way brings the benefits of a steeper learning curve, costs savings by recycling structural capital and new value creation through novel connections and combinations (Edvinsson & Malone, 1997).

1.2.3 Knowledge as object or process

There are large differences in people's perceptions and ways of thinking according to history, culture, religion and traditions. People even observe, conceive and perceive the world differently depending on social structures, ecology, educational systems and philosophy (Andriessen & van den Boom, 2007; Nisbett et al. 2001). Within the area of IC and KM, studies have further shown results of fundamental differences in the ways to conceptualise knowledge, both in IC theory and in IC practise when it comes to East and West (Andriessen & van den Boom, 2007; Zhu 2004).

When people speak about East and West, many countries come to mind. Here, we will use a simplified definition of the two cardinal points and define them as Asia and United States of

America. However, within the Asian continent several distinct religions flourish, which is why the Eastern part can be seen from three spectra of religious angles:

- The Hindu & Buddhism view on knowledge originates from India with its strong belief in human consciousness.
- The Confucian philosophy and its outlook on knowledge is that knowledge exists in action and shows itself in the ways of moral action.
- The Islamic angle on knowledge is that it derives from a higher power above, not idealistic, and can to a greater extent be searched in the conscious actions of a human being. (Andriessen & van den Boom, 2007)

Put together, the Asian outlook on knowledge claims to be a truth of the human being with its knowledge and actions as a base. The religious, cultural and traditional functions strongly influence and dominate these thoughts and perceptions. Thus, knowledge seen from an Asian point of view is about the human being concentrating on the self, meaning to be aware of motivation and inner drives. The Asian perspective talks about “the unity of being”, which is interpreted as knowledge being a part of reality. This is partly to increase the interactions with others and the surroundings, and partly to obtain deeper knowledge. Through these social interactions between individuals, the group, nature and the social context, the dynamic and lively *process, that is knowledge*, is created (Andriessen & van den Boom, 2007).

On the contrary, the Western philosophy is more separated from the religious, traditional sphere, and philosophy and religion are two diverse dimensions. The Western conceptualisation of knowledge unfolds itself in metaphors, such as instrumental and is seen as an organisational resource. Organisational words used to express this objectified phenomena are “store”, “to use”, “make use of”, “to measure” (Zhu, 2004). All resources are referred to in the same way; as “more” or “less” of a certain resource even when it concerns knowledge as such. Subsequently, *knowledge is objectified* (Andriessen & van den Boom, 2007).

Knowledge seen from a western angel can be further divided into three sub-divisions of resource perspectives:

- Knowledge as capital
- Knowledge as information
- Knowledge as thoughts and feelings

Western philosophy takes a stand in explicit knowledge either as a subject or an object and holds an *analytical* approach (Nisbett et al, 2001) to understand the behaviour. The Eastern viewpoint on tacit knowledge is on the other hand based on the unity of both the subject and object and it encloses a *holistic* outlook (Nisbett et al, 2001) on the thought process.

However, there are some restrictions to the possibility of drawing conclusions on the basis of this comparison, as the supply of developed theories constructing the Asian perspective is undersized and not complete. It may be problematic to apply Western theories within IC and KM on Asian businesses as it is of high importance to take the local Asian knowledge stance and perspective into account. Conversely, the Asian approach can contribute with information and also development of knowledge based theories and the practical performance of knowledge.

1.3 Positioning

KM is evidently a growing area of interest in the world today and the search continues in many companies after the Holy Grail in management success as organisations today need to be smarter, more innovative and more agile (Wheatley, 2002). In the western parts of the world there has been an increase in information and interest regarding KM, in contrast to the eastern parts where KM is in a growing developing phase (Andriessen & van den Boom, 2007). In addition, looking at project management, this is an area with mounting attention and interest (Sydow et al, 2004; Hobday, 1998). Even though KM should have a big role in project related situations, this area of practise is still largely underdeveloped in relation to the boost of project organisations (Kasvi et al, 2003). The lack of KM in practise might be explained by the problems related to the divergent theories that exist in this area.

Many researchers look upon knowledge from either a Western or an Eastern perspective (Andriessen & van den Boom, 2007; Zhu 2004; Nisbett et al, 2001) and, as we will show later, these perspectives are fundamentally different from one another. Other authors concentrate on how to accelerate learning and understanding of knowledge (Alvesson & Kärreman, 2001; Senge, 1993). They view the KM challenge as two sided; either as generative, creation of new knowledge, or as adaptive, transfer of knowledge. However, fewer studies have been made on practical cases concerning a specific industry area and organisational form, with both perspectives as a basis, which is why our interest awoke for exploring these theories in a real environment.

The research by Lytras & Pouloudi (2003) is positioned quite close to our study and they have looked into project organisations and KM effectiveness. The study resulted in a formulation of a KM model which concludes that, in all projects, each team uses both tacit and explicit knowledge. We believe this model, like all models, is a simplification of the reality, why we have decided to focus on these concepts to investigate how the two dimensions relate to one another and to what extent a project makes use of each dimension.

The study made by Kotnour (2000) is closely positioned to the study above, as they discuss knowledge creation, knowledge transfer and knowledge application in project-organisations. We found that the study is bordering on our edge and it has been an inspiration and guide in our research, although it derives from a Western (object) perspective and is conducted through quantitative methods. We, on the other hand, will use a qualitative methodology, as well as a broader perspective where both the Western (object) and the Eastern (process) perspective will play an equal role.

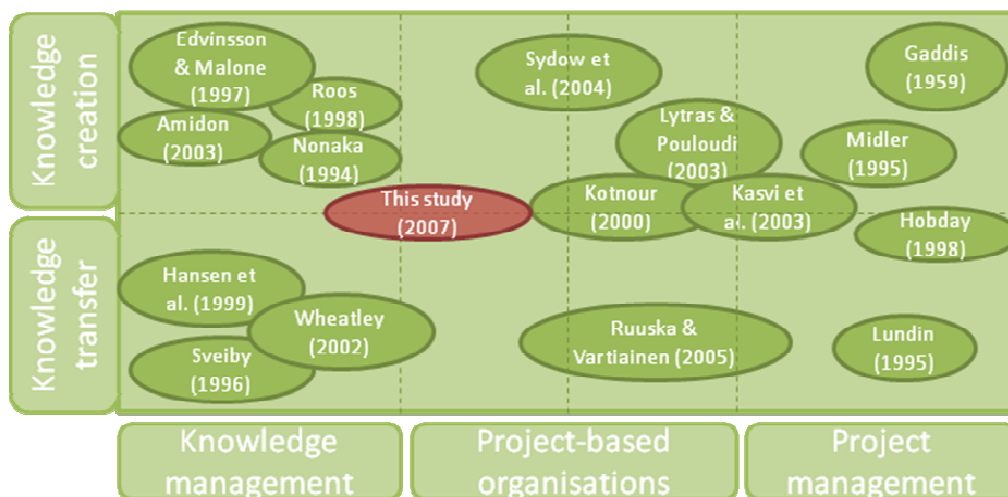


Figure 1.2 Positioning of this study.

1.4 Purpose

Our purpose is to describe, understand and mirror how a project-based, knowledge-intensive firm in the high-technology industry creates and transfers knowledge, seen from both the object and the process perspective.

1.5 Problem definition

How is KM being handled in the chosen project-based case company? Do they focus on knowledge creation or knowledge transfer? Do they derive from a view of knowledge as an object or a process? In reflection of other players in the business, could KM be handled differently?

1.6 Delimitations

In this study, we will not define project management, only KM in project-based organisations. The study has its focus on knowledge transfer and knowledge creation why we will not define any other dimensions possible for consideration.

We do not aim to compare our chosen case company to the other three companies; they are used as a reflective mirror on the main study object.

1.7 Disposition

In order to clarify our thoughts throughout the study and to make sure we are consistent in our writing and study perspective, ensuring natural transitions, holistic view guided through a solid red thread. The need for structure in an essay is of high importance as it is possible to concretise thoughts as well as to provide a clarified overview. To follow a structure can improve the ability to cause thoughts and content to develop. (Backman, 1998)

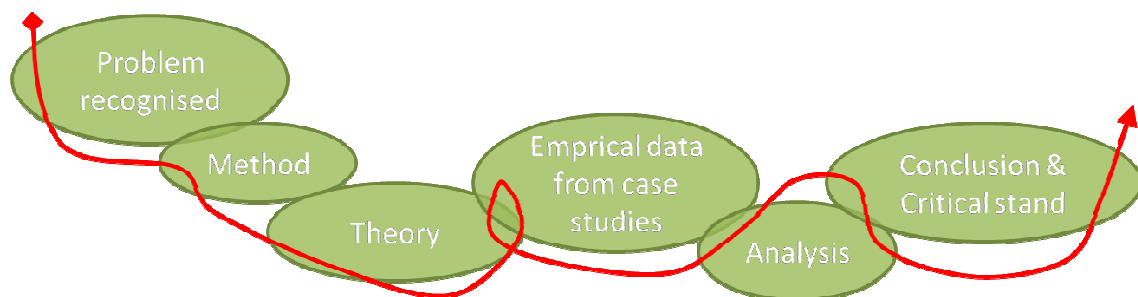


Figure 1.3. Disposition of this study - the figure above shows our thought and structure for the study.

We have started by presenting a background to the area being studied. Further we have accounted for recognised problems within the field, found a gap of knowledge in order to formulate a clear purpose for the study. We have in the next part accounted for how we proceeded when conducting our study and showed a critical awareness towards our ways and results. The theory chapter is constructed on four theories divided into the two perspectives, object (west) and process (east). Next, we have presented the empirical data with main focus on the case company CC and the mirror companies are marked with italic text. The analysis has been divided in the same way as the theoretical chapter, by the two perspectives which make it easier for the reader to follow. The conclusive part consists of a discussion and a further statement of the focal aspects we have concluded from the case study and a further deliberation on the future. Lastly, the red thread is the glue of our perspective that holds all the parts together.

2 Methodology

In life, people make certain assumptions. They generalise because they have to. For example, to be able to get into my car and drive I have to assume that everyone else, who I will meet in traffic are sober and capable of driving. Otherwise I would spend too much time judging every single driver, wondering if I am in for an accident.

2.1 Pre-comprehension of the study

Our interest in knowledge management (KM) derives from the fact that we have previously been enrolled in various courses related to this area. We acknowledged the fact that knowledge and KM are ambiguous concepts that are highly individualised, dependent on organisation, work ways and employees. In earlier studies, we have come across examples of high-technological companies managing human capital and knowledge in different ways, hence our interest developed for understanding how to create and transfer knowledge efficiently in a project organisation. We believed that the four organisations in our study, although all of them being knowledge-intensive, had different views on knowledge and how to manage knowledge. When performing this study we tried to use our pre-comprehension regarding the case companies, theories on KM and epistemological and ontological directions in relation to the new inputs we obtained.

2.1.1 Epistemology

In order to perform a well-founded study, it is important for the researchers to understand their own view of research and the research object. Our epistemological view is that studies of social sciences, like our study, are fundamentally different from those of natural science, and therefore require other approaches when studied. This view is called interpretivism and has several directions, like phenomenology and symbolic interactionism (Bryman & Bell, 2003). However, the direction within interpretivism, which we found most similar to our epistemological view, is hermeneutics.

In hermeneutics, the role of the researcher is open, subjective and involved. This approach dates back to the 15th century, when people started interpreting bible texts. The researcher is impacted by her own thoughts, feelings, impressions and previous knowledge. This pre-comprehension is

considered an asset, as opposed to a problem, as it is regarded as an important tool in the researcher's reflection and interpretation. A central aspect of hermeneutics is the so called hermeneutic circle, which rests on the belief that a part can only be understood when put into its whole and vice versa. Text, interpretation and understanding should be followed by new texts, new interpretations and new understandings, where there is no clear or predetermined endpoint. (Patel & Davidsson, 1994) Throughout the study the researcher's perspective should alternate between the parts and the whole. This is something we found very useful and even necessary when studying KM. Another important aspect is empathy within the researcher, who should be able to put him or herself in the interviewee's position when reflecting on the study. (Alvesson & Sköldbberg, 1994)

2.1.2 Ontology

Another important realisation for every researcher is the view of whether social entities are objective or socially constructed. Our ontology takes the direction of constructionism, which implies that social entities are continuously impacted by social actors (Bryman & Bell, 2003). Since this perception influences the research design, whether we are aware of it or not, it is useful to reflect on in order to obtain clarity of why we have chosen the following research method.

2.2 The methodological characteristics of our study

The purpose of this study was to gain a deeper understanding and describe KM in our case company, while simultaneously studying three other organisations to help answer our problems. KM, as a theory, is not universal and since it is largely dependent on the particular organisation and situation at hand, no existing theory could accurately describe KM at a specific organisation. Consequently, we found a gap of knowledge here and it was obvious that we needed to approach this problem in an *explorative* manner. An explorative approach is used when researchers are not fully aware of what they should be looking for (Jacobsen, 2002). The purposes of an explorative study are to collect as much data as possible regarding the object of the study and to approach the problem from all angles (Patel & Davidsson, 1994). Thus, we had no predetermined outcome in mind when performing the empirical study (Merriam, 1994).

Doing a case study of explorative nature, as we did, implied the use of an *abductive* approach. This is the most common approach when making case studies since it starts by having some background theory in mind and then moving iteratively between theory and reality. The abductive approach therefore bears resemblance to both inductive and deductive approaches. (Alvesson & Sköldbberg, 1994) First, we had a kind of deductive approach where we analysed

existing theories to gain a deeper understanding. Subsequently came a verification phase, where theories were compared to reality and to some extent confirmed. More important in this phase was the fact that new questions were brought up, which helped us shape our purpose. In the next phase we analysed the collected data in a nearly inductive way. This movement between theory and reality is often used in order to generate new theory (Alvesson & Sköldbberg, 1994).

The two strategies to conduct research are quantitative and *qualitative* and the latter conforms to our study as data based on privileged information, emotions, experiences and feelings are preferably conducted in a qualitative process way (Jacobsen, 2002). Since we assume that there are multiple realities it is easy to understand that reality needs to be interpreted, not measured. Our qualitative study aimed to gain a deeper understanding of KM at a single knowledge-intensive firm and to generate results that were versatile and evolvable. (Merriam, 1994) This is the reason why we chose to perform a case study involving a number of in-depth interviews.

2.3 Research design

We chose to perform a case study, as we studied one organisation intimately and three other organisations a bit more simplistically to use as a mirror when analysing. This way, we found that our analysis gained more depth and substance. A comparative study, a research design closely linked to our choice, involves studying two or more cases in order to compare and contrast (Bryman & Bell, 2003). However, our purpose has not been to perform a comparative analysis of the cases, instead using mirror companies to enhance the single company with reflections of similar or dissimilar aspects.

A case study was particularly suitable as we wanted to develop a theory about something unknown to us previously (Jacobsen, 2002). We wanted to describe a single phenomenon and through the case study gain a deeper understanding of the phenomenon (Merriam, 1994). We define our phenomenon as *knowledge creation and knowledge transfer in the project-based case company from both an object (Western) and a process (Eastern) perspective on knowledge*.

2.3.1 Choice of case companies

We selected our main case company based upon a number of different criteria. First of all, we wanted to study a firm which was clearly knowledge-intensive since KM is extremely important in those types of organisations. Second, we wanted to look at a large organisation which is project-based, since we figured that KM is even more important when employees work in temporary constellations. Third, we wanted to study an organisation that put a strong focus on R&D as our pre-comprehension is that this can affect the KM focus, which led us to the high-technology industry. Finally, we also chose our case company based on the fact that we wanted a

large organisation with a rather large human resource department, since they often are the ones thinking about KM.

When regarding all these criteria, we all thought of one organisation as the obvious choice. We were lucky enough to get their permission and help to study their KM. The organisation told us that they were very dependent on the knowledge of the employees but that they did not formally use phrases like KM or IC. This made our study even more interesting, not only for us, but also for the company itself.

To attain more depth in our study we decided to choose three mirror organisations that were similar to the first one following the same criteria. As mentioned before, our desire was to study their KM in the same way as we looked upon KM in case company and then use these findings to give more substance to our study.

We chose to keep the identities of the case company and the mirror companies anonymous, by request. Even though our thesis does not reveal sensitive information regarding the companies we believe that, by protecting their identities, we have gained access to important background information which we otherwise would have missed out on. A downside of keeping the companies anonymous is the credibility of the study which decreases as the authenticity, such as references, can not be verified. However, we decided that the advantages of anonymity outweighed the disadvantages since it was more important for our study to gain as much information as possible. We chose to call our case company “CC” throughout the study and the three mirror companies will follow the first three letters of the Greek alphabet, “Alfa”, “Beta” and “Gamma”.

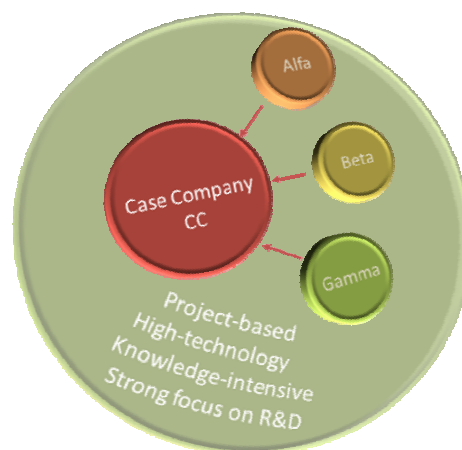


Figure 2.1 Illustration of the relation between our main case company and the mirror companies.

2.4 Personal interviews

After deliberation on how to conduct our qualitative case study, we chose to do a number of interviews, since we were interested in the single person's opinion (Jacobsen, 2002). However, we considered the downsides of personal interviews where the main concern was how our presence impacted the interviewees and their answers. The interviewees may very well have been impacted by the way we, as interviewers, looked, talked and acted (Jacobsen, 2002). One consideration when choosing interviewees is age difference which in our case varied from 5 years up to 15 years between us and the interviewees. Another thing to regard is the social status and the educational qualifications of the interviewees compared to us. The majority of our interviewees had a background in engineering and a professional knowledge that we lacked. Since we, at present, are students of business administration we daily converse with a certain jargon; economical terms which probably are not used in the working environment at this specific company. Hence, we excluded our economical jargon and used daily conversational language although we were aware of the fact that the engineering jargon might be used and could be incomprehensible for us.

During our interviews, we were attentive in observing the environment and the interviewees' way of responding our questions. We highlight the importance of our own interpretation of the interviewees' subjective answers to our questions since the respondents' perception of their company might not be coherent with our interpretation of their perception. Together with secondary data from each of the case company's web pages and internal company documents for enhancement of our own understanding, we have had the aim to gather the data to highlight a rich and informative empirical foundation.

We used personal interviews and a semi-structural approach since it enables a flexible and open interview method (Bryman & Bell, 2003). Our semi-structured interviews put the focal point on the interviewee and enhanced the interviewee's freedom to develop own ideas and express opinions without disturbance (Denscombe, 2000).

2.4.1 Choice of interviewees

Being able to have open access to the material needed and the object studied were an immense part of our study as well as a necessity. Our contact person at the main case company was very helpful and provided us with detailed information and put us in contact with the interviewees. Regarding the other case companies, we explained our mission and the same procedure applied there.

Our choice of respondents was based on the “information criteria”, i.e. we interviewed the people who we thought could provide us with the most relevant information (Jacobsen, 2002). In order to create a wide-ranging empirical data which importance we highlighted earlier, we interviewed six people we assumed having diverse perspectives at our main case company CC. The six interviewees held different positions at different levels within CC as this would increase the likelihood to collect the most comprehensive data and attain a holistic view. Primarily, an interview attempting to get a wide, overall view on KM and on the allocation of resources was held with a cost manager. Secondly, we interviewed two line managers who held utter responsibility for the engineers. Thirdly, as the perspectives of engineers were important factors to consider, we selected two engineers within different areas of the organisation. Finally, we thought it would be useful to interview a project leader.

In the other case companies we used a similar approach when selecting the interviewees. We ended up interviewing two people at each of the three organisations, where at least one was an executive. From a KM perspective and in order to get both a holistic and detailed view, we included this small amount of interviewees at each company with the focal point lying on retrieving in-depth information.

As a beginning, all of the interviewees were informed that their answers were to be treated anonymously and out of that reason, all of the interviewees’ names were exchanged to numbers. The six interviewees’ at CC are presented with numbers 1-6, the interviewees’ at *Beta* with 7-8, at *Alfa* with 9-10 and at *Gamma* with 11-12.

2.4.2 Reflections on conducting the interviews

Prior to the interviews we concluded an interview guide (appendix 1-3) for each different position held by the interviewee. This interview guide consisted of overall questions from general facts to feelings, emotions and attitudes. We made sure the interview guides were compatible to each other and to some extent connected to theory, to ensure the relevance and quality of the collected data. (Denscombe, 2000) We have aimed to conduct the interviews as discussions or more similar to a friendly talk than a structured interview which is why our interview guides have been fairly open. In order to make the interviewees’ feel more comfortable, we met them in their workplace to create open reflections and contribute to the respondents being able to feel comfortable in the situation.

Our interviews were conducted in person, with equipment for sound recording as the most safe documentation tool (Denscombe, 2000). We also complemented the interview with field notes, but the recording enabled us to focus on listening and asking questions. We should point out that we were aware of the downsides of recording; the respondents could get inhibited and decrease the quality of the interview (Merriam, 1994). Luckily, all our interviewees consented to the recorder

and did not seem to get self-conscious. Although time-consuming, we chose to transcribe all the interviews, in order to facilitate the analysis of the data. (Bryman & Bell, 2003)

Consequently, the six interviews at our main case company were all conducted at the organisation's office here in Lund and lasted about one hour each. However, since the other three firms had their Swedish head offices in Stockholm, we found it more efficient to perform these interviews by phone. The downside of this is that it is considered harder to gain contact with the interviewee in this way (Jacobsen, 2002) and the interviewee have a larger possibility to end the interview any time he or she feels threatened or pushed in the wrong direction. This is another reason to why we used such open interview guides, as we let the interviewee choose his or her own way of answering, whereby we found ourselves with all the answers we needed, also after the telephone interviews. All interviews were conducted in Swedish as this was the official working language within all four firms.

To form the foundation for our analysis, we gathered the transliterations and summarised the 12 interviews into thematic areas, which gave us an overview and emphasised our common basis for interpretation as a group.

During the interviews we asked how the interviewee perceived respective company's view on knowledge, object or process and where the company's focal point rested, on transfer or creation which demanded that we explained as thorough as possible how we define these four concepts (appendix 4). Important to keep in mind is that one does not exclude the other, they rather overlap and it is hard be stringent.

As hermeneutics with the aim to understand how our interviewees' perceive their reality and its consequences (Lundahl & Skärvad, 1999), we have interpreted the interviewees' view on knowledge, object or process and the focal point, transfer or creation, based on the overall impression from the way they answered the questions (see table 2.1 below).

2.5 Critical stand

2.5.1 Criticism to collection of empirical data

Since we conducted the interviews in two different ways, over the phone and in person through face-to-face communication, this could have an effect on the results. Six of the interviews, all with people in our case company, were conducted face-to-face with in advance booked in appointments in a quiet, private environment with at least 45 min time put off so that the interviewee would not feel stressed. The rest of the six interviews were performed over the phone, which were all booked in advance for at least 30 min. When we conducted the interviews over the phone, we experienced two cases of the interviewee

paying continuous partial attention which we had a hard time controlling. This could have affected the engagement and outcome of committed answers. However, we found the answers being comprehensive and thought through. The stress factor for these people paying continuous partial attention contributed to us sensing the stress and we tried to compress the interview in order to reduce the stress factor.

Another aspect is that one of the people interviewed was very much engaged in the interview and also our study as this person tried to imply new ways for us to conduct our research. This might have affected the interviewee's answers as he or she had a clear goal in mind with the interview. Since this was not our aim at all, we tried to exclude the interviewee's opinions on our study.

We have made sure to stay critical to answers and our own perceptions in order to interpret the collected data on a mutual foundation. Internal documents have also confirmed the interviewees' answers; hence we believe our sources to be trustworthy.

2.5.2 Criticism to theories used

Even though our analysis has been based mostly on empirical data, theoretical review has played an important role. Theoretical sensitivity means having insight and ability to give meaning to data, something which would have been almost impossible without any prior knowledge of the area of research. Reading literature and having professional or personal experience gives the researcher the capacity to understand the phenomena. (Corbin & Strauss, 1990)

A lot of literature and many research articles have been published on the subject KM. In positioning our study in between KM theories and project management theories, we narrowed the amount of research down, although still studying relevant theories. We found theories dating back to the 1950's but based our theoretical perspective on models of the 1990's as they are generally accepted in the world of KM today.

2.5.3 Validity and Reliability

When looking at validity in accordance to our qualitative study, the internal and external validity are the significant measurements here (Merriam, 1994). Internal validity concerns the causality of conclusion in relation to the questions in our recognised problem, in other words, how believable the findings are (Bryman & Bell, 2003). In order to ensure a high validity, we have underpinned our study on the related information and continuously reminded ourselves and the reader of our purpose and problem with the effectiveness of illustrations. We have kept updated mind maps to visualise the structure of the study in order to keep a clear mindset and make use of the theories and data collected with a constant relation to our purpose. We believe that this

study has high internal validity since we have studied what we aimed to study, namely, to describe and understand how a project-based, knowledge-intensive firm in the high-technology industry creates and transfers knowledge, seen from two different perspectives.

The external validity is expressed as transferability and it reveals if the findings are applicable to other contexts. This involves how the case company and mirror companies along with interviewees are selected (Bryman & Bell, 2003; Merriam, 1994). These are all selected on the basis of commune criteria to be able to correctly reflect conclusions of the mirror companies on the selected case company. The interviewees are intentionally selected from different parts of the organisations in order to achieve a broad base of perception for each company. Even though our conclusions are directed towards the case company we believe the approach of our study can be interesting to other firms, however the results are not directly transferable.

Parallel to these concepts is the study's reliability which is described as to what extent the result can be repeated if conducted at another time (Bryman & Bell, 2003; Merriam, 1994). The same study conducted at another point in time, by other researchers will vary since the human factor affects the interpretation and objectiveness that can never be assured to be exactly the same. It is therefore more natural to strive for a possibility to reach high understanding and that a future study conducted in the same manner is dependant and consistent. (Merriam, 1994) In this study, we have taken the interview effect into account as we tried to be objective and neutral in our questions stripped from academic educational jargon. All of the interviews were recorded and we listened to them repeatedly to ensure we interpreted the answers correctly and did not forget anything. Furthermore, we transcribed the interviews to obtain a trustworthy written basis for the compilation of empirical data. On top of this, we summarised each transliteration into paragraphs of focus areas which we all went through to increase the commune understanding and basis for our analysis. What all that this implies is contributing to a solid high reliability.

3 Theoretical framework

How many of us haven't written a text message conceived totally wrong by the receiver, since all interpretations are personal, where the solution has been to communicate the message over the phone instead? Knowledge sharing is a complex matter consisting of many different aspects.

In order to guide the reader through this chapter, we will briefly explain the way the theories are presented. First we will discuss the knowledge concept along with two separate definitions, namely object and process. We then present four different knowledge management (KM) theories all connected to the different views (object and process) and different focuses (knowledge creation and knowledge transfer). As a complement to these theories, we also review theories that concern KM in project-based organisations, in order to go deeper into our problem area.

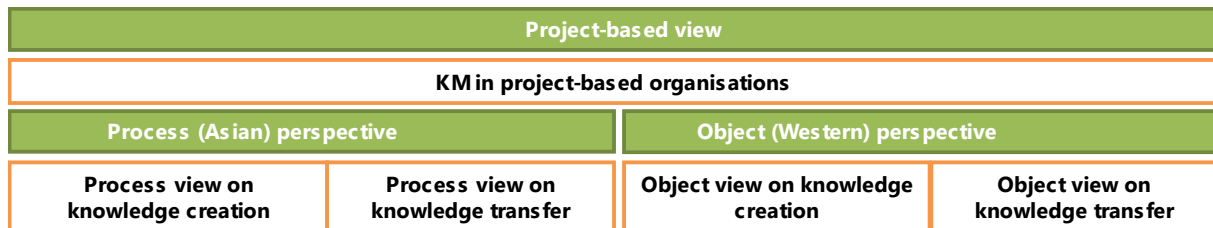


Figure 3.1: Model of how our theoretical framework is built up. It consists of four areas of theories, where these are divided into two perspectives and all in all they fall under theories of project-based organisations. Though the construction of the framework is built up as seen above, we have chosen to start by presenting the two perspectives as these are vital theories to understand.

3.1 Knowledge definition

Knowledge is a complex and intangible concept which can be seen and identified in many different ways. As an intangible concept, knowledge contains no formal structure, hence, the majority of times metaphors are used to concretise the phenomena. (Andriessen & van den Boom, 2007). Looking at different metaphors it can be stated that the Asian way of identifying and understanding knowledge can be called a *process* perspective and the American approach on knowledge is as an *object*.

Metaphors	Objective perspective - West	Process perspective – East
Knowledge as...	..a thing that can be controlled	..spirit and wisdom
	..an asset that can be created, stored, shared or moved.	..unfolding truth
	.. <i>capital</i> that can be valued, capitalized and measured, being a part of the accounting.	Unity of knowledge and action
	.. <i>information</i> can be codified, stored, accessed and used.	..essence-less and nothingness
	.. <i>thoughts or feelings</i> that are tacit but can be made explicit; that can be communicated and shared	Knowledge creation as a continuous, self-transcending process

Figure 3.2: Knowledge viewed from two different perspectives (Andriessen & van den Boom, 2007)

3.2 Knowledge management theories

The view of knowledge obviously has a large impact on the view of how it should be managed. Since there are numerous definitions of knowledge, there are at least as many of the concept of KM. According to Edvinsson & Grafström (1998:64), “*knowledge management means mainly to codify and file what is already known*”. This is a typical view of KM found in the Western part of the world. However, this view is contested by several authors claiming that KM goes far beyond the codification of knowledge (Nonaka, 1994; Alvesson & Kärreman, 2001; Amidon, 2003). The following theories are based on different views on knowledge, as an object or as a process, but also different focus on what is believed to be the key part of KM; namely creating or transferring it. One thing to keep in mind here is that creation and transfer of knowledge are not two activities separate from one another. They interact in the way that when you create knowledge you also often transfer it as a secondary effect. However, the different theories, accounted for below, still point their focus on one of these activities.

3.2.1 The object view on knowledge creation – “knowledge as capital”

A firm’s market value can illustratively be said to consist of financial and intellectual capital (IC). The latter has, in turn, several building blocks that could be organised under two main categories; structural and human capital. (Edvinsson & Grafström, 1998; Edvinsson & Malone, 1997; Roos et al, 1997)

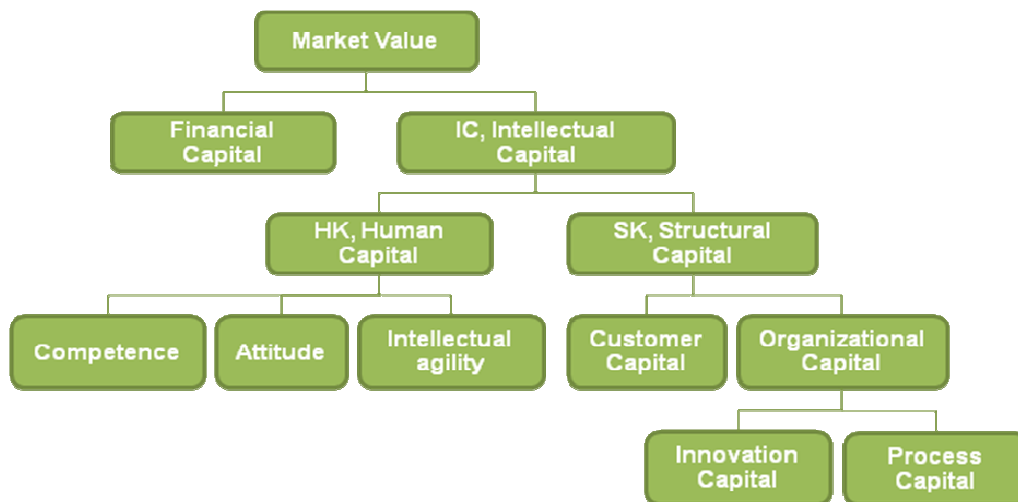


Figure 3.3: Intellectual capital model (Edvinsson & Grafström, 1998: p26 and Roos et al, 1997: p35)

Structural capital consists of hardware, software, databases, organisational structure, patents and trademarks; basically everything that remains when the employees go home. The structural capital is owned by the company and can, consequently, be traded. (Edvinsson & Malone, 1997) Structural capital can be divided into customer capital, which is the value of customer relations, for example loyalty and organisational capital. Organisational capital is the structure of the firm that enable the knowledge workers to control their competencies. Innovation capital, for example patents, business secrets and legal rights, in addition to process capital, i.e. work processes and technical solutions, make up the organisational capital. (Edvinsson & Grafström, 1998)

As opposed to structural assets, human capital is considered risky because it can never be owned by the organisation. Since it resorts to the organisation's employees, this asset can walk out the door at any time. (Edvinsson & Malone, 1997) This part of the IC is determined by the value of what the employees can produce (Edvinsson, 2002). Roos et al (1997) believe that this value originates from three components; competence, attitude and intellectual agility. *Competence* can be described as the "content" part of human capital, such as knowledge, skills and know-how among employees. However, if the employees are not willing to use their knowledge and skills these assets are not very useful. The *attitude of employees* is therefore important as the "soft" component of human capital. The organisation has little influence over the employees' attitudes since these depend mostly on personal traits. Nevertheless, the organisation can, to some extent, change attitude through the environment. There are three factors that impact attitude; motivation, behaviour and conduct. The third component of human capital is *intellectual agility*, i.e. the quickness or alertness of the organisation. In practise, this involves the ability to transfer knowledge from one context to another, the ability to improve through innovation and adaptation and the ability to see common factors and link them together. Intellectual agility is tightly linked

to competence, since it determines the ability to use the knowledge and the skills of the employees. (Roos et al, 1997) Beside from these components, human capital is also the company values, the culture and philosophy. (Edvinsson & Malone, 1997)

3.2.2 The object view on knowledge transfer – “knowledge as information, thoughts and feelings”

Since the beginning of 1990, KM has been considered a necessity for organisations to be able to reach success. This goes along with the growing importance of knowledge in a lot of businesses. (Hansen et al, 1999) However, according to an empirical study made by Hansen et al (1999) there are two main strategic approaches to take in KM. The authors call these the codification strategy and the personalisation strategy (Hansen et al, 1999). Similar to both these strategies is that they conceptualise knowledge as some sort of resource (Andriessen & van den Boom, 2007).

The codification strategy basically means to codify and store as much knowledge as possible in databases. This “person-to-document” approach makes the information useable for the whole company all of the time and at different places. By codifying knowledge organisations can save time and thus achieve “scale in knowledge reuse”. However, this is not always uncomplicated. There is a risk that codification gets into something that is time consuming without giving an easy way to spread and search for the knowledge. (Hansen et al, 1999)

The other type of KM is largely based on person-to-person contact with a great deal of focus on dialogue. This personalisation strategy regards knowledge that probably can not be stored and through conversations, employees come to a deeper understanding. To make this strategy work it is extremely important to have good networks, with frequent telephone meetings, quick e-mail responses and even transferring employees between offices. Using the personalisation strategy effectively will derive success in “expert economics”. Brainstorming meetings to disseminate knowledge and databases with information about who possesses the specific knowledge, is two common examples of business that work in this way. (Hansen et al, 1999)

Which approach of KM that is suitable for an organisation, is determined by its competitive strategy. If the organisation offers standardised and mature products and the employees rely mostly on explicit knowledge in order to solve problems, the codification strategy is the best way to go. If the organisation, on the other hand, provides customised and innovative products to customers with unique needs and if tacit knowledge is important, the personalisation strategy is the given choice. (Hansen et al, 1999)

In their empirical study, Hansen et al (1999) found that there were elements of both strategies in all the organisations, but that the ones who were effective focused on one strategy while using the other as a support of the primary strategy. Consequently, organisations should never completely ignore one strategy but neither should they try to use both equally. In their article, the authors suggest an 80-20 percent division. (Hansen et al, 1999)

3.2.3 The process view on knowledge creation

Nonaka (1994) thinks of knowledge as a wide-ranging concept with many faces and he defines knowledge as a dynamic human process, a “justified true belief”. Primarily the knowledge process is divided into two parts. The first, the epistemological part is built on tacit and explicit knowledge, conceptions first developed by Polanyi (1966) in his study of the knowledge creation process where he divided the knowledge into these two dimensions. *Explicit knowledge* can be explained as a formal structural lingo, a codified knowledge, since it is documented and transferred into words. It is discrete, digital and can be stored in archives like databases or libraries. *Tacit knowledge* can be described as quiet knowledge within an analogue process where individuals share the quiet knowledge to create a common base for understanding. (Nonaka, 1994; Drucker, 1993) Knowledge has a certain personal quality to it which makes it hard to communicate or transfer into numbers. Or as Polanyi (1966: p4) also expressed it: “*We know more than we can tell*”.

The second dimension, the ontological part is characterised by social interaction between individuals in order to develop and create new knowledge (Drucker, 1993). Here the event of ideas takes place in the minds of people (Nonaka, 1994).

Individuals could be seen as a third dimension where the people are committed to renew the world out of their own perspectives. Three factors enhance this commitment: intention, autonomy and fluctuation. Organisations that permit individuals and groups to act autonomously can obtain a higher level of flexibility; in interpretation of information, freedom in absorbing knowledge and the width of motivation aiming for individuals to self create new knowledge.

To package the parts of process in a smart format, Nonaka (1994) developed the “knowledge spiral” where these three dimensions all come together (figure 3.3). Knowledge creation or transfer is based on the interaction between tacit and explicit knowledge and these can be combined into four different modes.

- (1) ***Tacit knowledge to tacit knowledge***: The tacit knowledge is transferred through interaction between people, and can happen without language, instead through observations and on-the-job training. The most essential aspect of enabling people to share and understand each others though processes is that they share experiences, which

happens unavoidably when people enter a community. This process is labelled *socialisation* and is bred from building a team or a field of interaction where the transformation will take place.

- (2) **Explicit knowledge to explicit knowledge:** New knowledge is achieved by exchanging and combining knowledge between individuals through exchange mechanisms such as meetings and telephone conversations. To generate explicit knowledge from explicit knowledge, it is important to sort, reconfigure and categorise knowledge, coordinate teams, involve members of different sections and document existing knowledge which is collectively called *combination*.
- (3) **Tacit knowledge to explicit knowledge:** This interaction, between tacit and explicit knowledge, is called *externalisation* and conveys an interesting dialogue where individuals have the possibility to make use of metaphors to express their own perspectives, which works as triggers for knowledge creation. This happens in relations with other people.
- (4) **Explicit knowledge to tacit knowledge:** This transfer, from tangible knowledge, is a more traditional concept and is referred to as *internalisation* where organisational learning is a standout point. It is a good idea to combine concepts formulated by teams together with existing knowledge and data to generate more concrete and shareable aspects. To initiate this combination of concepts, both team coordination and documentation of existing knowledge can be used, as well as an iterative trial and error process where feedback will push the development of the concepts forward to actually take concrete forms. Conclusively, experimenting, taking action and learning by doing with members that share explicit knowledge is transferred through interaction and an iterative process to tacit features. (Nonaka, 1994)

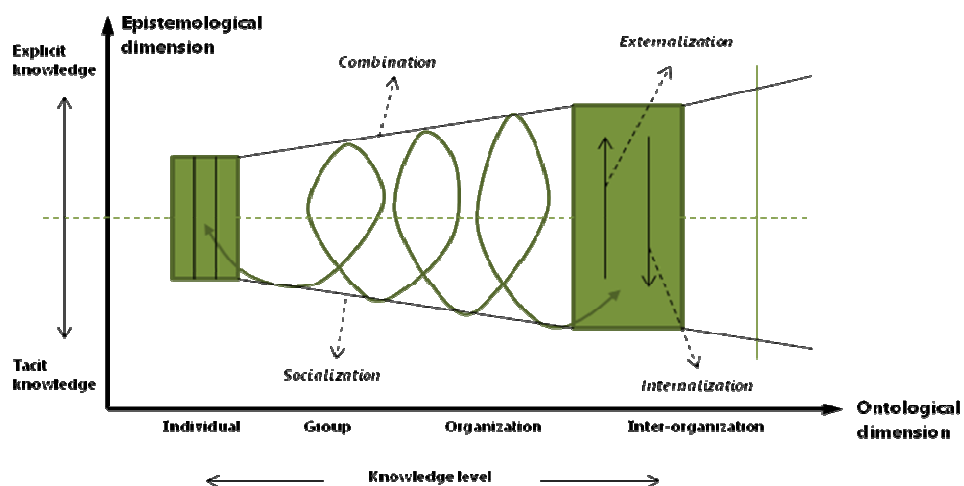


Figure 3.4 Illustration of knowledge spiral (Nonaka, 1994)

Nonaka (1994) states that the double loop learning effect is built in within the model and takes place continuously as organisations daily redefines their perspectives and activity. The more players involved, the bigger the interaction and the faster the speed of interaction between tacit and explicit knowledge. The mechanism which is the organisational knowledge creation process is articulated by an upward spinning spiral starting on the individual level moving past group and organisational to land on the inter-organisational level. Surely the four modes of conversion can separately create knowledge although fundamental is that they affect each other in a positive way and the presumption for knowledge creation is a continuous cycle of interaction and dialogue between tacit and explicit knowledge. (Nonaka, 1994)

3.2.4 The process view on knowledge transfer

Sveiby (1996) embraces an outlook on knowledge, concordant with the eastern way of defining knowledge as a process. As Sveiby (1996: p380) expresses it: "*All our knowledge therefore rests in a tacit dimension*". Further, he states the primary intangible resource to be the competence of people (Sveiby, 2001).

From an organisational and more theoretical perspective, knowledge transfer is not one-sided; people can create value in two directions, transferring knowledge externally *from*, or internally *to* their organisation. The transfer between individuals can increase the competence; the team work to co-create and diminish the gap between experts and administrative employees. The knowledge will grow every time there is a transfer, since it never leaves the creator, resulting in double knowledge. Moreover, if for example the customers and suppliers are included as a part of the company, the organisational boundaries become irrelevant and it does not matter who the individual is; the focus is instead put on creating a value generating relationship. From an internal, external and individual perspective existing in almost all firms, nine dimensions of knowledge transfers are presented below (figure 3.4). (Sveiby, 2001)

- (1) **Knowledge transfers between individuals:** This concerns the improvement of competence transfer between people along with trust, since people must be willing to share what they know. The activities suitable to trigger this are trust building, team activities, induction programs, job rotation and master schemes.
- (2) **Knowledge transfer from individuals to external structure:** The competencies of the outside world, i.e. the clients, suppliers and other stakeholders, need to increase. Activities of improvement are to enable the employee to help the customer learn about the products, job rotation with customers, product seminars and customer education.
- (3) **Knowledge transfer from external structure to individuals:** This concerns what the stakeholders can do to improve the employees' learning of ideas, new experiences, feedback and new technical knowledge. Activities working as triggers are focused on creating and maintaining good relationships, customer's quality management teams to increase understanding and anticipate the need of the customer.

- (4) ***Knowledge transfer from individual competence into internal structure:*** This stresses how to improve the transfer of tacit, individual competence into systems, tools and templates. Activities to support this should result in a simplified and more efficient sharing of knowledge.
- (5) ***Knowledge transfers from internal structure to individual competence:*** The antithesis to the latter, number four, concerns how to make the competence (now documented) available to other individuals to increase the capacity to act. To proceed, improvements must be done on the human-computer interface, implement action-based learning, seminars, interactive e-learning environments and similar events.
- (6) ***Knowledge transfers in the external structure:*** It is here possible to investigate how the customer perceives the organisation by looking at how the competence is transferred between the external stakeholders. Incitements for progress are partnership and alliances, image improvements of both brand equity on the product and on the organisation, quality improvement of the products, product seminars and alumni programs.
- (7) ***Knowledge transfers from external structure to internal structure:*** Concentration is put on what and how competence from the outside world can improve systems, processes, methods and products. Interpretation of customer complaints in better call centres and creating R&D alliances will work to its advantage here.
- (8) ***Knowledge transfer from internal to external structure:*** This conversion is the absolute opposite of the above, thus implicating how the outside stakeholders can make use and increase competence of the organisations' systems, processes and methods. The systems and processes can work integrative with servicing the customer, extranets, product tracking, help desks and e-business to expound the knowledge conversion.
- (9) ***Knowledge transfer within internal structure:*** As the internal structure can be resembled by the body's master-mind, the focal point here is put on how to integrate these systems, processes and methods effectively. The answer is drawn towards streamlined databases, integrated IT systems and better office layout. (Sveiby, 2001)

Often times, the tendencies in organisations are that these transfers do not have a coherent structure as the management lack the complete knowledge-based perspective. An organisation can not succeed in knowledge transfer following a selection of these nine steps; they need to include all of them. (Sveiby, 2001)

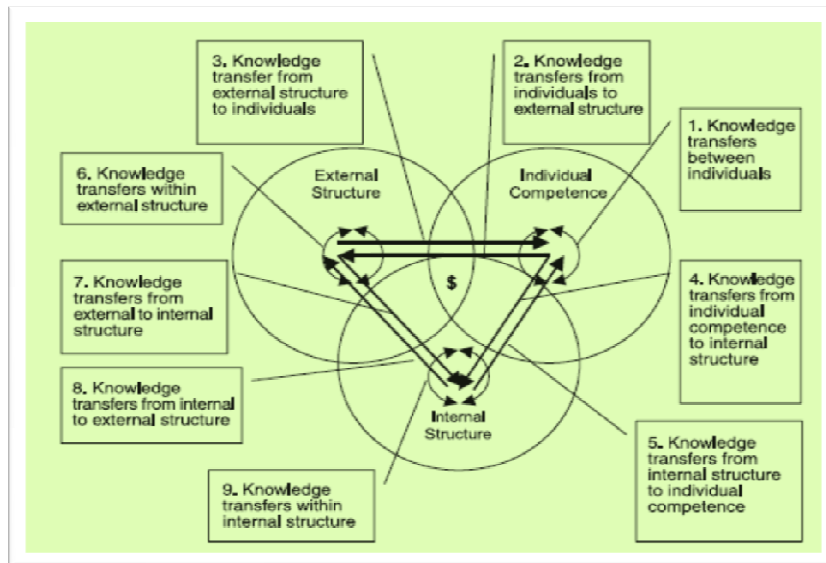


Figure 3.5. The nine-steps of knowledge transfers (Sveiby, 2001)

3.3 Knowledge management in project-based organisations

In order to understand the context, we define project-based organisations using the definition made by Sydow et al (2004). They define project-based organisations as companies working mainly in a project form, meaning that within structures and processes, these firms put emphasis on the project dimension rather than the functional dimension.

For project-based organisations to learn there must be creation, transfer and appliance of the knowledge from the employees (Kotnour, 2000; Argyris & Schön, 1978). Kasvi (2003) also discuss dimensions for KM in a project where the first is knowledge creation (learning and refinement), the second concerns storage and organisation and is called knowledge administration, third, the knowledge dissemination (within and outside a project) and last the knowledge utilisation & productisation which refers to the integration into products, decisions and application in other projects. (Kasvi et al, 2003)



Figure 3.6. KM dimensions to enhance learning and knowledge in projects

According to a study by Reinhardt (2002), knowledge transfer in a project organisation should take place in a project with different roles and responsibilities which can build a shared understanding, commitment from the top and transfer of the knowledge from consultants to the firm. Reinhardt (2002) found in his study two prominent factors: (1) to involve all managers and all employees. (2) Implementation of a system to organise the complex and dynamic process of the organisation. (Reinhardt, 2002)

Depending on the held position, for example project manager or team leader, the responsibility varies. Primarily, the team leader fosters the transfer of knowledge concerning the content, the process and the results of KM activities in formal and informal manners, both within and between the projects. (Reinhardt, 2002)

3.3.1 The project-based view on knowledge creation

A knowledge creating project organisation can be referred to as self-referential, or an autopoietic system (Eneroth & Malm, 2000). In other words this means an organisation which naturally works to renew itself, affected by internal forces, meaning it is an autonomous organisation where every business unit works with separate self-control. Every team should then be self-organised and the organisation should be cross-functional as this creates heterogeneous teams consisting of a mix between different business sectors and activities which enhances the creativity. These teams are often used in the Eastern world in the beginning of a project, i.e. in the early phase of innovation. (Nonaka & Takeuchi, 1995)

Projects have the right potential to create new knowledge (Sydow et al, 2004). Kotnour (2000) discusses this in his research about the different types of learning taking place in a project-based organisation namely: inter-organisational, intra-organisational and learning support cycles. Within each cycle, there is a focus on either transferring, sharing or applying knowledge. He concludes that the project-based organisation should focus on building knowledge as this will result in increased performance. The new knowledge can be created within and between projects and to enhance this learning process, there need to be an emphasis on open environments supporting the employees to admit mistakes and discuss problems freely and to support the learning through the entire project, not only at the end. (Kotnour, 2000)

3.3.2 The project-based view on knowledge transfer

Projects are characterised by fast, focused and autonomous knowledge. Being too focused results in caring less about the surrounding world. Being too fast will result in the lack of reflection and documentation of what has been learnt. Lastly, being too autonomous can result in that the project group will evolve into a "spinning silo" where the knowledge stays within the group and is not accessible to other projects or to the organisation. Instead of risking the wheel being

invented over and over again, knowledge transfer should be used to increase the inter-project learning and learning across levels. (Kotnour, 2000)

Problems that can arise within the project depend on that there is little time to build commune knowledge and form a tight group, or a "community of practice" where you operate on the basis that you share knowledge (Wenger & Snyder, 2000)

3.4 Mind-map over theories and empirical approach

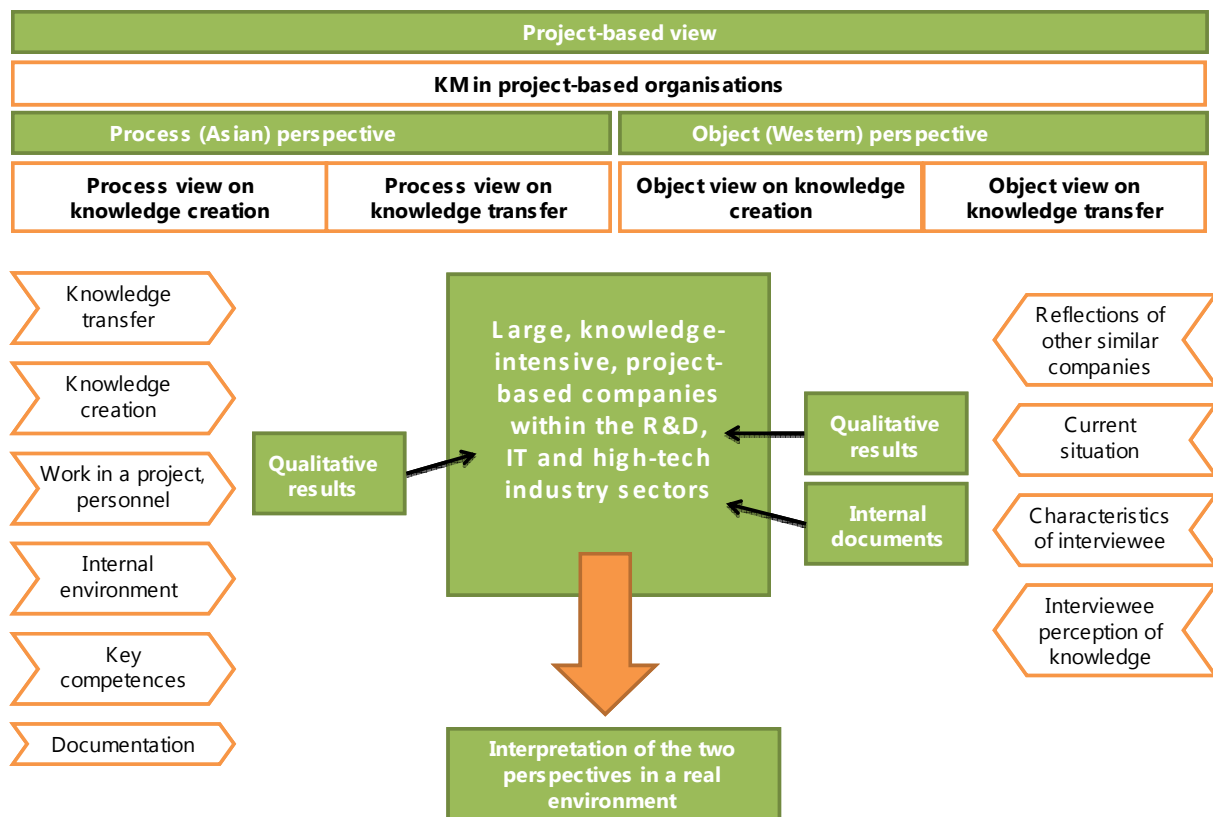


Figure 3.7. Mind-map over theories and empirical approach. This model describes how the theories relate to the empirical data review in the next chapter. To the left in the model, we show the subjects discussed in the interviews and to the right, more general information regarding the study's extent. Above these, we show the theories reviewed in this chapter. Finally, in the centre of the model the characteristics of our case companies are displayed leading us to our analysis.

4 Empirical data

Is it better for an organisation to be too focused on knowledge transfer, or the opposite, to put too much focus on knowledge creation? Does this choice depend on how knowledge is conceptualised within the firm? We are acknowledging the different perspectives in the Case Company and the additional three Mirror Companies.

First, we present the companies we study, where we put focus on data concerning their project groups and their view on key competences. We also give a short presentation of the companies' approaches to KM and IC. After this section, we have divided the rest of the chapter into formal and informal activities, supporting knowledge creation and knowledge transfer. We used this approach since we found it hard, if not impossible, to separate these two parts of KM. We have also tried to display how their views on knowledge (object and process) impact these formal and informal activities.

4.1 Information about the Case Company and the Mirror Companies

The chosen case company (*Case Company, CC*) is a company with its business on the very edge of new technology (1; 3). CC is a global company with research, development and production in many countries. The firm has a business-to-business strategy and most of its customers are loyal and remain customers for many years. With about 20 000 patents, the intellectual property portfolio of CC is one of the world leading portfolios (b). Consequently, knowledge within the company is its biggest and most important asset. Another reason for this is the fast developments within technology today, in general. The industry, in which CC operates, therefore requires the company to be flexible. However, since CC is a large organisation they are rather stable and can not change overnight, even if they would want to (5; 6).

CC is organised according to a classic matrix organisation, with lines and projects. It is hierarchically organised in both dimensions (6), which leads to the engineers mostly having two managers. However, it is the line managers who have the ultimate responsibility for recruitment, administration and development of the employees; hence the line provides the projects with the desired competencies (3; 6). The projects are organised after competencies and technical areas where the managers for each area are in charge of everyday work, keeping the efficiency and reaching the results through maintaining the balance of competencies (1; 3; 4; 6).

The workforce at CC is to a large extent made up of consultants, which enables CC to react and adjust to the dynamics of the business (1). Today CC is in a phase of extreme growth, which leads to consequences like constant employee shortage and time pressure (5). One of the advantages of CC, compared to the industry, is the relatively minor employee turnover (1). This is explained by motivating work tasks and the fact that there are several ways to make a career within the organisation (1; 3; 5; 6).

The first of the three companies, used to mirror CC, is *Alfa* (*fictitious name*). *Alfa* is a world leading company within business intelligence providing software services, with 10'000 employees around the world (annual report) and 100 of them placed in Sweden (9; 10). Like CC, *Alfa* is a knowledge-intensive firm (10) with a stable and high revenue growth (c). *Alfa* has enviably low employee turnover and a liable staff as the focus is put on the customer, innovation and work/life programs (d). Emphasis is put on an “all-inclusive” supply chain model, starting from pre-sale to follow-up. In addition, the customer is integrated through the entire process with extensive support and the solutions are sold together with consultancy services (9; 10).

Secondly, we have looked at *Beta* (*fictitious name*) which is one of the world's largest IT-companies with about 150 000 employees around the world and 1500 in Sweden (8; f). Like CC, *Beta* is organised both as a line and a project organisation (7). The organisation creates around 11 patents a day, adding up to a pile of 30 000. This displays the company's goal for the future, which is the next great invention.

The last of our mirror companies is *Gamma* (*fictitious name*), which is a commission-based authority involved in applicable research, methodology- and technique development and investigation for defence and security. This organisation, based in Sweden, consists of 1 250 employees (11) where 900 are academic researchers. This is an entirely project-based organisation (11). Customers are integrated in the supply chain and together they discuss possible problem definitions. Focus is then put on finding new solutions, new knowledge and new techniques (g).

The organisations above, CC, *Alfa*, *Beta* and *Gamma*, share the fact that large emphasis is put on R&D (about 25 % of their respective revenue is reinvested in R&D) to provide new solutions and be leading in their areas of innovation.

4.1.1 Project groups

CC has approximately five to six new projects running simultaneously which are at different phases (3). Out of the new projects, approximately half of them are initiated by customer orders and the other half on initiative from CC itself, in relation to the high-tech market's advancement and pace. Several projects are, after a successful result, put in a lower gear as "cash cows" to generate profit. Inquiries from both the specific customer and other customers needing supplementary functions, updates, maintenance, corrections or adjustments for a perfect fit with their own products keep these old projects alive for a long time (1). A typical example expressing a bureaucratic side of CC is when to decide on whether continuing the "cash cow" projects or not. This decision is made on formal regulations where the manager delivers a change proposal to the evaluation group and a control group for analysis who will determine on a reasonable extent of expenses. The last step for them is to decide if the project can be continued and subsequently respond formally with a new proposal (3).

A project consists of different phases. The first step is to perform a pre-study where there is an evaluation regarding if and how the project should be put in action. The decision depends on the needs, possibilities and potential for the projects, together with the customer needs and wants. Secondly, CC looks at the available supply of competencies within the firm, where there is a situation of competition between the projects as projects sometimes are in demand of the same competencies. When making the decision to run a project, CC has to find competencies for this, either through competencies available or by rearranging the composition in other project groups. However CC can mostly choose to wait with a project until there are personnel available. There is a formal process within resource allocation, although this process varies somewhat depending on the priority of the project. (1; 6)

The first project phase concerns the planning and the design where few and highly skilled people are needed. This phase results in the starting point for the next and the main phase, involving a longer span of the everyday running of the project, where approximately 100-300 people are needed. (1; 2; 5)

Composing project groups, optimal for every specific project and the organisation as a whole, is not an easy task. This assignment rests on the line managers and project managers together. The line managers are responsible for different competence fields and they must cover the technical supply need in their areas. Software developers can be divided into certain levels depending on experience and competence ranging from 1-3 or from 1-4, where level 4 developers usually are assigned a higher participation in the line managers' allocation of personnel and surveillance of competencies (3). The project manager put an order to the line manager on what competencies the project needs. In most cases they specify this request so carefully that they even name certain

engineers (5). Hence, to create a group that has both technical competence and the ability to build a good work team is left up to the cooperation between the line and the project managers.

If the line managers' primary responsibility is to maintain the competencies the organisation needs, the main task for the project leaders is to deliver the customers' products on time.

“Right man at the right place can work wonders” (5, CC)

It is important for the line managers to build a team with complementary characteristics. The focus within CC rests on finding people with complementary competencies, as well as workers with suitable experiences from earlier projects (2; 5). Though, managers do also take social skills and personal attributes into account when composing project groups. The workers can also influence which specific project they want to work on, although the projects within each technical area mostly are quite similar (3; 2). Right man at the right place can work wonders, but if you allocate the very same man to another project, it might not give the same fulfilment. Consequently, it takes time and cooperation between line and project leaders to compose an efficient group. As far as possible, CC therefore tries to avoid the scenario of taking an engineer off a project and instead try to solve whatever problem may have caused this consideration. (5)

“It is easy to make half-hearted efforts if you have a lot to do” (6, CC)

The composition of the groups can be tricky at times, since there is a high demand for the best competencies. To make full use of an engineers' knowledge, an engineer can sometimes be devoted to several projects at the same time, adding up to a full-time position. (6) The problem seen is the work load and the stress effect put on both the person working on these different projects and on the surrounding project workers. First and foremost, the worker needs to have several work processes in mind and sometimes spends more time switching contexts, than he or she is actually working. (5) Secondly, the other project workers have to keep these part-time workers updated on the information and development since the cross-over between projects is not taken into account in the job (2; 5; 6). Thirdly, if you have a lot to do, swamped in work, it is easy to be half-hearted about the work and the projects. Fourth, engineers allocated to a specific project are accounted for in exact numbers. If against the odds, there is a “*screw-up*” (6), a mistake made in a project resulting in a delay, the manager has to solve this without knowing how, nor having support from above. This means that if you for some reason should need an additional engineer to work on your project, it can be solved rather easily. Even if the manager from the beginning has assessed and presented the risks to the top management, these identified risks are not attended to; instead you keep going until you actually hit a problem. Evidently, within CC, time is a priority rather than risk planning. (6)

To facilitate the partition of personnel between projects and to reduce the competition of resources, the project leaders unofficially co-operate with one another and “deal” with the

competencies. They make use of each others' allocated competencies, putting two workers from different projects together in one project at a certain time and then moving both of them to the other project. (6)

Alfa also works with projects, but not exclusively (9). However, their projects are not nearly as large as those in CC. A normal project consists of 3-10 persons and the roles required in a project are predetermined in something the firm calls their "implementation method". Thanks to this, the problem of distributing the competencies is decreased. However, the strict role requirements along with the fact that *Alfa* only has about 100 employees often lead to the same people working together in all projects. (10)

Looking at the projects in *Gamma*, projects vary in size and range from small projects with 2 people to larger projects with 8-10 people. These projects are carefully planned and decided upon within each of their ten competence areas in cooperation with the Swedish armed forces. The majority of the projects are initiated by orders from customers; hence there is a well thought out and formal composition of competencies within these project teams. (12)

Beta is divided in three different business areas, and are differently organised within these areas, in the way best suited for that specific area. The project groups vary in size and composition, depending on the area. When a group is composed there is, similarly to CC, an internal competition for the best personnel, everybody wants the best competencies in their group. This is however not seen as a problem in the organisation. (8)

4.1.2 Key Competencies

Like most companies that work with research and development, CC is dependant on certain employees with key competencies who are part of a prerequisite for successful research. However, CC feels that there is a risk involved in getting to dependant on a minority of workers. Our interviewees all agreed that this is an actual problem in CC and the solutions momentarily are to focus on broadening and duplicating the knowledge (1; 3; 5).

There are two kinds of key competencies in CC. A small number of employees have chosen a career path leading them to a formal distinction to be "experts". There are three different levels of experts that all have as part of their responsibility to spread knowledge to the other employees (3; 5). The formal part of their technical knowledge is demanded to be documented, in a similar way as the knowledge in a PhD's dissertation, to make the knowledge available for all people within CC. These "experts" are also expected to hold seminars within their competence areas as another way of spreading knowledge. (5)

The other kind of key competence is defined as a person with profound specialised skills, a person specifically good at solving certain problem areas, although not formally appointed a role as an expert (5). Finding these specialists will occur through the internal, and informal, personal network of the employees since no documents or databases exist on whom possesses what specialised knowledge (4). Hence, if you talk about your problem, the word will spread that you are searching for somebody able to solve it and hopefully you will find the person competent in the problem area. This implies that finding help takes more time for new employees that have not had time to build their personal network. Also for the workers who have already created their personal networks, they do not always know who to turn to; hence the procedure is to go through others. (4)

“We have to try to build an organisation where we don’t survive because of heroes.” (5, CC)

“I’ve now learnt that it’s often better to choose somebody less experienced, even though it takes longer time, since nobody knows about this person, neither his experience nor his name, and they will therefore not snatch him away” (6, CC)

Within a project, the need for key individuals is greater in the start-up phase, whereas they in the main phase need more people with broader competence (2). Within a project, it is often possible to plan in advance for the need of a key competence as project leaders can define future problems. This specific person/competence might be available in the plans for the period in question and the project manager gets a guarantee from the line manager to get this competence. Though, when the time arrives, a reprioritisation of competence requirement may have occurred in relation to the different projects. Therefore as a consequent, the promised project will have to find another way to solve the problem. This result in project managers not requesting a certain engineer known for his or her key competencies, but rather find an unknown competence that is encouraged to learn and eventually reach the same level as the known key competence. In this way, projects can be guaranteed a problem solver and even though it may take longer time, looking at the big picture, the gain is higher (6).

Alfa agrees with *CC*, that there is a problem when certain competence areas are dominated by strong individuals. The HR department tries to identify these areas and duplicate the knowledge where this is needed. Hence, the initiative to avoid the risk of being dependent on employees with key competencies is centrally directed in *Alfa*. (10) In addition, *Alfa* has divided their organisation after a number of so called “skill groups”. These are areas, independent from projects, in which each area is “owned” by a certain individual. This person is in charge of the particular competence area and together with other people within the area has meetings in order to spread the knowledge. In this way the knowledge is not only shared internally, but also to partners and external consultants.

“Nobody is irreplaceable; it just takes longer to replace some people compared to others” (8, Alfa)

Also within *Beta* our interviewees look upon key competencies as a necessity which can cause problems. Still they do not try to document or maintain the knowledge from the key competencies. Sometimes it takes longer time to replace a person who left their position, but since nobody is irreplaceable, it is a cost the company can handle. Interesting tasks and good work conditions are the best way to make the personnel remain within the company. (8)

In contrast to all firms above, *Gamma* looks upon this type of addiction to key competencies as a necessity since the research world depends on elitism. Therefore, the best specialists and competences are needed to add height to the research. Width is easily created but height is impossible to achieve without these key individuals. (11)

The key competencies in *Gamma* are formally spread to different projects with the aim to be able to create a group around the key competencies with complementary knowledge, always at least one key competence within each project. The dispersion takes place to achieve a personal link between different projects. The firm spreads knowledge by letting one person have a main task and then being a part of several projects at the same time. In the middle of every floor at the office there has been created spaces, meeting spots, with the intentional purpose of supporting spontaneous meetings where knowledge could be exchanged, ideas can be born and innovation and creativeness can flourish. (12)

4.1.3 Approaches to Intellectual Capital and Knowledge Management

CC does not consider intellectual capital (IC) in their bookkeeping and they do not have anyone centrally appointed to be responsible for the knowledge transfer and creation within the firm, except one person at the HR department responsible for formal education and development. Organising courses, keeping statistics over who participated in which courses and give the opportunity to update CVs is as far the responsibility within HR goes for knowledge management (KM). The need for internal courses is rather significant because of the complexity and fast development of the technology. (1) However, the responsibility to enter and to attend these courses lies on the staff member themselves (4). Although, there are some compulsory courses for all new employees at CC. (5) Thus CC does not, to any large extent, formally work with KM from a centralised point of view. Still, CC considers their IC very important and something that is worth nourishing (1).

Alfa acknowledges that it requires a flat organisation, like their own, in order to manage knowledge (10). *Beta* has a bit more formal management of knowledge, though they do not use the term KM and neither do they have anyone responsible for managing knowledge explicitly.

However, *Beta* in accordance to CC values knowledge and the personnel as their most important asset. (8) *Gamma* as it is an organisation within development, knowledge management is what makes the organisation and the organisation is built to handle or manage this, in terms of work-ways, routines etc. (11)

4.2 Formal knowledge creation and knowledge transfer

4.2.1 New recruits

All new recruits have to go through a basic education independent of their earlier experiences, to learn the work procedures within the company (1; 5). This is the most essential part of the formal KM conducted within CC. The organisation also provides further education in form of formal courses for the employees, but these courses are more voluntary and the initiative often comes from the employees (4; 5). Newly appointed employees also get a mentor, within their competence area. This mentor is supposed to teach them the technical skills but also how to work and how to learn the rules and follow them. (3)

Like CC, *Alfa* offers their new employees in position as consultants a “master class” education, an educational package similar to the one in CC, but where they also become certified (10). This education depends on what kind of position the new employee has. A new employee, not necessarily a consultant, may be sent to *Alfa*’s head office in USA for education (9). *Alfa* also appoints all new employees with a mentor, a senior consultant that is to work with the junior consultant in a certain project (10).

4.2.2 Documentation

Formal work procedures and process thinking are important in the daily work of CC, but the organisation has found it difficult to manage these processes (5). Even so, there is a group within the company focusing on process management (1; 5). The objective is to implement regulated work processes and standard structures in order to create effective and simple work methods (1).

“CC wants to be able to put the knowledge on paper, but I know that it transfers from person to person in reality.” (5, CC)

“If you can call the source code documentation and not only the product, we are focused on documentation, the source code is the most important thing we do.”(2, CC)

Not to be deluded, the source code is one of the most important things for CC, but it does not contain all information. It lacks work-ways and how a specific problem was solved and instead

focuses on documenting the results. (2) The process description is found on the intranet at CC, where you are supposed to see the big branch and then be able to click down to your specific spot and follow the whole process (4). The underlying cause for this process thinking is to easily be able to exchange the personnel, and to avoid being dependent on anyone. The ambition is that every new person at CC can use the process description on the intranet and there understand what he or she are expected to achieve and how to manage this achievement. (5)

As a matter of fact, in *Gamma*, formal documentation is the foundation for knowledge transfer from one person to another without physically moving him or her. The entire research must be documented, not just the results, as it must be possible to do over again or to understand even if the person conducting the research is no longer around. However, *Gamma* has not put enough focus on this kind of documentation and, instead, management is putting emphasis on to increase the innovation and create a personal link, transfer ways of thinking in a process, by for example dividing people on different projects simultaneously. (11)

Within the research and development unit at CC, there are detailed formal systems and databases which are used in the daily work as it is necessary for the control testing before launch. If there is a faulty part, it is possible to search the module base to find the name of the developer having developed the certain module, and then cross-check the name with the computerised telephone book to find the person quickly and to be able to ask questions about the faults directly. These module bases need to be frequently updated. (4)

Likewise, it is desirable that this update of work processes occur frequently, but there are some obstacles as to why this is rather difficult at CC. First of all, there is not enough time, which makes the update of processes a secondary concern. When striving to achieve short-term goals and being able to deliver solutions to the customers on time, it is always put first and everything else becomes secondary. This is unfortunately something the firm has to accept, as long as they are under time pressure but this then leads to a downward trend. (5)

The constant problem with processes is that you cannot create a process and then be happy to be done with it. It is a continuous work, it changes all the time.” (4, CC)

The second problem is caused by the fact that there are some employees at CC who find themselves too important to follow the company's desires to devote time and effort to process. This makes other employees contemplate why they should take time away from their busy schedules if others do not. It then becomes common to deviate from the rules, to find shortcuts and to work after ones own initiatives instead. (4; 5) The personnel see the update of processes more as organisational politics which they never see the results from, only one more thing on their desk to do (6).

When work processes are not documented in the right way, there will always be problems to work according to the processes that actually are documented. Since the process update has to be made by everyone in order to not become obsolete, this is considered a weak spot in the organisation by many of our interviewees. (4; 5; 6) One way to get the employees to perform process updates is by allocating the time needed to do this, and also make updates an objective. (5) However, this is the responsibility of every line manager, and not all of them prioritise this.

According to themselves, *Alfa* is very good at documenting their work and what the employees have done, which results in the fact that much of the employees explicit knowledge is documented (9). *Alfa* has managed to develop a climate where the employees realise the importance of process documentation, both for the organisation but also for the individual, which is the key aspect of their success in this.

“It will be the heart in how we will drive a project forward, it will be a system that I can use [...on follow-ups, profitability etc] supporting the project portfolio as whole.” (10, Alfa)

Once they have managed to get the individuals to realise this, it will be done automatically and the more it is done, the more advantages are starting to show. They are also in the process of integrating several systems into one, where the employees will be able to find all information needed, such as who possesses which knowledge, details regarding the projects etc. (10)

4.2.3 Evaluations

There are several forms of evaluations within CC, but most of them are initiated by the project or line managers and not the top management. The closest group gather for a "lesson learned" scenario after a project has ended, but this is for formal documentation and there is no talk about what new knowledge the employees have acquired (5). Once a year an evaluation questionnaire, regarding the employee's views on CC, is distributed but this poll does not concern the employee's knowledge or education at all (1).

When a project has ended it will be reported what went wrong and what went right, from the bottom to the top. At the same time they collect reports of error from customers and some of the people within the project gather to discuss and try to solve the customer problems. Unfortunately it is difficult to motivate these engineers to commit fully to this old project, even if it is just for a couple of hours. The time is scarce and the employee's commitments are already on their new projects. Thus, these meetings are necessary, but due to a lack in time and motivation, not very efficient. (6)

Beta has, once a year, a poll where the entire workforce fills out the same form, which is put together and evaluated at a high level within the company. Subsequently every manager gets the

result for his workforce and they compose suggestions for activities or focus areas for the groups. (8)

4.2.4 Performance appraisals

CC takes performance appraisals very seriously and has a three step process for when these should be held over the course of a year. The first meeting has the purpose of setting goals and is often done at the beginning of a new year. Today, the formal goals are to widen the knowledge and to become more effective (3). The second step is to have a follow-up after half a year where there is possibility to change the goals. The last part is a summation of the year that has been. This leads to the fact that at least three performance appraisals are being carried out, where you talk about the employees' personal goals regarding their knowledge. (3) The directions come from the top of the organisation, but the performance appraisals are conducted by the line managers. (1)

Our interviewee at *Alfa* found it of utmost importance that he, as a manager, gets to know his employees in order to be able to lead them. The organisation has developed a system used to get closer contact to those employees which are hard to talk to, the ones who are not as open as the rest. This is basically a set of questions for the manager to ask, that will result in a more meaningful dialogue and closer contact to the employee in question.

One of the main tasks for the managers within *Beta* is to create prerequisite for knowledge dissemination and creation. The competence of the personnel and their further education and development is one main part in this work. Yearly, they have performance appraisals and planning meetings. They look at the career development and the competence of the personnel today and future needs. This is documented in a system, where you can see which courses a person participated and in which projects this person been working. This system does not show any qualitative factors so there is a risk that the system does not show what people really know, only what they are supposed to. (8)

4.2.5 Cross-site

Cross-site activity at CC is a virtual line and was created to reach competence exchange and to spread work methods. This group is working within the same competence field and they meet three times a year. In between these meetings they exchange information through a mailing group that they all take part in. The initiative to facilitate international knowledge exchange comes from above, but the responsibility for how to enable this lies on the line manager. This type of cross-site activity is only to find in one part of the company, since it is established by one of the line managers. (5; 4)

Beta has a type of cross-site activity where some of the top managers managing knowledge within the company get together to discuss “best practice”. At least one representative from each of the eight countries where *Beta* is active attends these meetings. Here they discuss how different projects were handled and what experiences they had. To learn from each other’s mistakes and successes is the main reason for these knowledge transfer meetings. (8) The part of *Beta*’s business, located in other countries, benefits from knowledge dissemination where the firm exchanges employees in both directions. The main reason is here, however, normally not knowledge transfer, but a requirement for completing a project. (9)

4.2.6 “Competence bottle necks”

A way to avoid dependency on key competencies is to always have more than one person with a specific knowledge/competence. Therefore CC tries to build away “competence bottle necks”. On initiative from the top management, reports about the competence situation within the company are reviewed at the top every month. The main focus on these reports is the shortages at the moment as well as expected future shortages of competencies. These reports can be viewed as a type of risk management. Within this aspect, CC finds it important to plan for future needs and if possible, always be one step ahead. The reports are sent hierarchic through the organisation from the object leaders who are reporting to the line managers and so on, until they reach the R&D manager. (3)

4.2.7 Summary of formal knowledge creation and knowledge transfer

Thematic area	Summarised material	Perspective & focus
New recruits	CC <i>Basic education is not enough, mentorship is of more significance.</i>	Process perspective
Documentation	CC <i>It is hard to manage documentation; knowledge has to be transferred from person to person.</i>	Knowledge transfer & process perspective
Evaluations	CC <i>Discussions, reflections and reports after a project</i>	Knowledge creation
Performance appraisals	CC <i>Formally three times a year with focus on broadening knowledge and have the employees work more effective.</i>	Knowledge transfer
Cross-sites	CC <i>Exchange competence and work-ways across borders</i>	Knowledge transfer
Competence bottle-necks	CC <i>Not be dependant on key competences</i>	Knowledge transfer

Table 2.1. Illustration of how we have collected our empirical material.

4.3 Informal knowledge creation and knowledge transfer

In CC, a regular phenomenon is to constantly think of ways to enable competencies to spread. Both the project leaders and the line managers seem to feel strongly that they have the ultimate responsibility for knowledge transfer and creation within their group. However, it seems to land on the line managers table, where he or she recognises the need for knowledge transfer when working closely with the operational part of the business (2; 3; 5) Thus, knowledge transfer in itself as a concept is not anything implied from the top like reports, rather this rests on the individual's initiative (4).

The individual initiative of the line managers is also seen at several places within CC, at some units, they work with cross-sites and create websites, homepages, mailing groups and check lists which works to spread the knowledge. Another way to spread the knowledge is the managers' encouragement of the employees to take courses for skill development (4).

4.3.1 Networks

Within CC, the notion that only the person who contains the knowledge knows exactly what that knowledge is (4; 5) has been seen by several people and is regarded as a problem, since it is hard to document this type of information (4; 2; 3). However, other people can have a pretty good idea about what that knowledge is and within CC, this first and foremost applies to the nearest manager.

In addition to the nearest manager, all employees at CC create their own personal networks (5; 6) and these networks seem to be a prerequisite to survive in the fast-paced firm.

“After a while, you build up some kind of personal network where you know who to ask for a certain question” (4, CC)

Within the personal networks, people have a good understanding of what kind of knowledge the different employees in the network possess although it can take up to two years to construct a useful web of connections and this process never stops (4; 5). The networks derive from old projects, contacts from a worker having worked at different projects or within a different technical area, from the hallway and from working on current projects (4). When a new game player joins, this person does not know where to search for information needed or who to go through. For example, a sub-project leader who is recruited externally can take on a second position of an object leader simultaneously, in order to learn about who possesses what knowledge. Important to notice is that this is an initiative taken by individuals within a project and decided in a decentralised manner (6). The employees' personal networks seem to be a

(helpful) survival kit for solving technical problems, especially under time pressure (4). At the moment, there is no formal support for new employees regarding how to build these networks; this is something they have to figure out on their own. There is, however, a desire from some of the engineers that the firm should find a formal system that supports these networks (4). Consequently, today in CC there is a lot of knowledge creation and knowledge transfer going on that is not really managed (3; 5), adding up to the informal part of our empirical study.

“[About personal network]; you have your own little backpack, with your personal web of contacts.” (6, CC)

In contrast to this, *Alfa* is, at the moment, introducing a formal system for back-tracking project phases and project members to be able to find solutions for a problem. In *Gamma*, the network is seen as a great advantage and a lot of effort is put on creating networks as well as taking part in informal and formal networks around the world. Here, formal networks can be as bad or as good as a regular company or authority. The informal networks however are the most valuable ones, resulting in the highest knowledge transfer although it is an effort keeping track of them. Even within the own organisation, the networks play a big part since there are no central documents of collected information on the know-how of different people. In order to document this type of information, it would demand a lot of resources put on updating the system frequently since the know-how changes from day-day along with the development of research. (11; 12)

4.3.2 Informal “talks”

In excess of the formal performance appraisals it is basically up to the line managers to decide how much time they should devote to more or less formal conversations with their staff. One of our interviewees said that he had an informal “talk” with all of his employees at least once every five weeks (3; 5). These “talks” had no agenda, it was up to the employee to decide what he or she wanted to talk about for that dedicated half hour. The same interviewee also had weekly meeting with his staff where he shared information. (5) To sum up; it is the line managers’ responsibility to keep themselves up to date with what knowledge their employees have acquired lately. This encourages the engineers to also talk to each other, and thereby knowledge is unavoidably transferred in these daily informal conversations.

“It’s the dialogue with the employees and discussions in meetings that are important” (3, CC)

CC is all about creating new knowledge in order to be one of the world leading companies in the high-tech market today (1-6). Put in relation to knowledge transfer, knowledge creation is perceived from the line managers’ perspective as more important, since CC provides educational courses within several areas from technical tool competence to leadership development in order to create new knowledge (3). However, self-studies also seem to be quite frequent and we can

conclude that many activities are steered by the individual's own initiative (3; 2). Another aspect to enable knowledge creation is to have appointed mentors, as guides and to have somebody to ask when needed (3). However, these knowledge creation activities have a secondary effect of also transferring knowledge, but some other activities are clearly done with the latter focus in mind.

4.3.3 Internal environment

Within the internal environment at CC flourishes openness as it is a decentralised organisation. The hierarchical structure can be seen both amongst the software developers where they can reach different competence levels and in the expert careers, though the feelings we get is that CC follows a flat structure environment. Decisions are, though made by the appointed managers not carved in rock and the group opinion as well as the individual opinion counts.

“Before, [talking about another department] we always extended our coffee breaks from 5 to 25 minutes since somebody came by and asked questions which led to some kind of informal update meeting. But it was very good; we learnt a lot and got to meet other people in other projects. It is actually one of the only departments still having a coffee table; all others had to get rid of it, since there is not space enough.” (6, CC)

The physical work environment is undergoing a constant change because of the growth in CC. Therefore working together in teams does not ensure that you sit together. Furthermore, the coffee rooms and kitchens have been taken away because of lack of space and instead coffee machines have been placed in every corner of the corridors throughout the company. One of the interviewees even enhanced the fact that the open coffee rooms from before enabled creativity and innovation as people would stop and ask questions and anyone was free to join the conversation leading to great ideas. This possibility has decreased as you lose the random meetings in the hallway.

Looking at *Gamma*, the organisation has worked actively with creating meeting places in the middle of every floor to benefit knowledge transfer and creativity. (11) *Beta* is a decentralised organisation though since they are working after regulated processes which are centrally controlled, the result falls in between the two. At *Beta* the employees work in an open work space and they carefully plan where to put the personnel to create the best work conditions and composition of people. The closeness to managers and the simplicity of having dialogues characterises the environment here. They also create special rooms where the personnel easily can co-operate and make use of knowledge interaction. It is a rather chaotic organisation, not very formal, with an open and transparent culture. (9)

“Fast, agile, flexible and self-instructional organisation” (8, Beta)

Beta has a clearly defined strategy from the HR-perspective where they put effort on employee satisfaction and employee engagement with a world wide workforce conducting a survey every year open to everybody to see. (8)

Likewise, at CC the culture encourages employees to ask questions and seek answers when they are unsure of something. Almost everybody is helpful and eager to share their knowledge with those who need help. However, this scenario is different for offices abroad, especially in the US, where the employees who have a deeper knowledge enjoy their expert status and wish to keep it this way. (5; 6) Creativity and the spirit of innovation is enhanced and encouraged in CC through letting the workers have freedom of working to try new ways and ideas during the project. The only demand is that the project reaches its goals. (4)

“Knowledge cannot be written down; it has to be transferred from person to person.” (5, CC)

The general environment is reflected in the work ways where the focus to a large part lies on reaching the results wanted as well as avoiding making mistakes, since making mistakes forces you to go back to re-evaluate and start over, which time does not allow. To go back is also hard since such a big company as CC, is heavy-steered. It can also take a long time to get to the action point as a lot of people are involved and it might be quicker to do it yourself. It is although important to not be caught up in the stressful spinning silo of always rushing to meet deadlines (6).

“We are growing in an explosive manner [...]. It is stressful to meet the deadlines, but we must focus on that.” (6, CC)

The most obvious way that knowledge is transferred at CC is through the work that the engineers perform together. The project and line managers contribute to this by deciding the composition of the work groups. Diversity in the work groups is one prerequisite for both knowledge creation and knowledge transfer. This encourages employees to “think outside the box” and hopefully to create a better work climate. (5) The responsibility for this type of informal knowledge transfer thereby rests on the line managers, since they are the ones recruiting new engineers. Within CC, there is a lot of stress and time and deadlines have become the leading values instead of learning. Hence, some expresses that bigger focus should be put on cooperation between projects and cooperation in utilising resources and employees (6).

Career development is an important motivational factor at CC and the encouragement is put on development possibilities and lets the engineers take part and affect the technical focus area they are working within even after many years of specialisation (5). Less can be said from the employees' side on which project to work on (3). There are great possibilities to get experience in handling big budgets and there is a possibility to try many things. (6)

Line managers are not only responsible for supplying the right competence within the company, like finding new recruits, they are also responsible for the wellbeing, motivation and further education/learning of their co-workers. (5) To create a setting where knowledge can be created and transferred is something the line managers think about on a daily basis (3; 5).

4.3.4 Problems with informal knowledge transfer

One aspect which takes the focus off knowledge transfer is that the projects or teams consist of the same people working together as the project group beforehand. Surely, there is a turnover of employees to some extent but this mainly depends on people changing their specialisation area or quitting their job (6).

Every project in CC demands a follow-up, although they are often conducted through meetings with the objective to together discuss the work progress, problems that arose, successful actions, the cooperation etc. However, in reality, the meetings take place with an undertone of worthlessness and since the same people will work together again on the next project and then have the same meeting. People at CC feel the meetings are unnecessary resulting on them discussing other things (6).

Another problem with informal knowledge transfer is that sometimes, people who have not been formally appointed “experts” do not have the responsibility to share their knowledge. Hence, they lack willingness and initiative to answer questions, help others and share their knowledge. These key competences realise their own value and want to keep the knowledge (4).

4.3.5 Summary of informal knowledge transfer and knowledge creation

Thematic area	Summarised material	Perspective & focus
Networks	CC <i>Personal networks are very important and takes time to develop</i>	Knowledge transfer and process perspective
Informal “talks”	CC <i>Dialogue to enhance notice on the employees’ development</i>	Knowledge creation, process perspective
Internal environment	CC <i>Decentralised, individual initiative, stressful, deadlines, career development, awareness of knowledge transfer</i>	Knowledge transfer, process perspective
Problems with inform. knowledge transfer	CC <i>Key competences not wanting to share their knowledge, unsuccessful follow-ups, low variety of teams.</i>	Knowledge transfer

Table 2.1. Illustration of how we have collected our empirical material.

5 Analysis

When was the last time you wrote a report on something you had performed and thought to yourself: - This will probably be stored in a company archive and never be looked upon or read again? - What a waste of time and what was really the point?

Since our analysis is based mostly on our own interpretations of the empirical data, but also on theories, we have structured this chapter based on both of these factors. We first present a four-fielder to illustrate our findings and then we review our analysis of how knowledge is handled as an object. After this, we analyse the activities that point to a process view on knowledge and this section have been divided after the theories generated by Nonaka and Sveiby (individual level, group level, intra-organisational level and inter-organisational level). We have chosen to present key competencies separately, since this impacts both the object and the process view. Finally, we sum up our findings by presenting another four-fielder meant to remind the reader of what the chapter has discussed.

5.1 A four-fielder

It is obvious that the four organisations have different strategies to create and transfer knowledge, as we have shown in the empirical chapter. Both the focus, and their views on knowledge differ and this is something that clearly impacts how they manage knowledge within their respective organisations. We have composed a four-fielder, showing our perception of the interviewees' outlooks on how their organisations create, transfer and conceive knowledge. These perceptions derive from our interpretations of the respondents' subjective answers, thus the model inevitably becomes biased. This model is used to help us analyse our empirical data, however, the responses have not been as clear-cut as one might think when looking at the model. Interestingly, not even employees within the same organisation, in CC, have exactly the same conceptions. One of the reasons for this result is that the view on knowledge and knowledge management (KM) is highly subjective and depends a lot on what kind of work or position the interviewee has.

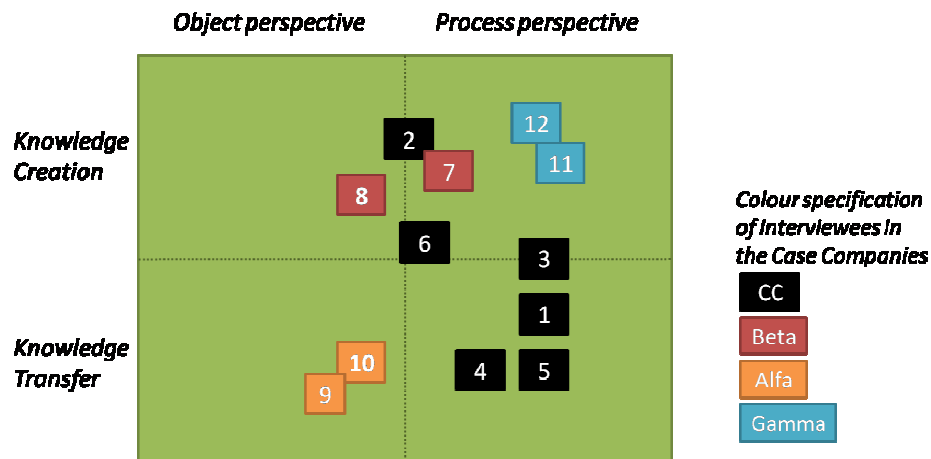


Figure 5.1. Four-fielder over the interviewees within each company.

The four-fielder above combines the two perspectives object and process with the knowledge creation and the knowledge transfer. This illustrates how we interpret each of the companies on the basis of the answers from our 12 interviewees. This model is not based on quantitative measurements and should consequently only be used to illustrate a general picture of our analysed data.

Looking at the responses from the employees at CC (figure 5.1), it is clear that the interviewees who are at the operational level (6 & 2) see knowledge more of an object, whereas the ones that hold higher positions within the organisation are of a slightly different opinion. Combined with placing the interviewees' perception of knowledge in the above model, we have continued to analyse and interpret in-depth to find significant features.

Out of our respondents at CC, number 1 is the person having the highest position within the hierarchy of the line. We interpret this person's view on knowledge as a process that does not need much managing while number 3 and 5, who are both line managers, feel that the focus for CC is to transfer knowledge. Number 1 is of the opinion that knowledge transfer will happen automatically when people work together, while number 3 and 5 feel that it is their responsibility to make the transfer happen. Nevertheless, all three of them find both knowledge creation and knowledge transfer of high importance, automatically transferred or not. We derived a similar placing from our interview number 4, an engineer, which can be explained by the close relationship and dialogue number 4 and his/her group has with their line manager, number 5. In conclusion, all of these four interviewees have a more strategic overview of the operational part of the organisation, leading them to view knowledge as a process and focus on the knowledge transfer.

Number 6, however, is a sub-project leader and there is a clear difference between this person's view and those earlier mentioned. This project leader's most important goal is to deliver the

product to the customers, leading this person to have a conception of knowledge as both a process and an object. More importantly, number 6's work tasks make him/her believe that the organisation is focused on creation of knowledge. In addition, number 2 is the interviewee with the lowest position within the line, an object leader, and also this individual has a focus on creating knowledge. Hence, interviewee number 1, 3, 4 and 5 are all within the line organisation and are responsible for making sure that the right competencies are found in the firm, consequently, they have their focus on transferring knowledge. Whilst number 2 and 6, within the project organisation, put their focal point on knowledge creation.

Looking at the other three organisations, the responses do not vary as much as within CC. This might be explained by the fact that we have not done as many interviews at these companies as in CC, but this was also never our desire. The fact that the two respondents, at each of the mirror companies, had rather similar positions could also contribute to the similar concepts at each of these firms. Still, the interviews at *Alfa*, *Beta* and *Gamma* give us a deeper foundation for this analysis.

Primarily, we are aiming to describe the two different perspectives, object and process. We will hereby provide you with our interpretations of knowledge transfer and knowledge creation within CC. Further, reflections of similarities, dissimilarities and possible implications will be viewed upon using our renderings from the mirror companies.

5.2 The object view on knowledge

CC's IC does not show in their bookkeeping, but there are clear signs that they, informally anyway value their IC high. Since it is a knowledge-intensive firm, CC acknowledges that the employees and their knowledge are the firm's most important asset. Accordingly, the nurturing of human capital is a big concern in CC. They make sure the employees have the right competencies, by educating newly employed engineers and also by giving them a mentor. Further, CC hires people with the right attitude to make them use their skills and knowledge in an efficient way (Roos et al, 1997). We find it is very interesting that engineers are basically self-motivated when it comes to develop new technology, which makes work motivation a minor concern for CC. The main risk of human capital, that the employee can leave the organisation at any time (Edvinsson & Malone, 1997), is downplayed by the organisation's low employee turnover. Still, there have been cases of this happening in CC, which everyone remembers and thinks about. It has become an organisational memory leading to the managements' wishes to document processes as an attempt to decrease the dependency on employees with key competencies.

There is a strong desire within the organisation to turn human capital into structural capital by codifying knowledge. This mainly concerns the processes and thereby the process capital which they try to make stronger. However, CC has a long way to go before having a clear-cut codification strategy. They have problems motivating the employees to frequently update the process databases.

As stated above, there is a tendency towards converting human capital into structural, but this is far from ready to be called a codification strategy. The wish to codify is one sign by CC, that also they to some extent view knowledge as an object, although their main outlook is that knowledge is a process. There are a few parts of CC where documentation is more acknowledged and the databases are somewhat up-to-date. However, this is not nearly enough and the whole company can not benefit from this. The main purpose of putting people's knowledge into databases is to save time by making the knowledge available to everybody all the time (Hansen et al, 1999). This leads us to wonder if this would be true for CC. The main reason for documenting at CC should rather be the decrease of dependence on key personnel.

Still, the desire in CC to codify mainly concerns processes and not other important information, like who in the company possess which specific knowledge. *Alfa* on the other hand derives from an object perspective and work a lot with documentation and systems for storing information. They have a good idea, which is to in detail document their projects and also what specific task each employee worked with within these projects. This leads to the advantage of quickly being able to find someone who earlier has worked with similar activities when starting a new project. By objectifying knowledge like this, processes have successively developed and *Alfa* puts a big focus on encouraging the employees to use the systems. They emphasise the importance of allotting time for writing reports and the value of doing follow-ups. CC also has a data system where you can see in what projects an employee has been working and what kind of courses a person has attended, but this does not go further than that, which when looking at *Alfa* might be something to consider.

Since employee engagement and employee satisfaction is of high importance at *Beta*, it is interesting to see how this is reflected in the organisation. One part of the organisation, the learning development centre, has the responsibility to enable career development for the employees, in an objectified manner, as the focus rests on practical or web-based courses focused on either personal or technical skills. Another system of frequent use is the quantity system documenting the amount of certifications which is frequently updated by the technicians themselves, although the quality is hard to define and put into structural capital. In addition, the resource manager has a detailed system of the employees' knowledge and current placements to be able to relocate staff at any time which lies in accordance with the codification strategy (Hansen et al, 1999), although the objective is the allocation of staff rather than increasing the

transfer or creation of knowledge. Though the systems in *Beta* have been successfully implemented, a problem and also the reason why another of our mirror companies, *Gamma*, awaits a development of such a system, is the uncertainty of updates. Subsequently, without clear general guidelines for how to manage the systems, much responsibility, like updates, is put on the individual. This is the current situation in CC and also the barrier in reaching a full codification strategy, if this is the desire.

Generally in CC, a big reliance rests on the results of the projects which are accurately accounted for in documents and reports. These result reports are however lacking descriptions over the work processes and contain primarily the results and the “winning formulas”. In some units of CC, the reliance on documentation is crucial. This concerns especially one unit between the basic development and the customer relations divisions. In this unit CC test all the module functions before the final product is put together to suit the customer. Therefore the module system and in addition a computerised telephone list are frequently updated. In these systems the employees can find who is responsible for which part of the product and subsequently it is easy to contact the developer directly when problems arise. Since the system is regularly updated, CC has an opportunity to develop it further as the system today is a good basis for a “personnel know-how database”. In doing this, CC could move closer to realising a codification strategy and by bringing the positive aspects of this system into use in the entire firm this system could work as a complement to personal networks and save time in the fast-paced environment.

In reflection, *Alfa* emphasises codification a lot as they have already implemented an integrated system for their projects including time reporting, follow-ups, know-how base for allocation, frame of budget etc. as a comprehensive base for their knowledge transfer, especially in between projects and throughout the organisation as it is a system available for all to use.

Since the employees at CC are under time pressure to deliver solutions to customers it is hard to motivate them to update the databases. Hence, when it takes time to save time, the disadvantages of today outweigh the advantages of tomorrow.

However, since most of the updating happens on the individual’s initiative and do not derive from the top, some line managers have recognised this problem, and allocate the extra time needed for their workers. There is also a conflict of interests between the line managers and the project managers, where the latter are more concerned with the short-term perspective of delivering the product on time. This, of course, gives the employees more reasons not to take time to update the databases, even though they know the line manager wants them to. Time stands out as critical in CC, though being too fast leads to neither documenting nor reflecting on what you have learnt. Stress together with the fact that CC is a decentralised organisation, results in that many decisions rest on the individuals’ initiative. But being too autonomous is nothing to strive for as the team can turn into a “spinning silo” keeping the knowledge inaccessible for

others outside the group. Since knowledge transfer is a central issue at CC, too much autonomy will (by itself, not taking other aspects into account) decrease the knowledge transfer between projects. The strong individuals, doing their own thing, are hence bad role models if CC wants to accomplish a codification strategy. This does not say that they should constrain own thinking.

Of more frequent use than codification in CC is the transfer of knowledge from one person to another. This is done both through daily work and in more formal manners, like appointing a mentor to a new engineer. To build and have a personal network is unavoidable at CC; however, this is not something the employees do over night. The implication of this is that new employees have a hard time knowing who to turn to when they need help to solve a problem. If it would be documented somewhere, what type of competence the employees have, more than who has been working on which projects it could make the construction of a personal network a lot smoother. Here, as discussed above, we render a need for a more thorough codification strategy, like a personnel know-how system.

To transfer knowledge between employees, a great amount of dialogue is required (Hansen et al, 1999) which is accomplished in CC through meetings, cross-site activities and the occasional transfer of employees to offices abroad. All of these actions comes from vague top management directions, and are then recognised and carried out by the line managers. This goes against theories on project-based organisations saying that knowledge transfer is best implemented from the top with a formal system. As discussed before, initiatives are now searching their way from below in CC as knowledge transfer naturally is about involving all engineers and having project managers implementing and supporting KM activities. That the line managers have a major responsibility is something positive, since responsibility often leads to motivation and engagement regarding the work. Though, for a balanced knowledge transfer, the fundamental initiative should start with the top management implementing and spreading standard work processes and ways of thinking, which can be seen in *Alfa*.

Accordingly, we can illustrate the difference in focus between CC and *Alfa*. From an individual level at CC there is a big reliance on the personal network whereas in *Alfa*, the codified processes and the formal systems are the foundation for every individual.

CC's KM is dominated by the personalisation strategy, but they aim for a more codified strategy in the future. This goes along with the rapid growth of the company, since a larger organisation needs to codify more than smaller firms. In addition, this shows that CC has a desire to be able to view knowledge more as an object. Their competitive strategy, on the other hand, is both to deliver customised products which require innovative and personalised knowledge transfer, but also to keep standardised solutions alive. This suggests that some projects need to focus on the personalisation strategy, whereas some could benefit, in both time and money, from being more

codified. Hence, maybe those failed attempts to codify knowledge are not failures, in the sense that these projects do not require such a strategy.

5.3 The process view on knowledge

CC, like most other companies, has its own unique approach to knowledge creation and knowledge transfer. However, there are some characteristics within KM at CC that are also discussed in the theories developed by Nonaka and Sveiby with a process perspective on knowledge.

CC acknowledges the fact that some knowledge within the company is tacit and can not be transferred through codification. However, they still seek a way to document processes within the organisation, for the purpose to spread knowledge ongoing in these processes. Thus, it would become easier for those who are starting a new project, if they could find guidelines and solutions in the databases when problems emerge. One obstacle is that a process is a flow, something intangible and dynamic and therefore almost impossible to document according to the process view. It is therefore no wonder that CC has trouble motivating their employees to update the processes, which they find needless and time consuming.

As *Alfa* emphasises value creation in their entire supply chain and, to a larger extent than CC, works on transferring knowledge through interaction, they retrieve a broader competence base and become less dependant on key competencies. Similarly to Sveiby's nine-step model (2001), they place focus on the transfer from the individual employee and the internal organisation to the customer and other stakeholders, the transfer from stakeholders to the individual employee and the internal organisation and also the transfer between the individual employee and the intra-organisation. Subsequently, this strategy of the three interlinked levels, internally, externally and individually, is a conscious choice of strategy which works to enhance the openness and the willingness to share knowledge in *Alfa*.

Nevertheless, a statement is neither black nor white; many times the scale of grey is rather large. The strategy optimal for *Alfa* might not be optimal for CC. Interestingly to notice is that even if CC does not make use of all of the elements in the nine-step model, it does not imply that CC is not using knowledge transfer or that they set boundaries for the transfer.

Changes are evidently occurring within CC comparing today to a few years ago although this ship is big and heavy to steer meaning it is time consuming and difficult to go back and adjust or alternate a fault within a project. In CC, knowledge is created at different dimensions; at individual level(1), in the work groups(2), internally, here named intra-organisationally(3) and externally, in other words on an inter-organisational level(4).

5.3.1 Individual level

There is not much encouragement from the managers that the employees should reflect over the knowledge they acquire while working. If the engineers were given time for reflection of what they have learnt and are learning, they would find themselves possessing new knowledge constantly and especially once a project has ended. Now it seems like the engineers do not even consider what knowledge they possess or when and how they obtain new knowledge. This is a fact we interpreted considering the way the organisation handles evaluations, both formally and informally. CC has no individual conversations about knowledge with the engineers after a project has ended, which could encourage the engineers to think more about their own knowledge. However there are attempts from single managers to maintain and develop the relationship with the employees and see to it that they are satisfied with both their work and their personal life. This can contribute to higher motivation and satisfaction among the employees which indirectly results in greater knowledge creation. However, the evaluations that, in general, take place at CC a few times per year are initiated by the line managers or project leaders and since their focus is on technical competencies this is also the focus of these evaluations. In the beginning of every year, the individual goal-settings are discussed and developed. This year, the individual performance management consists of the general aims to broaden one's knowledge and to work effectively, and also here, it implies a focus on broadening technical skills. This does not benefit the entire knowledge creation taking place within an individual since it should also incorporate the tacit elements and not just technical skills.

5.3.2 Group level

On a group level, CC, handles knowledge a bit better than it does on the individual level. Important to note is that knowledge transfer can mean both competence in the technical area and personal skills, for example how to discuss in a group. Technical competencies are well considered when it comes to composing the different project groups. Thus, the primary consideration comes down to what competencies the project needs and the line managers try to think about how to put together a team where newer engineers can learn from those with more experience. But there is a need for CC to focus more on the personalities of the engineers and combine this with the focus they have today on competencies if they desire a more heterogeneous team, when composing project groups. A heterogeneous team in terms of both competencies and variety of personalities will reach a higher level of innovation, creativity and discussions to stay a dynamic team.

This together with tight deadlines, increases the probability that the line manager will put together team members from the same previous team who have performed well in the past, contributing to low variety in job tasks, thus a "safe" competence allocation, which often is the case at CC. It also happens that the same engineers work together on several projects, when CC

only considers technical competence as a criterion for personnel allocation. When composing teams, since the line managers are only obliged to provide competencies for the projects, it is hard for them to compose more heterogeneous groups. Still, the managers are aware of the fact that too homogeneous groups result in a loss of dynamics and innovativeness in the team, thus leading to lower knowledge creation (Nonaka & Takeuchi, 1995). But since there are no guidelines from the top in allocating heterogeneous teams to boost up creativity, it is up to the project manager to do this. Composing teams in *Alfa* is also “safely” conducted and the same people often work together in different projects which work to their disadvantage as they lack of variety of project members in the composed groups. *Alfa* has, on the other hand, picked up on the importance of maintaining an open knowledge flow and a helpful atmosphere and works more actively with knowledge transfer. Induction programme trips for new employees, 6 month manager programmes, introducing words like value creation and having area skill groups are all incentives to enhance the knowledge transfer from both an internal and external point of view.

Gamma works consciously with increasing the variety and job rotation by allocating resources cross-functionally. This means that an employee can be active in two different projects simultaneously and in that way actively transfer knowledge about work manners and ways of thinking and thus solve problems between the teams. Since CC has a similar strategy of allocating personnel to several projects at the same time, cross-functionally, knowledge transfer should also take place here.

However, since the need of personnel is central and the time aspect critical, this strategy of allocation often results in confusion and work overload for the individual or the projects being allocated a certain resource percentage but in practise receiving less. The fact that some employees are switching between several projects can also lead to a negative feeling amongst the rest of the project members. The consequence is that the knowledge flow between individuals is sometimes broken and unbalanced in CC. On the contrary, one thing that enhances knowledge transfer in CC is that the high demand for “experts” leads some project managers to instead request engineers that are not as skilled, since it is more definite that they will get these workers. This leads to a broadening of the competencies as these under-expert level engineers eventually also reach expert knowledge by working with the problem solutions given.

The organisation acknowledges the fact that there is a lot of tacit knowledge both on individual and group level that can only be transferred through socialisation. Mentoring programs is an activity that enables transfer and is something the organisation has found to be a necessary complement to the courses offered to new employees. We interpret mentoring as one of the most important and well-performed actions at CC when it comes to knowledge creation and knowledge transfer.

Something that has become self-developed within CC, namely personal networks, transfers knowledge from one person to another with no support what so ever from the top. Since

knowledge from a process perspective is defined as a flow between people and is transferred through social interactions (Sveiby, 2001), personal networks are of high importance when it comes to knowledge transfer. To build these personal networks is a continuous process for every employee at CC and it takes a long time for each person before the network becomes well-founded and really useful. Once built up, the network enhances the opportunity for people from different parts of the organisation to help each other solve problems and ask for advice which contributes to a great amount of knowledge transfer. Still, these personal networks are not being actively managed or acknowledged by management, thus perhaps there is room for improvement. Informally, the networks are useful once they have a solid ground, but the construction of these personal networks could with most probability be facilitated even more if they were being formally managed. Within *Gamma*, they have noticed the value of informal networks and they consciously join formal and informal networks. Through providing contacts and encouraging the employees to join informal networks, *Gamma* gives the employees the correct prerequisites to create personal networks on their own. The reason for doing this is that *Gamma* wants to stay on the front edge within their field of research, to obtain the latest information and to enhance the creation of new knowledge. Hence the intra-organisational to inter-organisational knowledge transfer, and vice versa, is vital in *Gamma* and the tacit-to-tacit knowledge is what keeps the elitism and the top researchers' top.

Within CC, personal networks contribute to the tacit-to-tacit knowledge transfer and to a certain extent; these personal contact webs facilitate the transfer of knowledge from explicit to tacit knowledge as well. Another aspect of the conveyance of knowledge in CC is that they also do a lot to help explicit knowledge transfer through the organisation. Through meetings, "cross-site" activities, courses and "expert" seminars, knowledge is transferred from one person to others and thereby grows and develops on its own (Nonaka, 1994). Explicit knowledge can duplicate through trial and error which CC tries to encourage by having an open climate which supports freedom and empowerment. Explicit knowledge is also transferred to tacit knowledge through the use of databases; this is something which CC at the moment is rather poor at encouraging. People do not generally use the databases since they find it time consuming along with the fact that these databases are obsolete and incomplete. CC needs to get these databases up to date and motivate the employees to be a part of this update. Thus, it has become a downward spiral since CC does not know in which end to start.

5.3.3 Intra-organisational level

The transfer of knowledge on an intra-organisational level is not a priority at CC today. Since they are in a phase of growth it is hard for them to keep up, both regarding rationalising databases and to have an office plan that supports this. However, knowledge transfer is supported in CC through the organisational structure, thanks to their matrix structure. Here one line consists of workers from several different projects placed under the same line manager, thus

enabling the employees to interact with different people. In addition, the project leaders discuss issues, problems and exchange knowledge amongst one another and interchange competencies to help and increase effectiveness. Hence, helpfulness and co-operation between managers is on a satisfying level, which is a trigger in building trust and increasing the initiatives for everyone to transfer their own knowledge. This exchange of resources between managers is nothing that can be seen in the formal personnel allocation system, but it is a convenient way of solving problems. Besides, it also helps the informal transfer of knowledge between the two projects in question.

To a large part, willingness to share knowledge and help fellow colleagues, often occurs at CC without the fact that the individuals have such responsibility. This displays that trust is existent within the organisation. However, to increase helpfulness even more it is necessary to, from the top, clarify the importance of such, since when time is scarce and deadlines are first priorities helpfulness often comes second. To be able to maintain a knowledge transfer between individuals, the helpfulness can not be concentrated to a few formally appointed “experts” with the responsibility to share knowledge included in their job description. Despite the fact that helpfulness seems to be an unconscious mindset, it is lacking at its locations which is why the top management should clarify this as an outspoken company norm, for it to be generally accepted as part of the internal environment.

In a way, the physical environment at CC, where teams are not situated together due to lack of space does limit creativity and face-to-face communication. Also, the environment of small coffee machines instead of thought-out meeting places is a disturbance of knowledge transfer and creation. On the other hand, many small coffee stops increase the possibility to randomly meet workers from other projects and not only from the engineers’ own area of expertise, which enhances knowledge transfer.

From a process perspective, the internal environment at *Beta* seems to be the perfect tool for the future of knowledge transfer. Here, they focus on open-plan work spaces and face-to-face communication, which is extremely efficient. Also in practice, it works to *Beta*’s advantage and enhances their knowledge creation and transfer. *Gamma* also puts their focus on knowledge creation through their internal environment by putting up special meeting places in the middle of each floor connecting people and encouraging conversation, not only at certain times. Thus, the employees get new ideas and the vital innovativeness and creativity increases, thanks to this knowledge process of socialisation.

These aspects are not evidences of CC working in the wrong way; they are to be seen as implications for how to improve an internal environment undergoing rapid changes in order to maintain the creativity and more importantly the transfer of knowledge. The gain of having an internal environment that supports a slow-steered large organisation, operating in a highly dynamic industry, is far greater than the costs of obtaining this.

5.3.4 Inter-organisational level

On the inter-organisational level, where the internal and the external environment conspire, CC is undertaking some activities to enhance knowledge transfer. For example they have a lot of meetings with customers to understand their wishes and preferences, which leads to a knowledge transfer externally. As CC puts a major emphasis on producing product solutions with standards which are applicable for a large span of customer products, their customer relations are of immense significance. The company also customises the products through taking an active roll in the customer phase, considering that half of the company works in the division for customer and products. As product faults may appear, CC is prepared to carefully analyse and start up research on reports and orders from the customer company.

In relation to CC, *Alfa* has educations for their customers where they teach them about the products and also supplies them with both support and consultants that are on location to help deliver the solutions. This transfer of internal knowledge outwards to customers is something that could also be useful to implement in CC in order to get a knowledge flow in both directions (Sveiby, 2001). Looking at the circumstances, we would say that the interaction between the internal and external environment at CC is sufficient for supporting a desirable degree of knowledge transfer between CC and their customers, though it can always improve to the level where *Alfa* is at.

5.4 Key Competencies

The two perspectives of knowledge we discuss in this study, object and process, differs between our case organisations though it does not seem to affect nor be a basis for key competencies staying or leaving the company. Since the process perspective is dominant in both CC and in *Gamma*, and still they differ from one another, this aspect is interesting to analyse. In *Gamma*, research heroes are seen as the elite, top people indispensable to the organisation. The organisation is dependent on certain key employees and this is something *Gamma* gladly emphasises. However, *Gamma* is in a monopoly like situation, in contrast to CC. Consequently, CC needs to be aware of the risk of employees with key competencies leaving the organisation, which they also are.

Their quest to decrease dependence on certain employees and spread knowledge is beneficial and admirable. It is, as mentioned before, possible to allocate a key competence to several projects at once, instead of letting this person deepen his or her knowledge in a specific problem within one project. In doing this, CC makes sure that the key competence can spread the knowledge to more people and they eliminate the risk of this individual being in the “hot spot” or too focused on his or her specialisation. As the aim is not to hinder a development of the key competencies specialisation, only to avoid dependency, CC is at an operational level, though focusing on

knowledge creation in the big picture, actively thinking of knowledge transfer. However, the directive to eliminate or reduce dependency on key competencies derives from the top, although without suggestions as to the approach. This directive may also result, if conducted right, in effective knowledge transfer.

Interesting to relate to is *Beta* that has a strategy where one part accentuates its key competencies or experts through their web page and the employees all have a link of their own, which anyone with access to the Internet can see. This enhances the possibility of being recognised internationally for your work and publications both during and after working at *Beta* which indulges the loyalty towards their employees, indirectly guaranteeing the loyalty from the employees. This confirms the engagement and satisfaction of the members but also brings in a new mindset to keep the knowledge and nurture it at *Beta*. From a long-term perspective, the objective for the employees in this part of *Beta*, the web page is meant to contribute to the generation of new knowledge.

5.5 Summary

As we have tried to illustrate throughout this chapter, CC has an outlook on knowledge as a process, which we can derive from how they handle (or do not handle) KM. One can debate if it is the KM activities that have shaped this mindset or the other way around. However, our analysis points towards the fact that there is a slight difference in line of approaches for each of the four firms. Thus, for the purpose of illustrating this difference, we have placed the organisations within our four-fielder (figure 5.2).

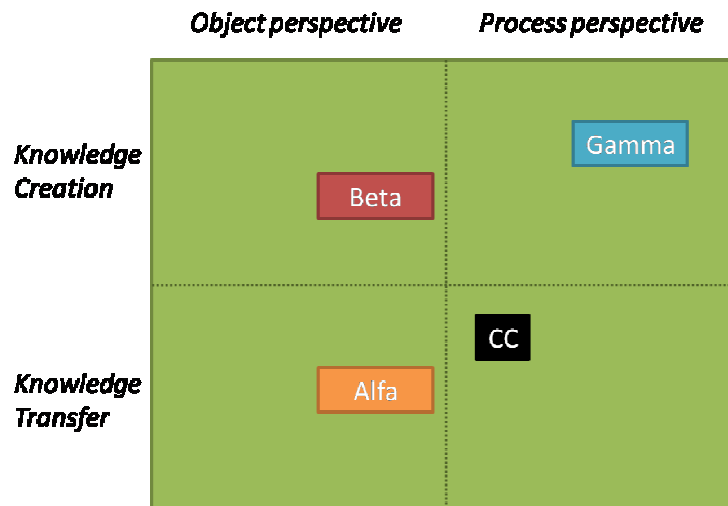


Figure 5.2. Four-fielder over each company. The four-fielder above combines the two perspectives object and process with knowledge creation and knowledge transfer. This illustrates how we interpret each of the companies CC, Alfa, Beta and Gamma. As also mentioned in figure 5.1, this four-fielder is constructed on the basis of our interpretations of the interviewees' subjective opinions, thus it is not a result of a quantitative method or a model based on a positivistic epistemology.

Within CC we found a clear desire to view knowledge as an object, which was also something we expected to find. Interestingly, after analysing the empirical data, it was apparent that we had initiated this study with the wrong conception. The high growth and dynamic business keep CC from handling knowledge in an objectified way. In addition, there are several parts of CC's KM that can not be objectified because of its nature. These factors have made our interviewees attentive to the fact that they actually, in practise, view knowledge as a process. This is also reflected throughout the interviews.

CC puts a lot of thought into transferring knowledge, much because of the nature of the projects that do not require as much knowledge creation. Consequently, CC falls in the field of the process/transfer conception, though near the middle of the four-fielder. This analysis becomes even clearer when we use the other organisations to mirror the activities within the companies that point towards different directions.

The middle of the four-fielder can be seen both as a position of confusion and clarity. Being positioned in the middle can derive from the fact that the organisation has unclear goals and lacks a thorough strategic identity as they seem to lack a focal point, instead resting on all the concepts simultaneously. The results are confused employees who start to create their own perception of the company's strategic identity and line of approach. On the other hand, given that the four-fielder is not a matter of choosing black or white, rather perspectives to help you see matters differently, being in the middle might reflect a company with a dynamic environment not wanting to put barriers for the mind into an outspoken perspective.

6 Conclusion

It's not about focusing on the right answers to the questions. It's about finding the reasons and causes behind the answers. How can the organisation take their ideas on knowledge with them into the future? How can CC change its KM to increase innovation?

6.1 Discussion

We are aware of the fact that the four-fielders, found in our analysis, can never reflect reality perfectly. In addition, the four-fielders are based on our interpretations, which inevitably are affected by our pre-comprehensions. In our empirical study we have found elements of all four views within all four organisations. However, using the four-fielder to guide us through the different directions was an attempt to clarify for the reader how our interpretation of the data was conducted. This became even clearer when putting CC in relation to our mirror companies. Still, our conclusions are focused on CC since they are our main object of study.

It is important to keep in mind that four-fielders and overviews are simplifications of reality and ours are no exceptions. No organisation can have only one united view on knowledge or focus 100 % on either creation or transfer. All of the organisations we have studied are high-tech companies that develop new technology. Therefore they would not survive without knowledge creation. Still, some of these organisations place their main focus on knowledge transfer. The basic outlook on knowledge, as an object or a process, is also the foundation for the company's strategy for how to manage their knowledge. Still, as we have shown, this view does not have to be identical throughout an organisation.

We also acknowledge the fact that both our own and the interviewees' subjective opinions have influenced our study, but this has also given the study more depth and enabled us to paint the reader a more illustrative picture. The interviewees also had different perspectives depending on what kind of position they hold at their company, which of course affects their focus. The closer to the operational part of the business, the more the employees objectify knowledge into the actual product they are working with.

6.2 Conclusions

Based on the characteristics of the chosen companies we have understood that different focus on knowledge and different KM strategies can be effective. We have drawn the conclusion that the focus on knowledge can never be insignificant or exaggerated. *The most important thing seems to be awareness of what the company's view on knowledge is and through that be able to choose the right strategy.* CC seems to have a moderately strong focus on knowledge in general, but this focus does not influence the whole organisation. With vague top management directives and divergent views on knowledge within several of the company's departments, the creation and transfer of knowledge will never be concrete enough to be completely efficient. Therefore CC must decide on how and where to put their focus.

The organisation has to be imbued with a "knowledge mindset" and everybody needs to see the use of every action they take regarding the transferring of knowledge, otherwise the employees will get the feeling that there is too much politics within the organisation. This of course affects the personnel's motivation negatively, when it comes to helping spread knowledge.

It is difficult for CC to motivate employees to update the data systems since they feel these are redundant and/or unnecessary, especially regarding documentation of their work processes. *CC has to decide more specifically how they want to approach the documentation of their work processes.* At the moment they try to, once in a while, update the databases which is something the personnel regard as inconvenient but necessary because of directions from above.

To find a way out of this downward trend, the system to document CC's work processes has to be of much higher quality than today. Easier to use, easier to update, but most important of all; the system must be generally accepted and it has to be of use to all of the co-workers in their everyday work-life. Without this last factor, the updates are always going to be in vain. The optimal system is a system that nearby updates itself while being used. One problem for CC is now of course how to construct and implement such a good system. Another problem is to get the personnel to realise that, this time around is exceptional and not like all the other times before, which were apprehended as unnecessary politics.

At CC, there exists a simple system with information registered on who has been working on what project and what educational courses a person has attended within the company. This system could from our point of view be extended and integrated together with the basic detailed data system of module functions and the computerised telephone list. At the moment *Alfa* is performing an ambitious attempt to create a comprehensive project database with detailed information about the employees. CC could learn from this and hence integrate the systems as well as add personal specified facts to the system, like which specific knowledge each person possesses. *By putting the specific knowledge of each person into a database it helps the*

personnel to faster locate somebody to ask in a situation where their own competence is not sufficient.

Important to keep in mind while drawing conclusions about the documentation at CC, is that not all work processes benefit from being codified. *Consequently, some parts of the organisation, which today are not put into databases, should continue not to be codified.* Tacit knowledge is of such nature that it can not be put into a data system, without losing essential meaning. Thus, CC should seriously consider what parts they wish to codify, the amplitude and more importantly, how they want to perform this codification.

The creation of personal networks, which both we and our interviewees find of immense character, could be facilitated through such data system, as mentioned above. *CC should support the informal personal networks* through more social interaction similar to the environment in *Gamma*.

Another fundamental decision at CC in the selection of KM strategy is to consider to which extent they are to be centralised or decentralised. For a large, project-based, knowledge-intensive company in the high-tech industry, which is how our case company CC is defined, *it is by our comprehension most favourable to be decentralised*, since the different departments are so unlike and consequently need suitable strategies. This is parallel with the current situation in CC, although the foundational thoughts must be better implemented and supported from a centralised perspective, similar to the situation in *Beta*. Therefore we see that *more distinct directions from top management regarding CC's KM strategy are a must.*

Important when trying to achieve a more distinct top management is to be careful enough that CC does not lose the motivation of the personnel. Distinct management often goes along with more control, which is not needed in CC. Today the managers on line level have a great amount of responsibility and the engineers have much space for work freedom, innovation and creation. *To be able to influence the daily work and to feel that everything you do is of high significance* are two other factors that have a strong effect on the employees.

Since engineers are more or less self-motivated when it comes to creation of knowledge with their general interest in new technologies and problem solving sense of mind, *we believe that the focus on knowledge transfer is the right decision for CC.* This is, however, something they can put even more focus on along with the reduction of key competence dependency. The fact that the “experts” have a responsibility to disseminate their knowledge through both lectures and seminars and also to put down as much of their knowledge as possible in writing, provides a good basis of transferring knowledge. *Also the organisational structure of CC and the fact that the projects sometimes share co-workers between different projects support the knowledge transfer.* Today CC has both a formal personnel allocation plan, but also when it comes to the

deviations from this plan, an informal cooperation between projects. This of course is important to preserve considering the knowledge transfer even though the personnel sometimes find it inconvenient when they have to keep two projects in mind at the same time.

To sum up, CC is on the right track with their process view on knowledge along with a decentralised organisation and a large focus on person-to-person transfer of knowledge. Their desire to codify more knowledge into databases is important, as long as CC can find a successful implementation and realise what parts that can not and should not be codified. A continued focus on decreasing dependency on key competences is also encouraged by us and this goes along with both a process and an object view on knowledge and transferring knowledge. Finally, top management needs to realise the importance of knowledge within the company and convey this throughout the organisation, while letting the practical decisions be made in a decentralised manner with an influence of a “knowledge mindset”.

6.2.1 A broader perspective

How is KM being handled in the chosen project-based case company? Do they focus on knowledge creation or knowledge transfer? Do they derive from a view of knowledge as an object or a process? In reflection of other players in the business, could KM be handled differently?

During our analysis, we tried to answer these questions and our conclusions above shows that we have been successful in doing this. However, we now reflect on another important question, namely; is there a higher value to this thesis, that reaches beyond the internal walls of our case company?

Looking back at our positioning (figure 1.2) we believed that our contribution mainly lies in the fact that we have tried to view KM from both perspectives; object and process – Western and Eastern. Thus, in our study we have seen activities that contribute to knowledge creation and knowledge transfer, which other researches in their studies, perhaps have missed. We believe that we have contributed to the research field of KM, when emphasising the importance of a researcher looking at a problem with different “glasses” (object and process). We feel that this is something researchers actively need to contemplate while performing a study, since the different perspectives derive from an unconscious level. Consequently the researcher will otherwise focus on one of the perspectives. To broaden studies of KM in this way have also contributed to the IC theory, since it presents an alternative way of looking at human and structural capital.

Although our conclusions are directed to CC, we believe that other firms could benefit from reading our thesis. It will open their eyes and help them see activities from another light and also to realise the importance of an effective informal “KM”. As a result our thesis could help

organisations to find new ways of handling their human and structural capital, when looking at knowledge from both an object and a process perspective. We will end this thesis with some implications, directed to CC, for a new way of managing IC which has been obtained from this study.

6.3 Implications for the future at CC

We have taken you through a journey of looking at KM, more precisely knowledge transfer and knowledge creation out of two perspectives, the object and the process. So, what does all of this mean for CC? What can they do to make their situation better? What have they forgotten to reflect on, that could make a difference? Well, we are not here to find the best way, to normatively provide CC with a solution or to correct CC's work ways. In this section we rather wish to inspire and make an attempt to indulge new thinking of today and the future within the area of study.

For the past several years people have been spreading information through texts, for example by email. Today, in 2007, we are moving towards a world where people want to see more on video, voice links, discussions which can attract all of our senses and move us to another level of interactivity. A second generation knowledge management can be found through the use of Wikis (h; i) and Wikiblogs (j), advanced online services (k; l; m; n) and wiki software for knowledge management. A wiki is defined as "*a web application that allows users to add content, as on an Internet forum, but also allows anyone to edit the content*" (o). Even YouTube (p), a web community for videos and seminars, which most of us have encountered, is a good way to spread information and support learning.

A lot has happened since the dotcom era had its boom, now we read about Web 2.0, Enterprise 2.0, SecondLife, etc. Giving people access to the world, creating these blogs, wikis and online forums is not to be confused with knowledge. They are only tools to enhance and facilitate the transfer and the creation of knowledge (Prusak, 2006). These are interesting and important developments, social networks, wikis and blogs are very dynamic ways of sharing knowledge. Looking at CC from both an object (Western) and a process (Eastern) perspective, we have found critical aspects that the organisation could put more focus on and by them indulging a new way of thinking; these web-based KM communities can bring value for the organisation.

We depicted the most critical factors for CC being the support from the top management, building prerequisites for creating personal networks and prioritise what to document and how. Here we present the opportunity to use web-based KM systems with forums.

With the web community SightSpeed for example, you are able to have video calls with anyone, have your own personalised page, create video and voice emails and blogs, multi-party

conferencing, community calling and call recording. Using Cospire, you can take the wikis one step further, where a special scoring system keeps track of credits. Every producer of knowledge is credited for their contributions to the knowledge community which is a strategy to get an organisation to share the knowledge internally. Though, important to keep in mind is that Cospire has an object view on knowledge but it is not said that this wiki renewal is inefficient. The new Jotspot Wikiblog that Google is launching in 2007 is a shared archive of knowledge which can be used publicly or privately and centralises the information without anybody having to know “html”, applicable to projects, for blogs and forums (j). In common for wikis and the above communities is that they are all web-based and good for collaborating and communicating effectively. These new tools can be useful in facilitating the process of building personal networks for CC, as members are connected through their email addresses and the forum is comprehensive including many parts.

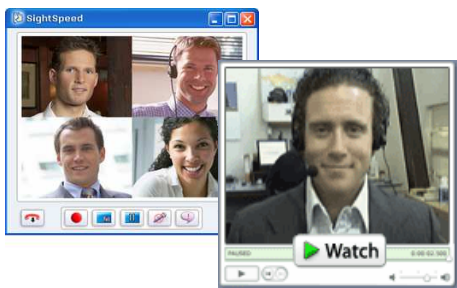


Figure 6.1. Video conferences or sending video Emails at SightSpeed. (m)



Figure 6.2. Examples of SecondLife 3D world – Presentations for stakeholders.(k)

Taking it a step further, CC can discover new ways to meet on SecondLife which is a 3D-virtual platform used for presenting, promoting and selling information to an online audience. It is also possible to collaborate and communicate in real time between multiple participants, training and educating in virtual classrooms as well as researching new concepts and products with this virtual world. Here, the greatest advantage for CC is the motivational aspect for the employees and the again, the support in building personal networks. It may also facilitate the process of building greater relationships with external stakeholders and customers and suppliers, share knowledge with people from around the world as well as raise the innovativeness and give inspiration to create.

Interestingly, these new ways of KM (through web-based tools) can be seen as handling knowledge as a process, yet most of them are developed in the U.S. Does this imply that we are moving towards more unified view of knowledge? Or could it be so that the Western world is finally starting to acknowledge the fact that if you view knowledge just as an object you are missing out on other important aspects? Whatever it depends on, it seems that KM activities begin to require an alignment of Western and Eastern perspectives of knowledge in order to become the “best practise” of the 21st century.

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c: Web page, corporate overview, <i>Alfa</i>	21 th May, 2007
d: Web page, corporate work life, <i>Alfa</i>	21 th May, 2007
e: Web page, personal info, <i>Beta</i>	23 th May, 2007
f: Web page, company info, <i>Beta</i>	23 th May, 2007
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Interviewees

1. Interviewee no.1 CC
2. Interviewee no.2 CC
3. Interviewee no.3 CC
4. Interviewee no.4 CC
5. Interviewee no.5 CC
6. Interviewee no.6 CC
7. Interviewee no.1 *Beta*
8. Interviewee no.2 *Beta*
9. Interviewee no.1 *Alfa*
10. Interviewee no.2 *Alfa*
11. Interviewee no.1 *Gamma*
12. Interviewee no.2 *Gamma*

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Appendix 1

Intervjuguide - chef

- **Kunskapsskapande och kunskapsöverföring**

(reflektera fritt över dessa begrepp och deras betydelse för er organisation)

Vilket begrepp är vanligast och/eller viktigast?

Hur fungerar det rent praktiskt hos er?

- **Begreppet kunskap – objekt eller process**

Hur ser du på begreppet kunskap? (reflektera fritt)

Vem, förutom du själv, vet vad du har för kunskap? Dina medarbetares kunskap – ditt ansvar?

- **Intern miljö**

Sammanställning av projekt. Hur sker detta?

Arbetsklimat, arbetsmiljö och värderingar.

- **Uppföljning av projekt**

Hur ser uppföljning av avslutade projekt, vad gäller kunskap ut?

- **Personalansvar & Nyckelpersoner**

Appendix 2

Intervjuguide - ingenjör

- **Kunskapsskapande och kunskapsöverföring**

(reflektera fritt över dessa begrepp och deras betydelse för er organisation)

Vilket begrepp är vanligast och/eller viktigast?

Hur fungerar det rent praktiskt hos er?

- **Kunskap – Objekt & Process**

Hur ser du på begreppet kunskap? (reflektera fritt)

Vem, förutom du själv, vet vad du har för kunskap?

- **Intern miljö**

Sammansättning av projekt. Hur sker detta?

Arbetsklimat, arbetsmiljö och värderingar.

- **Uppföljning av projekt**

Hur ser uppföljning av avslutade projekt, vad gäller kunskap ut?

- **Nyckelpersoner**

Appendix 3

Intervjuguide – Manager at CC

- **Intellectual capital/ Knowledge management**

Används dessa termer i företaget?

Formellt/Informellt?

- **Projektförloppet**

- **Utvärderingar**

Utvärderingar/medarbetarsamtal/feedback/enkätundersökningar/projektuppföljning.

Formellt/Informella?

Appendix 4

Förfrågan om Intervju Magisteruppsats inom Strategic Management *Intellectual capital och knowledge management*



Problem:

Vi har sett att vårt ”huvudföretag” (ett stort kunskapsintensivt, högteknologiskt företag) inte har någon formell hantering av kunskap. Trots detta går det väldigt bra för företaget. Enligt vissa forskare (Andriessen & Van den Boom) kan man antingen se kunskap som ett objekt eller som en process. Vi tycker att det kan vara intressant att relatera kunskapskapande och kunskapsöverföring hos just det företaget med andra företag som har en tydligare hantering av kunskap. Här har vi tänkt titta på Alfa, Beta och Gamma. Hur skiljer sig synen på kunskap (objekt eller process) i dessa tre företag? Hur skiljer sig synen på knowledge management i dessa företag (med fokus på kunskapskapande och kunskapsöverföring)?

Vår tanke är att med hjälp av teorier skapa en modell över synen på kunskap samt fokus inom knowledge management, och därefter placera in våra tre företag i denna modell. Vi vill utföra en mer ingående undersökning på det första företaget och sedan använda Alfa, Beta och Gamma som en sorts spegel i vår analys.

Vi vill, i vår analys, försöka skapa en bild av att olika kunskapsintensiva företag, som alla är framgångsrika, kan hantera kunskap på olika sätt och ur olika perspektiv. Vi inser att detta är en väldig förenkling av verkligheten och att det kanske finns element av både objekt tänkande och processtänkande i alla företagen. Däremot drar förmodligen företagen åt något speciellt håll. Vilket tänkande är bäst? Är något sätt effektivare beroende av kontext än något annat?

Syfte:

Vi vill alltså kartlägga olika strategier för knowledge management ur det här perspektivet (process vs objekt), med fokus på vårt ”huvudföretag”.

Användning av teorier:

Vi närmar oss problemet, som nämnts tidigare, från Andriessen & van den Boom – perspektivet och utgår från begrepp använda av Polanyi och Edvinsson samt teorier som Nonaka, Agyris & Schön, Hansen et al. och vi har även tittat på artikeln ”*Managing for creativity*” av Richard Florida & Jim Goodnight.

/Mvh

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Appendix 5 – Conclusive mindmap over study

