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IMPROVING KNOWLEDGE TRANSFER

- A STUDY OF AN INNOVATION PROJECT AT TETRA PAK

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ABSTRACT

The ability to create, utilise, transfer and protect knowledge is a source for sustaining competitive advantage. The augmented attention that has been given to knowledge has also lead to an increased organisational focus on strategies and organisational designs that help create new sources of knowledge and ideas. Furthermore, as project organisations aim at accomplishing long-term business strategies through short-term operational projects, the discussion about the importance and meaning of knowledge in projects has become of interest. There are also indications that there is no natural knowledge transfer within a project, and it can be difficult to ensure a transfer of knowledge after the completion of a project.

With this in mind, the purpose of this Master Thesis is to create an understanding for how knowledge is transferred within and between projects and how it can be improved. The purpose is to create this understanding from relevant theories and a studied project, and to make recommendations on how to improve knowledge transfer. We have studied an innovation project at Tetra Pak, and the main findings are that the project members rely heavily on direct personal interaction for transferring knowledge. IT and databases are not used to their full potential. Furthermore, the project lacks a strategy for knowledge transfer.

As a result, the main recommendation is to determine a knowledge management strategy, preferably one that focuses on transferring tacit knowledge. By determining a strategy, it will become easier to pinpoint areas of improvement. Besides the given recommendations, a more general conclusion is provided, which is in line with the recommendations, though not Tetra Pak specific.

Key Words: knowledge management, knowledge transfer, tacit knowledge, explicit knowledge, socialisation, externalisation, combination, internalisation, personalisation, codification, project, Tetra Pak

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	INTRODUCING THE PROBLEM.....	3
1.3	PURPOSE.....	6
1.4	DELIMITATIONS.....	6
1.5	POSITIONING THE STUDY	6
1.6	OUTLINE OF THE STUDY	7
2	THEORETICAL FRAMEWORK	9
2.1	KNOWLEDGE MANAGEMENT.....	9
2.2	INFORMATION VS. KNOWLEDGE.....	10
2.3	CLASSIFICATIONS OF KNOWLEDGE.....	11
2.4	KNOWLEDGE CREATION AND TRANSFER.....	14
2.5	TOOLS	20
2.6	DISCUSSION ON THE CHOICE OF THEORIES.....	28
3	TETRA PAK AND THE STUDIED PROJECT	31
4	EMPIRICAL FINDINGS AND ANALYSIS	35
4.1	CLARIFICATIONS	35
4.2	EMPIRICAL FINDINGS: USING EXISTING KNOWLEDGE.....	36
4.3	ANALYSIS: USING EXISTING KNOWLEDGE.....	38
4.4	EMPIRICAL FINDINGS: HAVING AN ENABLING CONTEXT	40
4.5	ANALYSIS: HAVING AN ENABLING CONTEXT.....	41
4.6	EMPIRICAL FINDINGS: SHARED EXPERIENCES.....	42
4.7	ANALYSIS: SHARED EXPERIENCES	43
4.8	EMPIRICAL FINDINGS: CREATING A KNOWLEDGE VISION AND FOCUS.....	44
4.9	ANALYSIS: CREATING A KNOWLEDGE VISION AND FOCUS	45
4.10	EMPIRICAL FINDINGS: COMMUNICATION	45
4.11	ANALYSIS: COMMUNICATION.....	49
4.12	EMPIRICAL FINDINGS: MENTORS AND SOCIAL NETWORKS	51
4.13	ANALYSIS: MENTORS AND SOCIAL NETWORKS	53
4.14	EMPIRICAL FINDINGS: IT AND DATABASES.....	54
4.15	ANALYSIS: IT AND DATABASES	58
4.16	ANALYSIS OF THE 4 MODES	60
4.17	SUMMARY OF ANALYSIS	63
5	RECOMMENDATIONS	65
5.1	IDENTIFY A STRATEGY FOR KNOWLEDGE TRANSFER	65
5.2	IT AS A SUPPORT FUNCTION.....	66
5.3	COMMUNICATION.....	67
5.4	MENTORS	69
5.5	VISION AND FOCUS.....	69
5.6	COMPETENCE ANALYSIS	70
5.7	SUMMARY OF RECOMMENDATIONS.....	70
6	CONCLUSION	73
7	BIBLIOGRAPHY	75

TABLE OF FIGURES

FIGURE 1: OUTLINE OF THE STUDY	8
FIGURE 2: FOUR MODES OF KNOWLEDGE CREATION AND TRANSFER	17
FIGURE 3: KEYWORDS AND TOOLS	20
FIGURE 4: STRUCTURE OF THE ALPHA PROJECT	32

APPENDICES

APPENDIX I: METHODOLOGY

APPENDIX II: INTERVIEW GUIDE

1 INTRODUCTION

The aim of this chapter is to provide background information about the investigated area, followed by an introduction of the problem area. Firstly, we discuss why knowledge has become one of the main focal points to sustain competitive advantage. This is followed by a brief discussion about some of the issues related to the complexity of knowledge transfer, and the obstacles related to knowledge transfer between projects. This brings us to the main objective of this thesis, which is to create an understanding for how knowledge is transferred within and between projects and how it can be improved. As a final note, we present the delimitations and the outline of this thesis.

1.1 Background

Lately, markets, technologies and regulations have been changing rapidly (Nonaka, et al 2001). Hence, it has been recognised that the ability to create, utilise, transfer and protect knowledge has become a source for sustaining competitive advantage (Teece, 2001; Davenport & Prusak, 1998). Consequently, there is a shift in focus from the more traditional sources of competitive advantage, such as economies of scale, to sources that are better suited for the economic environment of today (Drucker, 1993). Thus, there is an increased organisational focus on strategies and organisational designs that help create new sources of knowledge and ideas (Lei et al, 1999).

Another contributor to the increased interest in knowledge is the result of the trend towards leaner organisations, where experienced people were made redundant, taking much of the organisational knowledge with them. When realising this, many organisations had to rehire the employees that were once let go. The costly errors of disregarding the importance of knowledge have caused many organisations to struggle for a better understanding and structure of what they know, and how they should handle the knowledge existing within the organisation. Mainly, organisations want to create a consciousness about the knowledge that exists within the organisation and to use that consciousness

to manage, develop and diffuse it in ways that gains the organisation. (Davenport & Prusak, 1998)

The discussion about the importance and meaning of knowledge in projects has become of interest since project organisations aim at accomplishing long-term business strategies through short-term operational projects (Lei et al, 1999). While the traditional view of projects considers knowledge to be an unacknowledged by-product to task fulfilment, there is also another view that places knowledge in the focal point and where knowledge created within one project aims to be utilised in later projects (Packendorff, 1993). However, this requires that it be acknowledged that the possibility exists to gain from knowledge synergies created between concurrent, sequential or overlapping projects. Even so, Packendorff (1993) argues that this view should not be seen as a substitute to the traditional view, but rather as an important complement to it. The latter view implies that projects can also be seen as local arenas for knowledge creation, where new knowledge regarding technical matters and project organising are integrated and shared, and routines for organising the project are developed over time (Sahlin-Andersson, 1989).

It can be argued that there are two important aspects of knowledge in projects in terms of what can be gained from previous project experiences; firstly from a financial perspective, and secondly, from the perspective that organisations can avoid “reinventing the wheel”¹ (Björkegren, 1999). These two are interlinked in the sense that financial savings can be made if the reinvention of the wheel can be prevented. The issue of knowledge transfer within organisations and projects is part of knowledge management, since it lies in the interest of the organisation to exploit the knowledge that exists within it. This leads us to the next section, where the problems of knowledge transfer and knowledge management are discussed more in-depth.

¹ The expression refers to situations where existing knowledge is not sought for and utilised, wherefore already existing things are invented again.

1.2 Introducing the Problem

Many organisations begin their knowledge management efforts by trying to understand *what* they know and *where* that knowledge is. Knowledge management literature is often focusing on IT, where knowledge should be codified, systemised and standardised. Hence, many organisations have responded to the challenge of knowledge management by implementing IT systems while ignoring the cultural aspects, which influence how people behave around knowledge (Davenport & Prusak, 1998). Evidently, this leads to the question if knowledge management efforts should not be much more than IT? In this thesis, the standpoint will be that knowledge management is more than IT.

Regardless of how organisations choose to capture knowledge, it appears to be seen as something that can and should be managed just as other resources in the organisation. Some organisations try to make sure that the knowledge gained remains their property, so that it can be used in the future, while others even want to turn it into something measurable. However, one could question whether knowledge can be managed and for what purpose. Is the purpose to increase knowledge sharing, or is it to make the knowledge sharing visible to management? According to Tuomi (1999), some argue that knowledge cannot be “managed” and therefore the concept of knowledge management is misleading. Whether it can or should be managed could be debatable, but what is evident is that the management of knowledge is emphasised by both theorists and organisations.

Davenport and Prusak (1998) argue that the larger and more complex an organisation is, the less likely one is to find the best expertise at a location nearby. It might also decrease the chances of knowing where to find it. Geographical closeness and if we feel comfortable with a person determine who we talk to and ask for advice. Instead of trying to find the person who has the deepest knowledge of the subject, people hope to get good enough information from someone nearby.

Another issue of interest for this thesis is that while organisations as judicial entities are considered as permanent entities, project organisations are often called temporary organisations (Packendorff 1993). They exist only for a limited period of time, and their completion equals their termination. This implies that a specific project organisation does not have any history or future and, consequently, no organisational memory (Nelson & Winter 1982). Permanent entities have the advantage of having the support of structure and routines that are knowledge absorbing, and over time this knowledge becomes common practise. As such, temporary organisations, e.g. projects, do not have this support, i.e. there is no natural knowledge-transfer mechanism between the projects within an organisation (Björkegren, 1999).

Therefore we question what happens with the knowledge and experiences gained after the completion of a project? Ayas (1996) argues that, when a project is completed, project knowledge is diffused throughout the organisation either by absorbing project participants into the organisation or by assigning them to new projects. However, could it not be argued that although project participants stay in the organisation, it is no guarantee that the knowledge is transferred to and utilised in later projects? Feelings of depreciation may cause them to capture their knowledge instead of sharing it. It could also be that the project has been cancelled, creating negative feelings among the project members towards the organisation. Such a situation may also make former project members reluctant to share their knowledge with others. Another issue is that of uniqueness. The fact that knowledge is often associated with power may cause people to capture their knowledge instead of sharing it, which is something that von Krogh (1998) argues. People might fear that if they share what they know, their uniqueness is lost, and consequently they can be replaced by new project members. These examples show some of the complexity of the problem of knowledge transfer both within and between projects, and within organisations.

If the subject is to transfer knowledge, the first issue would be to conclude where knowledge resides in an organisation. In one way, it can be said that knowledge exists within a project or an organisation regardless of its employees, since the culture, traditions and IT systems remain even if some

employees leave the organisation. Seen from this perspective, it should not be difficult to gain, share and transfer knowledge within or between projects in an organisation. On the other hand, it could also be argued that knowledge is greatly tied to the people possessing it. Therefore, it might be difficult to separate a person's knowledge from him or her and transfer it to someone else. This is something that Polanyi (1998) argues, when stating that an individual's knowing is personal. Tuomi (1999) argues the opposite, namely that knowledge is social thus not available for any single individual. Social knowledge is also discussed by von Hippel (1994), who claims that knowledge is not easily transferred outside the community where it is created. Relating this to transferability of knowledge it does not matter if we choose to see it as personal or social since both point at the complexity of transferring knowledge to another person or a group of people.

The discussion above highlights the complexity of knowledge transfer. It indicates that there is no natural knowledge transfer within and between projects, and that it can be difficult to ensure a transfer of knowledge after the completion of a project. This could also be related to another aspect brought forward, namely that of knowing where in the organisation knowledge resides. Furthermore, this section has given a glimpse into the managerial issues of controlling knowledge and making it a property of the organisation by implementing IT. This problematic area leads to the main question of this thesis:

How can the transfer of knowledge within and between projects be improved?

The main question is asked from a management perspective in the sense that it assumes that the existing knowledge transfer within and between projects is not optimal, and that it can be improved. To answer the main question, two sub questions have been posed.

1. What theoretical tools help us understand how existing knowledge is transferred?
2. What do project members do to gain, share and transfer knowledge?

The first question will be answered by the use of relevant theories. We have chosen to use Nonaka's and Takeuchi's (1995) model of knowledge conversion to develop a discussion about how knowledge is created and transferred. From the model, tools have been derived with the aim to create an understanding for how knowledge transfer can be ensured and how it should be done. To answer the second question, we investigate a project within Tetra Pak. This project will be used to study the phenomenon of knowledge transfer. The answers to these two questions can provide an indication of how the model and theories used are applicable on the project. By analysing these aspects, we can answer the main question, which is related to the purpose of this thesis.

1.3 Purpose

The purpose of this thesis is to create an understanding for how knowledge is transferred within and between projects and how it can be improved. The purpose is to create this understanding from relevant theories and the studied project, and to make recommendations as how to improve knowledge transfer.

1.4 Delimitations

In this thesis, the phenomenon of knowledge transfer is studied. It is studied in a context where there is a consciousness about existing knowledge and attempts are made to use that knowledge. It is investigated by looking at one project. The intention is not to investigate the project itself but instead to use it as an example of knowledge transfer within and between projects. A limitation is made to focus on one project only, even though the intention is to study the transfer of knowledge within and between projects. This limitation is made possible since the chosen project provides the opportunity to study how knowledge has been transferred from other projects into the chosen project.

1.5 Positioning the Study

In this section, the thesis is positioned in relation to the problem and the perspective of the study. Firstly, the problem is discussed in terms of its

possibility to be controlled. Secondly, the authors' position towards objectivity and subjectivity is clarified.

It can be debated whether the problem posed is a control problem, where management wishes to control knowledge transfer. Without ignoring that this may often be the case, this thesis approaches knowledge transfer from the perspective that management should guide knowledge transfer efforts in different directions rather than control it. The difference is that we believe that the latter encourages project members to share their knowledge with others, while control may sometimes hold back spontaneous and voluntary knowledge sharing.

The authors' and the interviewees' subjectivity and ways of interpreting the reality influence the study conducted in this thesis. The consequence is that the subjectivity influences the result and makes an objective interpretation impossible. Hence, we argue that it is not a matter of choosing an objective or subjective way; instead the subjectivity influences the whole research.

1.6 Outline of the Study

In the first chapter, the reader has been introduced to the problem and the main question and the sub questions have been formulated. Their purpose is to enable the connection between the research and the purpose of the study. The remaining parts of this thesis will be presented in the model below. The methodology can be found in Appendix I, and the interview guide used for the collection of empirical data can be found in Appendix II.

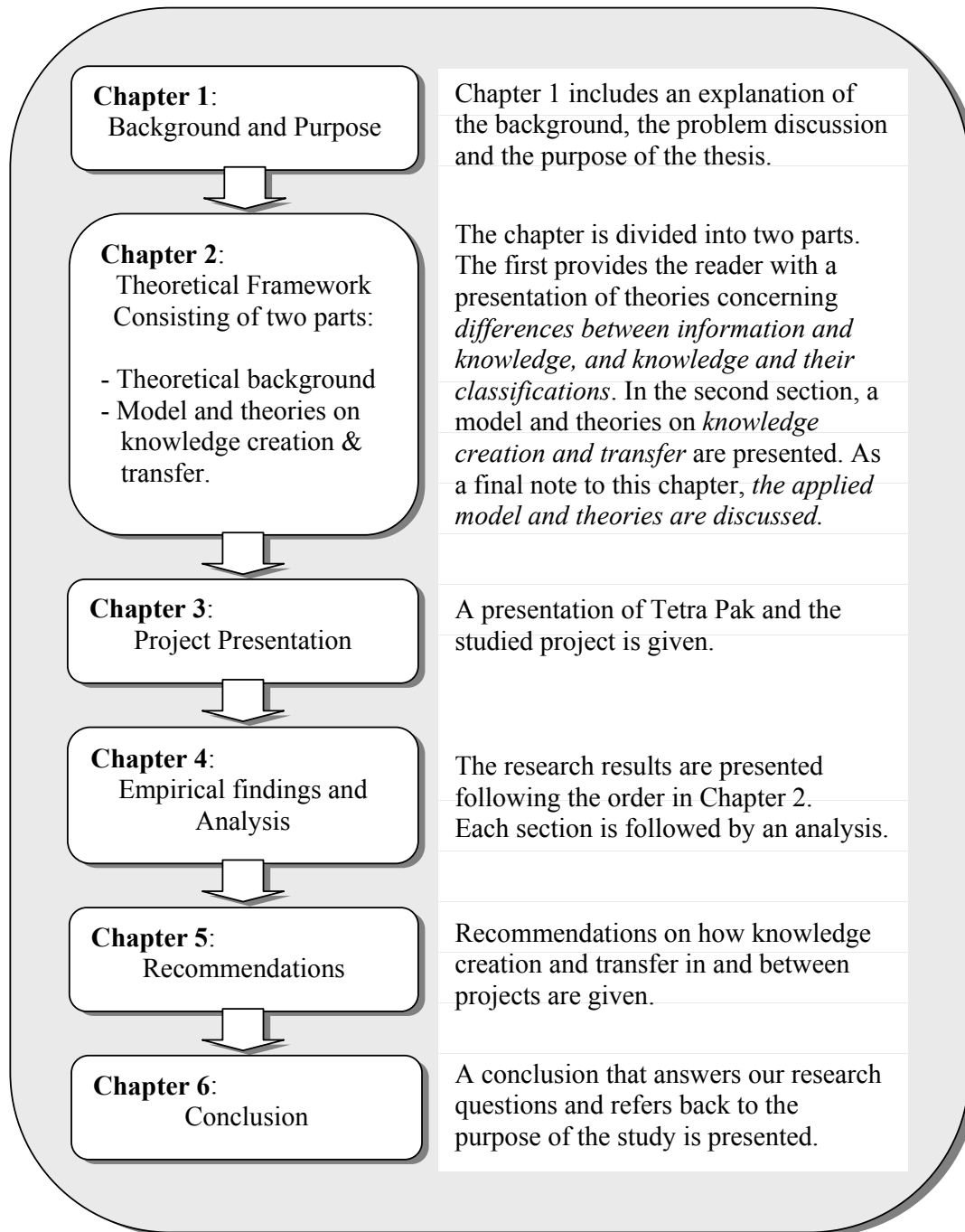


Figure 1: Outline of the Study

2 THEORETICAL FRAMEWORK

This chapter provides the reader with a theoretical framework of knowledge transfer. It is divided into two sections, where the first gives a theoretical background to the subject of knowledge transfer. It discusses areas like general knowledge management, the definition of information vs. knowledge and different classifications of knowledge. The second part of this chapter is dedicated to discussing Nonaka's and Takeuchi's model of knowledge creation and transfer (1995). This model is the main focus in this chapter and it aims at showing how knowledge is created and transferred. This chapter should provide the answer to the first sub-question asked in this thesis, namely "what theoretical tools help us understand how existing knowledge is transferred?"

2.1 Knowledge Management

As discussed in the background, downsizing, globalisation, increased returns of innovations etc., has made knowledge management increasingly important. Theories of knowledge management try to answer questions with regards to how we should manage knowledge work and organisations. To understand what knowledge management is, we need to understand what knowledge is, where it resides and how it is created (Tuomi, 1999).

There is a congruent view by many scholars (Davenport & Prusak, 1998; Tuomi, 1999; von Krogh et al, 1998) that knowledge management is of central importance to the development of sustainable competitive advantage in organisations. Among these scholars, three schools can be outlined each contributing their view to knowledge management, namely Cognitivist, Connectionistic and Autopoietic schools. In the Cognitivist epistemology, knowledge and understanding depend on updated and organised information. The Connectionistic epistemology emphasizes the knowledge and understanding that can stem from relationships and networks. Finally, the Autopoietic epistemology can be defined as something that resides in the mind, body and the social system (von Krogh et al, 1998). These views will not be discussed as such, even though many of the views brought up are reflections of

the three schools. The three different schools show that there is confusion about what knowledge management is and this is partially due to the fact that several disciplines are contributing to the ongoing research in the area.

2.2 Information vs. Knowledge

In this section, the difference between information and knowledge will be presented.

In everyday life, the terms information and knowledge are often used interchangeably, although scholars like Nonaka, Takeuchi and Schoenhoff make a clear distinction between the two. In short, Nonaka & Takeuchi (1995), describe information as data or a flow of messages that has meaning, shape and is organised for a purpose. Knowledge on the other hand is context-specific since it depends on a particular time and space. Without a context, it is mere information and not knowledge (Nonaka, 2001). Schoenhoff (1993) argues that information becomes knowledge when it is interpreted by individuals, given a context and anchored in the beliefs and commitment of its holder. Schoenhoff's explanation indicates that knowledge requires human action, while information can sustain without it. It also indicates that knowledge is highly subjective. Sanchez and Heene (1996) mean that knowledge is about beliefs; hence different individuals can have divergent instances of knowledge that can be opposing or inconsistent.

From a theoretical perspective it appears fairly easy to make a distinction between information and knowledge. In this thesis it is argued that in reality no distinction is made between the two concepts. The reason for taking this standpoint is that we have asked questions about knowledge and received answers that indicate that the concepts are used interchangeably. As a result, we see no reason to make a distinction between information and knowledge in this thesis. However, the above discussion serves as a foundation for understanding and positioning the concept of knowledge.

2.3 Classifications of Knowledge

In this section different classifications of knowledge will be presented such as tacit and explicit knowledge, and individual and collective knowledge.

There are numerous ways of classifying and describing the characteristics of knowledge. One is to make a distinction between tacit and explicit knowledge and another is to separate individual knowledge from collective. There are also other classifications with some similar characteristics to that of tacit and explicit knowledge. Penrose (1959) for example, made a distinction between objective and experimental knowledge while Hayek (1945) divided knowledge into scientific and practical. This section will mainly focus on the first two classifications.

The purpose of presenting different classifications of knowledge is to give the reader an understanding of the diverging ongoing debate concerning the classification of knowledge. Throughout this thesis, the classification of tacit and explicit knowledge will be used to create an understanding of what kinds of knowledge that are transferred in the empirical study. Together with the debate about where knowledge resides, i.e. whether it is individual or collective, they are also important for the discussion about how knowledge is transferred.

2.3.1 Tacit and Explicit Knowledge

The first scholar to introduce the concepts of tacit and explicit knowledge was Polanyi (1962). Reflecting upon that all knowledge is not explicit and cannot be shared by everyone, he developed a theory about personal knowledge using the terms tacit and explicit knowledge. Polanyi's statement "we can know more than we can tell", implied that tacit and explicit knowledge should be seen as inseparable dimensions of knowing, i.e. that some knowledge cannot be expressed and formulated explicitly (Polanyi, 1967: 4).

Somewhat contradictory to the theory of tacit and explicit knowledge is Popper's theory on objective knowledge (Popper, 1972). He argues that objective knowledge, or scientific, is independent of a person's beliefs, i.e. knowing without a knower. Thus he makes it impersonal. The opposite of that would be subjective knowledge, which belongs to a knowing subject.

According to Popper (1972), subjective knowledge has no scientific value, in the sense that it cannot be generalised.

Later on, Nonaka (1994) modified Polanyi's two concepts. In Nonaka's view, explicit or codified knowledge refers to easily transferable knowledge, which can be articulated verbally or in writing. Such knowledge can be found in databases, guidelines or organisational charts (von Krogh et al, 1998). When speaking of knowledge we often only consider the explicit dimension, whereas in reality what can be expressed in words and writing is only a small part of our entire knowledge (Nonaka 1994). Tacit knowledge is defined as knowledge deeply rooted in actions, commitment and involvement, which is difficult to articulate in written documents (von Krogh et al, 1988). Nonaka's view about tacit knowledge's transferability is in concurrence with Sanchez's and Heene's (1996) view, who state that tacit knowledge requires activity and participation from people to be transferred. Grant (1996) simplifies the distinction between the two and identifies know-how with tacit knowledge and know-that with explicit knowledge.

2.3.2 Individual and Collective Knowledge

Whether knowledge exists purely at an individual level or if it can also exist at an organisational level has been debated. Partially, this debate could be said to be linked to the issue of organisations wanting to make employees' knowledge their property. Since individual knowledge cannot be managed, "the important question is how to convert individual knowledge to organisational knowledge" (Cohen, 1998: 23).

Like Polanyi (1967), Nonaka and Takeuchi (1995) see the origin of knowledge as individual and organisational knowledge as collective knowledge, i.e. knowledge that is shared and transformed by individuals within the firm. Nelson and Winter (1982) on the other hand, presume that organisations have an ability to know independently of its employees. They claim that the organisation acquires better routines by gaining new knowledge and that this knowledge can be embedded in the values and norms of the organisation.

Brown and Duguid (1991) state that a great deal of knowledge is created and held collectively in tightly knit communities of practice. This makes the character of organisational knowledge heavily social, meaning that shared experience bonds the community, giving meaning to the shared knowledge. Von Hippel (1994) refers to this as sticky knowledge, since it evolves from the interaction of practitioners and does not easily leak, i.e. it is not easily transferred outside these communities. He claims that to make use of sticky knowledge, the problem solving needs to be moved into the community instead of trying to transfer the knowledge away from it. Does this imply that transferring knowledge between projects is impossible?

According to Argote and Ingram (2000), knowledge is embedded in three basic elements of the organisation namely members, tools and tasks. Members are the individuals in the organisation. Tools incorporate information technology such as hardware and software. Tasks reflect the goals, intentions and purposes of the organisation. Combining and crossing these three basic elements will form sub-networks where knowledge also can be embedded. Walsh and Ungson (1991) extend these three elements to five, calling them retention bins or repositories. These are individual members, roles and organisational structures, the organisation's standard operating procedures and practices, its culture, and the physical structure of the workplace.

The discussion above aims at showing that scholars do not fully agree where knowledge resides, which means that it may be difficult to determine where knowledge gaining, sharing and transfer take place, i.e. whether it is at an individual or collective level or both. In this study, these difficulties will be taken into consideration in the analysis. From a managerial point of view, this discussion on where knowledge resides can also have implications for the measurability of knowledge, i.e. the control.

This concludes the first section of this chapter. The second section will provide a deeper insight into how knowledge is created and transferred. However, we believe it is important to begin the next section with a discussion about our standpoint regarding knowledge creation and transfer and their, in our view, inability to be separated.

2.4 Knowledge Creation and Transfer

This section is of main focus for this thesis. Here the aim is to shed light upon how knowledge can be created and transferred. We also present and discuss Nonaka's and Takeuchi's model, "the four modes of knowledge conversion" from which keywords are derived. In addition, we will show the mode of procedure for grouping them into tools. However, before entering into the theories about knowledge creation and transfer, our standpoints will be clarified in regards to this matter with the purpose of showing the reader how we understand and view the subject.

During the writing process, we have constantly debated if and how knowledge creation and transfer are related. It is our opinion that the concepts are connected in the sense that in order for someone to transfer his or her knowledge to someone else, the receiver has to understand and create his or her own knowledge based on what the sender has transferred. In the same way, documented knowledge must be understood by the reader who then creates his or her own interpretation and knowledge in the area in order for a transfer to have taken place. Based on this, we argue that creation and transfer of knowledge are inseparable, i.e. you cannot have one without the other. With this standpoint, we support the view of Davenport and Prusak (1998) who claim that unless knowledge is absorbed, it is not transferred, and merely making knowledge available does not equal its transfer. Therefore, this thesis assumes that the creation of knowledge also involves the transfer of knowledge and vice versa. Hence, when using the expressions creation and transfer of knowledge throughout the thesis, we intend them to be viewed in this way.

Furthermore, it appears as if researchers do not fully agree whether the purpose of transferring knowledge is to make an exact copy of what is being transferred or to make local adjustments. The reason for assuming this is that different theorists use different words, such as transfer, conversion and translation (Nonaka & Takeuchi, 1995; Kogut & Zander, 1992; Cordey-Hayes & Major, 2000). In our view these words are not interchangeable. Where the first one, transfer, focuses on moving something from one place to another, the latter ones focus on making adoptions. In this thesis, the word transfer will be used

consistently to avoid confusion, even though our standpoint is in coherence with O'Dell and Grayson (1998), who argue that the point is not to make an exact copy of the transferred knowledge but rather to make adoptions. O'Dell and Grayson (1998) refer to this re-use as re-creation of knowledge. Despite this, they remain somewhat sceptical to only reusing knowledge by pointing out that if only existing knowledge is used, no new knowledge will be created. According to Cohen (1998), this debate, whether to reuse or create new knowledge reflects the western view versus the Japanese view, where the former advocates reuse. After having defined our standpoint regarding knowledge creation and transfer, a theoretical view will be provided in the following section.

2.4.1 Four Modes of Knowledge Creation and Transfer

This section focuses on how knowledge is created and transferred. It is presented through the model of knowledge creation introduced by Nonaka in 1994. The model was further explained by Nonaka and Takeuchi in 1995, and it is this version that will be used in this thesis. The model shows different ways in which knowledge can be created and transferred by using different types of interactions. Before doing this, a somewhat different view of knowledge transfer will be presented.

Argote and Ingram (2000) define knowledge transfer in organisations as the process through which one unit, e.g. group, department, or division is affected by the experience of another. They recognise two ways by which knowledge can be transferred, either by moving a knowledge reservoir, people or technology, from one unit to another, or by modifying a knowledge reservoir. In other words, people and technology can be moved between units and modification can occur through communication and training. By moving people, tacit knowledge can be transferred to other tasks and contexts, whereas transferring knowledge by embedding it in technology can only be successful if accompanied by a few individuals. The reason is that individuals can capture the tacit knowledge and understanding behind the technology.

This concludes Argote's and Ingram's (2000) thoughts on knowledge transfer. In the following section, the focus is turned to Nonaka's and Takeuchi's model, which will be explained and used throughout this thesis.

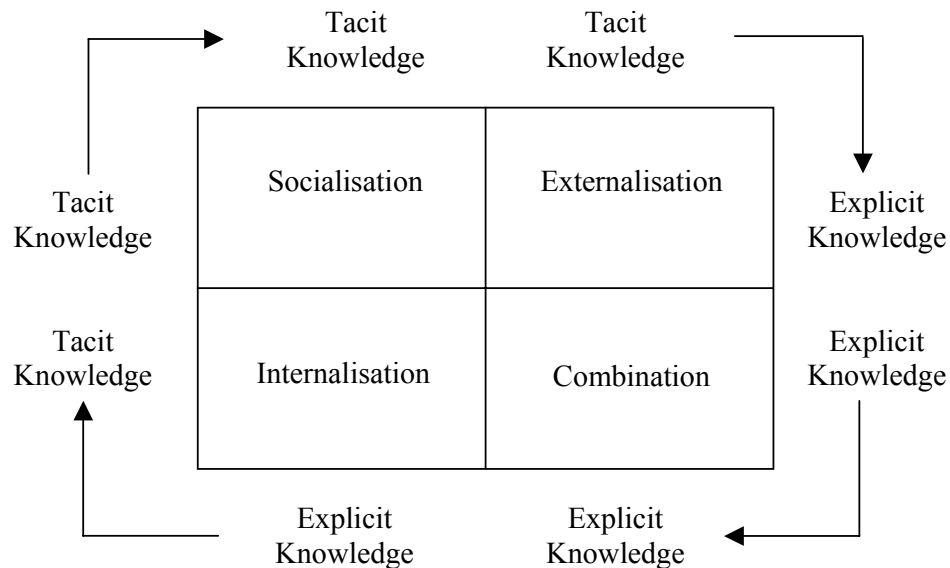
Nonaka and Takeuchi (1995), claim that in order to understand how knowledge is created, we must recognise that tacit and explicit knowledge are complementary. Knowledge is created through the interaction between tacit and explicit knowledge, rather than from tacit or explicit knowledge alone (Nonaka, 2001). Nonaka's and Takeuchi's (1995) view on knowledge creation is also linked to their opinion about whether knowledge is individual or collective, i.e. they claim that organisations themselves cannot create knowledge, since the individuals working within the organisation are the ones who possess it.

Nonaka and Takeuchi (1995) distinguish four modes by which knowledge can be created, namely: (1) *Socialisation*: from tacit knowledge to tacit knowledge; (2) *Externalisation*: from tacit knowledge to explicit knowledge; (3) *Combination*: from explicit knowledge to explicit knowledge; (4) *Internalisation*: from explicit knowledge to tacit knowledge. All four modes, socialisation, externalisation, combination and internalisation can create knowledge separately. However, most knowledge is created in the interaction between the different modes. As mentioned earlier, Nonaka and Takeuchi (1995) believe that an organisation cannot create knowledge by itself, i.e. that the knowledge is initially created by the individuals in the organisation. Even though, when tacit knowledge becomes explicit it is transferred from individuals to groups and finally to the organisation, which means that organisational knowledge is created. Nonaka and Takeuchi (1995) refer to this as a positive knowledge spiral. The knowledge spiral can commence from any of the four modes, but usually begins with socialisation. In Polanyi's (1967) view, tacit knowledge cannot by definition be made explicit, and therefore externalisation cannot take place. This would then mean that the knowledge spiral could not be realised.

Following here is a brief explanation of the four modes mentioned above. These are also shown in the model below. The arrows indicate how knowledge is transferred from one mode to another in what Nonaka and Takeuchi (1995)

refer to as the positive knowledge spiral. Therefore, we have chosen to discuss the concepts, creation and transfer, together.

Within each of the four modes, aspects are highlighted (*italic*). These will be explained more in-depth. The choice of aspects depends on their suitability for the study and has been done on the basis of subjectivity. Each aspect will be motivated in connection to their explanation. The purpose of explaining these aspects more in-depth is to show the more practical side of Nonaka's (1994) model. The aspects will also be used when presenting the empirical findings and analysis.



*Figure 2: Four modes of knowledge creation and transfer
(modified from Nonaka & Takeuchi, 1995)*

2.4.2 Socialisation

The highlighted aspects in this section are: shared experiences that are context specific, and apprentices learning from their masters/ on-the-job training.

This is the process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills. Tacit knowledge can be acquired directly from others without using language. This requires some form of *shared experiences embedded in a specific context* because without this context, the mere information makes little sense. Without a shared experience, it can also be very difficult for one individual to project him- or herself into another individual's thinking process. An example of socialisation is the *apprentice learning from his/her master* by observation, imitation and practice. In a business setting this is similar to *on-the-job training*. The socialisation process is primarily a knowledge transfer process between individuals (Nonaka and Takeuchi, 1995).

2.4.3 Externalisation

In this section, the highlighted aspects are dialogue and collective reflection.

Trough the process of externalisation new concepts can be created, since that is where tacit knowledge is made explicit. This is accomplished by using metaphors, analogies, concepts or models, which promotes interaction between sender and receiver. Often it is also triggered by *dialogue or collective reflection*. By reflecting upon what is conveyed, the parties help bridging the gap of what cannot be expressed in a direct form. This helps encouraging further interaction until both have the same knowledge. The externalisation process allows knowledge transfer among individuals within a group (Nonaka and Takeuchi, 1995).

2.4.4 Combination

The highlighted aspects in this section are: documents, databases, meetings and telephone conferences.

The third mode of knowledge transfer, combination, is the transfer of explicit knowledge between individuals. Explicit knowledge is exchanged through different channels, such as media, *documents, databases, meetings, and telephone conferences*. By sorting, adding and combining the explicit knowledge, new knowledge can be created and standardised, i.e. put into for example a handbook. This is the most common form of knowledge transfer

used in education. An example of combination in a business setting is when middle managers break down corporate goals and visions to operational goals. The process of combination allows knowledge transfer among groups across organisations (Nonaka and Takeuchi, 1995).

2.4.5 Internalisation

In this section, the highlighted aspects are: documents, documentation of explicit knowledge and oral stories.

The process where explicit knowledge is converted into tacit knowledge, internalisation, is often referred to as “learning by doing”. For explicit knowledge to become tacit, it helps if the knowledge is verbalised into *documents* or manuals. It can also be expressed through *oral stories*. By *documenting the explicit knowledge*, the individual will be helped to internalise his/her experience, thus making explicit knowledge tacit. In addition, this process aids the transfer of explicit knowledge to others, hence making people indirectly experience others’ experiences. The internalisation process transfers organisation and group explicit knowledge to the individual (Nonaka and Takeuchi, 1995).

2.4.6 Derivation of the Tools

The four modes of knowledge creation, and the section about knowledge transfer described above, provide a theoretical description of how knowledge is created and transferred. In each of the four modes of the model, we have highlighted aspects that will help us show the practical side of knowledge creation and transfer. These aspects have been recognised by Nonaka and Takeuchi (1995) and von Krogh et al (1998) as important for knowledge creation and transfer. They argue that once they are in place, they can help create an environment favourable for knowledge transfer. However, there are three additional factors not derived from the model that we also consider important for knowledge creation and transfer. The first one is having an enabling context, the second one is knowledge vision and focus, and the third is social networks. These will be argued for in sections 2.5.1, 2.5.3 and 2.5.5 respectively.

Below, the highlighted aspects, as well as the additional factors, are discussed and regrouped into tools. Arguments for the regrouping will be provided under each section (2.5.1-2.5.6) where the tools are discussed more in-depth.

KEYWORDS	TOOLS
Having an enabling context	Having an enabling context
Shared experiences	Shared Experiences
Knowledge vision and focus	Vision and Focus
Dialogue	Communication
Collective reflection	
Meetings	
Telephone conferences	
Oral stories	
Apprentices learning from their masters	Mentors and Social Networks
On-the-job training	
Social Networks	
Documents	IT and Databases
Documentation of explicit knowledge	
Database	

Figure 3: Keywords and Tools

2.5 Tools

In this section the different tools are presented and discussed. The aim is to present ways in which knowledge creation and transfer can be promoted. The reason why these particular tools have been chosen is discussed more in-depth in the discussion of our choice of theories in section 2.6. The structure of this section can also be recognised in the empirical findings and analysis.

2.5.1 Having an Enabling Context

One of the tools identified for transferring knowledge is to create an enabling context. This tool is important, because on the one hand it can be said that it enhances the other tools in the sense that an enabling context encourages interaction between people, and also that the other tools reinforce an enabling context. This means that it becomes important for more than one mode in Nonaka's and Takeuchi's (1995) model.

An enabling context can be fostered in a high-care environment (von Krogh, 1998), or what Nonaka and Konno (1998) refer to as Ba. They say that knowledge needs a context to be created, and Ba offers such context. Ba is Japanese and roughly means, "Place". Ba can be thought of as a shared space for emerging relationships. It does not have to be a physical space (office, dispersed business space); it can also be virtual (email, teleconference), mental (shared experiences, ideas, ideals), or any combination of them and that serves as a foundation for knowledge creation. When individuals interact, the environment or Ba is essential for knowledge creation, and particularly important when transferring tacit knowledge.

According to von Krogh (1998), some organisational conditions are more favourable than others when fostering knowledge creation and transfer. The way people in the organisation relate to each other is particularly important. Von Krogh calls this *care* and makes a distinction between high-care and low-care environments. Typical characteristics of a low-care environment are untrustworthy behaviour, constant competition, imbalances in giving and receiving information and a "that's not my job" attitude. According to von Krogh (1998), all these characteristics endanger effective sharing of tacit knowledge, since they might decrease the participation and interaction between people, which is often required for the transfer of tacit knowledge. In this kind of environment, the individual will try to capture his/her knowledge rather than sharing it, thus blocking the creation of new knowledge. Since knowledge-sharing in a low-care environment will lead to reduced power and influence to the knowledge-bearing individual, he or she will not be motivated to make his/her knowledge explicit or sharable unless there are clear transactions that would make this favourable.

In a high-care environment on the other hand, there is “mutual trust, active empathy, access to help, lenience in judgement and courage” (von Krogh, 1998: 3). This type of environment can assist to speed up the communication process, allow people to share knowledge and to express and discuss ideas freely. He further argues that good relations eliminate a knowledge-creation process of distrust, fear and dissatisfaction. When care is high, the individual will share his/her knowledge as well as receive active help from others. Finally, expressing personal difficulties in the process of knowledge creation will be met with compassion from other team members and active feedback will be provided.

According to von Krogh (1998) a high-care environment can be encouraged by implementing a team based incentive system that rewards actions that contribute to knowledge creation. The team would be rewarded based on its overall performance to avoid misuse of the system by any individual. He further points out that performance appraisals should include assessments, not only from managers but also from subordinates, to avoid creating an environment of care only present towards superiors.

In conclusion, an enabling context can be seen as a tool that, if it is accomplished, can encourage knowledge transfer. Hence, projects should strive for such an environment.

2.5.2 Shared Experiences

In this section, the importance of shared experiences and a common language for the creation and transfer of knowledge are discussed. Even though this is brought up in the socialisation mode (section 2.4.2), we argue that it facilitates knowledge creation and transfer in all four modes. If people lack a common language, it may be difficult to assimilate some knowledge. Shared experiences may facilitate the transfer of tacit knowledge, which cannot always be conveyed in words.

Davenport and Prusak (1998) state that when working in similar areas and receiving the same type of training, the understanding of one another’s words and actions increases. Kogut and Zander (1992) refer to this as having a shared

stock of knowledge, i.e. that some knowledge cannot be transferred unless sender and receiver have the same basic knowledge. Brown and Duguid (1991) argue that specialised groups produce specialised knowledge and the information that circulates easily in one community might have little value for those who lack the background knowledge necessary to make it comprehensible.

Related to having a shared experience is the importance of having a common language, since without it, it will be difficult to transfer knowledge even though the experiences are the same. Authors like O'Dell & Grayson (1998), argue that there is a need for a common language when transferring knowledge. They declare that an individual's tacit knowledge must be made explicit in a language known and acceptable to the others in order to be understood.

2.5.3 Knowledge Vision and Focus

The third tool is knowledge vision and focus. It works as an overarching tool, because it shows in which direction the organisation should head in terms of knowledge. According to Nonaka and Takeuchi (1995), it is the most critical element of corporate strategy. The organisation should conceptualise a vision about what kind of knowledge should be developed and operationalised.

The knowledge creation and transfer would be facilitated by a knowledge vision, either articulated separately or incorporated in other corporate statements. The vision should not only include what knowledge the company should seek and create in the future, but also how they should work today. The vision should encourage the individual to identify sources of knowledge that can aid other parts of the organisation. Furthermore, the organisation should identify how it could move towards the knowledge vision (von Krogh et al, 1998).

A good knowledge vision inspires and gains commitment at all levels of the organisation, from top-management to frontline personnel. It should be a stable vision that the organisation can keep during a longer time period. One way to create this setting is to involve employees from various departments in the creation of a vision. By identifying knowledge activists, i.e. souls of fire, who

can energise and maintain the level of commitment to the knowledge vision, the organisation is more likely to be able to spread the message and gain devotion to the vision. These souls of fire can be individuals or a department dedicated to enabling knowledge transfer (von Krogh et al, 1998).

O'Dell and Grayson (1998) stress the importance of defining what kind of knowledge is the most critical to transfer, i.e. a knowledge focus. This will help the employees know where in the organisation knowledge transfer is most critical and also why this kind of knowledge should be transferred. This focus may change or vary with departments; the important thing is that the focus is flexible.

They further argue that in order to create a vision and knowledge focus, the organisation needs management support. Management can show their support by communicating the vision, and also by actively inspire to share knowledge, and act as mentors in doing so. It could also be to give up the notion that knowledge should be kept away from subordinates as a source of power. One way to enforce this way of thinking and acting is by evaluating managers and supervisors within projects. The purpose with this is to assess how much time and effort that is use to discuss changes, share ideas or how much time is given for employees to ask questions (O'Dell and Grayson, 1998).

2.5.4 Communication

This tool encompasses dialogue, meetings and collective reflection. The collective name, communication, was chosen because each of the three aspects involves some form of communication. We argue that these aspects of communication can be guided and structured to encourage knowledge creation and transfer, wherefore we see it as a suitable tool in this study.

Davenport and Prusak (1998) prescribe talk as the key method to share and transfer knowledge. Of course, this can involve any number of informal or formal settings and practices: Water cooler chats, fairs, conferences or any forums with direct face-to-face contact are identified as the most effective. Through formal group discussions and conversations, people can exchange and reflect upon each other's ideas. By assigning someone who manages the

conversations or group discussions, the organisation can maintain a certain etiquette and standard of these meetings. According to von Krogh et al (1998), this is one of the best ways to share tacit knowledge although it is often overlooked by organisations as a way to create and share knowledge.

2.5.5 Mentors and Social Networks

This section will focus on mentors and social networks. The reason why these have been put together is that both deal with interaction between people where the one of the purposes is to gain knowledge from each other. The discussion will start with a section on mentors, after which social networks are discussed.

2.5.5.1 Mentors

We have chosen to alter Nonaka's and Takeuchi's (1995) example of an apprentice learning from his/her master, which is used when exemplifying the socialisation mode. The reason for this is that the relation that exists between an apprentice and his/her master is to our knowledge fairly uncommon in organisations today. Instead, we would argue that it is more used by craftsmen. As a result, we have chosen to discuss the use of mentors instead, since we see the relation between a mentor and his/her protégées to be similar to that of an apprentice and his/her master. This tool is important because it shows how knowledge within an organisation can be shared from experienced employees to less experienced in an informal way.

Von Krogh et al (1998) suggest having mentoring programs where less experienced colleagues have access to senior members or experts in the organisation as a way to access knowledge. The mentors should be responsible "for helping junior members to grow and actualise their full potential in the organisation" (von Krogh et al, 1998: 6). However, mentoring programs must encourage senior members to share their knowledge, which can be difficult, since keeping knowledge to oneself can by some be seen as a way to make oneself hard to replace.

According to Messmer (1998), the most important qualifications for participation in a mentoring program are commitment to growth, the ability to listen, trustworthiness and objectivity. Senior managers should be strongly

encouraged to become mentors and then evaluated on their success in this role. Likewise, protégés should be recognised for their initiative to broaden their business knowledge and advance in their profession. Messmer (1998) further argues that it is important to get support from senior management to demonstrate to all employees that the organisation stands behind the program. Corporate mentoring programs are meaningful to mentors as well as for the protégés. Another key issue is thoughtful pairing of mentors and protégé. Messmer (1998) argues that this can be decisive for the success of a mentoring program. Mentors should have experience in the particular area of interest to their protégé, whether it is technical knowledge in a specific area of business or well-developed interpersonal skills.

Sveiby (1997) states that another purpose with mentoring programs is to create networks. The reason is that while the protégés gain tacit knowledge from more experienced employees through observations they can at the same time be helped with establishing networks faster.

2.5.5.2 Social Networks

Social networks can be described as the link between two people, which in turn are linked to additional people. Relationships in a network are symmetric in the sense that no given centre can be identified, with the result that a network's boundaries are determined from the individuals', unit's or organisation's perspective. Through the relation between people, new knowledge can be created. Furthermore, the relationship can be both positive and negative in the sense that it is demanding at the same time as it creates possibilities (Helgesen, 1996).

Networks are not only used to create contacts outside the organisation, but are important for the informal contacts within the organisation as well. These networks can be called informal networks and they are important for satisfying different social needs (Wärneryd, 1978). The foremost used form of communication in informal networks is the informal communication (Wärneryd, 1978). According to Katz and Kahn (1978), informal communication is more advantageous than formal communication. They argue that it is more spontaneous and

pleasant and that it can be more informative. Furthermore, they claim that it is faster than official communication channels.

2.5.6 IT and Databases

The final tool is IT and databases. We have chosen to combine the highlighted factors, namely, documents, documentation and databases, into this tool. The reasoning behind this is that when documenting something it is often stored either in a database or in other IT tools. Consequently, this is a place where stored knowledge can be found. Theorists (Sveiby, 1997; von Krogh et al, 1998; Davenport & Prusak 1998) have given IT great attention as an enabler for knowledge creation and transfer. According to Hansen et al (1999), IT has made it possible to handle knowledge in a less resource demanding way, through codification and virtual storage. He further argues that it makes knowledge accessible to people in an organisation without it being connected to a specific person. This positive view of IT as a knowledge management tool reflects to a large extent the knowledge management literature, and it is also visible in how organisations use IT. Another scholar who argues for the “obvious“ benefits of using IT is Stewart (1997), at the same time as he points out that it is flawed. In his view knowledge management is a disguise for intellectual capital, and the purpose is to transfer human capital into structure capital by using IT. In other words making the individuals knowledge a property of the organisation.

Despite Hansen et al’s (1999) view on IT; they state that whether to emphasise on IT or not depends on the line of business that the company is in and its employees. A company that focuses on product innovations is best supported by a personalisation strategy while a company with a mature product benefits from a codification strategy. In a codification strategy, knowledge management is based around IT, wherefore it could be said that this strategy mainly focuses on explicit knowledge. The knowledge should be stored in databases and easily accessible for anyone in the organisation. The personalisation strategy on the other hand, focuses on person-to-person contacts and IT is merely used to help people communicate their knowledge, not to store it. Since the emphasis is on personal interaction, it could be said that its main focus is on transferring tacit knowledge.

Hansen et al (1999) further suggest that companies who use their knowledge effectively pursue one of the strategies predominantly and use the other strategy to support the principal one. They see it as an 80-20 split, where 80% follows the predominant one and 20% follows the other. Pursuing both or the wrong strategy can according to them damage the business quickly.

Their view have similarities with that of O'Dell and Grayson (1998) who argue that IT is a common way of sharing explicit knowledge, whereas tacit knowledge is best shared through people. They further state that some forms of databases may function as ways to capture tacit knowledge and they suggest different ways to organise such databases. One way is to structure the content around best practice and experiences gained within the organisation. This kind of knowledge should be presented in short descriptions with contact information of who possess this knowledge within the organisation. Another way is to use discussion databases, and the idea is to let employees communicate business gaps and solutions. If considering using discussion databases it is important to define the purpose and content of them, otherwise it might be difficult to attract employees to use them and to ensure that they are used for a specific purpose (O'Dell and Grayson, 1998). As a final note, we question the possibility of storing tacit knowledge in databases.

This concludes the theoretical framework of this thesis. Issues connected to knowledge creation and transfer have been of main focus. The model and the tools discussed will be used further on to analyse the empirical findings. To conclude this chapter, a discussion on the choice of theories is presented.

2.6 Discussion on the Choice of Theories

The theories that have been used in the first part of the theoretical framework served the purpose of providing the reader with a background to the different views and classifications of knowledge. This background should be useful for the second part of the theoretical framework, where the theories were narrowed down to discuss knowledge creation and transfer to help us answer the first sub question. As mentioned earlier, much of the literature on knowledge management focuses on IT and how it can be used as a management tool. We

aimed at finding additional perspectives relevant for knowledge transfer, wherefore we chose to use a model that deals with how individuals create and transfer knowledge, both by social interaction as well as by using IT. However, one can question whether all the areas of the model are of equal importance, or if one or more of the modes are more important. Nonaka and Takeuchi (1995) do not rank the modes differently, but argue that each of the four can create knowledge independently and by engaging in the knowledge spiral, individual knowledge can become organisational.

In addition, one might ask why the different tools were chosen and not other ones, seeing that there may be important aspects not covered in this thesis. The tools that we have chosen are to a large extent included as important aspects in Nonaka's and Takeuchi's (1995) model, but in addition other scholars (Davenport & Prusak, 1998; von Krogh, 1998) have made similar notes about these tools. However, Nonaka's and Takeuchi's influence on these other scholars can be debated, since their weight appears to be rather significant in regards to the theories on knowledge transfer. Even so, our choice fell on the tools above, because we consider them to cover most of the important aspects that can help knowledge transfer. As was questioned in regards to the model, one might ask oneself whether all the tools are equally important for knowledge transfer. We believe this to a large extent be dependent on setting.

With the above in mind, we move on to the next chapter of this thesis, which presents Tetra Pak and the project.

3 TETRA PAK AND THE STUDIED PROJECT

In this chapter, the object of our study is presented. The chapter includes information about Tetra Pak and the studied project. After that, a presentation of the identified problem from Tetra Pak's point of view is given.

Tetra Pak was founded 50 years ago. When it began in the early fifties, it was one of the first packaging companies for liquid milk. Since then, Tetra Pak has become one of the world's largest providers of processes and packaging solutions. Today, Tetra Pak forms part of the Tetra Laval Group, which was founded in the early nineties after the acquisition of Alfa Laval. This extended Tetra Pak's activities to include equipment for processing liquid food. Today Tetra Pak develops, manufactures and markets systems for the processing, packaging and distribution of liquid food. The company also offers software services including factory planning, control and monitoring of plants, computerised logistics studies, training, follow-up service and marketing assistance (Tetra Pak General Brochure).

Tetra Pak's products are sold in over 165 markets and it currently has market companies, packaging material plants and packaging machine assembly factories in several countries around the world. Geographically, Tetra Pak is divided into two regions: Tetra Pak Europe & Africa and Tetra Pak Asia & Americas (Tetra Pak General Brochure).

One of the main factors that have contributed to Tetra Pak's success is its ability to innovate and market its innovations rapidly on a global scale, both in packaging and processing technology for liquid foods (Tetra Pak General Brochure). There are approximately 10 to 12 innovation projects active in Tetra Pak's Corporate Research Organisation. All together there are 180 active projects within Tetra Pak. The projects' length varies from less than a year up to three years. Today, much of the Corporate Research Organisation's resources are absorbed in the object of our study, namely a project that we will call the "Alpha project". The Alpha project is a pace plus project, in other

words, an urgent project with high priority. The urgency lies in getting the new project to the market faster than its competitors. To accomplish this, existing technologies are used wherever possible. A prototype has been constructed, to which much of the work is centred, and where the members test different hypotheses. Approximately 70-80 persons, all within the Corporate Research Organisation, are involved in the project. They are also using external consultants and are working closely with subcontractors as well.

To understand the organisation of the project, its structure and organisational chart are presented. There are seven areas of expertise within the Alpha project. Each area of expertise has a sub project manager. They report project specific matters to the project management team. The project management consists of the person representing the commercial side, the project administrator and the project manager. They in turn report to the steering group of the project, which is constituted by top managers from various Tetra Pak companies around the world. The people involved in each area of expertise also form part of a larger line organisation with the same expertise, wherefore everything outside the project is reported to the respective line managers.

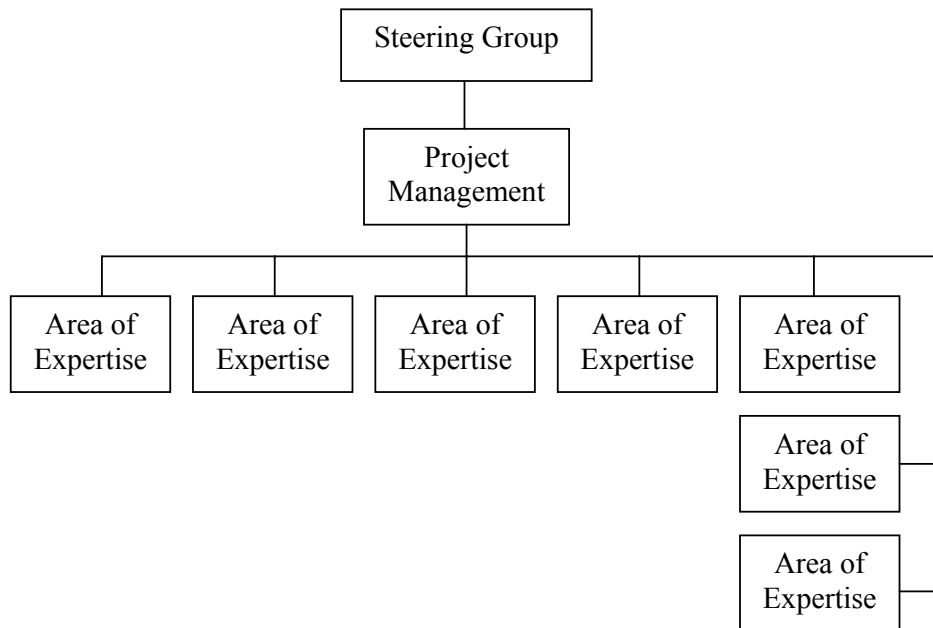


Figure 4: Structure of the Alpha project

The innovation- and project focus in the Corporate Research Organisation has brought knowledge management to the centre of attention at Tetra Pak. The persons at Tetra Pak who gave us the assignment believe that there is a need to increase the inherent knowledge sharing and transfer between projects. A reason given is that there are signs of “not invented here”, i.e. that devices that can be found in existing machines are reinvented. Other reasons given are that the use of the intranet could be more extensive and that some people are reluctant to share their knowledge.

In the past, attempts have been made to overcome this problem. Some years ago recommendations on how to approach knowledge management in Tetra Pak were outlined. These recommendations included addressing three areas, namely Culture & People, which included creating an environment where people are open and willing to communicate their knowledge; Processes & Networks where the focus was on building networks, both informal and formal; Tools & Methods, which focused on the company intranet, databases and other IT tools available. However, these attempts were not manifested throughout the organisation in a satisfying way.

This chapter has provided the reader with background information needed to get a basic understanding of the organisation and the studied project at Tetra Pak. This understanding is valuable when moving on to the next chapter, the empirical findings and the analysis.

4 EMPIRICAL FINDINGS AND ANALYSIS

In this chapter, the empirical findings from the Alpha project are discussed and analysed, following the structure of the theoretical framework. However, we will begin the chapter by giving a picture of how the interviewees are using existing knowledge in the Alpha project. Thereafter, the empirical findings related to the tools will be presented. The analysis will be presented in connection with each tool to avoid repetition. The reader should be aware that the purpose of the analysis is to analyse the current knowledge transfer by using the tools, and hence answer the second sub question: “What do project members do to gain, share and transfer knowledge?” At the end of this chapter, attention will once again be given to Nonaka’s and Takeuchi’s model (see section 2.4.1) in an analysis of the four modes. There the tools will be put into the context of the four modes and analysed to see how the modes are represented within the project. The final section in this chapter provides the reader with a brief summary of analyses.

4.1 Clarifications

Before entering the empirical findings and the analyses, a few clarifications will be made. Firstly, all interviewees have been given a male identity to prevent the identification of any particular individual. Secondly, when presenting the empirical findings the following system has been used.

- All of the interviewees: 14
- Most of the interviewees: 8 - 13
- Half of the interviewees: 7
- Some of the interviewees: 3 - 6
- Two of the interviewees: 2
- One of the interviewees: 1

4.2 Empirical Findings: Using Existing Knowledge

The aim of this section is to create an understanding about the attitudes regarding existing knowledge since it reflects the extent to which it is sought for and used. From the Alpha project's point of view, there are two ways in which existing knowledge should be used, according to one of the interviewees. Firstly, the Alpha project should use knowledge gained from other projects and secondly; knowledge gained in the Alpha project should be used in other projects. In this thesis we will only look at the first one, since we cannot judge how knowledge gained in the Alpha project should be used in other projects. The reason is that this thesis only studies the Alpha project (see Delimitations, section 1.4), wherefore knowledge transferred outside that project cannot be investigated. It could also be that other projects that may use knowledge gained in the Alpha project lie in the future, which also makes their study impossible.

When asked how the interviewees go about finding out if technologies or inventions already exist, most of the interviewees say that they listen and talk to others or hear rumours about it. To make sure that you find the person with the best knowledge in a certain area, more than one person should be asked, but this is not done to any wider extent, says one of the interviewees.

When asked if they use knowledge that exists in the organisation, one interviewee says that, to him, it is not important to invent new things if existing solutions work, or as he puts it:

“Copy shamelessly, if something works, copy it.”

However, according to some of the interviewees, few people look at earlier projects or ask for help to find out what has already been invented or if that knowledge may exist elsewhere. The consequence of this behaviour is that too much is re-invented in the organisation.

An expression used by some of the interviewees is “not invented here”, which refers to projects that re-invent what already exists in the organisation. According to one interviewee, proof of this is inventions that have components

with the same function as existing ones, but created through different solutions. He thinks that employees do not take the time to find out what has already been made in the Corporate Research Organisation. Another interviewee believes that they are not good at searching outside Tetra Pak to find out if there already exists solutions that they can use.

However, some of the interviewees give examples of actions taken in the Corporate Research Organisation to make sure that people try to find existing knowledge. One example is that sub-project managers within the Alpha project are seated near his/her line managers who, due to their position, have knowledge about other projects. Another attempt to ensure that existing knowledge can be used is Tetra Pak's warehouse, where all prototypes of machines from previous projects are stored. The warehouse's purpose is that it should be possible to bring back machines and other utensils from closed projects to re-apply the technologies that were used in the past.

On a project level, all the interviewees agree that existing knowledge has been used. They mention technologies already known to the company in the forms of blueprints that have been used and developed even further to meet the higher demands of today. In regards to the personnel that have been brought in for their knowledge, all the interviewees mention two specific persons that have previous experiences that are useful in this project. Another example is when there was a change in project managers. By letting the former project manager and the new one work side by side during one month, the change of project managers was facilitated. Today, the former project manager is part of the steering group, with the purpose to represent the history of the project.

Another concrete example of how existing knowledge is used in the project is given by some of the interviewees, one interviewee explains:

"I have used material from an earlier project, which I used to work in. This material would probably have gone to waste if I had not thought about using it in this project."

Another interviewee says that he uses detailed information from earlier projects, such as test results. While one interviewee has documented material from an earlier project, which he thinks, he might be able to use in this project.

Earlier projects that have been cancelled can also be helpful. One interviewee says that he looked at a cancelled project for solutions, when there was a particular task that he did not know how to solve. He also talked to people who had been involved in this particular project to find out what they had done well and what went wrong. In addition, one interviewee says:

“I cooperate with other Tetra Pak companies and make use of what they have done in other projects. Besides that, I do not actively search for things that I can use.”

4.3 Analysis: Using Existing Knowledge

In the project, the attitudes towards using existing knowledge are positive. Despite this, few project members appear to take the time to search for existing knowledge in databases. Instead, they create new innovations, even though the same solutions might exist somewhere in the organisation. O’Dell and Grayson (1998) state that when it takes time to locate existing knowledge, high search costs may cause people to make new innovations. With this in mind, the project members’ behaviour could be a result of high search costs, i.e. that it is time-consuming to search for existing knowledge. This corresponds to attitudes reflected in the section about IT and databases (see sections 4.14 - 4.15), where the interviewees state that it is difficult to find information in a structured and easily accessible way. In addition, learning about existing knowledge is tightly connected with networks (see sections 4.12 - 4.13), since that is the most common way of sharing knowledge in the project.

Even though there are indications that people reinvent, there are also signs that the Alpha project has tried to get around this problem. This is visible in various ways. One example is that employees with relevant experiences and knowledge from earlier projects have been brought in; another is the use of existing technologies in the form of blueprints. Interviewees also state that they have

used material and knowledge from earlier projects. When compared with theory, we see that this corresponds with one of Argote's and Ingram's (2000) ideas about how to transfer, and hence use, existing knowledge. They talk about moving or modifying knowledge reservoirs. According to them, reservoirs in the form of people or technology can be moved, which is exactly what has been done in the Alpha project.

However, von Hippel (1994) argues that knowledge that resides in a community is not easily transferred outside this community. The implications for knowledge transfer are twofold. Firstly, the knowledge that has been brought into the project in the shape of people and blueprints may be context specific and hence not easily transferred to the setting of the Alpha project. Secondly, the knowledge residing within the Alpha project may be difficult to transfer to other projects.

As mentioned above, O'Dell and Grayson (1998) say that taking time to transfer existing knowledge can imply high search costs, which in turn may have the consequence that people choose to invent new things instead. However, by using people who have knowledge about existing technologies, we see that the project has been able to avoid these high search costs to some extent, since the members do not need to search for the knowledge; it exists within the project. Furthermore, O'Dell and Grayson (1998) mention the risk of only using existing knowledge, meaning that the result will be that no new knowledge is created. It is our opinion that by moving knowledge reservoirs, the Alpha project has managed to create a balance between using existing knowledge and creating new. Some of the interviewees state that existing technologies have been developed and improved to fit the new demands at the same time that new parts have been innovated for the project. This is what Argote and Ingram (2000) refer to as modification. However, one could question if people bother looking outside the project if they think that they have all the knowledge needed within.

4.4 Empirical Findings: Having an Enabling Context

The physical work environment in Tetra Pak is characterised by open-space offices with small separate meeting rooms. The interviewees have both positive and negative opinions about this. On the one hand they facilitate communication and make project management easily accessible, but on the other hand it is noisy and some say that it is difficult to concentrate.

When putting together the project team, one of the focal points was on creating a differentiated team. They wanted to create a differentiated team with members who possess knowledge in different key areas. According to one of the interviewees:

“A differentiated team has value for the success of the project, since people with diverse experiences and personalities will force the other members to look at things in different ways and from different angles.”

At the beginning of the project great focus was put on creating a team spirit. By locating the project in Eslöv, away from Tetra Pak, the team was allowed to work tightly together without disruptions. This enabled them to build up a team spirit, strong enough to survive and expand to include new members when the project team was moved back to Tetra Pak in Lund. One of the interviewees explains the advantages of returning to Lund:

“The project as such also had many advantages of becoming fully integrated into the Corporate Research Organisation, since we had complete access to the competence areas, i.e. the key technologies that we needed for the project.”

Other issues have been highlighted by some of the interviewees. One is that everyone can call to a meeting. This is normally done when more than one person can assist in solving a problem. Another is that they stress the importance of the fact that there is a democratic decision-making process in place. In addition it is considered important that everyone gets to pose questions during meetings even if they are outside ones area of expertise. A somewhat divergent view is given by one of the interviewees:

“One has to be careful /.../ if the majority of the people do not see the point with a new tool then there is no point in trying to convince them.”

4.5 Analysis: Having an Enabling Context

A shared space for emerging relationships, or what Nonaka and Konno (1998) refer to as Ba, may be either physical, virtual or mental, or a combination of the three. When putting this into the context of the project, we see that all three are represented. However, the third type of Ba, the mental Ba, is covered in sections 4.6 – 4.7, which deals with shared experiences. The virtual Ba could be said to be in place within the project, since different communication tools, such as emails, telephones and video and telephone conferences are used frequently. According to Nonaka and Konno (1998), these are examples of the virtual Ba.

The physical work environment such as the open-space offices could be said to represent the physical Ba. There are two aspects of this; on the one hand, some of the interviewees see the open environment as a facilitator to direct communication, but on the other hand, it has been said that the constant noise and interruption can make it harder to concentrate. This means that for some of the interviewees, the open-space offices works as a physical Ba, while for some it does not.

Another aspect of this type of physical environment is that the lack of offices and closed doors makes the project management easily accessible for everyone in the project. Von Krogh (1998) argues that the way people in the organisation relate to one another is particularly important for knowledge transfer. By making the project management accessible to all members, it could be argued that a high-care environment is encouraged.

Von Krogh (1998) argues that in a high-care environment ideas should be discussed freely. This is showed during meetings when ideas are shared and everyone is allowed to ask questions, even if the subject is outside a person’s area of expertise. Other characteristics of a high-care environment are access to help, willingness to share knowledge, mutual trust and active empathy,

according to von Krogh (1998). To find the strongest indication of these aspects, it is necessary to look into the importance of networks within the project (which is dealt with more in-depth in sections 4.12 - 4.13). The reason is that through the networks, members share their own knowledge as well as receive help from others to solve problems. The indications given above, together with the fact that all the interviewees stress their extensive use of networks as a way of sharing knowledge, we consider the Alpha project to be a high-care environment.

On a final note, we believe that the reason why the few people mentioned to be unwilling to share their knowledge could be that they are afraid of becoming replaceable. Von Krogh (1998) argues that this is a common reason why people capture their knowledge. Another reason could be that they are afraid to lose power, since knowledge is often associated with it, according to the same scholar.

4.6 Empirical Findings: Shared Experiences

The empirical findings in regards to shared experiences and having a common language are presented below. When it comes to shared experiences, most of the interviewees state that they have a background in some form of engineering and have worked in the Corporate Research Organisation or within other parts of Tetra Pak. Some of the interviewees also say that they have worked with project members in earlier projects. During the interviews, it is noted that the language that they use appears to be very company specific and is characterised by technical abbreviations. When the interviewees talk about the project it is assumed that everyone understands the context. It also becomes evident when the interviewees talk about different successful Tetra Pak projects that have become separate companies. They are referred to with their product name, for example Rex, Top and Brik, and their shapes are also assumed to be known to everyone.

There is evidence that the common language used by the project members and their shared stock of knowledge are not evident for external parties, something that we experienced during the interviews, and some interviews also mentioned

it to us during the interviews. In the beginning, the project experienced problems with the subcontractors, since it turned out that they had not fully understood the instructions given by the project. Since this was realised, the project try to be clearer in their instructions and to have feedback sessions more often than they had in the beginning.

4.7 Analysis: Shared Experiences

Davenport and Prusak (1998) state that people working in similar areas and receiving the same type of training have an increased understanding for each other's words and actions. In the context of the project members, we see that most of them have worked within Tetra Pak for quite some time and some have even worked with other project members before. The members' understanding of each others' reasoning and wording are clear signs of Davenport's and Prusak's (1998) statement. This could also be related to what Kogut and Zander (1992) refer to as having a shared stock of knowledge. The fact that most of the projects members appear to have a background in some form of engineering and have worked in the Corporate Research Organisation or within other parts of Tetra Pak exemplifies this.

The paragraph above shows that there are shared experiences and a common language within the project. In turn, this could mean that there are possibilities for knowledge transfer. Putting the above in the context of socialisation, Nonaka and Takeuchi (1995) argue that the key to acquiring tacit knowledge is shared experiences that are context specific. We interpret that the project and the Corporate Research Organisation constitute a specific context where shared experiences are generated and have been so for a long time, wherefore possibilities for socialisation can be seen.

In the project, the issue of a common language is also relevant. O'Dell and Grayson (1998) stress the need for a common language for knowledge transfer to take place. The interviewees use certain expressions that are obvious to them, without realising that these expressions mean very little to outsiders (us). It is very specific in the sense that they use the product names when referring to other Tetra Pak Companies and technical abbreviations when discussing e.g.

technology used in the project. Having a common language is evidently affected by shared experiences. Therefore, one might wonder how knowledge transfer to other projects is affected if the common language is specific to the Alpha project. If this is the case, it probably has a negative effect.

However, there are also indications of a lack of a common understanding. One example given by one of the interviewees concerns the misunderstandings between the subcontractors and the project. Whether the lack of a common understanding is due to a lack of a common language or a shared stock of knowledge or both would be mere speculations. Since they are aware of this problem and actions have been taken to improve the situation we see no need to comment on this issue any further.

4.8 Empirical Findings: Creating a Knowledge Vision and Focus

Information about knowledge management can be found on the intranet. The information focuses on the importance of having shared experiences and the importance of networks as a mean to share knowledge. Part of the information is more general, in the sense that it explains the concept of knowledge management, while other parts appear to be specific guidelines as to how Tetra Pak should approach knowledge management. Examples of what is said on the site are:

“Sharing experiences or ‘Best Practices’ is the overall aim of a company that focuses on knowledge sharing in general.”

“Networks exist to create, share and distribute knowledge in the line organisation and their focus should be to collect, codify and distribute best practices.”

When asking some of the interviewees whether there is an outspoken knowledge vision at Tetra Pak, most of the interviews answer that they do not recognise anything like that. Some of the interviewees even started talking about other things, such as the goal of the project. Nor was there any clear answer with reference to the project management’s role in the knowledge

sharing within the project. As regards the steering group, two interviewees say that they find it very de-motivating that the steering group do not keep themselves updated by using the project information that is available in Tetra Pak Innovation Network (TPIN), which is where project documentation is stored for future reference (this will be explained in detail in section 4.14 - 4.15).

4.9 Analysis: Creating a Knowledge Vision and Focus

According to von Krogh et al (1998) knowledge creation and transfer would be facilitated with a knowledge vision. Nonaka and Takeuchi (1995) take this issue even further, stating that it is the most critical element of corporate strategy. Since some of the interviewees say that there is no knowledge vision or focus within the organisation and others start talking about other issues, we find it irrelevant to analyse the information posted on the intranet that concerns knowledge management. This choice is made since if no one is aware of such a vision or focus, it is either due to the fact that there is none, or that it has not been articulated.

On a final note, we wonder if it may not be so important to have a knowledge vision in the project since none of the interviewees mention it. On the other hand, it could be a case of “what you do not know, you do not miss”, which would mean that the interviewees are unaware of how a knowledge vision and focus could guide the knowledge transfer. One thing that points to the need for having a knowledge vision and focus is that the interviews indicate that there is no accordance regarding how existing knowledge is used and sought for.

4.10 Empirical Findings: Communication

Here, we show how communication is used in the case project. This section is divided into three parts, where the first presents different ways of communicating in the project. The second part deals with meetings, and the third part with feedback. This division is in accordance with what the interviewees have been discussing when asked about communication.

Common ways to communicate are via e-mail, phone and through meetings. There are also more informal ways of communicating such as talking during coffee breaks, approaching a person's work place, and asking spontaneous questions. One of the interviewees states:

"We are not so good at documenting experiences, but instead people talk to each other and that is what is important."

When asked how they go about finding solutions to problems, most of the interviewees state that they discuss ideas and solutions with the closest co-workers. One interviewee says:

"The competence I need is often available in my neighbourhood, and I do not have to go very far to get the information I require."

However, one interviewee says that the fact that the organisation is a matrix organisation can make it difficult to ensure that everyone is informed about different project related issues. It is not only the project participants and the sub-project managers that need to be informed, but also the line managers within each area of expertise. Due to the organisational structure, it is not always clear who should inform whom.

Another interviewee claims that when he has information that he thinks may be valuable to someone else he informs that person about it. He also thinks that he informs more than others do.

Although the majority of the knowledge that project members search for and use can be found within the project or the Corporate Research Organisation, to some extent other companies within Tetra Pak are also involved in knowledge sharing. One interviewee mention the use of the Tetra Pak Strategic Global Marketing Company, which is used to get insights or knowledge concerning the future market and to discuss the packaging and the price.

"The Corporate Research Organisation y has come far in opening up towards other companies within Tetra Pak. What is still left to do is to find out what

knowledge might be needed from other areas in order to open up towards these areas.”

4.10.1 Meetings

Meetings within the project are held both cross-functionally and within each area of expertise. The meetings are held regularly, and their purpose is to update everyone about the status in all areas. Occasionally, there are meetings held by the project management. The meetings can concern problems and risks, feedback from the steering-group or provide a status report of the project as a whole. One of the interviewees says that structured and scheduled meetings are needed in a big project like this one. Another of the interviewees views meetings as very positive:

“During the meetings all the pieces in the puzzle are put in place, which makes it possible to solve a task much faster”

Most of the interviewees appreciate and value the information that they get from the meetings. Some of these interviewees say that sometimes, the meetings provide valuable input from areas that they normally would not be looking at. Despite this, some are of the opinion that there are too many meetings and that this result in that there is very little time to sit down. Referring to the meetings, one interviewee says that:

“There is too much talk and too little action.”

In addition to the meetings that are held within the project, other initiatives have been taken that could be of relevance from a knowledge-sharing point of view. Most of these initiatives aim at providing an insight into new areas and create awareness for other employees' work.

One initiative taken is that each person within a department presents the progress of his or her work. The reason given is that unless people are involved in the same project, they may not know what their colleagues sitting in the same room are working on. The interviewees that are involved in this initiative are positive towards it.

Another initiative is the one-hour innovation seminar held once a month. The purpose of the seminars is to give anyone within the Corporate Research Organisation the opportunity to speak about his/her area of expertise and innovations made. In this way, knowledge about what other parts of the Corporate Research Organisation are doing can be shared with others. One interviewee says that these seminars also work as an incentive to those who have invented something specific in an area. Unfortunately, the attendance ratio is low due to lack of time. A similar initiative, but on a smaller scale, has been taken by one of the line managers who invites people from other areas of the organisation to speak about their projects.

In addition, two interviewees mention that in the past there used to be so called “Challenge Sessions” within the project where the members met and discussed each other’s work. The point was to have an open discussion about the material and to get people to think on new lines entirely without drawing any conclusions about the points that were made. One of the interviewees says there was reluctance towards these challenge sessions in the beginning, but that the opinions changed after a while. He points out that:

“People noticed that they could actually learn something from these sessions.”

4.10.2 Feedback and Evaluations

Another aspect of communication is that of feedback and evaluations. This is related to knowledge transfer in the sense that when people reflect upon their actions, greater focus is placed on the knowledge gained. Views about feedback on an individual level are given by some of the interviewees. One interviewee says that people feel encouraged by getting attention and feedback on their innovations. Another interviewee points out that a successful project is rewarding in itself.

Other interviewees commented evaluations and feedback on a project level. During the first year of the project, they had a voluntary project audit. The purpose was to get inputs from an external party, the audit team, concerning what could be improved or done differently. Other evaluations are those done

together with subcontractors, where both parties have had to improve from the feedback given.

When asked if there are any continuous evaluations throughout the project, one of the interviewees explains that there are evaluations made in TPIN (Tetra Pak Innovation Network, a database) after the completion of each phase/milestone in the project. To continue to the next phase, certain criteria must be fulfilled. Another interviewee points out:

“The milestones are good opportunities for reflection.”

Within the project, evaluations are made at different levels according to one interviewee. Firstly, there are evaluations of the project as a whole, made by project management. Secondly, there are evaluations conducted by and for each area of expertise, and thirdly, there are evaluations within each area of expertise concerning details such as test results etc. All the evaluations are stored in databases.

When asked about evaluations, most of the interviewees mention the final documentation that is done at the end of every project, where every part is thoroughly documented. Some of the interviewees also speak about lessons learnt. One of the interviewees says that he has participated in lessons learnt meetings before and that it was very rewarding. Another interviewee says:

“Too little emphasis is put on expressing what has been done right or wrong. There are too few lessons-learnt sessions.”

4.11 Analysis: Communication

Davenport and Prusak (1998) state that talking to each other is the key method to sharing knowledge, whether it is formalised or not. From the interviews we note that oral communication is the foremost used way to share knowledge. The fact that oral communication is the strongest form of communicating within the project is possibly reinforced by the open-space offices, which promote communication.

Talk is also used for finding out if knowledge about a particular subject exists within the project or within the organisation as a whole. We support the opinion of Nonaka (1994) that this way of learning about existing knowledge is efficient in the sense that there is often more to tell about a particular issue than what is documented in writing. Could this be one reason to why project members prefer to talk to each other instead of searching for knowledge in databases? The fact that people prefer to talk to each other instead of searching the databases could also be a sign that there is a high-care environment in place, which promotes interaction between people.

One way that project members share their experiences is by using for example analogies of previous projects. According to Nonaka and Takeuchi (1995), analogies and metaphors are used together in the externalisation mode, where the analogies synchronise what the metaphors describe through contradictions. In the project, there are signs that analogies are used when referring back to previous projects. However, the use of metaphors has not been identified in this study. The reason for this may be the way the study was conducted, i.e. through interviews. It could also be questioned if the mere identification of the fact that analogies are used in the project is proof enough to state that socialisation exists.

Von Krogh et al (1998) argue that group discussions are one of the best ways to share tacit knowledge. The challenge sessions held in the initial phase of the Alpha project can be seen as formal group discussions. During the interviews however, the interviewees made no indications that there are any organised group discussions going on at present.

Even though the interviewees give no direct examples of current group discussions, there are signs that are visible both formally in meetings where everyone is allowed to speak their mind and raise questions about different issues, and informally through spontaneous discussions. Therefore, people can express and discuss ideas freely, which is one characteristic that von Krogh et al (1998) state to be significant for a high-care environment.

According to Davenport and Prusak (1998), forums with face-to-face contact are one of the most effective ways of sharing knowledge. Within the Alpha project there are many opportunities given to share knowledge in this way, e.g. through meetings. They have managed to cover a broad spectrum of meetings that are both cross-functional and within each area of expertise. However, the innovation seminars might not be as effective from a knowledge sharing point of view, since the attendance at these forums is still rather low.

When it comes to feedback and evaluations within the project, it appears that the interviewees value the ones that are held, especially the lessons learnt sessions and they request more. This could be an indication that everyone wants to take part in lessons-learnt sessions, which can be seen as collective reflection. Collective reflections are one part of the externalisation mode, where tacit knowledge is made explicit (Nonaka and Takeuchi, 1995). Therefore, lessons learnt sessions where project members get to reflect on experiences gained could be seen as a part of the externalisation mode. However, the interviews have indicated that not all project members are included in the lessons learnt sessions, which would then mean that not all members are invited to take part in the collective reflection.

4.12 Empirical Findings: Mentors and Social Networks

In this section, mentors and social networks within the Alpha project are presented. Both the empirical findings and the analysis will be divided into two parts, where the first brings up the findings regarding mentors, and the second deals with social networks.

4.12.1 Mentors

Only one of the interviewees says that the only mentor program that he knows about is an informal one, which exists in one of the areas of expertise, but that most employees are not aware of its existence. He explains that employees are seated in a specific way in the office, young and new, with older and more experienced. It has a two-way purpose, where the first is to encourage new employees to turn to more experienced ones for advice; and the second is that

the new employees' should be able to portray their more theoretical ways of thinking to the more experienced ones.

Even though only one of the interviewees talks about the informal mentor program, most of them state that they have someone that they ask for advice. Some also claim that they are mentors or have been asked to be one. Most of the interviewees believe that mentors at all levels in the organisation could help introduce new employees to people and thus get them to start creating networks, since it is commonly agreed that it is difficult to be new in the organisation and that it takes time to build up a network, or as one interviewee puts it:

“It is hell to be new and not knowing who to talk to.”

One interviewee says that as newly employed, you often just turn to the closest contacts, and if they do not know the answer, the new employee will not know it either. Another person suggests that new employees should visit other parts of the organisation to talk to people, find out what is being done where, and get to know people. In this way it will also make it easier for them to know whether things have been done before or not.

4.12.2 Social Networks

There is coherence in the answers in regards to the importance of networks. Both formal and informal networks are mentioned, although the main focus is placed on the informal ones. All interviewees believe that informal networks are vital for the knowledge sharing within Tetra Pak. The longer you have worked in the organisation, the larger your network is. When there is a problem that needs solving, all of the interviewees choose to talk to people before searching for information in databases or in development reports. According to one of the interviewees, it is important to accept and encourage informal networks and show that they are important. Another interviewee states:

“By building up informal networks, you learn who to talk to and you also become known to other people. You could say that networks are built up through a ripple effect.”

Another explanation is offered as to how informal networks are created. For example, organised get-togethers within the project or departments and different clubs within Tetra Pak, such as a photo club. These clubs serves as formal networks where informal networks are created.

There are approximately sixty formal networks and a budget set aside for them. Most of them have annual meetings where experiences are shared. Some of the interviewees believe that a lot could be gained by formalising some of the informal networks, for example one for project management.

Another issue that the interviewees bring up is that when you are new, you do not know about the methods available to find answers to your questions. One interviewee says that one way is to look for development reports in TPIN and then contact the author of the report that matches the area in question.

4.13 Analysis: Mentors and Social Networks

In accordance with the previous section, this section will also be divided into two parts. The first part analyses mentors, and the second social networks.

4.13.1 Mentors

According to von Krogh et al (1998), mentor programs should help junior members develop and grow at the same time, as senior members should be encouraged to share their experiences. Since there is no outspoken mentoring program within the project or the Corporate Research Organisation it is difficult to analyse such aspects. What can be said is that by seating new with more experienced, informal mentoring is encouraged to some extent. Nonaka's and Takeuchi's (1995) opinion about mentors is that protégés learn from observations and imitations. Therefore, it is difficult to know if the informal mentoring that exists within the project really transfers tacit knowledge since the mentors have more of an advisory role, rather than someone to observe and copy. Even though signs of informal mentoring exists, other signs indicate a need for a stronger mentorship since a majority of the interviewees state that it is difficult to be new. In spite of this, we argue that they way people are seated

may still have a positive affect on socialisation. The seating may offer the new employees the opportunity to see how more experienced employees work, and perhaps copy their behaviour, thus transferring tacit knowledge from one person to another.

4.13.2 Social Networks

According to Sanchez and Heene (1996), a large portion of tacit knowledge can be found in networks. It appears that the importance of these networks is identified rather early in project member's work since they provide information and knowledge necessary for their work. It is our view that within the Alpha project, project members have experienced the importance of networks for locating existing knowledge. As we see it, the informal networks are the ones that are emphasised as means for knowledge transfer within the project. The fact that there is no specific aid in place to help the project members find the person with the best knowledge in an area probably contributes to this personalised way of finding knowledge. However, this personalised way of transferring knowledge may also hinder knowledge transfer since it might be difficult to know whom to turn to. In turn, this difficulty could lead to high search costs in the sense that it may be too time-consuming to find the right person (O'Dell and Grayson, 1998). The result is then that members invent things without checking if solutions already exist.

However, it is clear that people mainly look within the Corporate Research Organisation for knowledge needed. The way they go about finding the person with this knowledge is through asking people. In our view, this could imply that it is not always the person with the best knowledge in an area that is asked, but rather the one who is closest geographically, like Davenport and Prusak (1998) argue to be common in large and complex organisations. The result of this could be that valuable knowledge remains unidentified and consequently it is not taken advantage of.

4.14 Empirical Findings: IT and Databases

There are about eight places where information is documented and stored; different things are documented in different places. As an example, the overall

project documentation is stored in TPIN and a shared account keeps calculations, technical documentation and other working documents. In addition, more general information can be found on the intranet.

An expression used in Tetra Pak according to one interviewee is that you have to search actively to find information. However, he thinks that there is an information overload that makes it impossible to do so.

The intranet at Tetra Pak is called ORBIS and it has grown tremendously since it was introduced some six or seven years ago, which means that it is now rather difficult to navigate and to find information. It is considered to be obsolete and not user-friendly. One interviewee says that:

“You can spend days trying to find information there, it contains far too much information. It is like people measure their success in the amount of information that is put on the intranet.”

Some of the interviewees even use the same phrase when expressing their view of the intranet:

“If you want to hide something, put it in ORBIS.”

4.14.1 The Server

To make working documents, meeting notes etc. available to everyone in a project, they are stored on a shared account. All interviewees refer to this account as “the server”, to distinguish it from their hard drive, hence the expression “the server” will be used when talking about shared accounts.

One issue brought up is that the extensive use of the server throughout the project has made it rather large. This means that the initial structure is lost quite early in the process, especially if people put information on the server without having received any guidelines about where to put it. Another issue is that a lot of the information becomes obsolete after a while, and if that information is not removed from the server, it takes even longer to find what you are looking for.

4.14.2 Technology Intelligence

Technology Intelligence is the department within Tetra Pak that is responsible for Tetra Pak's Innovation Network (TPIN) and Technology Intelligence databases. They also give workshops and courses in how to search for information and projects in databases and TPIN. You can also subscribe to receive emails about when new information and reports in any areas of interest is available. The information is greatly appreciated by some, while others say that they rarely take time to read the emails they send out. In general however, the opinion about Technology Intelligence and its services is positive.

4.14.3 Tetra Pak Innovation Network (TPIN)

TPIN serves as a knowledge reservoir where you can find information about ongoing and closed projects. A general view among all interviewees is that TPIN is not a tool to be used daily, for that purpose the server is used. TPIN is not open to everyone, and to enter, a username and a password are required. Approximately one fourth of Tetra Pak's employees have access to the system, but within the Corporate Research Organisation, everyone has access, according to one of the interviewees.

Common for the answers regarding the use of TPIN is that they are fragmented, diverse and cover various areas. Some interviewees say that TPIN is a tool to keep track of documents that are useful during a project's phase transitions. To pass these phase transitions or milestones, certain requirements must be fulfilled, and these can be found in TPIN. Other interviewees state that the purpose with TPIN is that it should be possible to read what was done in a project from beginning to end. This documentation is represented by the development reports that are dealt with in the next section.

Common for all the interviewees is that they do not use TPIN as a working tool in their daily work. Instead, they put working documents, such as protocols from meetings and memos, on the server. Despite this, we have had indications that information is sometimes entered twice, both on the server and in TPIN.

The opinions about TPIN vary to some extent, but the majority state that they do not use it very much. One reason given is the fact that it requires a username

and password. Another reason given is that it is difficult to search for information and it takes too long, i.e. that:

“Unless you know the name of the document or if you are not entirely sure of what you are looking for, you can spend weeks looking for information in TPIN.”

The fact that one interviewee has not entered information into TPIN that he was asked to do two years ago, shows how limitedly it is used, according to him. One reason for the limited use of TPIN within the project is that it is an anonymous system, says another of the interviewees, and that people prefer to talk to one another to gain knowledge about different project-related issues instead of reading about them. There are also indications that the training in how to use TPIN is insufficient, resulting in the limited use.

On a final note to this section, there was one interviewee who expressed the opinion that TPIN only helps others. What he meant was that by entering information into the system, others can access it, while his gains are limited.

4.14.4 Development Reports

A major part of TPIN is the development reports. The reason why we have separated the two, although they express similar opinions, is that the interviewees discussed them as two separate things.

Most of the interviewees are positive towards the development reports, and see them as a good way to increase the knowledge transfer between projects. Lately, there has also been some pressure from management that the documentation must be increased, which all of the interviewees agree with, in the sense that the reports could be used more extensively. One interviewee argues that it should be natural to investigate what has been done earlier, before starting the development of something. If the documentation is not used, it is pointless, and he continues:

“You owe it to yourself to read them.”

At the same time as the interviewees are positive towards the development reports and think that they have a purpose; only some of them state that they write development reports on a regular basis. One reason stated is that the system for writing development reports is unsatisfactory because there are so many things in a project that are never documented. These things may not be significant enough for a development report, although they are of importance for the project's progress. On the other hand, he also says that if he were to document every little thing, he would not have time for anything else.

In addition, it is mentioned that the reports are heavy to read and that that is one of the reasons why people prefer to ask someone in person instead of searching for a development report on the subject. In addition, one interviewee says:

“People may tell you things that you cannot read about.”

4.15 Analysis: IT and Databases

Through the interviews, we have tried to find a pattern regarding the use of the IT and databases that are in place. Even though the server is used extensively there appears to be some reluctance towards documenting knowledge gained. The reasons given vary but it seems like most of the interviewees feel that they do not have the time to do so. In addition, there are few incentives to document knowledge gained. Here a parallel can also be drawn to a von Krogh's (1998) low-care environment, where knowledge is not shared unless the benefits of doing it are clear. Another reason could be that there is more to tell than what can be put down in words, something that Nonaka (1994) also discusses.

It can be said that within the project, members document progress or other important aspects quite frequently on the server. This aspect of the documentation seems to work well. However, they all say that they ought to document more in TPIN, i.e. that more development reports should be written. This could indicate that there is room for more internalisation to take place, since according to Nonaka and Takeuchi (1995) this is made possible when people document their experiences, thus internalising them. We question whether the uneven focus on the server and TPIN could have anything to do

with being able to see the benefits from using both, and also the balance between a short and long term focus. We base this on the fact that the server is used for a project specific purpose, i.e. the benefits are obvious, while it is more difficult to see the benefits of documenting in TPIN, since it may be difficult to see how the documentation can be used in the future.

Even though the interviews provide some clarity with reference to the IT systems, the answers still vary both in terms of what kinds of IT support that is used, how often it is used, and also the opinions about documenting experiences in an IT system differ. Both TPIN and the server appear to be used mainly to upload information. We are of the impression that both are used fairly little to search for information that others have uploaded. The fact that the documentation is stored in various places could make it difficult for others to locate the information that they search for. This could then be one of the reasons why the retrieval of documented knowledge is not as extensive as it could be. According to O'Dell and Grayson (1998), it is very important to define the purpose of an IT system. With this in mind, a parallel could be drawn to the various answers given in regards to what TPIN should be used for. Maybe this could indicate that the purpose of TPIN is not clearly defined.

Seeing that the use of IT varies is not necessarily negative. Hansen et al (1999) argue that whether to emphasise IT or not depends on the line of business that the company is in, i.e. whether the company is focusing on product innovations or mature products. Consequently, an organisation like the Corporate Research Organisation at Tetra Pak should benefit from a personalisation strategy, since their focus is on product innovations and thus mainly transfer of tacit knowledge. This focus is adapted to a large extent in the project, seeing the importance that the person-to-person contacts have, put in relation to IT. However, even though management encourage a personalisation strategy, for example through emphasising the importance of the networks, management also requests that a stronger focus should be put on IT. This means that at the same time as a personalisation strategy is encouraged, more emphasis is also placed on a codification strategy. This is something that Hansen et al (1999) warn for, claiming that by pursuing both strategies the business will be damaged.

The above discussion is related to O'Dell and Grayson (1998) statement that tacit knowledge is best shared through people, whereas explicit knowledge can be shared with IT. This might help explaining the personalisation focus in the project since the type of knowledge that is important to transfer in an innovation project is mainly tacit, something that is supported by Hansen et al (1999).

Another issue mentioned by Hansen et al (1999), is that IT has made it possible to handle knowledge in a less resource demanding way. However, given that some of the interviewees state that the databases are difficult and time-consuming to use, we see indications that the IT tools that are in place have not made knowledge-searching less resource demanding within the Alpha project. Whether the more personalised approach used in the project today, is more resource demanding than an IT approach is impossible to tell.

4.16 Analysis of the 4 Modes

In this section, we once again turn our focus to the model. The tools corresponding with the four modes will be analysed from the model's point of view to see how the four modes are represented within the project. Some tools may be discussed more than once, but in different contexts.

4.16.1 Socialisation

In this section, the tools that correspond with the first mode, namely socialisation, are analysed. These tools are shared experiences and mentors. As concluded in previous sections (4.7 and 4.13), shared experiences exist in the project.

Even though there appear to be elements of socialisation in the project in the shape of shared experiences, the issue is not without complexity. According to Polanyi (1998), an individual's knowing is highly personal. It could be questioned if this is an indication that knowledge cannot be transferred to other people? Another complex issue is that even though the shared experiences and some form of mentoring are in place, tacit knowledge transfer may be difficult to determine. This brings us to another issue related to the above, namely that

of control. Since the transfer of tacit knowledge cannot be visualised it also becomes problematic to determine how to measure and control it from a manager's point of view. Tuomi (1999) takes it a bit further, saying that knowledge cannot be managed.

The focus on socialisation within the Alpha project does not appear to be as strong as the focus on externalisation, i.e. where tacit knowledge is made explicit. Externalisation will be the centre of analysis in the next section.

4.16.2 Externalisation

In this section, the second mode, externalisation, where tacit knowledge is made explicit, is discussed. The tool derived from this mode is communication.

Seen from Nonaka's and Takeuchi's (1995) view of externalisation, the way the project members communicate could indicate that there is a strong focus on externalisation within the Alpha project. It could also be argued that this focus is reinforced by the extensive use of informal networks and meetings, since both provide the opportunity to share experiences. However, seen from Polanyi's (1967) point of view it is difficult to express and formulate tacit knowledge. Leonard and Sensiper (1998) take on a similar standpoint, arguing that it is common that people are unaware of their tacit knowledge or are unable to articulate it. From their point of view, realising the externalisation mode would be complicated.

As a final note to this section, we argue that since IT is not seen as a completely well functioning tool, people are forced to pursue a more personalised way of sharing knowledge, which could be one reason for the strong focus on externalisation in the project.

4.16.3 Combination

The third mode, combination, is the focal point of this section. In this mode, explicit knowledge is combined with existing explicit knowledge. The tools associated with this mode are communication and IT and databases.

In the combination mode, IT and databases are used for documentation and retrieval of explicit knowledge. As mentioned earlier, IT and databases are extensive, although they are not used as much for retrieving knowledge as they are for storing it. It can be argued however, that the documenting is sometimes seen as being the end in itself. Therefore, it can be argued that the retrieving, and sometimes the storing of knowledge that take place in the combination mode are not given much emphasis in the project. However, it should not be neglected that in this project blueprints and test results from earlier projects have been used.

Although IT and databases are available in the project, oral communication is the foremost common way of transferring knowledge. This conclusion has few similarities with the knowledge management literature that focuses on IT as a tool for storing and retrieving explicit knowledge. The reason why much of the literature has this focus may be that IT can be used to control the knowledge transfer. In turn, this means that the project's way of retrieving knowledge creates a dilemma, seeing that it is difficult for management to determine and thus control the transfer, even though the knowledge is explicit.

4.16.4 Internalisation

The fourth mode, internalisation, focuses on making explicit knowledge tacit. The tools derived from this mode are IT and databases, and oral stories, which form part of the communication tool. In this mode, explicit knowledge that can be found for example in databases can be used to internalise an individual's knowledge.

As mentioned earlier, the retrieval of documentation is rare, which means that this type of internalisation is not very common either, in the sense that few people look for documented knowledge that they can use and internalise. Despite this discussion, we find it impossible to judge whether internalisation in this shape takes place within the project, since there is no proof that the documented knowledge becomes tacit for the person who uses it.

Instead, oral stories are a more common way to transfer knowledge, seeing that personal interaction is emphasised in the project. However, for the same

reasons that are mentioned above we find it difficult to determine if internalisation takes place.

Another issue related to internalisation is “learning by doing”, which is mentioned by Nonaka and Takeuchi (1995). In the Alpha project this is a key element in the development process, since every new approach is tested on the prototype. Nonaka and Takeuchi (1995) further state that when experiences are internalised into the individual’s tacit knowledge base, they become valuable assets. Assuming that the new approaches tested in the prototype are derived from knowledge gained in the previously discussed modes, it would imply a possibility for internalisation.

4.17 Summary of Analysis

In this section, a brief summary of the tools’ significance in the project, put into relation with knowledge transfer, is given. Thereafter, the analysis of the four modes in Nonaka’s and Takeuchi’s (1995) model is summarised. The actual improvement of the tools will be dealt with in the following chapter, the recommendations. As mentioned in the beginning of this chapter, the aim of the analyses was to answer the second sub question, namely “what do project members do to gain, share and transfer knowledge?”

Our general impression is that the knowledge transfer functions well within the project. Nevertheless, the analysis has shown that it can be improved. On an overall level, it can be said that all the tools are more or less apparent within the project, knowledge vision and focus excluded, which does not exist. The tools that are most apparent in the project are: having an enabling context, shared experiences, communication and networks. This very much signifies the personalisation focus that the project has, seeing that these three tools are important for the interaction between people.

The least apparent tools are mentors and IT and databases. This requires some explaining, the tool exist, but is not used to its full potential mainly due to lack of time and reluctance. In regards to mentors, there is no formal mentoring program, and the one that does exist is informal and only covers one area of expertise.

To conclude this section, it could be said that the requisites for all four modes are in place in the project, even though there seems to be a stronger focus on the modes that emphasise direct interaction between people. However, it remains unclear to us whether the mere existence of the requisites is enough to conclude that the four modes are in place.

5 RECOMMENDATIONS

In this chapter, the answer to the main question of this thesis will be provided, namely “How can the transfer of knowledge within and between projects be improved?” Here, the answer will be given as recommendations specific to the context of the studied project. They will serve as a guide in how to improve knowledge transfer. A more general answer to the main question will be given in the conclusion.

The aspects that will be brought up in this chapter are: Identification of a knowledge management strategy, IT support, communication, mentors, knowledge vision and focus, and competence analysis. As can be noted, not all of them are names of tools that have been discussed throughout this thesis. Instead, the recommendations focus on the areas that need improving. Therefore, recommendations will not be made for all the tools, since some of them are believed to function fairly well.

5.1 Identify a Strategy for Knowledge Transfer

The overarching recommendation is that the Alpha project must identify a knowledge transfer strategy. The two knowledge management strategies identified in section 2.5.6 are personalisation and codification. We argue that the preferred strategy must be identified. At present, their focus is not completely clear. From our point of view it appears that the management strives towards having a stronger focus on IT, while the members in the Alpha project appear to focus more on personal contacts. Since the personalisation focus is already in place, and the project members appear to be comfortable with this way of working (it almost appears as if it has become institutionalised), we recommend the Corporate Research Organisation to maintain its focus, thus making IT a support function, where the personalisation strategy should receive 80 % of the focus.

It can be said that the personalisation strategy is almost fully developed, wherefore the focus of this chapter will mainly be on issues that can further enforce this strategy and make IT more of a support function.

5.2 IT as a Support Function

As discussed in section 2.5.6, the emphasis on IT should be approximately 20 % when pursuing a personalisation strategy and it should mainly work as a support function.

A support function to the personalisation strategy could be to implement an aid that guides the project members in finding the person with the deepest knowledge in an area. This kind of aid could be a directory on the intranet, with names of the people who possess the deepest knowledge in an area. Organising the directory after areas of expertise instead of names will make it easier to navigate when searching for specific knowledge. One way to make sure that the directory remains updated is to require everyone who wants to use the directory, to list and rank his/her areas of expertise, which would then facilitate the finding of the person who possesses the deepest knowledge in a particular area.

We see this directory as a way to locate knowledge in other parts of the organisation too, since it appears as if project members all too often search for knowledge only in their close surroundings, instead of taking time to find the person with the deepest knowledge in an area.

Other ways of making the people knowledgeable in an area come to the attention of those who seek that knowledge, could be by using bulletin boards on the intranet or arranging knowledge conferences. In our opinion however, bulletin boards are not a constructive way of locating knowledge for the Corporate Research Organisation, since the IT tools that exist today are not used extensively. Introducing bulletin boards would only mean one more unused tool on the intranet.

On the other hand, we believe that regular knowledge conferences may be a complementary tool to the directory in the sense they increase the awareness of

knowledge in other areas of expertise. This awareness can then be used when searching for knowledge bearers in different areas. In addition, it could be said that whereas the directory offers information, the knowledge conferences can be seen as a source of knowledge. Another issue is that knowledge conferences offer a face to the name in the directory, something that we think could further increase its use. The knowledge conferences could be an extended version of the innovation seminars that exist today.

In spite of the fact that IT should be a support function and not the focal point of knowledge transfer, some issues need to be ameliorated or changed to improve the use of the existing IT systems. It seems to be unclear which documentation should be placed where, and also which issues that are important to document. Therefore, setting up a clear structure for where, how and what to document, could clear this matter. In turn, this will have positive effects for the user-friendliness when people search for documented knowledge. This could be part of a knowledge vision and focus, which is discussed in section 5.5.

In our opinion, the idea of documenting important aspects of a project is good, but there needs to be an attitude change towards the development reports. In our interviews, we see a pattern where the majority considers the reports to be something time-consuming and rarely used, instead of valuable sources of information that one naturally searches before starting an innovation or uses for problem solving. This attitude change could be facilitated by a clear knowledge vision and focus, which is discussed in the following section.

5.3 Communication

In this section we will offer recommendations regarding how projects should be evaluated. This is related to knowledge transfer in the sense that when people reflect upon their actions, greater focus is placed on the knowledge gained. The reason why the recommendations in this section focus on evaluations is because the other aspects of communication covered in the empirical findings and analysis work well in the Alpha project.

To start with, we find that it is positive that they have the milestone evaluations that are reoccurring and more or less work as a checklist. It helps the project management to get insights into the project status, what has been done and what is still left to do.

In our opinion, the examples given of the project audit and the evaluation session with the subcontractors are also good ways of getting external knowledge and feedback. However, it appears as if this is not a standardised way of evaluating a project, but rather events that are specific for this project.

Although we have found some positive indications of the evaluations made, other evaluations appear to be focusing mainly on documentation of project progress, and not knowledge and experiences gained from that progress. All interviewees say that lessons learnt are a valuable evaluation tool. Lessons learnt offer an opportunity for the project members to reflect upon their work, what they have learnt and what can be improved in the future. This type of reflection forces the individual to become aware of his or her knowledge, which will also make it available for transfer. However, when lessons learnt are done, it does not appear that all project members are included in the sessions. Hence, it is our opinion that the Alpha project would benefit from having more lessons learnt within the whole project, including all levels.

On a final note, it is important to provide storage for documented evaluations, since there are indications that different types of evaluations are kept by the persons that conducted them, which makes it difficult for others to know about their existence and thus access them. Furthermore, we think that all types of evaluations are important, and as far as we can see in the project, it appears as if documentation is placed on the same level as evaluation, although more focus is placed on the former. Therefore, the final recommendation regarding evaluation would be to separate it from documentation and place a stronger emphasis on it.

5.4 Mentors

In this section, recommendations regarding mentors are given. As can be noted in the analysis (section 4.13.1), the only mentor program that exists is informal and only covers one area of expertise. In our opinion, mentors can help the transfer of both tacit and explicit knowledge, in the sense that mentors can share their experiences with less experienced employees. A mentor program can also help new employees build up a social network faster. In addition, a mentor program can enforce the personalisation strategy, since it encourages interaction between people. Furthermore, it appears that many people request an official mentor program, which could also indicate that there is a need for one.

5.5 Vision and Focus

As stated earlier, having a clear knowledge vision and focus can facilitate an attitude change. In our opinion the Alpha project and the whole Corporate Research Organisation could gain a lot from having clear and outspoken directions concerning knowledge transfer. These directions do not necessarily have to be in the shape of a vision as long as they are manifested among the project members. This recommendation is based on the fact that there does not appear to be a unified approach on how knowledge should be transferred.

One aspect of establishing a knowledge focus could be to make everyone feel that his or her knowledge is important for the project. Therefore, we recommend that all project members should be recognised for the knowledge that they possess, instead of (as in the case of the Alpha project) only seeing and mentioning two persons as important for the transfer of knowledge. By recognising and emphasising everyone's importance, we believe that more people will feel confident and share their knowledge more actively. Another important aspect of this is that there needs to be commitment from management. Commitment in this case refers to having a management that communicates the importance of knowledge sharing and who acts accordingly.

Part of establishing a knowledge focus could also be to determine what knowledge the project finds critical to transfer, since it might not be very important to transfer knowledge that will become obsolete within a few months anyway. Determining the lifecycle of the knowledge in question will help in understanding what knowledge that is critical to transfer. Another aspect is whether the knowledge is costly to reproduce. If it is not, maybe that is not the knowledge to prioritise. Finally, by determining if the critical knowledge is tacit knowledge or explicit, it will become easier to understand what needs to be done to transfer such knowledge. Tacit knowledge will require more face-to-face interactions while explicit knowledge can be documented and stored in databases.

5.6 Competence Analysis

In this final section, recommendations regarding competence analysis are given. This recommendation may not be essential from a knowledge transfer point of view, but it may be useful for management to identify what knowledge exist in the project, and to know in advance what competence might be needed in the future.

Regarding competence analyses, only one structured analysis has been done in the project, and this was done in the beginning. Since then, only a few ad hoc analyses have been done. In our opinion, structured competence analyses should be done continuously throughout the project in order to be well prepared when future needs surface.

5.7 Summary of Recommendations

To summarise this chapter, our recommendations are that a personalisation strategy should be pursued, making IT a support function. Within this support function, existing documentation procedures should be improved, a directory of areas of expertise could be created and knowledge conferences could be held. We also recommend that greater emphasis is placed on regular evaluations, and particularly lessons learnt. The next recommendation is to create a mentor program, which will promote interaction between people, thus enforcing the

personalisation strategy. Furthermore, we recommend that a clear knowledge vision and focus is established. This can help identify the importance of transferring knowledge and also what knowledge is critical to transfer. Finally, competence analyses should be done on a regular basis to create an awareness of the knowledge that exists, and what will be needed in the future.

6 CONCLUSION

The purpose of this thesis has been to create an understanding for how knowledge is transferred within and between projects and how it can be improved. This understanding has been created from relevant theories and the studied project, and recommendations have been made as how to improve knowledge transfer. Now that this understanding has been created, conclusions on a more general level can be drawn. It can be said that these conclusions answer the main question of this thesis on a more general level, i.e. “How can the transfer of knowledge within and between projects be improved?” Consequently, the aim of this chapter is to provide an answer to this question.

A project's focus is of significance when determining how to improve the knowledge transfer, i.e. whether it is on mature products or on inventing new ones. This is important since the focus will determine what knowledge management strategy to use, namely a personalisation or codification strategy. By determining which strategy to follow, some parts of Nonaka's and Takeuchi's (1995) model will stand out more, since a personalisation strategy focuses more on the transfer of tacit knowledge while a codification strategy emphasises more on explicit. Therefore, the modes that correspond with direct human interaction will stand out if a personalisation strategy is pursued and vice versa. However, all modes in the model remain in use, since it is through their interaction that knowledge is generated and transferred from the individual to the organisational level. We have realised that we cannot identify when the modes take place, instead it is only possible to see if the tools that promote the different modes are in place. Hence, it is also impossible to see whether an improvement in the actual knowledge transfer is taking place. One thing that is visible is if the use of the tools is increased. This can then provide an indication of that knowledge transfer is improved.

The chosen strategy will help determine what tools to emphasise, since certain tools have a stronger connection to personalisation and codification respectively. For instance, a tool like IT and databases should not be the main focus

when pursuing a personalisation strategy, while oral communication and social networks may not be as important in a codification strategy. However, this does not mean that any of these tools should be excluded, but by putting greater focus on the tools connected to the chosen strategy, the knowledge transfer can become better focused and hence improved. It should be noted that visualising the transfer of knowledge becomes difficult when pursuing a personalisation strategy. This can be viewed as a trade off, as a personalisation strategy emphasises the transfer of tacit knowledge, which is difficult to visualise, while a codification strategy emphasises explicit knowledge, which can be found in documentation. A personalisation strategy may therefore result in the belief that knowledge is not transferred; while it may just be that it is not visible. In projects, this belief might be reinforced, since projects are of a temporary structure where long-term routines may not have time to become established. This makes it even more difficult for management outside the project to see the knowledge transfer within and between projects, which in turn may result in the belief that it needs to be controlled, which is not necessarily the case.

In addition, we conclude that some tools are important for the improvement of knowledge transfer, irrespective of strategy. These tools are an enabling context, shared experiences and knowledge vision and focus. This reasoning is based on the thought that in an enabling context, people are willing to share their knowledge, both tacit and explicit. Shared experiences also facilitate both tacit and explicit knowledge transfer, and by having a knowledge vision and focus, it becomes clearer what knowledge to focus on and how to transfer it. However, the empirical findings show that knowledge is transferred irrespective of the presence of a knowledge vision. This means that knowledge transfer can exist without guidance or control from management. However, even though knowledge transfer exists without guidance, we conclude that a knowledge vision and focus can direct and enforce the knowledge transfer, especially in projects, that are limited in time and that do not have deeply rooted routines.

To conclude this thesis, it can be said that knowledge transfer within and between projects can be improved by choosing a strategy for knowledge transfer. The strategy provides a direction, which determines which tools to focus on. As a result, knowledge transfer within and between projects can be improved.

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APPENDIX I - METHODOLOGY

The purpose of this appendix is to present the research approach and method of this thesis. Through the methodology, the readers should be able to understand the authors' way of approaching the problem and their way of working.

Course of Action

Our interest in the area of knowledge management was established during the first semester of the Masters program of International Management at Gothenburg School of Economics and Commercial Law. When discussing which area of knowledge management to study, our interest fell on how knowledge intensive organisations manage to make use of existing knowledge and how project knowledge can be preserved and used by others. With this in mind, Tetra Pak was contacted. We met with Ralph Maléus and Rolf Viberg with whom we discussed a suitable approach to the area of interest. After that, the purpose of the study was formulated and the object of study, namely the Alpha project, was singled out. Once this was done, we returned to the theories to get a deeper understanding of the subject of knowledge creation and transfer, to then be able to prepare an interview guide. We also had extensive discussions with our tutor. When we began our empirical work, our understanding of the subject was widened, which resulted in that the main question was refined. The empirical study was also analysed and compared with the theoretical framework.

Research Method

In this section, the chosen research method is discussed. The main difference between a qualitative and a quantitative research approach is not the quality of the research but how it is carried out (Yin, 1994). Merriam (1994) argues that in a quantitative method, the researcher transforms the data into numbers and quantities that can be statistically compared, while in the qualitative method, the researcher interprets the information. Merriam (1994) further argues, that the nature of the problem, the questions that are being raised, and the results that the researcher wants to reach determine how to approach the problem.

Since the purpose of this study is to create an understanding for how knowledge is transferred within and between projects and to see how this transfer can be improved, we have chosen to use a qualitative method, which is favoured if the researcher is concerned with people's everyday behaviour (Silverman, 2001). However, we do not say that there is only one way to approach the problem of knowledge transfer within and between projects, but that the complexity of the problem and its difficulty to grasp empirically have lead us to use a qualitative method.

Data Collection

In research it is possible to distinguish between primary and secondary data. To be able to collect primary data one can use secondary sources to get a good understanding of the research area. Therefore, the preliminary stage of the study involves making a review of literature available in the areas of knowledge management. For this study, secondary sources have been useful to get an insight into previous research and to create an understanding of the subject. Secondary sources have also been used to build the theoretical framework and the methodology. Examples of secondary sources that we have used are books and academic journals. We have also studied some company specific information given by Tetra Pak regarding their knowledge management, such as brochures and documented material found on the intranet as well as the Internet.

Primary data provides more current and specific data for the research. The data is the result of a study made by the researcher. A total of fourteen interviews were conducted, all members of the studied project. The interviewees' positions were project management, people responsible of different areas of expertise, and people responsible within these areas. The interviews were of in-depth character; the reason being is that we wanted to collect extensive information. By asking open-ended questions and setting aside approximately one hour for each interview we anticipated to capture attitudes and believes of the interviewee, which could be difficult to capture in a questionnaire. We have therefore used semi-structured questions, allowing the interviewees to speak freely and to bring up any issues within the subject that they are asked about.

This may have contributed to the dispersed answers. Another reason for using this type of questions is that it leaves room for spontaneous questions to be asked by the researchers, which creates a more discussion-like interview.

We are aware of that the researchers unintentionally could have lead and guided the interviewee at times. All interviews have been recorded to aid the interviewers firstly to pay full attention during the interview and secondly to avoid missing out on important data. The interviews were then transcribed. In addition, the interviewees were contacted again if something needed to be clarified.

The management of the studied project chose the first two interviews. The following interviews were brought on by a snowball effect, where the different interviewees suggested names. In addition, from the project chart we identified other project members of interest for our study.

APPENDIX II – INTERVIEW GUIDE

This appendix covers the interview guide used during the interviews. It starts with some questions that are of a general character. Thereafter, more specific questions are asked in regards to knowledge sharing, problem solving, IT and databases and a lesson-learnt workshop. Some of the sub questions were not asked, depending on whether the answer was given in the main question.

Could you tell us about your work? Tell us about the project that you are working in.

- What is your position and task at Tetra Pak? And in the project?
- Are you comfortable in the project group?
- How would you say that the project composition affects your way of working and functioning in the group?
- How much experience do you have from project work?
- Have you worked in other projects at Tetra Pak?

Do you have a mentor in the company? If so, for what purpose?

Could you tell us a bit about other projects at Tetra Pak?

Tell us about the communication within and between projects in Tetra Pak

- While working in one project, do you meet people from other projects?

How would you describe the working environment at Tetra Pak?

How would you describe the working environment in your current project?

Knowledge Sharing

Tell us about Tetra Pak's efforts to increase knowledge sharing.

- From a "knowledge-sharing point of view", what role would you say that the project management has?
- How is knowledge from previous projects shared?

Tell us about how your knowledge is used in the project.

- How do you share your knowledge with other people?
- Are you encouraged to search for knowledge and to share your own knowledge?

Problem Solving

Tell us about how you normally go about solving a problem that you do not have the answer to?

- Who do you talk to in that case?
- Why do you talk to that particular person?
- Do people ask you for advice?

How do you make sure that the things that you do have not been done before?

How do you make sure that you have all the knowledge needed to solve a problem?

IT and Databases

Tell us about TPIN (Tetra Pak Innovation Network)

- Do you use TPIN? For what purpose? How often do you use it?
- What is your opinion about TPIN?
- How often do you write something that is posted in the TPIN?

How are projects evaluated? (Do you have meetings where you discuss successes and failures, etc?)

Lessons Learnt workshop

What was the purpose with the workshop?

What did you learn from the workshop?

Have you used the knowledge gained from the workshop?