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Experience transfer in
professional networks in Statoil
The use of information technology

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Abstract

Professional networks are established in Statoil to enable experience transfer between people with similar interests. In this thesis I have conducted a research study about professional networks. Through interviews with members and leaders from three professional networks, I have learned a lot about how they are being managed, the participation of members, and how this affects their overall success. The main focus has been to look at how experiences are transferred between members in professional networks, and to look at the value of IT for connecting and spreading knowledge to network members. Since knowledge is said to be socially embedded within individuals, this becomes a particular challenge when network members are not co-located. When people in an organisation are co-located however, they can interact on a frequent basis to learn from each other. This is by Lave and Wenger [1991] referred to as Communities-of-Practice (CoP), where knowledge is shared in its natural context, for example through story telling.

CoPs and professional networks have continuously been compared in this report, since they both aim to connect and spread knowledge to members. According to Lave and Wenger [1991], CoPs are small, members are self-selected, and they are held together by the passion and commitment of members. Professional networks on the other hand are large and managed by a network leader. In spite of this, the results from my research suggested that professional networks can be considered CoPs.

I observed the success of professional networks to be heavily dependent on the network leader. Some professional networks are very large and have a broad scope, and this can have a negative effect on their success. Most importantly, informal meetings between network members were not prepared for, and this is a serious shortcoming. To overcome the problems identified with professional networks, I have recommended that the responsibilities of the network leader are divided among several leaders. IT solutions should correspond more to the needs of each professional network than the needs of the organisation, and reward systems are suggested to encourage the use of IT for experience transfer.

Preface

This report is entitled "Experience transfer in professional networks and the use of information technology", and is the result of my post-graduate thesis. This is leading to the degree "Master of Science in Technology" (Computer Science), and is the finishing part of my studies at the Department of Computer and Information Science, NTNU, in march 2006.

The thesis has been completed in co-operation with Statoil ASA, and research has been conducted at their locations in Stavanger and Bergen.

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Chapter 1

Introduction

With competition constantly increasing in the market, companies are seeking new ways to sustain and enhance their efficiency and competitiveness. In this regard, companies have recently been focusing on knowledge as a competitive resource, and it has become a challenge for organisations to locate and share their knowledge. Knowledge is valued as a competitive resource mainly because of its tacit component, which means that organisational knowledge is embedded and therefore hard for competitors to duplicate. In large organisations where people are geographically spread out, information technology can be used to connect people and spread knowledge. The usefulness of information technology in this regard is however arguable, since it is said not to be suitable for transferring tacit knowledge.

Communities-of-practice (CoP) are introduced by Lave and Wenger [1991] to enable transfer of tacit knowledge in its natural context, and Statoil is divided into professional networks who also aim to spread knowledge to members. In CoPs, knowledge is created through active participation, and the more members participate, the more they learn and are motivated to continue their interaction in the CoP. Statoil is a large organisation with professional networks spread out all over the world, and to maximise their competitiveness in the market, it is essential that members in professional networks cooperate and share their knowledge. In this report I wish to investigate the importance of professional networks and how they facilitate experience transfer between members. It is of interest to identify potential problems with professional networks that may affect their success, and a comparison will be made to CoPs, as Lave and Wenger [1991] argue that too much organisational structure may have a negative effect. It is essential to identify problems with making members participate in professional networks, since in CoPs, members learn through active participation.

This report will explore and elaborate on the current methods used for experience transfer in professional networks in Statoil. Research is conducted to learn more

about professional networks and experience transfer between members, and two objectives have been defined:

1. Look at how experience is transferred between members in professional networks in Statoil
2. Determine the value of information technology as an instrument for experience transfer

An essential part of this report focuses on similarities between professional networks and CoPs. It has therefore been important to investigate experience transfer in CoPs and the value of information technology. To learn more about knowledge management and CoPs as a way to spread knowledge to members, a literature study is first conducted. When sufficient knowledge has been gained, case study research with three field trips will be conducted. During the field trips I will attend two meetings, and three network leaders and six network members will be interviewed. The aim of the research is to observe network members in their natural context, and to identify their opinions about professional networks and the methods used for sharing experiences between members. The results from the research will be compared to existing theory about CoPs, and I will try to identify problems with professional networks that can affect their usefulness. I will also look for possible shortcomings with the CoP-theory to see how well it addresses the problems encountered in professional networks. Based on my research findings, recommendations will be made on how to improve experience transfer and the value of information technology for experience transfer in professional networks.

1.1 Structure of the report

In this report, I have conducted a literature study about CoPs and a research study about professional networks in Statoil. CoPs are considered a way to spread knowledge in an organisation, and in **Chapter 2** I will talk about knowledge management and the role of information technology for knowledge transfer in organisations.

Further, **Chapter 3** presents CoPs and the principle of legitimate peripheral participation. The effects of organisational structure are discussed, and general CoP characteristics about members, size, activities and knowledge transfer are presented. Advantages and problems with the use of information technology are highlighted, before the chapter finishes off with a discussion of problems with CoPs.

Chapter 4 presents Statoil as an organisation before giving a description of three professional networks. Common methods for experience transfer in professional networks are also described, and the characteristics of management, network members, size, boundary objects and the use of IT are compared to CoPs. Finally, some

of the problems encountered with making members participate actively in professional networks are presented.

Chapter 5 talks about the research conducted. First, the methods used to collect research data are presented. Then a description of the field trips is given, before I make an evaluation of the research study performed.

Chapter 6 presents the results from the research and continues to compare professional networks with CoPs. In particular, a more detailed description about professional networks and the methods used for experience transfer is presented. An evaluation is made on the communication between network members from different licenses. Then, the current problems with professional networks are described, before a final comparison is made to decide whether or not professional networks can be considered CoPs.

In **Chapter 7**, the research findings are discussed, and recommendations are made on changes that can be made to improve the value of professional networks for spreading knowledge to members.

Finally, **Chapter 8** will round off with a conclusion and the significance of my results.

Chapter 2

Knowledge Management and the role of IT

Knowledge has currently been discovered by organisations as a competitive advantage that can enhance their efficiency and competitiveness [Blackler, 1995]. Being able to locate and share knowledge is therefore of great interest to organisations, and the aim is to find efficient methods for managing organisational knowledge. Organisations that try to exploit the competitive advantage of knowledge are often referred to as knowledge-intensive firms [Blackler, 1995]; [Hayman and Elliman, 2000]. Alvesson [2004] emphasises how activities in knowledge-intensive firms are based on the intellectual skills of employees. These employees are by Hayman and Elliman [2000] referred to as knowledge-workers who enrich given information and learn from the information that is communicated. Knowledge-workers are also educated to a high level and have career loyalty to an area of expertise [Tsoukas, 2005]. In this chapter, I will first talk about the challenges involved with transferring knowledge in organisations. Then I would like to discuss the role of information technology (IT) for knowledge transfer, before rounding off with a general discussion of Community-of-practice (CoP) as an approach to knowledge management (KM).

One challenge with knowledge transfer in organisations can be caused by great disparities in knowledge-intensiveness [Alvesson, 2004]. This can be explained with an example from Statoil, which is divided into specialised units with several experts. This only constitutes one part of the organisation however, and other parts of the organisation deal with routine tasks like selling petrol at a petrol station. People working in these parts of the organisation are often less educated, and this highlights the differences in knowledge-intensiveness depending on which part of the organisation you work for. Alvesson [2004] further explains how knowledge is normally embedded in techniques, rules and procedures. In knowledge-intensive firms however, knowledge is rather based on the cognitive skills of personell and

is rooted in the work culture as shared collective understandings [Blackler, 1995]. This shows how organisational knowledge can be socially embedded, and this is why it can be seen as a competitive asset.

The social embeddedness of organisational knowledge can be explained by the tacit component of knowledge, which was first expounded on by Michael Polanyi in 1958. Tacit knowledge is based on the observation that "we know more than we can tell", and is embedded in an individual or a group. As a result, it is difficult to explain or transfer, since it depends on "the observance of a set of rules which are not known as such to the person following them" [Polanyi, 1958]. Often, learning by observing, by practice, or by doing is the only way to transfer such knowledge [Polanyi, 1966; Nonaka, 1991], and Lave and Wenger [1991] explain how learning can happen through repeated participation in a group. An example of this is a soccer-player that will continuously improve each time he plays soccer with his team. The more he moves towards becoming an expert however, the more embedded becomes his knowledge. This is a matter of "learning by doing", since you cannot learn how to play soccer from reading about it in a book, you have to learn it through practice. Nonaka [1994] expands Polanyi's [1958] principle of tacit knowledge in a more practical direction with both cognitive and technical elements. Tsoukas [2005] criticises Nonaka [1994] for not interpreting Polanyi [1958] right, and rather explains how knowledge can be classified as "know how". According to Nonaka [1994], this is simply the ability to put "know what" into practice. In my opinion, tacit knowledge is embedded in the practice that constitutes it, and I argue that this is why it can be such a valuable asset for organisations. Tacit knowledge is best shared through facial interaction, and it is very difficult to express, formalise and share [Lubit, 2001]. Explicit knowledge on the other hand, is codifiable and can exist in a number of forms, which are all easy to communicate [Hislop, 2002]. The receiver of explicit knowledge is assumed to understand it from reading it, without any form for interaction with the sender [Hislop, 2002].

Being able to exchange tacit knowledge between individuals in an organisation is essential for realising the full potential of knowledge. Organisations should therefore allocate time and resources to the transfer of tacit to explicit knowledge, since explicit knowledge is easier to understand [Lubit, 2001]; [Marwick, 2001]. Nonaka [1994] has identified four processes for transferring knowledge between its tacit and explicit forms, and these are explained further in Section 3.6. In general, the transfer of knowledge between individuals is a challenging task, and Knowledge Management (KM) is introduced to manage organisational resources [Alvesson, 2004] and thereby maximise knowledge transfer in an organisation. A variety of approaches on how to manage knowledge currently exist [Blackler, 1995], and Nonaka and Takeuchi [1995] explains knowledge management as a set of processes that permits the use of knowledge to generate and add organisational value. In this

regard, KM is really about providing the right knowledge flows to the right people at the right moment. Further, Alvesson [2004] explains the role of KM either for creating new knowledge or reusing existing knowledge. As mentioned earlier, the transfer of knowledge in organisations can be a challenging task, and I would now like to present four challenges with KM, as identified by McDermott [1999]:

1. Technical challenge, the capability to design information systems that make information available and make people think together
2. Social challenge, developing communities where knowledge can be shared and diversity maintained
3. Management challenge, creating an environment that truly values knowledge sharing
4. Personal challenge, being open to others' ideas and for people to share their own ideas.

For knowledge transfer to be successful, organisations must be aware of these challenges and strive to overcome them. It is important here to understand that an organisation alone cannot impose a knowledge sharing culture. Organisations can facilitate knowledge sharing by for example developing necessary KM solutions (KMS), but individual activities and personal networks may matter more than what can be centrally controlled or administered [McDermott, 1999]. When it comes to making individuals share their knowledge, Alvesson [2004] says that trust, motivation and identification with the organisation are crucial success factors.

IT can be used to create KMS, and I would now like to explore on the use of IT to support creation, transfer and application of knowledge in organisations, The creation and use of IT can enhance the efficiency of knowledge transfer considerably, but it is important to remember that problems with KM can typically not be solved by the development of a technology solution alone. This is due to the difficulties involved with transferring tacit knowledge between individuals, and implies that when knowledge is highly tacit, a significant amount of facial interaction is required for effective sharing.

This chapter suggests that knowledge has one tacit and one explicit component. This has proved to have some implications for experience transfer, and I would therefore like to take a closer look at the relationship between the two components. According to Hislop [2002], tacit and explicit knowledge are inseparable and mutually constituted. This basically means that all knowledge has a tacit component that makes it difficult to codify and share electronically. If this is true, I argue that all knowledge will be difficult to share electronically and will to some extent require

verbal communication with the sender, either via telephone or meeting face-to-face. I agree with Hislop [2002] that all knowledge has a tacit component, since all knowledge is created through practice. This makes it difficult to express on a piece of paper, and I believe that the complexity level of personal experiences will determine the need for verbal interaction in addition to reading about it for example in a report. The transfer of a less complex experience may not require for any verbal interaction at all, while a more complex experience may require for a face-to-face meeting. Zack [1994] also explains that when the sender and receiver of knowledge share similar knowledge, background and experience, IT is considered an efficient tool for communication. When the sender and receiver of knowledge do not share similar backgrounds however, knowledge transfer via IT must be supported with facial interaction. More specifically, Alavi and Leidner [2001] explain that if the knowledge base of two knowledge-sharing individuals is small, there is a greater need for contextual information, e.g. for the practice that constitutes the knowledge. This implies that explicit knowledge will be less relevant, and hence IT will be less applicable to KM. It is important to remember however, that different views of knowledge exist, and these will have different implications for the role of IT in KM. Alavi and Leidner [2001] have suggested several differing views of knowledge, and throughout this report I have chosen to adapt their view of knowledge as a state of mind, an object and as access to information.

Object When viewing knowledge as an object to be stored and manipulated, the role of IT involves gathering, storing and transferring knowledge. An example of this is the use of databases to store topics that are of great relevance for an organisation.

State of mind When viewing knowledge as a state of mind, knowledge is the state of knowing and understanding. The role of IT is then to provide access to sources of knowledge rather than knowledge itself. An example of this is the use of intranet pages to publish relevant information to all people in an organisation.

Access to information When viewing knowledge as condition of access to information, the role of IT is to provide effective research and retrieval mechanisms for locating relevant information. An example of this is an index-system supported by a search-function.

The above listed views of knowledge are included to show that there is no single role of IT in KM, and that even if IT does not apply to all the issues of KM, it can support KM in many ways. In general, IT can increase knowledge transfer in an organisation by extending the reach of individual's beyond the formal communication lines [Alavi and Leidner, 2001]. Alavi and Leidner [2001] have also identified some potential problems with the use of IT for knowledge transfer, and these are:

1. IT is helpful only if an individual knows what he is looking for, and little new knowledge creation occurs
2. Knowledge in KMS may inhibit learning and result in the same knowledge being applied to different situations even when not appropriate
3. Do individuals modify the explicit knowledge received via IT to suit their situation and thereby create new knowledge?
4. Do individuals trust knowledge added from people they do not personally know?

In general, IT provides a way to connect people in organisations that are globally spread out, but because of the tacit component of knowledge, this has proved to be a challenging task. The most important thing to keep in mind from the above discussion is the fact that even though explicit knowledge exists that is easy to transfer between individuals, it is crucial to remember the importance of the tacit elements underpinning it. Without an insight into the natural context of the knowledge to be transferred, it is impossible to develop a full understanding of what the knowledge actually means, and this is also stated by Hislop [2002].

So, KM is about managing organisational knowledge, and Community-of-practice (CoP) is one of many approaches organisations can take to KM. Their ability to enable the transfer of tacit knowledge in its natural context is what makes CoPs particularly valuable for organisations who wish to manage their knowledge. Since I throughout this chapter have highlighted the challenges involved with transferring tacit knowledge, I would now like to take a closer look at the importance of CoPs in this regard. It has been a common understanding that knowledge is the property of individuals, but it is becoming more obvious that a great deal of knowledge is being produced and held collectively [Brown and Duguid, 1998]. This is a matter of shared know-how, where knowledge is generated when people work together in groups. This is highlighted by Brown and Duguid [1991], who have made an evaluation of Orr's [1996] study of how machine-repair technicians learn at their workplace. This study is based on an observation that these technicians learn more from the work with machines and by telling each other stories about their work than from reading documentation and procedures developed by the organisation. Brown and Duguid [1991] argue the importance of learning from story-telling, and suggest that inevitably situations occur when group improvisation cannot bridge the gap between what the organisation supplies and what a particular community actually needs. In my understanding, this means that for organisations to successfully manage and make use of their knowledge, support must be given that corresponds to the needs of the employees rather than the needs of the organisation. And, these needs can only be understood by understanding the details that constitute the practice [Brown and Duguid, 1991]. So, by talking together about their different expe-

riences with machine-repair, technicians gradually increase their knowledge. This clearly shows the importance of letting people in an organisation work together to learn from each other. Brown and Duguid [1991] call this a collaborative process where individual learning is inseparable from collective learning and learning is inseparable from working. The concept of legitimate peripheral participation in CoPs was introduced by Lave and Wenger [1991] to explain how members in a community learn by observing and participating actively in that community. The more they participate, the more they learn move towards full participants in the community. Full participants acquire the subjective viewpoint of the community and learn to speak its language. Brown and Duguid [1991] explain this as workplace learning in terms of communities being formed or joined, and the central issue is not learning about practice, but rather about becoming a practitioner, like the machine-repair technicians observed by Orr [1996].

There are many ways to spread knowledge in an organisation, and CoP is one of them. Professional networks in Statoil also aim to spread knowledge to members, and it is therefore essential to take a closer look at CoPs. By doing this, a comparison can be made between professional networks and CoPs to identify similarities. One of the objectives of my research is to evaluate the use of IT for experience transfer between members in professional networks, and so Chapter 3 will focus on CoPs and the use of information technology for experience transfer within CoPs.

Chapter 3

Communities of Practice

A community of practice (CoP) is by Lave and Wenger [1991] described as a view of organisational learning in which social structure and meaning are continually negotiated through participation. It is further explained as a set of relations among persons, activity and world, over time and in relation with other CoPs. I agree with Lave and Wenger [1991] when they say that CoPs are considered an intrinsic condition for the existence of knowledge. I think this is proved by the existence of tacit knowledge, which is said to be embedded in people's minds, and can therefore not be explained on a piece of paper. With the existence of CoPs, people can meet to discuss their experiences, and this is said to have a more positive effect on knowledge transfer, since understanding can be gained from repeated interaction and body language. This also proves that learning happens through active participation in a CoP.

The political and participative dynamic present in all CoPs is a matter of situated learning and legitimate peripheral participation. According to Thompson [2005], this can be described as a virtuous cycle where; the more people participate, the more they learn, and the more they identify with and become prominent within a group, the more motivated they are to participate even further, and so on [Lave and Wenger, 1991]. The virtuous circle is a defining characteristic of a CoP, and an organisational grouping that lacks this ability cannot be defined as a CoP. It is however important to remember that CoPs do not necessarily imply co-presence, a well-defined and identifiable group or socially visible boundaries. It rather implies participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities [Lave and Wenger, 1991]. The professional networks in Statoil are an example of exactly this, because its members are geographically dispersed and seldomly meet.

The CoP theory was first introduced in 1987 by Etienne Wenger, who at the time

was looking at apprenticeship as a learning system. The essence was the recognition that it is not the relationship between a master and an apprentice alone that is important, but rather the apprentice's relations to other apprentices and even to other masters that organize opportunities to learn. This is a concept where learners are seen as apprentices and teachers are seen as masters, and was by Lave and Wenger [1991] considered a synonym for situated learning where learning through apprenticeship is a matter of legitimate peripheral participation. This is also an example of situatedness and 'learning by doing', and was explained with an example in Chapter 2 of how a soccer player gradually improves each time he/she plays. Situatedness, also called situated learning, simply means that all activities are situated [Lave and Wenger, 1991], and I argue that this is a matter of tacit knowledge, that you cannot simply write down factual knowledge, because it needs to be represented by the person who performed the activity. Of course it is important to consider the complexity level of the activity performed, as well as the current knowledge of the receiver. Lave and Wenger [1991] argue that learning is not merely situated in practice, but is rather an integral part of generative social practice in the lived-in world. In my understanding, this simply means that people gain new knowledge when participating actively in the society.

3.1 Legitimate Peripheral Participation

Legitimate Peripheral Participation is about the process of integrating newcomers into a CoP, and is introduced by Lave and Wenger [1991] to explain how learners inevitably participate in communities of practitioners, and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community. Explained differently, it is a way to speak about relations in the community, e.g. between newcomers and old-timers, about activities, identities, artifacts and communities of knowledge and practice - it is simply a matter of how newcomers become part of a CoP [Lave and Wenger, 1991]. Lave and Wenger [1991] continue to explain how the practice of a community creates a potential "learning curriculum" which is what newcomers with legitimate peripheral access can learn. Once they become members of a community, they first learn the culture of the practice through participation. Gradually, the learner starts to understand what constitutes the practice of the community in means of who participates, what they do, how they interact, what other learners are doing and what learners must learn to become full practitioners [Lave and Wenger, 1991]. I agree that these are all important elements when it comes to understanding the purpose of the community and to find out how to fit in. If you do not fit in, you are neither able to participate actively in that community, and hence you will not learn. It is of course also important to remember the importance of motivating members into participating, and this will be discussed in Section 7.3. It is also worth mentioning the "learning curriculum" as a characteristic of a community, because it is

situated and can therefore not be considered in isolation.

Story telling plays a major role in embodying newcomers into a community, and has implications for what and how newcomers learn. According to Lave and Wenger [1991], apprentices learn from conversations and stories about problematic and difficult cases. Orr [1996], in his research on the learning of machine-repair work describes patterns of story telling where technicians who repair copier machines tell each other 'war stories' about their past experiences in making repairs, and so newcomers learn how to make repairs and tell war stories, and gradually become full members of the community:

They are focused on the work, not the organization, and the only valued status is that of full member of the community, that is, being considered a competent technician. In pursuit of this goal, they share information, assist in each other's diagnoses, and compete in terms of their relative expertise. Promotion out of the community is thought not to be worthwhile

[Orr, 1996]

Brown and Duguid [1998] argue that a key task for organisations is to detect and support existing and emergent communities, using IT where possible. The key to the success of these communities and the formal organizations within which they operate, is then that they are perceived as useful by their members, who share their hard-won, practical knowledge with other members because the results are useful and personally gratifying. There is no abstract philanthropy at work here; the motivation is practical benefit [Coakes, 2004]. Figure 3.1 shows a comparison of a CoP and other organizational forms. Professional networks seem to have similar characteristics to CoPs, except for their dependence on a network leader to hold them together. Key managerial tasks to create and sustain communities of practice is to identify the right people and help them come together as communities of practice. Manager's should also provide necessary infrastructure to overcome the vulnerability that can occur because CoPs lack legitimacy [Wenger and Snyder, 2000].

3.2 Organisational structure

The ability of an organisation to intervene to encourage the growth of a CoP is uncertain [Thompson, 2005]. CoPs are groupings that are physically identifiable in the organisation, with visible structural components. The organisation can provide support with its structural components, but the challenge is to persuade people to interact around these structures [Thompson, 2005]. It is crucial that people identify with and feel motivated to contribute to CoPs, and imposing too much structure

	What's the purpose?	Who belongs?	What holds them together?	How long do they last?
Communities of Practice	To develop members' capabilities; to build and exchange knowledge	Members select themselves based on expertise or passion for a topic.	Passion, commitment, and identification with the group's expertise	As long as there is interest in maintaining the group
Formal work groups	To deliver a product or service	Members include everyone who reports to the group's manager.	Job requirements and common goals	Until the next reorganization
Project teams	To accomplish a specified task	Members are assigned by senior management.	The project's goals and milestones	Until the project has been completed
Informal networks	To collect and pass on information	Membership consists of friends and business acquaintances.	Mutual need and relationships	As long as people have a reason to connect

From Wenger, "Communities of Practice: The organisational frontier" in HBR, 2001

Figure 3.1: CoP and other organizational forms

can demise the community itself. It is therefore interesting to identify the level of structure that can be imposed on a community before having a negative effect. It is also important to consider boundary objects, which are likely to form key ingredients for CoP activity. Examples of boundary objects are documents and terms, and I agree with Thompson [2005] that they are important, because they serve the purpose of gathering members around a common medium and encourages discussion. Wenger [2006] also emphasises the importance of boundary objects when it comes to the meaning they may have to CoP members and also when it comes to brokering ideas between CoPs.

By interviewing members in professional networks, I was able to identify the various levels of interaction that occurred between members. Daily interaction mostly occurred via email, telephone and best practice documents, but also via face-to-face contact. This contact was however not so frequent, but happened through formal meetings organised by the network leader. Examples of such meetings are network meetings, workshops and courses. It became obvious however, that not all members used the resources in the network, and rather talked to someone in their own department than discussing experiences with people from other departments. I also noticed a limitation on informal meeting areas in the departments. I only observed a coffee-machine, and other than that it seemed like lunch was the only other informal meeting place. I argue that the existence of such informal meeting places is crucial to the existence of CoPs, since interaction is not enforced upon members,

but rather happens naturally. It is of special interest to identify whether or not a professional network can be called an organisational grouping or a CoP. This will be discussed in more detail in Chapter 4 and 6.

3.2.1 Seeding vs. Controlling structure

When it comes to organisational structure, I mentioned earlier that too much structure can demise a community, and that when it comes to CoPs it is simply a question of how an organisation can provide support without interfering too much. To explain this in further detail, I choose here to make a distinction between controlling structures and seeding structures [Thompson, 2005], with an aim to understand how CoPs can be affected by different forms of organisational structure.

Seeding structure A CoP can be structured either by a seeding structure or a controlling structure. A seeding structure involves the introduction of structure in a nonprescriptive way in hope of indirectly seeding future collaboration and communication. An example of how this is done is through the use of Information technology (IT) as a medium for linking experts instead of an imposed structure. This is said to have a positive effect, because it is providing people with the monuments, instruments and points of focus that are required as a basis for communicative interaction [Thompson, 2005].

Controlling structure The use of structure in attempts at directly controlling present collaboration is likely to fail, and is therefore said to have a negative effect [Thompson, 2005]. This is referred to as a controlling structure, and some examples of controlling structures are best practice documents, targets and the introduction of consultants. Also, an IT-solution with focus on increased documentation and imposing a specific structure on collaborative work is an example of a controlling structure.

In CoPs, the distinction between a controlling structure and a seeding structure is essential. This is a matter of continuous interaction between structure and practice in the CoP, and can be explained by the fact that people require preexistent raw materials to communicate (seeding structure), and the fact that the materials used are always subject to negotiation, and thus not amendable to direct control (controlling structure) [Thompson, 2005]. Some of the main seeding structures that may occur in professional networks are: A clearly defined focus area, time spent on the network is sanctioned by the line organisation, local gossip; knowing what others know, what they can do and how they can contribute. Other seeding structures are a network that involves a core team of especially dedicated and competent individuals, networks that are facilitated by discussions and updated information on the intranet and a network leader that acts as a 'knowledge editor'.

The distinction between controlling and seeding structures is best explained with an example. Again I refer to Orr [1996], who conducted a study of the work practices of some machine-repair technicians. This is an example that is often referred to when explaining the concept of CoP, and is basically an observation of how the technicians mostly work in isolation, alone at a customer's office. The only help they have when performing their job is documentation about the machines they work with, and according to Brown and Duguid [1998], one should not think that they have collective knowledge. Orr [1996] revealed however, that these technicians spend a lot of time with one another at lunch or over coffee, where they talk about the experiences they have made. By swapping so-called "war stories", the technicians learn from each others problems and positive experiences. This lead to a form of collective knowledge which can referred to as a CoP. I argue that the spontaneous nature of how the technicians met had a great effect on the learning in this community. This was not something that was enforced upon them by their organisation, but was rather something they did because they wanted to, and because they could see the benefits from sharing their experiences. Now, it would be interesting to see what happens if these technicians are separated, e.g. moved to separate offices. Would they keep in touch via email or telephone, or would the CoP resolve. And what happens if the organisation enforces a CoP structure and forces the technicians to participate? I argue that experience transfer is most likely to have a positive effect when it happens in its natural context, e.g. by the coffee-machine. This is an example of a seeding structure. A controlling structure on the other hand, could be the introduction of formal meetings where technicians must participate to share experiences.

Based on the above descriptions of controlling and seeding structures, I agree that the distinction between the two is important for organisations who wish to encourage the commitment of employees in CoPs, and hence the growth of the community. In this report, I wish to determine whether or not the professional networks in Statoil can be seen as CoPs, and at the same time identify seeding and controlling structures. It is of particular interest to identify whether or not information technology can be seen as a seeding structure, and this will be discussed in Chapter 4, 6 and 7.

3.3 Members

Lave and Wenger [1991] assume that CoP members have different interests, make diverse contributions to activity and hold varied viewpoints. I argue that this is of great importance to the success of the CoP, since innovation happens best through the occurrence of problems. Explained differently, if a CoP is represented only by people with similar opinions, it will not be as beneficial, nor for the members or

the organisation in which the CoP exists. This can be explained by a need for 'tension' between the opinions of members, because this is what creates discussion, and thereby knowledge. So, the growth of a CoP depends on its members, and should therefore consist of a mix of experienced and newcomers.

When it comes to the participation of members in a CoP, it is crucial that they identify with the community. First when they feel that they belong are they likely to be motivated to contribute. The DMI network leader in Statoil explained that when planning network meetings, he always asked new members to talk about their experiences within a relevant topic. By doing this, he strengthened their identification as group members and increased their future motivation to participate, while at the same time adding to the group identity. This is also in accordance with the principle of legitimate peripheral participation [Lave and Wenger, 1991]. Group participation in Statoil is supported by the use of intranet pages where technical information as well as contact information is available for members. Members also communicate via email and telephone, and often drop by the neighbour office. The network members spend most of their working day at their own desk in their own office, and then they participate in the network via emails and phone calls. As mentioned earlier, no informal interaction was observed except for meeting at the coffee-machine. This is a serious shortcoming, as I agree with Thompson [2005] when he says that organisational expertise should be cultivated through practice, because this is more likely to motivate people to participate in the community.

Members of CoPs communicate with each other through a complicated web of "personal networks" - smaller, frequently overlapping groups comprised of people who know, have worked with, and trust each other. Figure 3.2 shows the components of a CoP. All CoPs have a core group, e.g. consisting of those who have been members the longest. It is argued that members of the core group are those who identify most strongly with the community [Thompson, 2005]. When interviewing the DMI network leader, he explained how he has been the leader since the establishment of the network in 1998. He also spend a lot of time on managing his network, and did not seem to think that time was an issue, as long as he got the job done. I think this is a good example of how members of the core group identify with and participate actively in the CoP.

3.4 Size

I think the size of a community does influence the communication quite significantly. You have a very different kind of conversation if you have 15 people than if you have 200

Etienne Wenger, 2003

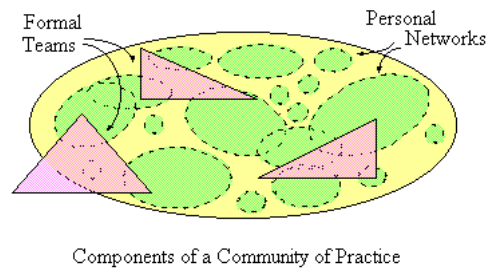


Figure 3.2: Components of a Community of Practice

Communities may have great differences in size, and this can heavily impact on the communication between members. It is however important to think in terms of participation, e.g. the size of the core group of the community makes a big difference, while the size of the lurker group (for peripheral participants) does not influence communication to such a great extent [Lave and Wenger, 1991].

3.5 Activities

Some common learning activities and communication tools identified in CoPs are face-to-face meetings, group dialogues, case clinics, external input, visits, learning journeys, field trips, email, websites, videoconferences and informal interaction, to mention a few. It is important to remember the negative effect too much control in a CoP can have, and CoPs should be cultivated rather than managed. Some ways of cultivating CoPs are:

1. Enable members to formulate their own questions and to access each other for answers
2. Build relationships of trust and knowledge-sharing across departments
3. Assess the level of success of the CoP by level of participation, diversity of participation, member development, satisfaction, and stories of problems and challenges solved through the work of the CoP.
4. Pay attention to the participation of members - if members leave or join, try to find out why.
5. Keep feeding the CoP useful information and material

Of the above listed factors, this report has paid special attention to the building of trust and knowledge-sharing across departments, and this will be discussed in further detail in Chapter 6.

3.6 Knowledge transfer

Knowledge transfer is the process of moving knowledge around in an organisation and between its members. When it comes to CoPs, they may differ in size and may be spread out geographically. Consider a large CoP that is geographically spread out, transferring knowledge between the members will be more difficult than transferring knowledge between members of a small, local CoP. This is because of the tacit component of knowledge, as described at the beginning of this chapter. Duguid [2005] explains that both the tacit and explicit forms of knowledge are important for organisational effectiveness, and both forms must be transferrable within an organisation. I discussed earlier that explicit knowledge is easier to transfer than tacit knowledge, and this is because of its codifiable form. As a result, all knowledge should be made explicit before transferred, and Nonaka and Takeuchi [1995] have identified four different processes for transferring knowledge between its explicit and tacit forms. The four processes are *Socialisation*, *Externalisation*, *Combination* and *Internalisation*, as shown in Figure 3.3. The circle of arrows indicates that you have to control all four processes to achieve maximum effect, and the notion From and To represent the transfer from one individual to another.

Nonaka and Takeuchi [1995] give the following description of the four processes:

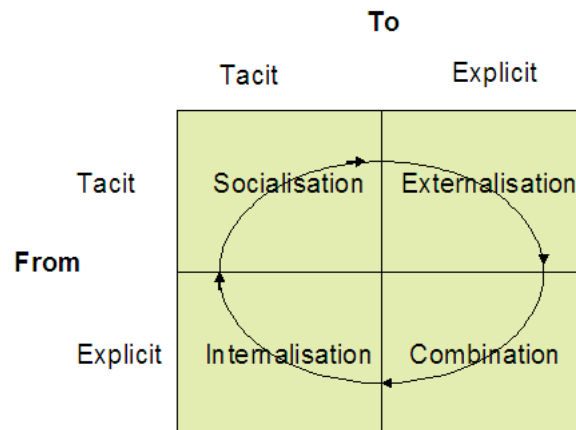


Figure 3.3: Four processes for Knowledge Conversion [Nonaka and Takeuchi, 1995]

1. **Socialisation** Transferring tacit to tacit knowledge. Socialisation is about the transfer of experience to create mental models of technical skills. Examples are on the job training, brainstorming, team meetings, out-of-office activities, building trust and dialogues. The key is that both individuals have

some common knowledge/experience, since without this it is very difficult to understand the other person's thought process.

2. **Externalisation** Transferring tacit to explicit knowledge. Externalisation means communicating tacit knowledge through metaphors, analogies, hypotheses and models. This process of knowledge transfer is often aroused by dialogue or common reflection.
3. **Combination** Transferring explicit to explicit. Individuals exchange and combine knowledge via documents, meetings, videoconferences and computer networks. The use of technology is well established.
4. **Internalisation** Transferring explicit to tacit. Internalisation is a process where the individual is embodying competence, and this is linked to the concept of learning by doing.

In local CoPs, the whole process indicated in Figure 3.3 is more likely to occur than in global CoPs, and I argue that this is also why the transfer of knowledge in global CoPs is a more complex task. This can be explained by the fact that members of global CoPs do not often get a chance to meet face to face, hence interaction is infrequent. As a result, knowledge transfer mostly happens through reading reports and emails (combination). In other words, the transfer of tacit knowledge is difficult, because even though members can talk on the phone, factors like body language are missing. Internalisation can however occur in cases where both individuals share similar experiences, but socialisation and externalisation are difficult to achieve, since these processes require interaction with a team for knowledge transfer to occur. The professional networks in Statoil try to overcome these problems by arranging network meetings twice a year, where all members are invited. It is up to the network leader to decide the agenda for the meeting, and the DMI network leader explained how he tries to pick topics that will be of interest to all network members, but this is hard, because the different oil platforms operate under different conditions. The aim of the network meeting is nevertheless to encourage discussion about relevant topics, so that members can learn from each others experiences.

It becomes clear that global CoPs in particular, are dependent on the use of information technology for transferring knowledge between members. The rest of this chapter will focus on the use of information technology in CoPs and the concept of social capital, which can be introduced by organisations to motivate members into participating.

3.7 Social capital

Social capital refers to network ties of goodwill, mutual support, shared language, shared norms, social trust, and a sense of mutual obligation that people can derive value from [Huysman and Wulf, 2005]. Huysman and Wulf [2005] further explains that it is about the value gained from being a member of a network, and examples of benefits are access to important people, insider information and career opportunities. According to Cohen and Prusak [2001], it is the glue that holds communities together. In my understanding, this is simply a matter of making people understand the potential benefits gained from participating in a CoP, because the existence of the CoP relies heavily on how active members are. I therefore argue that social capital should be used by organisations to motivate CoP members. Huysman and Wulf [2005] argue that IT is the tool that helps people get connected, and social capital helps them stay connected. This issue is important to consider when implementing IT to support experience transfer in communities.

3.8 The use of IT in CoPs

When knowledge management (KM) was first introduced, IT tools like repository systems and intranets were considered common medium for transferring knowledge. Today however, KM is centered around communities where tacit knowledge can be transferred. The role of IT in communities is to help people get and stay connected [Huysman and Wulf, 2005], and it is of great interest to identify how IT can play a role in building and sustaining CoPs. It is becoming more and more clear that people will not use technologies only because they exist, and in CoPs it is therefore essential to develop technologies that correspond to the needs of its members. From interviews with professional network members in Statoil, it became clear that they are distributed by time and space, hence they are to a certain extent dependent on IT to communicate. When it comes to the use of IT in these professional networks, it is therefore important to identify how people relate to each other and how communities evolve. Then it will be easier to understand why they do or do not use IT to share their knowledge [Huysman and Wulf, 2005]. When it comes to the use of IT in CoPs however, Lesser (2000) argues that it is not the technology itself but the motivation for people to relate to each other that connects people.

In general, intranets and databases are common IT tools used for knowledge transfer in CoPs. It is argued however, that databases can capture "knowledge bytes", but that they are unable to present the social processes that constitute the actual practice [Hayes and Walsham, 2001]. Hayes and Walsham [2001] conducted a brief literature review, and observed that there have been few interpretive studies that have explicitly considered technology and knowledge working from a CoP

perspective. Hayes and Walsham [2001] also performed a critique to and extended several concepts developed by Lave and Wenger [1991] about CoP and situated learning. In this section I wish to go further into this, first of all because it is important to identify and highlight the use of IT in CoPs, but also because it is important to highlight negative aspects of CoPs. Lave and Wenger [1991] introduced the concept of situated learning and legitimate peripheral participation, and this is based on the view that learning is an integral and inseparable aspect of social practice. Learning then happens when newcomers in a community are given access to fully participate, and from participating they gradually become adequate members. This sounds nice and easy, but Lave and Wenger [1991] warn that newcomers need to see the value of becoming full participants for them to participate. Also, newcomers have access to the periphery of the community, which gives them access to observe and participate in CoP activities, which is important if they wish to become insiders/part of the core group. This is an aspect that is important not to forget, and I wish to explain this with an example.

Example Consider a girl that is new on the soccer team, and that she is not sure if she wants to join the team at all, since she is only there because her father wants her to. At this time, she is in the periphery of the team, while the other players are at the core. First of all, the other players must be nice to her and make her feel welcome and as part of the group. They can do this by passing her the ball, and showing her that without her, the team would not have the same value. By doing this they gradually integrate her into the team, and if she sees the value of being part of the core, she will start participating.

As you can see, it is not just a matter of participating in a group. First of all, the new-comer must see the value from participating, but as the example above illustrates, the old-timers in the group must also make the new-comer feel welcome for him/her to see the potential benefits. What do you think would have happened in the above example if the core team turned their backs on her? I think this analogy can be used to explain the use of IT in CoPs. Consider a CoP that is currently using three IT systems. The members of the CoP are all familiar with and know how to use these systems. But then a new IT system is introduced, and this leads to different reactions from members. First of all, they have to learn a new IT system, and this takes time. Second, the new system must be integrated into the CoP, which means not only with its members, but also with existing IT systems. In Statoil, the new collaboration platform TeamSites is currently being introduced. When conducting my research, it became clear that it has only been introduced to the headoffice in Stavanger, which is where network leaders are located. Most of the network members I interviewed had heard about this new system, but did not know much about it. My general impression was that those who had not tried it yet, had great expectations, but those who had started using it were disappointed.

And I argue that this proves the difficulty of integrating a newcomer into an already existing CoP, and that it is not only about having access, but it is also about potential benefits. And of course, integrating a new IT system into a large organisation like Statoil, which consist of so many different professional networks with different needs, is not an easy job. I therefore suggest that it will be easier to introduce it to the network level rather than the organisation level, and I will come back to this in Chapter 7.

In my understanding, the aim of IT in CoPs is to enable communication between members, especially when members are spread out geographically. It should be a place where members can spread and find useful information about the subject represented by the CoP, as well as information on how to contact other members. This is also in accordance with Marwick [2001]. It is simply a tool to bridge the gap between CoP members, who all have their own tacit knowledge. According to McDermott [1999], it is a technical challenge to design information systems that make people think together. Again, I argue that this is because of the tacit aspect of knowledge, which can simply not be explained without its natural context, which can not be displayed electronically. Using IT for knowledge transfer increases the speed on the availability of information, which in turn enhances innovation. The use of IT has however one serious limitation in that it filters out important cues like body language and tone of voice, and is hence not an appropriate medium for immediate feedback [Johannesen et al., 2001].

3.8.1 Advantages

In summary, IT can be used to build and sustain a CoP by bridging the gap between members who are spread out geographically. Communication is possible via email, intranet pages with discussion forums, contact information and databases with reports and documents. In general, I argue that IT is a good tool for bridging the gap between members, but that in the long run, the use of such knowledge repositories alone is not sufficient. As explained earlier, IT is not the proper medium for transferring tacit knowledge, and face-to-face interaction must often occur in addition to reading electronic documents. The level of facial interaction required depends on the tacit knowledge of the receiver of an electronic document.

3.8.2 Problems

When it comes to information technology within CoPs, Walsham [2002], has identified three examples of what it cannot deliver:

1. Knowledge repositories independent of human knowledgeability
2. Shared norms and values within CoPs

3. They cannot create an environment conducive to good communication

First of all, what the databases contain is not the same as the deep tacit knowledge of the contributor, but rather a sense-giving effort. As a result, the information stored in a database is only valuable when connected to the sense-giving effort of the contributor. Second, CoPs are composed of individuals with their own tacit knowledge, and this has implications for the design of IT systems within CoPs. Third, the reason why members may feel reluctant to engage in sense-giving activities is first of all because of reward systems that encourage individualistic behaviour rather than team contribution, and secondly because of the fear of surveillance from people at higher hierarchical levels [Walsham, 2002]. I agree that these are important problems when it comes to the use of IT in CoPs, then in particular the fact that information stored electronically can easily be accessed by others, and members must feel safe that no negative consequences will occur [Hayes and Walsham, 2001].

3.9 Problems with CoPs

According to McDermott [1999], there is not only the technical challenge of designing an IT system that is of perceived value to its users. It is also a challenge for the manager to create an environment that truly values sharing knowledge, without imposing too much structure. Another challenge is to develop a CoP where knowledge can be shared and diversity maintained. For this to occur in the first place, members must be open to others' ideas and share their own ideas. I agree with McDermott [1999] that these are all important challenges, especially when it comes to making members trust others' ideas and to share their own. I argue that organisational culture plays an important role here; are people motivated to share information in their daily jobs, or is the organisation characterised by a competitive environment? In Statoil, for example, one of the network members explained how people in her department compete to be better, and sometimes meetings are arranged without inviting all members in the department. Informal conversation with another Statoil employee also revealed that some departments have a bad culture when it comes to sharing experiences, especially men like the power of knowing more than others. In my opinion, this only highlights the importance of motivating members to contribute, to make them feel they gain something from participating. This can be done by making them identify with the CoP. Members will then feel comfortable, and when they feel comfortable they will be motivated to participate and share knowledge. It is a matter of making people understand the myth of independence, which states that "no man is an island" [Ford and Snehota, 2003]. This simply means that businesses/people must rely on each other to produce value, and always take others' actions into account. I argue that this shows the value of working together, because no one knows everything, and there are always

new things to learn. It is important to remember however, that for knowledge sharing to be effective, people must be willing to share their knowledge. And this is affected by the level of trust that exists between the relevant parties [Hislop, 2002].

Hayes and Walsham [2001] have extended several of the key concepts within theorisation and situated learning outlined by Lave and Wenger [1991]. When it comes to peripheral participation, some authors argue how IT provides opportunities to CoP members because of how it enables them to observe and collaborate with other members in the community.

3.9.1 Peripheral participation

Hayes and Walsham [2001] argue that peripheral participation is more heterogeneous than suggested by Lave and Wenger [1991] and subsequently Brown and Duguid [1998]. Hayes and Walsham [2001] explain this by the fact that although people in an organisation are given equal access to the communication forums of other professional groups, they are likely to choose groups based on their own motivation and normative assumptions. I agree here with Hayes and Walsham [2001], as I noticed the same thing happening in the professional networks in Statoil - it is not as simple as having access to a peripheri, it must be the peripheri that corresponds to the motivation and needs of the member. Professional network members in Statoil explained how they can choose themselves which professional networks to attend, and this is a decision based on their professional needs.

Lave and Wenger [1991] looked at apprenticeship as a learning system, and considered this a synonym for situated learning where learning through apprenticeship is a matter of legitimate peripheral participation. This is also an example of "learning by doing". Hayes and Walsham [2001] did not observe a master/apprentice relationship in Compound UK, and argue that such a relationship may be relevant to traditional and well established areas of specialism. It is however not relevant to many knowledge work contexts they argue, because here the aim is to become competent rather than an expert. In my opinion, apprenticeship can be considered a good tool for learning, but I agree with Hayes and Walsham [2001] that when the aim of learning not is to become an expert, it can not be regarded a synonym for situated learning. Also, I argue that it is possible to become an expert and full participant in a community without the existence of apprenticeship, but that it will take more time.

3.9.2 Full participation

Lave and Wenger [1991] suggest that moving from peripheral to full participation in a CoP requires newcomers to change their social practices to replicate those by the more experienced. Hayes and Walsham [2001] argue that it is not just a matter

of making the newcomer adjust, but that it rather requires changes in work practices of all employees. Here I agree with Hayes and Walsham [2001], since it not simply a matter of gaining access to and identify with the CoP, the core members of the CoP must also identify with and adjust to the newcomer. When it comes to the use of IT in this process, I agree that it can both assist and hinder this movement from peripheral to full participation.

3.9.3 Legitimate participation

One shortcoming with Lave and Wenger's (1991) concept of legitimate participation, is an overview of how legitimate practice is established and sustained in specific contexts [Hayes and Walsham, 2001]. Lave and Wenger [1991] do mention the possibility that newcomers are either permitted or kept from observing and participating, but they do not say anything about the motivation of newcomers. Hayes and Walsham [2001] also argue that the emergence of communities does not necessarily follow the principle of learner to full participant, but rather emerge in relation to the different motivations of members for participating. I would like to point out here that neither authors mention the possibility of interest conflicts between members in the community - what happens then, and what can be done to overcome such difficulties? Also, I argue the importance of different personalities represented in a CoP, because learning happens via discussion, and all members in a CoP have the same opinions and always agree, the CoP will not be fertile. I definitely think there is a challenge here in attracting different personalities to the same CoP, because different people are often motivated by different things.

3.9.4 Other problems

In general, CoP is seen as a medium for sharing knowledge between members, and it is argued that CoPs are important because they do not separate knowledge from practice. Lave and Wenger [1991] explain how access to a CoP allows newcomers to observe and participate, and this is described as vital to become insiders and eventually full participants in that CoP. What is not mentioned however, is how access to the CoP is gained. This is a matter of identifying CoPs in an organisation and making them visible. But, too much interference from the organisation can lead to a controlling structure, which is likely to have a negative effect and demise the community itself. So how then, is access gained? Existing literature about CoPs explain how they develop naturally and are a natural medium for experience transfer. Take for example the technicians observed by Orr [1996], who discussed previous experiences with machine repair during lunch or by the coffee-machine. This is a so-called "hidden" CoP, where participation happens naturally. Then what about newly-hired technicians, are they also invited to lunch and become part of the CoP, or will they be outsiders? This is an important issue that should be paid more attention to in the literature. I also argue that CoP is a concept that sounds

very good in theory, but is it really functioning in practice? Many attempts have been made to develop guidelines for creating and sustaining CoPs in organisation, but I wish to pay attention to how these guidelines are developed - How can one person decide on the right approach for creating successful CoPs, why is what one person says more correct than what someone else says? I argue that no such guideline can be developed to be used by all organisations, because the underlying factors and organisational characteristics are always different, hence different methods for creating CoPs should be employed. I think Alvesson [2004] gives a good explanation of this, when he talks about how not all knowledge-intensive firms fit the same characteristics, because the world is simply not structured in ways that make it possible to use categories that order it in an unproblematic way. Most important is it however, to understand the criticality of imposing too much structure on such communities. With this in mind, I argue that CoPs are more likely to be successful when they develop naturally, but that they could also be successful if they are cultivated in an organisation instead of being managed.

Another problem encountered with CoPs, is that Lave and Wenger [1991] do not say much about how they are maintained. The only thing mentioned about maintenance of CoPs is that they are bound together by the common passion of members. Then, when members of a CoP loose interest, the CoP will dissolve. In Section 3.7 I talked about social capital, which by Cohen and Prusak [2001] is considered the glue that holds communities together. I argue that this is an organisational structure that can have a positive impact on CoPs, and should be introduced to avoid dissolution of CoPs.

3.10 Summary

In summary, CoPs are said to generate new knowledge through the active participation of members. In order for CoPs to be successful, members must therefore feel that they belong to the community and must be motivated to participate. Becoming a full member however, requires access to ongoing activity, old-timers, other members of the CoP, information, resources and opportunities for participation [Lave and Wenger, 1991]. According to Lave and Wenger [1991], becoming a full participant in a community also involves engaging with the technologies of everyday practice. This is about more than learning to use tools, but is rather a way to connect with the history of the practice and to participate more directly in its cultural life [Lave and Wenger, 1991]. Information technology is of great importance in today's society, but it has proved a difficult task to make people use it. This was also confirmed from my interviews with professional network members, who explained that they do not use intranet pages either because they are not updated, or because it is much easier to ask someone for help than spending time searching a webpage. Both CoPs and information technology (IT) are seen as medium

for transferring knowledge, and Section 3.8 looked at the use of IT for knowledge transfer within CoPs. Chapter 4 and 6 will present the use of IT for knowledge transfer in professional networks.

Chapter 4

Statoil ASA

Statoil ASA is a geographically dispersed organisation that is divided into specialized fields called professional networks. For the purpose of this report I focus on Statoil's business domain Technology and Projects (ToP), and three professional networks within ToP will be investigated to identify how experiences are transferred between network members. It is of particular interest to look at the use of IT as an instrument for experience transfer in professional networks.

In this chapter I first present Statoil as a corporation, before I give a short description of the professional networks DMI, SG and SI. Further I would like to focus on some potential problems involved with the management and success of professional networks in general, before I wish to investigate if professional networks can be considered CoPs. The use of IT as a seeding structure will also be investigated.

When comparing professional networks to CoPs, I have focused mainly on the DMI network since the research data collected are mainly from members of this network.

4.1 The organisation

Statoil ASA was established as a norwegian oil company in 1972, owned 100 percent by the government. Statoil is an integrated oil and gas company with considerable international activity. It is represented in 31 countries with its headoffice in Stavanger. Statoil operates within searching, developement, natural gas, petrochemistry and retailing of gas and oil products, with its main emphasis on searching and development. Statoil ASA manufactures 1 million barrels per day, and is the world's third largest seller of crude oil with 25 400 employees world wide. Statoil markets 2/3 of all norwegian gas to Europe, and is the leading producer on the norwegian continental shelf where the organisation operates 20 oil and gas fields.

The norwegian shelf is the backbone of Statoil's enterprise, and will continue to be so for a long time. The company's solid foothold on home ground should serve as a good basis to grow internationally, as it is expected that future manufacturing will take place abroad [www.statoil.com]. Figure 4.1 shows an overview of platforms on the norwegian continental shelf and Figure 4.2 shows one of the platforms, Gullfaks.



Figure 4.1: Overview of norwegian platforms

Technology and Projects (ToP) is a business domain in the organization chart shown in Figure 4.3. ToP is responsible for Statoil's technology development and research as well as planning and accomplishment of larger development projects. This business domain has a special responsibility for technological innovation that contributes to finding more oil and gas and to maximize the output from fields in operation. ToP was established in 2004, aiming to strengthen Statoil's competence within research and technology development and to ensure increased attention around the planning and accomplishment of larger development projects. With an increasing number of development projects in Norway and internationally the requirements for a more efficient project execution are sharpened. Special attention is paid to a better planning of the early phase, parallel activities, increased standardization and re-use, application of new technology and a closer relationship with contractors [Statoil, 2004].



Figure 4.2: Gullfaks-platform

4.2 Professional networks

ToP consists of 106 professional networks, and the purpose is to connect people with similar interest so they can share similar information. By doing this, the network is expected to contribute to increasing the knowledge of members. Professional networks are considered the biggest potential for experience transfer across the organisation, and this clearly shows the importance of network characteristics and how they are being managed. It also shows the importance for members to have access to and see the value from participating in such networks. This is in accordance with Lave and Wenger's (1991) principle of legitimate peripheral participation in CoP, as described in Section 3.1. Professional networks and CoPs also have the same purpose, namely to make it possible for members to build and exchange knowledge.

In this section I will first give a description of the three professional networks investigated in my case study research. Since both professional networks and CoPs are considered instruments for experience transfer between members, I secondly wish to investigate if professional networks have more similarities with CoPs, and to identify whether or not a professional network can be considered a CoP. It is also interesting to see if IT can be considered a seeding structure in professional networks.

4.2.1 Downhole Mechanical Isolation

The professional network 'Downhole Mechanical Isolation' (DMI) is the result of a working group established in 1998-1999. The workgroup was established to perform immediate action towards the license in question to avoid continuous



Figure 4.3: organization chart of Statoil

problems with equipment and enormous costs. Then it was decided that the work should continue as a project, and include all licenses. And the result was increased quality and decreasing costs. The professional network and the project were established in parallel, and when the project was disused in 2004, the network was established on a permanent basis. The network leader running the network today is the same person as the leader for the working group established in 1998-1999.

4.2.2 Structural Geology

The professional network 'Structural Geology' (SG) was established in the early 90's when structural geology was a hot subject, and it was desirable to increase competence about this topic. Since the few people working with structural geology were spread out in different parts of Norway, the network was established as a rallying point for people within the discipline.

4.2.3 Seismic Interpretation

In the past there were specialists in the North Sea, Norwegian Sea and Barents Sea, which were divided into business units. Each business unit had its own leading geologist or geophysicist. Because these business units were dispersed between 4 offices, the professional network 'Seismic Interpretation' (SI) was established to connect people and enable experience transfer between offices.

4.2.4 Experience transfer

Figure 4.4 shows an overview of the norwegian oil field Tampen, and can be used to explain the utility of professional networks. In the Tampen area there are four licenses: Snorre, Gullfaks, Visund and Statfjord. It is assumed that all licenses are organized similarly, with different subdivisions. The entire Gullfaks field is formed by Gullfaks A, B and C. Gullfaks A consists of one division for people who work with drilling, and one for people who work with subsea wells. Employees from Gullfaks A and other licenses who work with subsea wells can then be members of the same professional network. As you can see, these network members are geographically dispersed, which can both impose constraints and opportunities on experience transfer within the network.

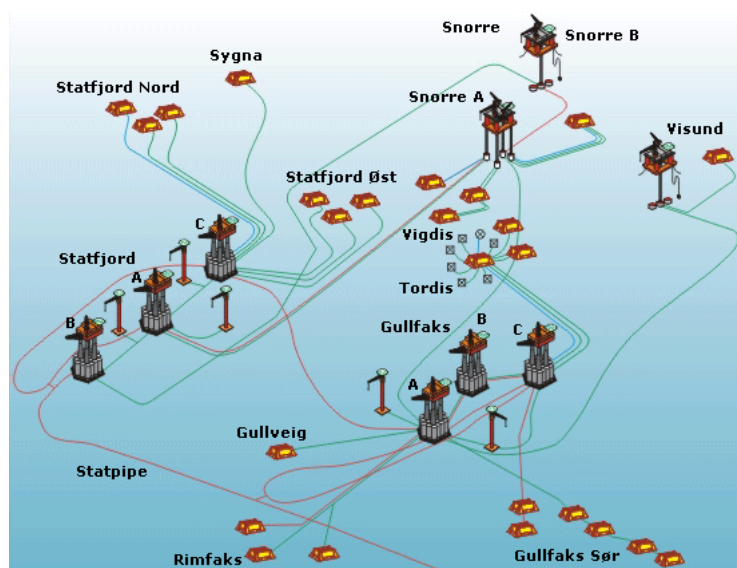


Figure 4.4: Overview of the norwegian oil field Tampen

Different instruments for experience transfer have been identified in professional networks, and the network leader is responsible for arranging network activities to encourage experience transfer. One common activity is the networks meetings, where all members are invited to attend. These are arranged twice a year. Some networks arrange workshops instead of or in addition to network meetings. The DMI network arranges network meetings however, and the aim of the meeting is to present information about relevant topics and experiences learned from operations within the different oil fields. This is a chance for members to meet people from other oil fields, and to get an overview of who to contact if technical questions occur. Figure 4.5 shows an example of how knowledge transfer may occur between members of the different oil fields represented in the DMI network.

As you can see, intial contact may occur at the network meeting. If members from

DMI network activities

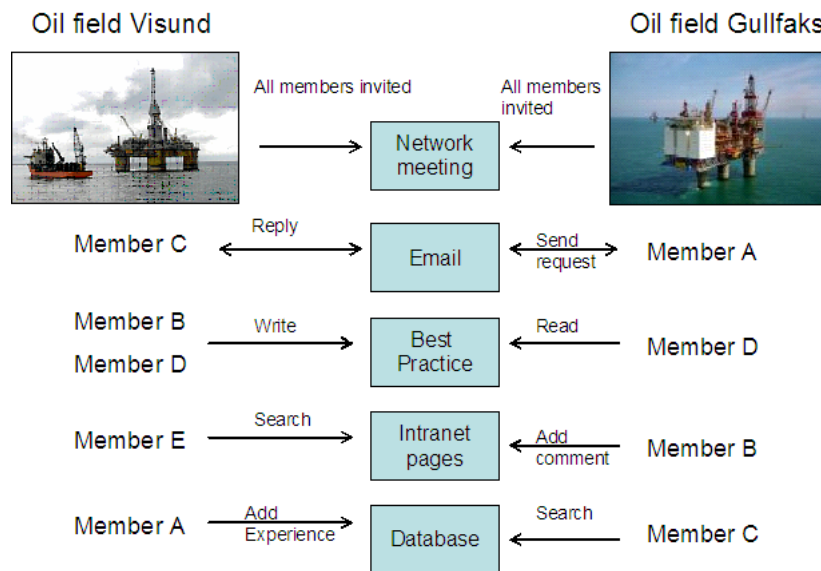


Figure 4.5: DMI network activities

different oil fields face similar challenges in their work, they may contact each other via email. Further, Member C from Gullfaks may write a best practice document about a topic, which is a guideline developed to make people follow a certain standard when doing their job. When Member C from Visund is going to perform a job within this topic, he/she searches the database for best practice documents for this topic, and finds the one written by member C from Gullfaks. Further, intranet pages can be used to search for information or to add information. Professional networks also have experience databases where the oil fields add information about the operations they perform. Also here, Member D from Visund may add an experience that will later be of interest to Member A in Gullfaks.

The above described instruments for experience transfer are also common methods used within CoPs, because CoPs can also be spread out geographically, and do not necessarily require co-presence. What is interesting to see however, is how successful experience transfer is in practice. First of all, professional networks need a dedicated network leader who takes time to plan and arrange network activities. Second, network members must see the value of participating and they must trust and perceive online information as useful as well. CoPs do not have network leaders, but according to Lave and Wenger [1991], also here there is an issue of making people participating. They also argue that full integration into the community only

happens through repeated participation.

The challenges of management and participation are the greatest ones when it comes to experience transfer in professional networks, and will be discussed further in 4.2.5 and 4.2.7. Chapter 6 will also take a closer look at experience transfer in professional networks to see what methods are perceived as useful by network members.

4.2.5 Management

A professional network is managed by one or two network leaders. A professional leader is responsible for quality assurance and consultation within the subject area in which he/she is considered an expert. He/she is expected to spend 20 percent on running the network, and 80 percent on quality assurance and consultation. The responsibility as a network leader involves making information available to network members by updating intranet pages and arranging network activities. Examples of network activities are network meetings, workshops or courses. In general, CoPs are informal, self-selected and organise themselves. Professional networks are self-selected but formal and have a network leader. CoPs do not have a leader, and it is argued that too much control can demise the community. A network leader however has more the role of a 'knowledge editor', which is simply to make information available rather than imposing a specific structure on collaborative work, and can therefore be seen as a seeding structure (see Section 3.2.1).

4.2.6 Size

In an interview with the Knowledge Board on the 3rd of November 2003, Etienne Wenger explained that CoPs can differ in size, but that the size will definitely influence the communication between members. Professional networks also differ in size, some have several hundred members. With regards to size, professional networks and CoPs are therefore considered similar, but I would like to point out that communication in large networks is more challenging than communication in small networks.

4.2.7 Participation of members

When it comes to the participation of members in professional networks, this is optional, and it is up to employees to register themselves as members. This is mostly based on need and interest, and how actively they participate depends among other things on how time-consuming their job is. Once registered, new network members are automatically given access to resources in the network, like intranet pages and experience databases. In CoPs, members also select themselves based on expertise and passion for a topic, and so the basis for participation is the same in professional

networks and CoPs. CoPs are characterised by legitimate peripheral participation, which is the process of integrating newcomers into the community by giving them access to observe and participate. I argue that this is also how newcomers learn in a professional network, first of all because they are free to choose which network to participate in. In both cases however, members must see the benefits from participating. I argue that since CoPs often develop naturally, members are naturally a part of it and are therefore motivated by the CoP itself. When it comes to professional networks however, participation is optional, and many members do not have or take the time to participate actively. As a result, they may not become full participants, but rather stay out in the periphery. This lack of participation could be that members fail to see the perceived value from participating. Some potential benefits are:

1. Establishing personal networks
2. Get an overview of who knows what in other oil fields

In accordance with legitimate peripheral participation where newcomers learn by observation and participation [Lave and Wenger, 1991], members in professional networks learn by attending workshops and network meetings. In the DMI network, members are also asked to present their own experiences within a relevant topic. Network members may also learn from information stored in databases and intranet pages.

4.2.8 Boundary objects

CoPs use so-called boundary objects to enhance communication between members, and this is a structural component that may affect the commitment of the group. In professional networks, best practice documents, reports and steering documents can be identified as boundary objects. These documents are by many network members perceived as useless, and even though some have to use them in their everyday job, they are not particularly useful as boundary objects. Presentations at network meetings however, were perceived as useful by many members, as they contained useful technical information and information about who to contact to ask supplementary questions. In conclusion, such presentations can be considered boundary objects.

4.2.9 The use of IT

In CoPs, intranets and databases are considered common IT tools for knowledge transfer, but a shortcoming is their inability to express the social processes that constitute the actual practice stored in the database. It is becoming more and more obvious that people will not use technology simply because it exists, and it is therefore essential to develop technologies that correspond to the needs of its members.

In general, the aim of IT is to enable communication between CoP members by providing technical information and information on how to get in touch with other members. In professional networks, intranet pages are used to publish relevant information. According to Alavi and Leidner [2001], knowledge is here viewed as a state of knowing and understanding, and hence the role of IT is to provide access to sources of knowledge. Experience databases also exist where members can store both positive and negative experiences with an operation. Alavi and Leidner [2001] here view knowledge as an object and as access to information, and the role of IT is to gather, store and transfer knowledge to members. Efficient search mechanisms for locating relevant information must also be provided. In my case study research, network members were asked about the perceived value of these intranet pages, and it seemed that newcomers use them more than oldtimers. The reason for this seems to be that oldtimers know more people in the organisation, and knows who to contact to find information (their personal network is bigger). Newcomers however, have not participated long enough to establish a large personal network. I argue that this proves the value of IT as a seeding structure and a tool for integrating newcomers into the community and help them become full participants.

4.2.10 Problems

One of the biggest problems with regards to making members participate in professional networks, is to motivate members to participate. There seems to be a gap between efforts made by members and the perceived value from participating, and this can be caused by several reasons:

1. The learning process in the network, as identified by Lave and Wenger [1991], has not properly started, and the member does not identify with the network
2. The benefits from participating are yet not clear to the participant, e.g he/she can only see the effort required
3. Participating is too time consuming, e.g. members must travel to attend network meetings, because they are geographically spread out.
4. A poor network leader who fails to motivate network members. Professional networks seem to be largely dependent on the involvement and dedication of the leader, and if he/she does not do a good job, members will not perceive the network as useful.
5. Apprenticeship is non-existing, e.g. newcomers are not connected with oldtimers to learn from them and ask questions. As a result, newcomers have to participate alone, and this can be both scary and less motivating.

According to Lave and Wenger [1991], learning in CoPs is based on apprenticeship, and no apprenticeship exists in professional networks. Hayes and Walsham [2001] argue however, that such a relationship is not relevant to many knowledge work contexts because of the aim here to become competent rather than an expert. I argue that without the existence of apprenticeship, it takes longer to become an expert, but that by actively participating in CoPs, expertise will gradually be obtained.

Professional networks have one or two network leaders, and these are considered experts within the subject represented by the network. From the research conducted, it became obvious that this dependence on one or two persons is definitely a weakness for professional networks. First of all, this is a job that requires a dedicated leader, and if the network leader does not do what is expected of him/her, the network is not likely to survive. Even worse, what happens if the network leader quits the job or something happens to him/her? Then a new leader must be found, and this could take time, not to mention the amount of work required for the new leader to learn how to do the job. He can also be considered a new participant in a CoP, as he starts out in the periphery. The only difference is that he has no oldtimers to learn from, and moving from the periphery to the core will therefore take more time than what is normal in CoPs. It is also a matter of adjustment, both for newcomers and oldtimers, as argued by Hayes and Walsham [2001]. The task of making member identify with and feel motivated to participate in the network also becomes a challenging one, because the new leader must himself/herself identify with the network before being able to motivate current and new network members.

4.3 Discussion

In general, there are so many similarities between CoPs and the DMI network that I choose to call the DMI network a CoP. Even some of the problems encountered are similar, then particularly when it comes to motivate members to participate actively. I argued earlier that IT could be seen as a seeding structure because it is perceived as useful when it comes to integrating newcomers into the network. I also argue that the DMI network is likely to be characterised by a seeding structure, since the time spent on the network is sanctioned by the organisation, the network involves a core team of highly competent and dedicated individuals (like the network leader) and the networks are to a certain extent facilitated by discussions and updated information on the network webpages. This is important to have in mind when introducing information technology as a solution for experience transfer. It is essential that IT should not impose a specific way of collaborating that conflicts how communication currently takes place in the professional networks.

Finally, I would like to mention the problem of access to a CoP or a professional network. Even though participation is optional and members are given access to

participate, how actively they participate and in which network or CoP they choose to participate in is mainly controlled by motivation. If members are not participating actively, a network leader should take a closer look at use of motivational factors and other instruments for increasing participation. An evaluation of the work performed by the network leader should also be conducted, to see if he/she can improve the performance of the job.

Chapter 5

Research

To investigate the success of professional networks and their value to network members, it has been essential to talk both with leaders and members of the networks DMI, SG and SI. By doing this, I wish identify how experiences are transferred between members, and to take a closer look at the use of IT. In Chapter 4, I concluded that IT could be seen as a seeding structure, and the results obtained from the research will either prove or disprove this statement. Further, it has been essential to identify how actively members participate in network activities, and to detect reasons for lack of participation as well as motivational factors.

The research also aims to investigate further whether or not the DMI network can be considered a CoP, since was my conclusion in Chapter 4. The results from the research will be presented in Chapter 6, and based on these I will in Chapter 7 discuss the methods used for experience transfer and the use of IT as a seeding structure. I will also discuss how well the CoP theory captures the problems to be addressed with professional networks.

Before conducting the research, I defined two main objectives:

1. Look at how experience is transferred between members of the professional networks in Statoil
2. Determine the value of information technology as an instrument for experience transfer

These objectives were considered when choosing an appropriate research method, and based on the results obtained I will develop some recommendations on the use of information technology for experience transfer in professional networks. These recommendations will mainly consider design and management issues.

It is worth mentioning that most of the research was conducted with members

from the DMI network, and the results obtained are mostly concerning this network. I therefore wish to focus mainly on the success of this network with regards to experience transfer between members and the use of IT as a seeding structure.

5.1 Methods

To answer the objectives of the research, it was essential to gain a better understanding of how experiences were transferred between network members in SG, SI and DMI. To learn more about this, I chose to conduct semi-structure interviews both with network leaders and members. By talking both with leaders and members, I hoped to understand how the networks are currently being managed as well as the involvement and participation of members. In addition to the interviews conducted, I had informal lunch conversations with other network members, and two formal meetings were attended. These will be described in Section 5.2.

Seeing that interviewing is a qualitative research method, I wish in this chapter to give a description of what qualitative research is. Within qualitative research there are several different methods to choose between, and I chose case study research. Therefore, a short description of case study research will also be presented, before discussing interviewing as a research method. Then I wish to present the field trips conducted to carry out to collect research data, before talking about how the interviews were carried out. Lastly, I wish to make an evaluation of the interviews, and this will be based on the framework of Klein and Myers [1999].

5.1.1 Qualitative research

A research method is a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection. The choice of research method influences the way in which the researcher collects data [Myers, 1997]. Qualitative Research is collecting, analyzing, and interpreting data by observing what people do and say. Whereas quantitative research refers to counts and measures of things, qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. Qualitative research is much more subjective than quantitative research and uses very different methods of collecting information [Geocities, 2006]. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions [Myers, 1997]. The motivation for doing qualitative research, as opposed to quantitative research, comes from the observation that, if there is one thing which distinguishes humans from the natural world, it is our ability to talk. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live [Myers, 1997].

There are a number of various qualitative research methods, and I decided to conduct case study research [Myers, 1997], which is characterised by frequent field trips over an extensive period of time [Walsham, 1995], and detailed, intense knowledge about a case or a small number of related cases is developed [Robson, 2002].

Interview

Interviews involve the researcher asking questions and hopefully receiving answers from the people who are interviewed. Interviews are a far more personal form of research than surveys, as the interviewer works directly with the respondent. This also gives the interviewer the opportunity to probe or ask follow up questions [Valenzuela and Shrivastava, 2006].

Some drawbacks with interviewing is that it can be time-consuming and resource intensive. The interviewer is also considered part of the measurement, and must be well trained in order to guide the respondent in the right direction during the interview and control the quality of the results. It is therefore important to organize in detail and rehearse the interviewing process before beginning the formal study [Valenzuela and Shrivastava, 2006]. Three different interview techniques are identified by Robson [2002]:

- **Fully-structured interview** A fully structured interview has predetermined questions with fixed wording, usually in a pre-set order. The use of mainly open-response questions is the only essential difference from an interview-based survey questionnaire [Robson, 2002].
- **Semi-structured interview** According to Robson [2002], a semi-structured interview has predetermined questions, but the order can be modified based upon the interviewer's perception of what seems most appropriate. Question wording can be changed and explanations given; particular questions which seem inappropriate with a particular interviewee can be omitted, or additional ones included. Semi-structured interviews are conducted with a fairly open framework which allow for focused, conversational, two-way communication.
- **Unstructured interview** An unstructured interview is an informal discussion about a topic, where the interviewer "warms up" the respondent by starting to talk about a topic that interests the respondent, for example soccer [Knut Rolland, Intervju].

To collect data about experience transfer in the professional networks, I chose to use qualitative research with semi-structured interviews as the main sampling strategy. Semi-structured interviews are said to be less intrusive to those being interviewed because it encourages two-way communication and its purpose is to obtain

general information relevant to specific issues [Geocities, 2006], which in this case is to elaborate on the use of information technology for experience transfer in professional networks in Statoil.

I am certain that semi-structured interviews was the most appropriate sampling strategy for this qualitative case study research. This is mainly because it enables two-way communication, and this may make the respondents relax more. And when they relax, it is a bigger chance that they will speak from their heart instead of giving the answers they believe I want to hear. Before carrying out the interviews, a telephone interview was conducted and two meetings were attended. These activities were helpful to improve my understanding of how the professional networks are managed and how this impacts its ability to transfer experiences between members. Based on this knowledge it was easier for me to ask good questions during the interviews.

By carrying out the above listed methods, I hope to obtain enough data to answer the objectives of the research, as defined at the beginning of this chapter.

5.2 Field trips

Case study research is characterised by frequent field trips over an extensive period of time [Walsham, 1995], and three field trips were planned over a period of 5 months, which is the time allocated to write this thesis. As explained earlier, semi-structured interviews were carried out to collect data for this case study research. In addition, a telephone interview about the DMI network webpage was conducted, and a meeting about TeamSites was attended. I also participated as an observer on at a DMI network meeting. In this section I will describe these events, and a detailed description of the planning and execution of the semi-structured interviews will be presented.

First, a description of the field trips:

1. The first field trip was a one-day trip to Stavanger. A meeting was attended about the introduction of TeamSites as a collaboration platform in the professional networks. This was when it was decided that I should perform a research study about the role of information technology for experience transfer in professional networks in Statoil. A decision was made to focus on three professional networks, and the characteristics of these will be described in Chapter 6.
2. The second field trip went to Stavanger and Bergen, and lasted for three days. On day 1, a DMI network meeting was attended. This lasted one whole day, and my role was to observe what was happening on the meeting. On day 2,

the DMI network leader and two DMI network members were interviewed, using a semi-structured interview approach. All interviews lasted for approximately one hour each. On this day, one of the respondents I was going to interview did not show up. On day 3, I went to Bergen and interviewed two DMI network members there.

3. The third field trip went to Stavanger, and lasted for two days. On day 1 the professional leader for the SI network and a member of the SG network were interviewed. On day 2, the professional leader for the SG network and one SG network member were interviewed. It was not time to arrange more than 4 interviews on this last field trip, since it had to be planned during christmas. As a result, it was not easy to get hold of respondents.

Subsequent sections will present in more detail the specific actions performed to collect data under these field trips.

5.2.1 Meeting about TeamSites

On tuesday 27.09.2005, a meeting was attended in Stavanger about TeamSites, which is a collaboration platform. TeamSites had already been introduced to people working at the Statoil headoffice in Stavanger, and the intention of the meeting was to discuss whether or not the it should also be introduced to all professional networks in Statoil. The outcome of the meeting was a decision to wait. I was originally supposed to look at the use of TeamSites in professional networks, but now a decision was made to focus more generally on experience transfer between network members and the use of IT.

5.2.2 Telephone interview

On friday 11.11.2005, a telephone interview was conducted with the professional leader of the DMI network. The purpose of the meeting was to go through the collaboration platform .Workplace, ' the network webpage for DMI, which is one of 21 professional network in the larger network 'Drilling and Well'. The interview lasted for 30 minutes, and I was guided through the webpage and given an explanation of how it works, what work is required to update it and what actions are performed to make people use it.

The network webpage can be found on the following address, and you must be a registered user to enter:

<https://extranet.statoil.com/bob/>

5.2.3 Network meeting, DMI

On monday 28.11.05, the DMI network meeting was attended at the norwegian oil museum in Stavanger. The purpose of attending the DMI network meeting, was to observe how it was being performed, how many people attended and the involvement of those attending. It was also my intention to observe whether or not any experience transfer occurred, both during the meeting, but also during lunch and coffee breaks.

5.2.4 Semi-structured interviews

This section will give a description of the interviews conducted for this case study research, from choosing interview objects, developing an interview guide and finally how the interviews were carried out.

Choosing interview objects

To answer the objectives of the research, it was essential to speak both with network leaders and members, and respondents were located in Stavanger and Bergen. Some of the network members interviewed in Stavanger were spread out between different buildings. And this was the intention from the beginning, to speak with members from the same network who are not co-located. By doing this, it was easier to get an impression of how experiences are transferred not just within the network, but also between network members from different locations.

Interview guide

The respondents interviewed for this case study research had two different roles in the professional network:

- Network leader
- Network member

A network leader can however also be a network member in other professional networks, and it was therefore necessary to ask the network leader the same questions as a network member. Using the semi-structured interview approach, questions were not prepared in detail, only headwords were prepared in advance. First of all, this ensured some basis for comparison of the answers given during the interviews. Second, it ensured flexibility during the interview, and let the respondents speak more freely, which is likely to improve the collection of data. Since most of the questions asked were similar for both respondents, only one interview guide was prepared in advance of the interviews. The interview guide included questions both for network members and network leaders.

The following Interview guide was prepared in advance of this case study research:

1. Network member:

- Use of professional networks
- Experience transfer within and between professional networks
- Use of information technology/network webpages
- Trust and Motivation
- Characteristics of a good/bad professional leader
- Network meetings

2. Network leader:

- Network history
- Network management
- Maintaining the network

Appendix A summarises some of the most common questions asked during the interviews.

Carrying out the interviews

A total number of nine semi-structured interviews were conducted to collect data for this case study research, as shown in Table 5.1. The respondents were located in Bergen and Stavanger, and three field trips were planned to carry out the interviews. All interviews lasted for approximately one hour each. During the field trips, informal lunch conversations with respondents and other Statoil employees were also attended.

Participants	DMI	SG	SI
Network leader	1	1	1
Network members in Bergen	2	0	0
Network members in Stavanger	2	2	0
Total	5	3	1

Table 5.1: Interviews conducted within three professional networks in Statoil

Three of the interviews were conducted with help from my supervisor, Knut Helge Rolland, but I conducted the other six alone. Considering this and the length of the interviews, a tape recorder was used to avoid losing important data. The respondents were asked first if it was okay to use a recorder, and they did not have a problem with this. The only problem with using a tape recorder is that the respondents may not speak as freely as they would otherwise, but to minimize the chance of this happening, I promised to transcribe and email them the interviews as soon as possible after the interview. By doing this I was hoping to comfort them into speaking more freely.

Changes on the way

It was originally desirable to conduct more more than nine interviews for this case study research, but given that the research was performed in Stavanger while I am located in Trondheim, it was challenging to plan and carry out interviews. Planning and carrying out field trips takes a lot of time, not to mention the amount of work required to work with the data collected afterwards. Given these conditions, I still believe that the information collected is sufficient to give a reasonable answer to the research objectives defined in Chapter 1.

5.3 Evaluating the interviews

Klein and Myers [1999] have developed seven principles for conducting and evaluating interpretive field studies in informations systems, and these principles will be used to make an evaluation of the semi-structured interviews conducted. Each principle may help the researcher to discover or better understand a significant part of the case that contributes to an understanding of the field study as a whole [Klein and Myers, 1999]:

1. **The hermeneutic circle** The principle of the hermeneutic circle is the meta-principle upon which the other six principles expand, and it suggests that human understanding is achieved through repeated iteration between the interdependent meaning of parts and the whole that they form.
2. **Contextualization** The principle of contextualization requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.
3. **Interaction between the researcher and the subject** The principle of interaction between the researchers and the subjects requires critical reflection on how the research data were socially constructed through the interaction between the researchers and the participants.
4. **Abstraction and generalization** Here it is required to be able to relate ideographic details revealed by the data interpretation through the application of principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.
5. **Dialogical reasoning** The principle of dialogical reasoning requires sensitivity to possible contradictions between research theory and the actual findings from the empirical data, with subsequent cycles of revision.

6. **Multiple interpretations** The principle of multiple interpretations requires sensitivity to possible differences in interpretations of a story among participants.
7. **Suspicion** The principle of suspicion requires sensitivity to the possibility of the respondent's stories being partial or twisted.

It is up to the researcher to choose which of the above mentioned principles are relevant for his/her research. This depends on what the researcher wants to report and the target group of the research [Klein and Myers, 1999]. For my research, I believe that principles 3, 4 and 6 are important, and the rest of this chapter will relate the performance of the interviews to these three principles.

5.3.1 Interaction between researcher and subject

Interviews are the best method for getting access to personal thoughts and opinions, and was therefore the research method I chose for my case study research. It is important during an interview that the researcher finds a balance between being to active/passive, because this can affect the person being interviewed. If the interviewer is too passive however, he/she may seem uninterested and unprofessional. This can again lead to the subject not wanting to participate at a later occasion. An interviewer that is too active on the other hand, may underpin the meanings of the subject and as a result, the research data will not give a truthful representation of reality [Walsham, 1995]. Clearly, the interaction between the researcher and the subjects is crucial for the relevance of the empirical data collected, and the quality of the interview data determine the quality of the results. Valenzuela and Shrivastava [2006] have identified some qualification criteria for the interviewer:

- **Knowledgeable** Being familiar with the topic
- **Structuring** Outline the procedure of the interview
- **Clear** simple, easy and short questions which are spoken distinctly and understandably.
- **Gentle** being tolerant, sensitive and patient to provocative and unconventional opinions.
- **Steering** To control the course of the interview to avoid digressions from the topic.
- **Critical** To test the reliability and validity of what the interviewee tells.
- **Remembering** Retaining the subject information from the interviewee.
- **Interpreting** Provide interpretation of what is said by the interviewee.

First of all, the researcher must be familiar with the topic. Before starting the research phase of this thesis, I spent a lot of time reading literature about knowledge, knowledge management and communities of practice. I also attended a meeting in Stavanger about professional networks and the use of TeamSites to learn more about professional networks and the use of information technology for experience transfer within such networks. This gave me a good basis for asking the subjects relevant questions. Second, the interview was planned in advance by developing an interview guide (see Section 5.2.4). This was a short list of headwords, and was helpful for me to focus on the right topics during the interviews. I deliberately chose a semi-structured interview approach, as this is more a two-way conversation that made the subjects relax and speak more freely.

The reliability and validity of information was tested by asking all subjects questions about the same topics. It is however important to keep in mind my limitations as an interviewer, as I have limited experience with performing interviews and conducting research in general. As a result, the planning of the interviews was time-consuming. I was so lucky that my supervisor, Knut Helge Rolland, participated during the first three interviews, and this served as a guideline for the six other interviews. I found that it is very challenging to perform one hour interviews, because you have to keep your head clear and ask the right questions at the right time. It is also a matter of making the subject feel comfortable and part of a conversation rather than feeling cross-examined. Based on the qualification criteria described by Valenzuela and Shrivastava [2006], I feel that the interviews went good, and that a lot of useful information was collected. However, it took some time to get used to conducting interviews and to ask the right questions, but I definitely feel that I had a good connection with the subjects, and they all seemed very eager to contribute. This was in fact my general impression of Statoil employees that I met during lunch or in the hall - they were all positive and curious about the subject of my thesis, and most people had an opinion about experience transfer and the usefulness of information technology in this regard. As a result of this interest for the topic of my research, all subjects responded quickly on my requests and it was easy to make them participate and to plan a date for the interviews. Only one of the subjects never showed up to the interview, and I was told by his secretary that he had to go work on an offshore platform. And this is a common situation in Statoil, it is hard for people to plan events like interviews in advance, because unforeseen things may occur. Luckily, this only happened to me once.

Challenges occurred

In one particular case it was hard to get the interview subject to speak freely, and this was very challenging, as I had to ask a lot of leading questions to get the infor-

mation I wanted. This is also likely to reduce the quality of the interview data, as it might have caused the subject to give the answers he/she thought I wanted rather than telling me her/his own opinions.

To avoid taking notes during the interviews, I used a tape recorder. By doing this, I was able to focus 100 percent on the respondent and it was easier for me to ask relevant questions about the topics discussed. It was also essential to conduct the interviews face-to-face, because then it is easier to connect with the subject and look at things like body language and facial expressions. This was important in order to understand the validity of the information revealed. In one particular interview, I got the impression that the subject did not want to tell me his/her real opinions about the topics discussed, but rather tried to give answers to the liking of the organisation.

In general I am very happy with the results obtained from the interviews. Most respondents gave good answers to my questions, and were more than willing to participate on a later occasion if necessary. I could also see that some respondents actually enjoyed the interview situation, and seemed in no rush to finish it. It is both fun and inspiring to work with such people, and I think this has had a very positive effect on my results.

5.3.2 Abstraction and generalization

In all research, it is desirable to examine the validity, reliability and generalisability. In this regard, especially the value of interviews has been questioned. As described in Section 5.1.1, I chose to conduct a case study research. This involved several field trips to interact with interview subjects in their natural setting. By doing this, it was easier for me to understand their working environment, and thereby to evaluate and analyse the response to my questions.

When conducting research, it is important to relate research findings to theoretical concepts. By doing this, the information can be abstracted and general concepts can be discovered. In this report, the CoP theory presented in Chapter 3 is used to emphasize the findings from the research, which is to elaborate on the transfer of experiences within professional networks. Since CoPs are considered good instruments for experience transfer between members, and this is the purpose of professional networks, all research findings are evaluated from a CoP point of view. A comparison is made between professional networks and CoPs, to identify whether or not professional networks can be classified as CoPs.

In particular, I would like to mention that how respondents were chosen for this case study research was not incidental. The network leaders interviewed were picked out by their leaders, and I then contacted these to arrange interviews. When

contacting the network leaders, I also asked if they could direct me to some of their network members, and when I received the contact information, I contacted the members on the list. On my second field trip, I interviewed DMI network members, and since this trip was better planned than the third trip, I had time to interview more members from this network than from the other networks. Because of this, I took a decision to focus mainly on the DMI network when presenting the research results. By doing this, I hoped to preserve the validity of the data as abstractable and generalisable. My evaluation of professional networks towards CoP theory is hence based on the information collected about the DMI network.

5.3.3 Multiple interpretations

When conducting research, it is important to keep in mind that different people may have different interpretations of things. An example of this is how two persons can make the same story sound like two different stories. And this is only natural, because people perceive different things as important and hence focus on different things. This can for example be caused by different backgrounds and different jobs.

During my research, I have kept in mind the differences between my background and the background of the network members interviewed. The biggest difference is our technical competence, as I am studying information technology and they work with oil and gas. As a result, we have different ways of interpreting things, and I am sure that another researcher with a different background would not end up with the same conclusion as me. The distinction may not be large, but the results presented may have a different focus.

Chapter 6

Results from interviews

This chapter will present the empirical data collected from semi-structured interviews with members and leaders in the professional networks DMI, SG and SI. The information presented here will give answers to the research objectives defined in Chapter 1, which were to:

1. Look at how experience is transferred between members in professional networks in Statoil
2. Determine the value of information technology as an instrument for experience transfer

In Chapter 4, I concluded that a professional network can be considered a CoP. It is therefore of great interest here to compare findings about professional networks with the CoP theory presented in Chapter 3. Further, I wish to focus on the use of IT as a seeding structure. Too much control in a CoP can have a negative effect, and if IT is seen as a controlling structure, it might not be a good tool for experience transfer in professional networks. The implications of IT as a seeding or controlling structure will be discussed in Chapter 7, and recommendations will be given on what to do with regards to the use of IT for experience transfer.

This chapter is divided into three sections. First, I will present information about professional networks, then in particular how they are managed and the participation of members. Second, I present a description of how experiences are transferred between network members, and what tools are used to enable experience transfer. Throughout the whole chapter I wish to discuss similarities to CoPs, and the final section will conclude whether or not professional networks can be considered CoPs. It is important here to remind the reader that this chapter describes my interpretation of the empirical data collected, and this is not necessarily the correct interpretation.

6.1 Professional networks

Professional networks are established to connect people and enable experience transfer between members. They are also considered helpful when it comes to increasing competence about a relevant topic, and serve the purpose of a rallying point for members who are geographically spread out. It is therefore essential to investigate how this is functioning in practice. This can be done by comparing it to the success of CoPs, which are also a way to spread knowledge in an organisation. CoP theory introduces the concept of legitimate peripheral participation, which I have discussed earlier. The success of professional networks is mainly evaluated from the participation of members and the characteristics of the network leader. As argued by Lave and Wenger [1991], a newcomer in a community must be given access to participate and observe actions performed by oldtimers. In this regard, the professional networks are particularly important to newcomers in the organisation. Network activities are planned and organised by the network leader, and by attending or making use of these activities, newcomers can participate and observe. The more actively they participate, the more they learn and are likely to become full participants.

In professional networks, both membership and participation is optional. It is interesting to see how this affects the possibility of moving from the periphery to full participation in the network. This will be investigated further in Section 6.1.2.

6.1.1 Network members

Professional networks have a variety of members from different oil fields. The DMI network for example, has members who are interested in plugs, while the SG network has members who are interested in geology. All Statoil employees who have an interest in plugs then have the opportunity to register as a member in the DMI network, while employees with an interest for geology can register in the SG network. This example shows that network members participate out of professional interest. People working in different oil fields are likely to have similar interest, since they all work with one goal in mind, namely extracting oil. This means that many of the operations performed in different oil fields will be similar. Since oil fields are spread out around the norwegian coast however, they are likely to operate under different conditions. This is accordance with Lave and Wenger [1991], who assume that CoP members have different interests, make diverse contributions to activity and hold varied viewpoints. I argue that the different experiences from network members working in different oil fields is likely to contribute to the success a professional network, just as it is assumed to be beneficial for a CoP. By choosing network membership out of interest, members are also more likely to identify with and contribute to the overall activity of the network. This is also in accordance with the principle of legitimate peripheral participation, and will be discussed in

more detail in Section 6.1.2.

6.1.2 Participation

From the interviews conducted, it became clear that all nine respondents were members of more than one professional network. Which networks they participate in depends on interest and professional needs, and how actively they participate seems to depend heavily on:

The nature of their job Some people may not have time to participate actively, as expressed by Engineer A in the DMI network:

If you work in an operative project, it is what happens there that controls your work day

If network members do not have time to participate, it will affect the usefulness of the professional network, because it is the active involvement from members that keeps the network alive. It is therefore essential that members feel they gain something from participating.

Benefits To motivate network members into participating actively in a professional network, they must be aware of the potential benefits achieved by participating, and the utility value from participating must exceed the costs. Some desirable benefits were identified from the interviews:

1. Information about operations performed elsewhere in the organisation
2. The establishment of personal networks (see Section 6.2.5)
3. Ideas on how to perform an operation
4. Advice on how to perform an operation

Availability of assistance and information The network leader should be available to answer questions or direct a member to other experts within the domain. Relevant information must be available all the time and should be easy to find.

Relevance of subject area There seemed to be a trend among network members to choose one principal network in which they participate actively, and then have a few subnetworks from which they receive emails with information about network activities. Which activities to attend in these subnetworks is decided from relevance of the subject area to the member's job, because they do not have time to participate actively in all relevant networks, as explained by Member B (SG).

When Lave and Wenger [1991] talk about legitimate peripheral participation, they

argue that when a newcomer is given access to a community, it is up to the newcomer to participate and observe the practices of the community. In professional networks, all members are given access to observe and participate. But, even though they are given this access, they do not necessarily participate actively. And, according to Lave and Wenger [1991], this is required if they want to become full participants and increase their own competence. I agree here with Lave and Wenger [1991], but I would also like to point out the importance of network characteristics and perceived benefits by members. In professional networks, participation is optional and decided from the personal interest and professional needs of members. I therefore wish to point out the possible negative effect of too large networks. Too large networks may embrace too many topics, and all topics represented in such networks may not be perceived as interesting by members. Hence, they may be discouraged to participate in network activities like network meetings, simply because a lot of the information presented is not of relevance to their interest and needs, which is why they decided to become members to begin with. Secondly, it is pretty much left in the hands of the network leader to provide useful information to members, and if he/she is doing a bad job, it will affect the motivation of members. I argue that this is one of the biggest differences identified between CoPs and professional networks. CoPs do not have a leader, and it is up to members to arrange CoP activities. And this is definitely a benefit of CoPs, because members know best what they want, and are more free to influence the activities in a CoP. In professional networks however, the participation of members largely depends on the network leader and how he manages the network. It is important here to be attentive to the possible negative effect of a controlling structure. A controlling structure may occur if the network leader directly tries to affect the way members participate. I argued in Chapter 4 stated that professional networks can be considered a seeding structure. I based this statement on the observed role of network leaders as "knowledge editors", and as long as this role is maintained, a seeding structure will also be maintained.

Example I present here an example of members who are not participating actively in their network. Consider members working within different licenses. A license is responsible for all operations in one oil field, both the operational and organisational part. All licenses have a platform where oil is extracted, and these are located in different areas around the norwegian coast. Because of the operational part of licenses, it may be difficult for these network members to participate on network meetings, or meetings in general. According to the DMI network leader however, it is simply an issue of prioritising network activities, because he has noticed that some licenses participate more than others. The trend is however that most licenses do not show up at meetings, just a few are participating actively. This shows that personality is an issue that makes it hard for the network leader to create a network where all members are equally motivated and committed to participate.

The personality of the network leader is also important for the success of a network, since it affects the way he/she chooses to manage the network. Some network leaders may choose to spend most of their time on quality assurance and consultation rather than arranging network activities. It is simply a matter of different styles and personal preferences. A successfully managed network should, according to the SI network leader, publish a lot of useful information at all times, arrange relevant courses and provide useful IT tools. It is also important to consider the characteristics of the network, e.g. size and what countries are represented. In a global organisation like Statoil, all professional networks are likely to have members scattered around the world, and information should be available either in english, or in all languages represented in the network.

The above example showed that participating in a CoP or professional network may not be as simple as having access. Clearly, it is also a matter of personality, and some people tend not to prioritise participating in such communities. I argue that this is a challenge for network leaders, but it is not an impossible challenge. It is more an issue of getting to know the members and understand what their needs are. The DMI network leader e.g. tried to do this by letting network members influence the agenda on network meetings. In conclusion, the ability of the newcomer to move from the peripheri to full participation is first of all a matter of personality, but it also depends on interest and motivation, both from members and the network leader.

6.1.3 Managing professional networks

The management of professional networks is very time-consuming, and demands a lot from the network leader, who must provide necessary information to network members at all times. A network leader is allocated 20 percent of his job to spend on managing the professional network, which involves keeping the network web-page updated, arranging network meetings and keeping him/herself updated on what is happening in the field and the network domain. A dedicated leader is important for a successfully managed network, and network members have identified some premises that should be fulfilled by the network leader. The characteristics of the network will also affect the perceived usefulness of the network by its members, and this will also be discussed in this section.

The network leader

A good leader is important for a successfully managed network, and below is a list of characteristics identified from interviewing network members:

- Must regularly provide necessary information to network members
- Must allocate sufficient time to managing the network

- Must be an expert within the subject area of the network
- Must engage network members into participating
- Must be good at filtering the right information
- Must be contact seeking and committed
- Must be available for technical questions
- Must be creative to make people interested

A network leader should have all the above listed characteristics to be a good leader. As you can see, it involves a lot of responsibility. Overall, commitment to the network, both from its leader and members, is crucial for the success of the network. A good leader should also be predictable, because an unpredictable leader is not easy to deal with, and the members must know what to expect from their leader. In general, it seems to be a common perception among network members that a successfully managed professional network heavily depends on the network leader. Member B (SG) explained that a good leader must regularly emit relevant information and must work actively with network activities. Member D (DMI) also emphasizes that the amount of time spend by the leader on managing the network is important. Engineer C (DMI) explained how some networks are totally unpredictable:

Some of the network meetings I have been invited to, they invite you to a certain date, and then after a while, it is cancelled, or moved to a different date, cancelled again and moved to a new date

When this happens, there is obviously something that is not working, and it discourages network members to participate, simply because the whole network seems unserious. And it gives a signal that the people managing the network do not think it is important enough to prioritise it. This leads me to the issue of trust, because it is hard to trust an unpredictable leader, and trust is highly important in all relationships. A good leader must also be a decision maker, a 'doer, not just a talker'. As explained by Engineer C (DMI), a good leader should be pro-active, not just sit on the fence and wait for problems to come along. The DMI network leader explains that many network leaders find managing the network a challenging task, because it requires hard work and it must be prioritised, and you must do most of the work yourself. And this calls for a committed network leader:

I have decided to do the best I can to keep the network alive [...] I spend a lot of time, and I work more than I should. 7 1/2 hour working day is not so important, what is important is to do all the things you are supposed to do.

[Network leader, DMI]

There is always so much more to do, you just have to set the limit and go home. But some times it is really tempting to do things, like last night, I was up until 3 am working..

[Network leader, SI]

The above quotations are indeed examples of committed network leaders who spend more time on managing the network than the 20 percent allocated. As described in this section, commitment is a key issue when it comes to successfully managing professional networks. In order to be committed, network leaders must be motivated. Some motivational factors for network leaders are that they constantly get to meet new people, which will increase the size of their personal network. They also have a versatile working day and get higher salary. It is also important to arrange for the engagement of a new network leader, to help him/her adjust to the job. The SI network leader explained how he was disappointed about the network leader he took over for, because he did not have a system for storing relevant information. The old network leader also did not work with the network, because he was not very interested in spending time on the network. The SG network leader confirmed that the position as network leader is not easy to begin with, as it requires previous knowledge about what the position implies (SG network leader).

It sometimes happens that people are hired as network leaders who have only worked in Statoil for a couple of years, and for them the job is more challenging than for people who know the organisation well and have previously participated actively as members in the professional network. Personal networks are of high importance in the job as a network leader, and a leader that is relatively new to the organisation must be capable of quickly enlarging his personal network. This can be done by participating on network meetings, workshops, courses, from working on projects or from subscribing to several professional networks.

I argue that the observations made in this section first of all prove the responsibility of being a network leader, but also that this dependence on one person is a clear limitation with professional networks. It is not only a matter of finding a network leader with the right qualities, but he must also be motivated to spend time on the network, and arrange network activities that further motivate members to participate. This is one of the biggest differences identified between CoPs and professional networks so far, and is a serious shortcoming. It should definitely be of interest for professional networks to consider distributing responsibilities between several people, not just one. I further argue that this is one of the main reasons why some professional networks are not successful. If the leader fails to do his job,

information will not be made available to members and then the whole purpose of the network is gone. As a result, the network will be perceived as useless by its members.

Network characteristics

A professional network can have many different characteristics, and there are huge variations on practice, management and usefulness, and these differences can be caused by different factors. For members to maximise the benefits from participating in such networks, it is therefore important to look at network characteristics and how they are being managed. Some general characteristics affecting the usefulness of professional networks were identified from the interviews:

- 1. Size**

Large networks have more resources, but the planning of network activities like network meetings are more complicated, e.g. difficult to find a suitable location. It can also be a challenge to locate and spread the knowledge of all network members.

- 2. Geographical dispersion**

Some networks are more spread out geographically than others, and it becomes a challenge to gather all network members simultaneously. This is because meeting involves travelling, and travelling is time-consuming and expensive.

- 3. Scope**

A network with a narrow scope is likely to be of more direct relevance to its members than a network which represents a broad scope of topics.

- 4. Skills and commitment of network leader**

The network leader must be committed and have sufficient knowledge within the domain to be able to answer technical questions from members

- 5. Experience transfer**

Network members must be made aware of the potential benefits from sharing experiences. The methods available for experience transfer must therefore correspond to the needs of network members and maintain high quality.

The above listed factors all affect the success and usefulness of professional networks. CoPs also have similar characteristics, and CoP members are not necessarily co-located. This means that they can also be spread out geographically and have different sizes, but Etienne Wenger (2003) has argued that communication in small CoPs is easier. I agree that communication in small CoPs and professional networks is easier, and I think this is because the scope of the community will then be more narrow. Again, I wish to mention the research performed by Orr

[1996], where he observed how some machine-repair technicians tell each other "war stories" about problems encountered in their job. This is the perfect example of a small CoP with a narrow scope, where members are interacting in their natural environment. When it comes to experience transfer, CoPs make use of boundary objects to enhance communication between members. In the case of the technicians, these boundary objects were story telling and documentation about machines. Boundary objects also exist in the professional networks, in form of best practice documents and reports. These boundary objects are however not perceived as particularly useful by most network members, and I therefore argue that this is a structural component that can be considered a controlling structure.

The history of professional networks can also affect their usefulness. As explained by Engineer C (DMI), the DMI network is a well-functioning network, and he/she thinks this is because the network has had the same leader since its establishment. In other networks, new network leaders are constantly hired, and they stay for a little while before they disappear again:

They build and build, and tear it down, and then they build and build again, before tearing it down again, and then..

Such network management seems unprofessional to members, and is likely to discourage active participation in the network.

6.1.4 Maintaining professional networks

As you can see, keeping a professional network alive is a demanding job, and it seems to require more time from the professional leader than the 20 percent allocated. Some of the network leaders interviewed confirmed the lack of guidelines and training for newly-hired network leaders, and this is likely to have a high impact on how the networks are being managed and maintained. From the interviews conducted, a number of premises have been identified for a well functioning network:

Prioritize The network must be prioritized, and the network leader must allocate time to running it. This is very important in order to maintain a network that is perceived as useful by its members.

Network meetings Network meetings should be emphasized and well planned, and they must have an exciting agenda to motivate members to participate.

Intranet pages Intranet pages must be continuously updated with information that is of interest to network members. The network leader decides what informa-

tion to put there, and the SI network leader explains that he sends emails with links to the webpage, to make people use it.

Coaching New network leaders should be coached on how to do the job. Last year, a workshop was arranged where all network leaders participated. This was a management coaching workshop, where central leaders from Statoil went through the working tasks of a network leader and came with suggestions on how to solve problems. Some subject areas also arrange irregular meetings for network leaders within the field to enable experience transfer.

Interest The leader must take an interest in the job and feel commitment.

Delegate Quality assurance should be delegated to specialists, then the leader will have more time to spend on managing the network.

In general, what is most important is to have a dedicated network leader that performs the tasks he is required to do. But in order to do a good job, he/she should be trained and have someone to turn to for advice when necessary, because it takes time to adjust to this sort of job. First, there is a matter of trusting yourself and the advices you give, but a network leader should also delegate as much responsibility as possible. Again though, this is a matter of trust, because it can be hard to trust that the people you delegate responsibility to will do the job in a satisfying way. Another thing that is of great importance, is for network leaders to communicate and share their experiences, both good and bad, and that network leaders communicate with their leaders to understand what is expected of them.

As you can see, the maintenance of professional networks is mainly up to the network leader, although network members must participate to keep the network alive. Since CoPs do not have a network leader, it is more up to the community as a whole to keep the network alive.

6.1.5 Example on the everyday use of networks

Engineer A (DMI) is working for the Snøhvit-platform, and was asked what he would do if he was told to go to an oil platform, say, in Dubai, and do a job - what preparations he would do in advance. For him it was natural to use his personal network, both internally in Statoil, but also his external network, consisting of contractors and other people he knows in the service industry. He said he has been working in Statoil for so many years now, that he knows a lot of people in the system, and therefore automatically knows who to call that can tell him more about the job. And this, I think, is a key point to notice: It seems that people who have been working in Statoil for a long time know a lot of people in the organisation,

both within the professional networks they attend, but also in other parts of the organisation. As a result, it is more natural for them to pick up the phone and make a phone call than searching for information on a webpage. For newcomers in an organisation however, it might be easier to search a webpage for information than to pick up the phone and call someone they do not know. This can be explained by the fact that the threshold for starting a discussion with people you know is much smaller than with people you do not know. And, of course, it seems natural to use a webpage if you do not know who to ask. This underpins the importance of attending network meetings and social arrangements, because this is where face-to-face contact is made. This is also in accordance with Orlikowski [2002], who talks about the importance of introducing practices for "knowing the organisation".

The above example proves the use of IT as a seeding structure when it comes to integrating newcomers into the community or professional network.

6.2 Experience transfer

The main objectives defined for this research were to look at how experiences are transferred between members in professional networks, and the use of IT as an instrument for experience transfer. The methods identified for experience transfer between network members in DMI, SG and SI are network meetings, workshops, best practice documents, intranet pages, databases and personal networks. In this section, the characteristics and perceived value of these methods for experience transfer will be presented and compared to common activities in CoPs.

6.2.1 Network meeting

Network meetings are important in Statoil for identifying and sharing the knowledge of individuals

[Network leader, DMI]

Network meetings are arranged to gather network members, who often are spread out geographically in the organisation. The idea is to present topics of current interest to members, and it is up to the network leader to arrange these meetings and decide what to put on the agenda. In CoPs, face-to-face meetings are considered appropriate community activities, and network meetings therefore qualify as a CoP activity. Some possible outcomes from participating at network meetings were identified from talking to the network members. First of all, for the network leader it is an opportunity to show who he/she is, so members become familiar with his/her face. Engineer B (DMI) on the other hand, sees network meetings as an opportunity to get to know people and to get technical information about products used in other oil fields. Engineer C (DMI) thinks the most important benefit from participating at

network meetings is that you get to see the experiences made by members working in other oil fields, and that he can take this information with him back to his office and say:

No, this plug I cannot use, or, that was a good idea, that plug I would like to use, or, here I don't think it is appropriate to use this equipment

It seems to be a common comprehension among network members that the information presented at network meetings is not detailed enough, but that you get to know who performs the desired action and so you can go directly to this person later and ask for necessary details. It also serves as a meeting place for colleagues who seldomly meet face-to-face, and they get a chance to chat and get to know each other better. I argue that this also happens in CoPs, because it is not just a matter of getting competent, but to establish a network of people to contact when necessary.

A network meeting is more superior, it is more about meeting people and knowing who is located where, who works with what [...] and knowing that someone from different fields have the same problem

Network leader, SG

I further argue that the purpose of network meetings is not to give people the solution of all their problems, that would be impossible, given the diversity of problems arising in different oil fields. It should rather serve as an inspiration place for people within the same subject area who are geographically spread out.

One example of what can be presented on a network meeting is how an oil-drilling operation was performed at the Kristin-platform. If this operation is valid for oil-drilling at the Gullfaks-platform, meeting attendants from Gullfaks will get ideas and advice on how to perform this operation, and can subsequently contact the people from Kristin for closer details. Explained differently, the relevance of the information presented depends on the background of the listeners, and what the listener knows about the background of the presenter:

The more you know about the background of the presenter, the more you can evaluate the benefits of their work and the relevance to what they are doing compared to what you are doing

Engineer A, DMI

The above quotation shows the importance of participating at network meetings, because this is where you meet members and learn about members. Network meetings also enable informal chats during lunch and coffee breaks. It is argued that

CoPs should be cultivated, and that one way of doing this is to build trust and knowledge-sharing across departments. In my opinion, this is exactly one of the benefits from participating at network meetings. These meetings also cultivate the professional network by providing useful information and material to members. In addition, it enables members to formulate their own questions and to access each other for answers.

Motivating people to attend

Statoil employees are geographically spread out and often have busy working days. Allocating time to network meetings may therefore not be their number one priority, especially since it takes a lot of time for example for a network member in Trondheim to travel to Stavanger for a one-day meeting. It is therefore important to take this into consideration when planning the network meetings, and make it attractive enough for people to allocate time to participate. First of all, the date for the meeting should be set at least six months in advance, because then people will book this date. According to Engineer B in the DMI network, locality and comfort is important - if the meeting is held at an exciting place with nice food, it is more tempting for people to attend. The agenda must also provide interesting presentations about relevant topics, and engage network members to talk about their experiences within these topics. Finally, network members from other countries should be invited and asked to talk about their experiences. It should be interesting for members to learn how similar operations are performed in other countries.

Example To motivate members to participate at network meetings, the DMI network leader starts planning them early, and a couple of months before the meeting he asks people for ideas on what presentations to arrange on the meeting. It is important to be attentive to what is going on in the licenses, what operations are being performed and what equipment is being used. Based on this knowledge, he tries to choose what is most interesting for the network members, and he chooses a few members to present the work they have done within the topics chosen.

In CoPs, members are said to be self-selected, which means they are motivated by their passion, commitment and identification with the group's expertise. In professional networks, members are also self-selected, but I argue that since these networks are imposed by the organisation, they may not satisfy the needs of the members 100 percent. This can be explained by large networks having a large scope, and the agenda on network meetings may therefore not consist interesting topics only.

6.2.2 Information technology

Only 15 years ago, information technology was not commonly used for experience transfer in Statoil, because they only had Unix installed on their computers. This is a command-based operating system which is mostly used by experts. At that time, the SG network leader explained, they communicated by phone instead of email. The introduction and usefulness of information technology for sharing experiences is important to identify, and seems to rely heavily on the substance of the experiences being shared. Tacit knowledge is best shared through face-to-face interaction, while explicit knowledge is easier to transfer electronically. In the literature, it is however argued that all knowledge has a tacit component, and that tacit and explicit knowledge are mutually dependent. If this is true, one can question the usefulness of information technology for experience transfer, and one should pay special attention to the specific needs and requirements of each professional network, since there is no point in investing in a solution that is not needed. There seems to be a common misconception in the field of Knowledge Management that an IT solution alone is sufficient for successful sharing of experiences between people in an organisation. IT should rather be considered a remedy for knowledge transfer, and only if it is applied properly. In CoPs, the role of IT is to help people get and stay connected, and if it does not correspond to the needs of the members, it will not be considered useful for connecting people. Common IT tools for experience transfer in CoPs are intranets and databases, which is similar to IT solutions used in professional networks. I argue that IT serve a similar role in CoPs and professional networks, because it is mainly a place where members who are geographically dispersed can share information.

This section will give a description of the IT solutions used in professional networks in Statoil, and will elaborate on their usefulness for current users.

When asked about the value of information technology (IT) as a tool for sharing experiences between professional network members, Engineer A (DMI) responded that

IT can be of great help, but then the information must be very well edited. [...] When you are part of a large project, you don't have time to search for things on a computer. You have to know what to search for and where to find it [...] I don't think you will come far without access to other facilities than the electronic..

This clearly shows that IT has a great potential, but that it demands a lot from the network leader who is responsible for updating and managing information on the network webpages. IT can be a great tool for sharing information, but when it comes to knowledge, IT should not be the only method for knowledge transfer. Explained differently, systematised detail information is suitable to put on intranet

pages, for example. It is my general impression that people who have been working in Statoil for a long time do not tend to use IT as an instrument for experience transfer. This is mainly because they have a huge personal network they can make use of, but also because they are so experienced that they often do not need to find information elsewhere. As a newly-hired employee, Engineer B (DMI) explained that finding information was problematic, because there is no structure in where information is stored, and available reports are sometimes erroneous. Hence, finding the right information is a time-consuming job:

If you have a problem or face a challenge, it is better to make a phone call or send an email, because there is so much information in the system you can search yourself to death

Engineer C, DMI

Also Member B (SG) explained that she is not as experienced as other people in her department, and if she has a question, they help her find the solution. She also believes that it is easier to talk to people you know instead of spending time searching a webpage. It becomes quite clear that personal contact is preferred to searching some webpage for information. Again, the underlying reason seems to be the amount of time involved with searching a webpage compared to picking up the phone and ask someone. This shows the importance of participating at network meetings to meet people, because it is easier to trust information published by people you know. This also shows the importance of designing IT solutions that are easy to use, but equally important is it to be selective with what information to publish. Another thing that is important is the matter of trust, as discussed previously. It is not always easy to know if the information on a webpage is valid - it may not have been updated, or a newer version might exist somewhere else in the system. This indicates the importance of constantly updating intranet pages and databases so that members know they can trust the information they find. The DMI network leader is aware of this, and in addition to keeping the intranet updated at all times, he also publishes minutes of meetings on the webpage. By doing this, he forces people to use the webpage. He further explains the importance of publishing things in a way that minimises the need for updating, and that if he is not conscious about this, it is impossible to keep the webpage up to date.

A final point to mention in this section, is the difficulty of designing one IT solution to fit all parts of the organisation. All professional networks have different characteristics that will highly impact the nature of their needs, and these needs should be determined before the introduction of an IT solution. It is also worth mentioning that during one of the field trips to Stavanger, I had informal lunch conversations with some SG network members, and they said that there is currently no well functioning data archives in Statoil, and that no one asks them what

they need in a computer system. If they try to explain what they want, they just get in response that they are being negative to the new system, and that everything will be fine once they get used to it. This clearly shows the lack of considering the needs of the users, which is the number one rule when designing IT solutions. The following sections give an overview of some of the IT solutions currently used within the professional networks DMI, SI and SG.

Intranet pages

All professional networks have intranet pages where relevant information is published. Two different collaboration platforms are used by the three professional networks DMI, SG and SI. DMI uses the .Workplace platform, while SG and SI use Earthweb.

Earthweb Earthweb is where intranet pages for professional networks within geology and physics are located. Desirable intranet pages are accessible from the main page, and hence this is where the intranet pages for the SI and SG network can be entered. On the main page, news about network meetings, workshops and available positions within the organisation are published. When an intranet page is entered, news and information relevant to that particular network will be found. Examples of relevant information are standards, work processes and best practice documents. There is also an overview of all network members, and presentations from network meetings are available here.

.Workplace .Workplace is where the intranet pages for the DMI network and all other networks within drilling and well intervention are located. All network leaders have received a template that must be followed, but there are huge individual differences on what can be published. From the main page, a network member can choose to enter the desirable intranet page, which then displays a list of professional networks within the field. Figure 6.1 shows an example of the DMI network webpage in .Workplace. As you can see, the .Workplace network webpage contains information about the network, network leader, network meetings and minutes of meetings. It also contains information about technical equipment and boundary networks that could be of interest to DMI members. A list of network members and their CV is also published on the webpage.

I have noticed two challenges with regards to using intranet pages to allocate network members and find useful information about them in their published CV. First of all, how do you know that the CV of a network member is updated, and more importantly, how do you make people spend time on updating their CV regularly? Another important issue is how to make people actually use the intranet page to search for people with relevant knowledge, when it is much easier to make a phone


Network description:	Description
Network leader:	Sveinung Robertsen  Phone 97433284
Next network meeting:	28.11.05 / 04.05.06
Members/contact persons:	Contact persons Statoil , Contact persons Other companies
Minutes of meeting:	Minutes of meeting Network meetings Minutes of meeting Monthly Contractor Meetings
Technological ambitions and problems within the discipline:	Disciplin ambitions & problems

Figure 6.1: Network webpage for DMI,[Bob extranet, 2005]

call or ask someone in your office? And this is I think, one of the core problems with the use of information technology for experience transfer: How do you make people use it? e.g. how do you make people update their CV and search other CV's to find people who possit the knowledge they seek? I think this is a matter of what information you present, how you present it and what you publish where. Lave and Wenger [1991] do not talk much about the importance of trust and motivation when it comes to participation in CoPs. From my research, I have observed that trust and motivation are crucial when it comes to knowledge transfer, then in particular with regards to the use of IT. I will talk more about this in section 6.2.6.

DBR

DBR (Daily Drilling Report) is a reporting tool used to store daily reports of performed operations and the use of technical equipment on platforms. DBR experience is used to add more definite experiences, both successful and unsuccessful, about what you did and why. So, do people actually use DBR to search for and read reports? A participant at the DMI network meeting said that:

Nobody reads reports - if you know who possesses the knowledge you are after, you can contact the person in question and possibly be directed to the right documents

It should be noted that this was said by a person that has been a Statoil employee and member of the DMI network for several years, and has a well established personal network that he can use to find information. Newly hired employees do not have this opportunity, and have to use IT tools more frequently. Engineer B (DMI) explained how people in her department have started using DBR more for registering positive/negative experiences for different operations, but that she is not sure if other departments are equally good at using DBR, even though they should.

You have put in a plug, and it is functioning well, that was how it was planned and how it is supposed to be, hence you do not see the usefulness of logging that experience

Engineer C, DMI

The above quotation clearly states the problems with making people use DBR to add their experiences, because they just do not see the potential benefits at the time. Also in CoPs are databases a common method for experience transfer, and the use of databases as a seeding structure in professional networks will be discussed in Section 7.2.

Synergi

Synergi is a reporting system for all unexpected incidents, both within quality and security. According to Engineer A (DMI), Synergi is one of the well functioning IT tools, and is imposed by the government. Engineer C (DMI) has a different opinion however:

Synergi is used to log happenings, but is not so good as an experience database, because the search function is not so good, and the information is not well organised

In general, different users of Synergi seem to have different opinions on its usefulness, and this can be caused by the fact that those who use Synergi regularly are good at using it and therefore like it, while those who do not normally use it have problems.

6.2.3 Best Practice documents

Best practice documents are guidelines developed to make people follow a certain standard when doing their job, and are stored in a database called DokuMap. They are generally developed by a small group of specialists who are asked to present what they know about a particular topic, and what they know is then processed into a best practice document. This is often done by inviting a group of 5-10 people to attend a workshop with the single goal to develop best practices. The creation of

best practice documents through such research seems to be a better solution than giving the responsibility to one person only. The SI network leader explained that it is hard to find people who are willing to write best practices, because it involves a lot of pressure on the individual. From the interviews it became clear that some subject areas within Statoil were more dependent on such documents than other parts of the organisation. Member A (SG) said that these documents are essential for him to do his job, and when asked, he responded that it can be hard to navigate through this "wood of documents", but that he trusts that the information contained in best practice documents is correct. He emphasises however, that even though there is a strong focus on the use of best practice documents in his department, he does not think that all employees in Statoil are equally comfortable using them. And this suspicion was confirmed when speaking to the SI network leader, who said that he thinks people do not use them because they have a tendency to be a bit boring. Member B (SG) says it is difficult to choose the level of detail in a Best Practice document, and stresses the importance of making it simple enough for all people to understand. Engineer A (DMI) confirmed why best practice documents are often perceived as useless:

You cannot write best practice between two covers, it is of a way too complex substance. Of course you can write best practice on some things, but not on complex problems. It is definitely my opinion that best practice documents on the whole are unsuccessful and useless. Of course, no rule without an exception

I think the problems with best practice documents can be explained by the tacit component of knowledge, which basically involves that the presumptions underlying particular best practice document is different from the presumption for the job you are going to perform. Further, tacit knowledge is explained as knowledge embedded in people's heads, and this is hard to express on a piece of paper, because your knowledge is subjective and written from invalid presumptions. Three factors affecting the usefulness of best practice documents have been defined:

1. Differences in reservoir, rock mechanics and technical equipment on the different platforms
2. Time - what was valid 15 years ago may not be valid today
3. Differences between people and cultures

In CoPs, boundary objects are used to enable communication between members. Best practice documents can be considered boundary objects, but the above listed factors affect the usefulness of best practice documents on a general level. Another thing that is worth mentioning, is that a best practice document can be considered an organisational structure, and this can have a negative effect. This research has

suggested that the usefulness of best practices is relatively small, and a lot of network members tend not to use them. The existence of such documents alone is not sufficient for them to be considered controlling structures. But if network members are forced to use them however, I argue that it would indeed be a controlling structure.

Arena and TeamSites

TeamSites is a Microsoft collaboration platform, and is currently being introduced to people working at Statoil's headoffice in Stavanger, where many network leaders are located. Other parts of the organisation are using Arena, which is a Lotus Notes collaboration platform. At the meeting attended in Stavanger on September 27th 2005, it was discussed whether or not TeamSites should be introduced to the professional networks, but it was decided to postpone this decision. During all interviews, I asked the respondents what they knew about TeamSites, and they had all heard about it, but there seemed to be great confusion with regards to when it was being introduced to their departments. When asked about the training of people to use TeamSites, Engineer B (DMI) said that there are superusers within the department who are following a course. The superusers must then help other people in the department who do not get the same training. For all computer systems within a department, there is one superuser that people can ask.

Advantages One of the possible advantages with TeamSites compared to Arena, is that it will be easier to get an overview of what is happening in projects in other parts of the organisation, because more general information will be published:

The advantage with the new team site, is that you will always be aware of what is going on around you, because information is more openly available.

Engineer B, DMI

The above quotation shows the expectations to TeamSites expressed by many of the network members interviewed. They seem to have the impression that with team sites, everything will be much better and information will be easier to access. When speaking to the DMI network leader who has started using TeamSites however, he said that it is difficult to use because there is no structure. This is also likely to cause problems with the search function, and this limits the usefulness of TeamSites for spreading knowledge to network members.

Problem Since TeamSites has not been introduced to all parts of Statoil, network members from different licenses may currently be using different collaboration platforms. This has proved to cause some difficulties when it comes to experience transfer between these members. This can be explained with an example where a network member from one license sends an email to a network member from a different license. The email contains a link to a report in the Arena archive, and the receiver of the email is using TeamSites. As a result, the receiver will face problems when trying to open the report. And it is annoying when you receive links that do not work, because you have to search your way through the old archives to find the database they are stored in. As a result, you spend way more time than you should, to find information that should have been included in the first place. This clearly has some implications for the introduction of new IT systems into organisations, and I will discuss this further in Section 7.4.

Quality Assurance

Quality assurance means that information exchanged between two individuals should be double checked against given standards, requirements or best practice documents to make sure it is valid. This can be done by making a phone call/sending an email to an expert, ask someone face-to-face or find information on the intranet, e.g. the network webpage. Engineer A (DMI) explained that he prefers email and telephone instead of intranet pages and databases when quality assuring information. This seemed to be a general trend among network members, and I think this can be explained by

1. The ability to trust information found on webpages
2. The tacit component of knowledge

First of all it is not easy to trust information found on a webpage, since there may not be an overview of who has written it, when it was written or when it was last updated. Oldtimers in professional networks tend to know what information to trust through experience, but newcomers lack this experience, and will come across challenges trying to find valid information. Also, knowledge has a tacit component which makes it difficult to share electronically. An example of tacit knowledge is the ability to ride a bike - it is hard to learn, but once you have learned it, you automatically know how to do it. It is however difficult to explain on a piece of paper, because the natural context is missing. As a result, it is difficult for a reader with no prior knowledge about bike-riding to understand. The issue of trust is discussed in more detail in Subsection 6.2.6.

Discussion

Introducing a new IT system into a complex organisation like Statoil does not seem to be easy. It occurs to me that all network members interviewed were so positive

to the introduction of TeamSites. This can only mean that they are not happy with the current solution, Arena. Unfortunately, based on the comments of the DMI network leader, it seems that also TeamSites may not be the right solution. Then of course, it is important to remember that no professional networks are similar, which again means they will have different needs. And this is probably where the problem is, because it is simply impossible for one IT system like TeamSites to satisfy the needs of all professional networks and their members. Clearly, there is a need for a tailor-made solution, and this should be based on the characteristics and needs of each separate network. In Section 3.8, I compared the introduction of a new IT system into a CoP with the introduction of newcomers. I argue that this is a good analogy, because first of all, members must be aware of it and welcome the new solution. Second, as members repeatedly use it, they will start to identify with it and gradually the system becomes integrated in their everyday work. By trying to understand the introduction of IT systems from a CoP and peripheral participation point of view, I will in Chapter 7 discuss the use of IT as a seeding structure.

It is essential to keep intranet pages and databases updated, otherwise people will not use them. During an interview with member A (SG) in January 2006, the SG network webpage was entered, and it became obvious that it had not been updated since October 2005. There were also a lot of empty headings, which make it difficult to use. Member B (SG) also explained how SG network members store their CV at the intranet page earthweb. This enables other members to enter it and see, but a problem here seems to be that not all network members take the time to keep their CVs updated. This proves that you cannot always trust information you find on a webpage. This is in accordance with Walsham [2002], who identified three examples of what IT cannot deliver in CoPs. These examples basically proved the inability of IT to display the natural context in which the knowledge was created in the first place. In general, I argue that tacit knowledge creates a challenge when it comes to designing appropriate IT solutions for professional networks.

6.2.4 Workshops

Workshops are arranged to gather specialists around a particular problem. This is a way of spreading knowledge, and the SG network leader thinks workshops are a better way of sharing experiences than network meetings. This is because network meetings are mostly about informing members, and the outcome depends on whether or not the agenda corresponds to the interest of the member. A workshop brings into focus a particular subject, and only people who are interested in that particular subject will attend. On a network meeting on the other hand, network members who are not particularly interested in one of the subjects presented will not attend, and they will not receive the same benefits from attending. I argue that workshops are similar to CoPs, especially since they are small in size, and only people with a particular interest and competence participate. They do not happen

naturally however, and if they are too organised and structured, they may not be successful. If the participants themselves can influence participation and activities performed, it will most definitely be considered a CoP activity.

6.2.5 Personal networks

Alone we are so little worth, our knowledge is so little worth if we do not spread it

[Network leader, DMI]

A personal network consists of people you have met and know, and that you can contact to ask for help during your working day. Having a personal network is just as important as being member of a professional network, but it takes time to establish, and is established through face-to-face contact. And this is where the professional network comes into play, by participating at network activities, network members get to meet new people that they can 'add' to their personal networks. When asked how she knows who to ask for help in Statoil, Engineer B (DMI) responded that "you just get to know people, and to know who to ask for help" - to create that network is very important. She further explained that to develop her personal network, she attends network meetings, because this is where you meet people and get to know them. Then later, when a problem occurs that nobody in the department knows the answer to, you remember that you met someone at a network meeting that is an expert within that area, and you send him/her an email.

Example An example of the usefulness of attending network meetings to create personal networks is when two people meet who work with the exact same things for two different platforms. Person A has worked in her division for six months, while Person B has worked in her division for three years. They start talking, and realise that Person A is currently working on something that Person B did a while ago. After the meeting is over, Person A goes back to her office and sends Person B an email, who then sends an email back with information about what she had done when she performed the same job. It turns out that this information is exactly what Person A needs, and she would have spend days trying to find all that information herself, while it only took Person B a couple of minutes to attach documents and send the email.

The above example clearly shows the importance of meeting face-to-face to create personal networks, and it is therefore essential for the network leader to arrange social meetings for network members. It is important however to mention one possible problem with personal networks, which is again a matter of personality: Embarrassment.

Do I really have to call a colleague, that's a bit embarrassing, then they will think that I am not so competent, that I do not know how to do my job

[Member D, DMI]

It is important to create a culture where it is permitted to ask for advice, and people with experience should be more accessible in the organisation. The establishment of personal network is similar to the social capital theory described in Section 3.7. Social capital theory is also about creating networks of people to identify who knows what in an organisation. According to Cohen and Prusak [2001], social capital is the glue that holds communities together, and I argue similarly that personal networks are what hold professional networks together. This is proved by the fact that most network members consider the establishment of personal networks one of the main benefits from participating actively in the network.

6.2.6 Trust and Motivation

To do a good job, employees should be motivated and trusted. When asked if Statoil employees are motivated by their leaders, Engineer C (DMI) responded that there is no 'carrot' in the organisation for sharing experiences, and that some people may like to have some business secrets - "for me to know and you to find out". Engineer B (DMI) says that she is very satisfied with the social environment she works in, but that the sharing of technical information between departments is a bit single-tracked, and that some people want to keep their knowledge to themselves. She thinks this is caused by two things:

1. Majority of men in her department
2. People are highly competent, but compete to get better

The problem in her department is so big she is thinking about moving to a different department where she can work with like-minded people and she can contribute something. There is no doubt that you learn more from discussing problems with other people, and this is also highly motivational, but it is important in a discussion that people are on the same competence level. Another thing that is important is the issue of trust, being trusted and given responsibility can be a highly motivational factor. From the interviews it became clear that there is no particular effort made to motivate people into sharing their personal knowledge, and this is clearly a weakness.

Example The issue of trust is particularly important in a high-risk industry like the oil industry, because if equipment fails it can lead to fatal consequences. Unfortunately, it seems that contractors cannot always be trusted, and this is best

illustrated with an example of a conversation between the DMI network leader and a contractor. The contractor contacted the DMI network leader to let him know that a new plug had been developed. To make a long story short, the contractor said the plug was qualified, but when the DMI network leader asked to see the qualification report, he never received it, and after a while it became clear that the plug had not been qualified at all. As a result, the DMI network leader did not want to use the plug, but the contractor somehow managed to get the plug into the organisation. Fortunately this was discovered and stopped in time. If this had not been discovered, the consequences could have been fatal for Statoil.

Also in CoPs, trust is important, and I think the ability to trust other members emerges when you listen to others ideas and share your own ideas.

6.2.7 Boundaries

It was of interest to identify possible boundaries to the experience transfer in an organisation with the size and geographical dispersion like Statoil. Member A (SG) was asked if he has thought of any factors limiting the experience transfer in his working day:

Well, since I am located in Stavanger, which is close to everything, it should not be a restriction, rather an opportunity to access resources. The size of the organisation is not a limitation in itself, but rather the number of persons involved in making a decision and the amount of steering documents can be a limitation.

The above quotation shows that political boundaries are likely to occur in Statoil, because of the number of people involved in making a decision. Another thing that is important to mention is personal limitations. Member D (DMI) explained that the only limitation on a professional network is the limitation of the people involved. If a member does not go back to his licence and tells everyone what he/she experienced at a network meeting, professional networks are in vain. It is worthy for the person participating, but does not mean anything for Statoil as an organisation. This is clearly a personal boundary - experience transfer and the usefulness of the network in connection with experience transfer heavily depends on the individual.

6.2.8 Experience transfer within a license

It is also interesting to look at experience transfer between co-located network members, because people are not placed in an open-plan office, but rather have their own offices. Also, because of the size of some departments, network members are located on different levels in the building. An example of this is the Snorre

license, with Snorre A on the second floor and Snorre B on the third floor. A SG network member working at Snorre A admitted that the stairs up to Snorre B are very 'heavy', and that physical dispersion has a great impact. Earlier, Snorre B was on the same floor as Snorre A, and then cooperation was much better. This shows that personality is a factor affecting experience transfer - if you are an outgoing person who like talking to people, you are more likely to go to the person next to you or to someone on a different floor for advice. A reserved person on the other hand, is most likely to stay in his/her office. The SG network leader emphasizes the importance of internal meetings in the department, because everyone is working on their own projects, and they are not too good at sharing information about their work, and often they do not even know what the neighbour is working with. Currently, her department has meetings, but they are not technical enough. This shows that it is not always easy to talk together and share experiences in a large organisation.

Another thing that is important to mention here, is that while professional networks and CoPs are established as a place where people with similar interest can meet, people working within the same department may have the same departmental interest, but different personal/professional interest and needs. For example, two people working within the Well intervention department in Gullfaks may work with different things within the field of well intervention, and can therefore not learn from each other. In spite of this, communication within departments is more frequent than communication between departments, and I will talk more about this in Section 6.2.9.

Example Figure 6.2 shows the organisation of the Gullfaks field, which consists of three departments; Gullfaks A, B and C. The purpose of the figure is to show how the Gullfaks field is constructed, and what common instruments are used for transferring experiences between departments, in the professional network and with externals. As you can see, there are weekly meetings for the Leading Well Engineers from Gullfaks A, B and C where happenings for the coming week and successful/unsuccessful operations are discussed. Other than that communication takes place through emails, phone calls and informal chats. Communication with the DMI network on the other hand, takes place through network meetings and the network webpage. Communication with externals happens through email, telephone and monthly meetings with contractors.

6.2.9 Experience transfer between licenses

Interviews with network members revealed that network members in different licenses do not interact regularly, and that there is almost no communication at all. Based on information collected from talking to network members, I have devel-

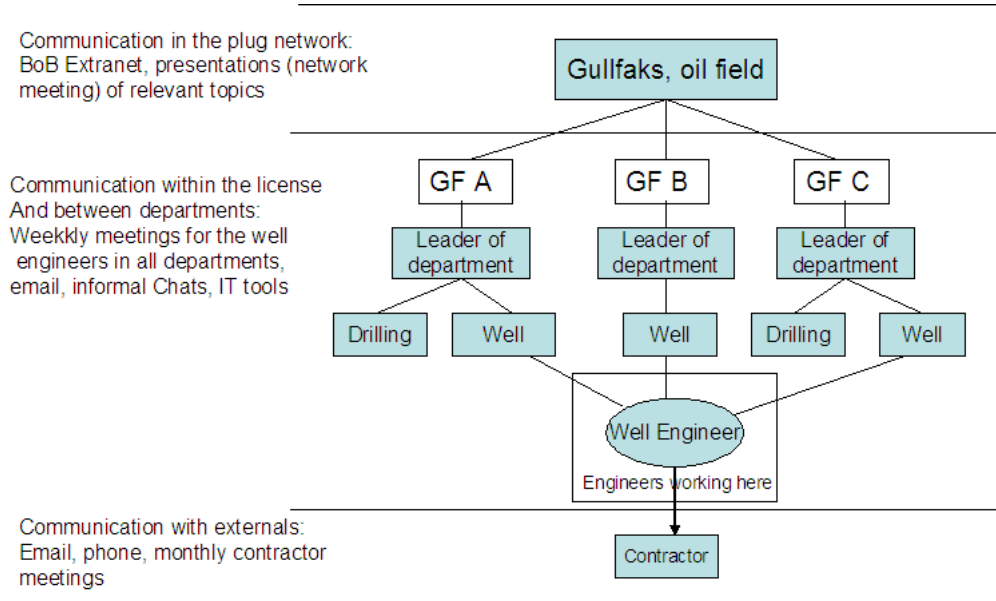


Figure 6.2: Organisation chart of the Gullfaks field

oped a model that shows how experiences are currently being transferred between co-located network members.

Figure 6.3 shows the relation between network members from four different oil fields and their network leader. This is represented by arrow A, B, C and D in the figure, and are solid-drawn lines. The relation between the different oil fields is represented by arrow 1,2 and 3, which are dotted lines. A solid-drawn line symbolises a strong and regular relationship, while a dotted line symbolises a weak and irregular relationship. Based on this information, it becomes obvious that all oil fields represented in the model frequently interact with the network leader. This relationship is represented by monthly contractor meetings and quality assurance of technical equipment. The DMI network leader emphasizes however that there are huge differences between licenses; some prioritise contractor meetings more than others and very few licenses show up to these meetings. The relationship between the different oil fields however, is according to the network members often non-existing. The only time they meet formally, is at network meetings arranged by the network leader. Other than this there is almost never any formal or informal contact. When asked about the cooperation between oil fields, Member A (SG) answered that it is by far not good enough, but that there has currently been arranged two meetings for people working in the oil field Tampen (see Figure 4.4). The purpose of these meetings is for people from different licenses to get to know each other. It has however proved to be a challenge for them to keep in contact, since

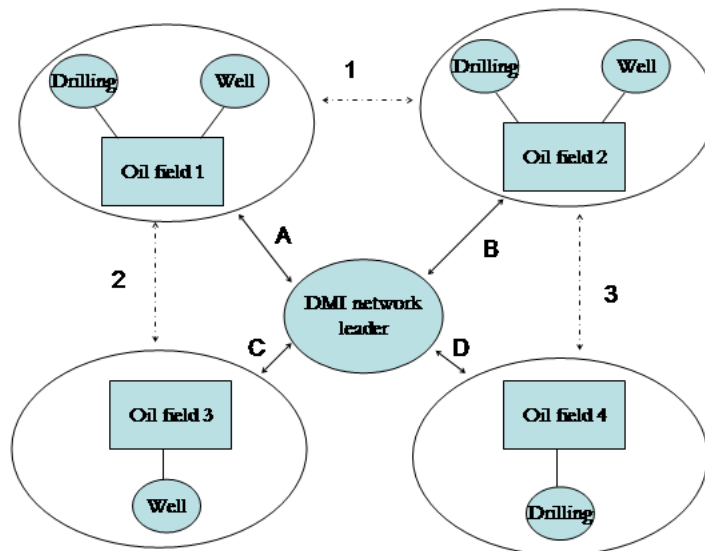


Figure 6.3: Current model for experience transfer between oil fields in a professional network

they are geographically spread out. This limited communication seems mainly to be due to the lack of time and resources. Member C (DMI) also said that there is no form for organised meetings between different licenses other than the network meetings arranged by the network leader. Member B (DMI) however explained that if they are going to perform a new operation, her license invites other licenses and people from the headquarter to "brainstorming meetings". This simply involves discussing how to perform that particular operation. The information revealed in this section proves the lack of regular meetings between licenses and shows the oil field's dependence on the network leader. If the network leader in Figure 6.3 is removed, experience transfer between oil fields will become almost non-existent. This is indeed the biggest shortcoming with professional networks compared to CoPs, and will be discussed in more detail in Section 6.3 and Chapter 7

6.2.10 Discussion

This section has listed some common methods used in Statoil for sharing experiences between members of professional networks, as well as the importance of making network members allocate time to network activities and to share their own personal knowledge. With regards to sharing experiences, the interviews re-

vealed that facial interaction was considered by far the best method. In other words, face-to-face contact is perceived to be of higher value than the use of information technology. This is also considered the best interaction method in CoPs, as it is considered a place where people can meet to discuss their tacit knowledge. When asked, most network members responded that they did not use intranet pages to find people with similar experiences. They rather participate at courses, workshops and meetings, as this is a way to enlarge their personal networks. For technical specifications on the other hand, for example to find the length of a subsea well, computer systems are essential. This confirms that tacit knowledge is best shared face-to-face, while explicit knowledge like raw data can be shared with information technology. I argue here that when it comes to transferring explicit knowledge, IT can be considered a seeding structure. When it comes to sharing tacit knowledge however, the value of IT as a seeding structure is uncertain. This will be discussed further in Section 7.2.

The introduction of the new collaboration platform TeamSites may impose some challenges, the most important being how to make people use it. Most people feel more safe using tools they are familiar with than learning something new. For experience transfer to be successful, you must get along with the person you are sharing experiences with, you must be open for new impulses, you cannot just assume that your opinion are the best, but be open to the opinions of other people.

6.3 Problems

From the results presented in this chapter, some general problems with professional networks have emerged. Most problems seem to stem from the fact that all professional networks are heavily dependent on one or two dedicated leader to be successful. Below is a list of some problems identified with professional networks:

1. Network activities

One network leader is responsible for all network activities, which is to arrange network activities and spreading relevant information to members. This can be done via intranet pages, email or meetings. It is important to keep this information updated at all times, and my research proved that this is a problem. Most network leaders do not want to spend their valuable time on updating webpages, and most of them did not prioritise this. And when the intranet pages are not updated, they are not useful to members, who will then stop using them. It is also important to be critical with regard to what information to publish, as it is desirable to avoid information that is irrelevant to members.

2. Size and scope

The size of the networks is another problem. One of the network leaders

explained that his network had so many members that it is possible to arrange network meetings. Since the networks are also geographically spread out, some members have to travel to attend meetings. Since travelling is time consuming, this may in itself be a reason why members do not choose to participate actively. When talking with network members, they also explained that the information presented at network meetings is not always of equal interest. I argue this as an indication that the network scope is too broad.

3. **Perceived value**

The perceived value of attending is by most members considered to be the establishment of personal networks. Then what about oldtimers who have been members for many years, they do not have the same need to enlarge their personal network as newcomers, and are therefore not equally motivated to participate. This shows that the perceived value from participating must exceed the efforts involved.

4. **Trust**

Some network members have problems when it comes to trusting information on intranet pages or in databases. I therefore argue the importance of face-to-face contact in addition to the use of IT, so that people can meet and get to know each other. Then, when they recognise the name of the person who has written the report, it is much easier to pick up the phone and give him/her a call.

5. **Informal meetings**

I observed a lack of informal meetings. Network members mostly meet when formal meetings are organised by the network leader. I can understand the lack of informal meetings when network members are spread out geographically, since they do not get a chance to meet during lunch or at the coffee-machine. Co-located network members should however meet informally on a frequent basis.

In summary, a lot of the problems with professional networks seem to be caused by the dependence on one dedicated leader, together with the size of the network for which he/she is responsible. As long as the network leader is dedicated and aware of his responsibilities, he/she is likely to do a good job as a knowledge editor. And as long as this role is achieved, professional networks can be considered a CoP. I argue that this is a serious shortcoming, and the geographical dispersion of members does not make it any easier. There is an expression saying "out of sight, out of mind", and I think this is suitable here; being responsible for members who are not located in the same department, or even the same country, will affect the dedication of the leader. By this I mean that it is easier to feel responsibility towards people you meet at lunch everyday, than people you never meet you do not feel the same responsibility for.

The large size of many professional networks is another problem. CoPs also differ in size, and Etienne Wenger argues that communication in small CoPs is easier than communication in large CoPs. This is also the case in professional networks, and I believe that the dependence on one dedicated leader is likely to affect participation and hence communication in the network. If the network leader fails to motivate members to participate, they may not identify with and become part of the community. According to Lave and Wenger [1991], this is how newcomers learn in a CoP.

In Section 3.8.2, I argued that one of the problems with professional networks is a gap between the efforts required to participate and the perceived value by members. In the above list, I stated that the enlargement of personal networks is the main benefit for members to participate. Technical information on the other hand, was not mentioned as a benefit from participating at network meetings, and since members originally choose to participate because of professional interest, this is definitely an issue to be considered. In CoPs, members participate out of interest, and the more they participate, the more they learn. This was by Thompson [2005] referred to as a virtuous cycle. This theory was originally based on the idea of apprenticeship as a learning system, where the newcomer is considered an apprentice that can learn from the master, who is considered full participant and part of the core team. In professional networks, no such apprenticeship exists.

The main challenge both in CoPs and professional networks is to develop a culture where knowledge sharing and diversity is maintained. For this to occur, members must be open to others' ideas, and they must be willing to reveal their own ideas. If the community fails to motivate members to participate in this manner, it is not going to be successful. When it comes to the issue of access, this is similar in CoPs and professional networks. Lave and Wenger [1991] argue that once a member is given access to a community, he/she can become a full participant by continuous observation and participation. I argue that this is not as simple as it seems. It is important here to remember that when access is gained, the member must want to and feel motivated to participate. This is again a matter of the perceived value gained from participating.

6.4 Conclusion

In general, CoPs are seen as particularly important because they provide a meeting place where knowledge is separated from practice. This is a matter of making people talk, to understand the tacit knowledge embedded in the mind of all individuals. And, it is only by accessing each others tacit knowledge that new knowledge can be created. When professional networks meet face-to-face, this is also a place where

members can discuss their own experiences to learn from each other. Throughout this report, the focus has been on identifying whether or not professional networks can be considered a CoP. Figure 6.4 shows a comparison of the two, and based on the information presented here, I will decide if professional networks can be considered CoPs.

	Communities of Practice	Professional networks
Spread information	x	x
Virtuous cycle	x	x
Apprenticeship	x	No
Identifiable group	Not always	x
Geographically spread out	x	x
Legitimate peripheral participation	x	x
Story telling	x	Presentations
Leader	No	x
Boundary objects	x	x
Informal meetings	x	No
Varying size	x	x
Use IT	x	x
Facial interaction	x	Seldom
Access	Happens naturally	Optional

Figure 6.4: Comparison of CoPs and professional networks

Figure 6.4 shows that CoPs and professional networks serve a similar purpose, which is to spread information to members. The virtuous cycle is considered the defining characteristic of a CoP, and an organisational structure that lacks this ability cannot be considered a CoP. Lave and Wenger [1991] also argue that the idea of a CoP was originally the result of looking at apprenticeship as a learning system. In professional networks, no actual apprentice/master relationship is defined, but I argue its existence in the interaction between newcomers and oldtimers in the network. I also argue that professional networks can be defined by a virtuous cycle, where the more members participate, the more they learn about who works in the organisation and who posit similar experiences. Further, CoPs are not always identifiable, whereas professional networks are identified and organised by the organisation. Legitimate Peripheral Participation represents the process of integrating newcomers into a community, and membership in professional networks is optional and based on professional interest and needs. This is considered the motivational factor for members to participate, and by repeated participation, they will learn more. In CoPs, members are also self-select based on expertise or passion for a topic. When CoPs exist in an organisation, they are physically identifiable. It is however an issue of how much structure the organisation can impose without having a negative effect. All professional networks have a network leader, but as long as he/she serves the role as a knowledge editor, I argue that these networks can be considered CoPs rather than organisational groupings. CoPs use boundary objects to ease communication between members, and examples of boundary objects in professional networks are best practice documents and technical reports.

In professional networks, no informal interaction was observed except for conversations during lunch or coffee-breaks. CoPs on the other hand, are often characterised by conversations happening in its natural context, like the machine-repair technicians observed by Orr [1996]. This is not always the case in CoPs either though, since they may also be geographically spread out.

Both in professional networks and CoPs are databases and intranets commonly used IT solutions, and hence they face similar problems when it comes to displaying the tacit component of knowledge. This is therefore important to consider before designing and introducing IT solutions to the community. IT is supposed to bridge the gap between CoP members, and to enable communication when members are geographically spread out. In professional networks however, newcomers see IT as a seeding structure whereas oldtimers saw it more as a controlling structure. This was earlier explained by the fact that oldtimers have a large personal networks to make use of, and are therefore not equally dependent on IT.

Professional networks have many similarities to CoPs, and I argue that they to a certain extent can be considered CoPs. It is important to remember however, that too much control can demise the community. I therefore wish here to summarise my findings about professional networks, to see whether or not they can be considered seeding structures. First of all, by attending network meetings, members learn what other network members know and what they do. Second, a dedicated and competent leader can also be considered a seeding structure, especially when he/she fulfills the role as a knowledge editorm, which is to spread information to members. But, the dependence on one competent leader for the success of the network is a strong weakness, and it is important to be aware of this. Network leaders publish information on intranet pages, and as long as they are updated, this may also be considered a seeding structure. A final seeding structure is the arrangement of network meetings where members meet to talk about relevant topics.

It becomes clear that professional networks have a seeding structure. Throughout the report I have argued that the use of IT in professional networks can be seen as a seeding structure when it comes to integrating newcomers into the network. The value of IT as a seeding structure will be discussed and evaluated more closely in Chapter 7.

Chapter 7

Discussion

In Chapter 6 I concluded that professional networks can be considered CoPs and that they have a seeding structure. In this chapter I wish to investigate the implications of this. In Chapters 4 and 6, I commented on the use of IT as either controlling or seeding structures. In this Chapter, I will first take a closer look at experience transfer between network members, since my research suggested that between licenses, this is currently not a strong relationship. Next I will take a closer look at the IT tools used by professional network members, and discuss their structural use. Then I wish to investigate how well the CoP-theory captures the problems identified in professional network. It is important to discuss possible variances between professional networks and CoPs. Finally, the design of IT in professional networks will be discussed, before the last section summarises the recommendations suggested throughout the chapter.

7.1 Experience transfer

Experience transfer is about changing organisational culture and work habits, which means making people take the time to articulate and share what they know [McDermott, 1999]. For this to occur, people must see the benefits from knowledge sharing. Professional networks have members from different licenses who manage different oil platforms, and two different characteristics with network members are identified:

1. Network members working within the same license are co-located
2. Network members working in different licenses are spread out geographically

This has some implications for the ease of experience transfer between members, and I would like here to discuss some general observations made with regards to experience transfer in professional networks.

A license is responsible for the operation of an oil platform, and is constituted by people with different knowledge about different areas of the operation. As a result, people within a license have different professional needs that attract them to different professional networks. People who are responsible for the same area of operation however, are likely to be attracted to similar professional networks.

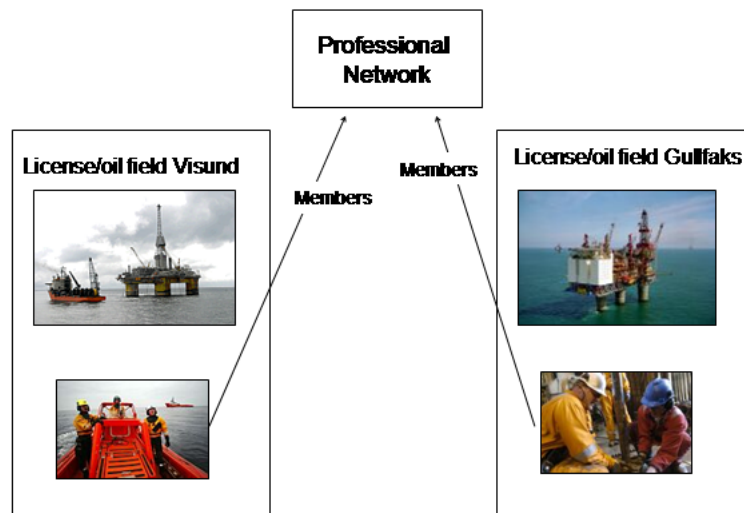


Figure 7.1: Co-located and geographically spread out network members

Figure 7.1 shows how some network members working within the same license can be co-located, while network members from different licenses are geographically spread out. Clearly, experience transfer is easier between co-located network members, as it enables daily interaction with informal meetings. The only thing that can hinder facial interaction between these network members, is the physical organisation of department in which the license is located. During my field trips I observed that people sit and work in separate offices, and some departments are so big they are spread out between several floors. In theory, people should be situated in open-plan offices to maximise experience transfer, and this is an issue that should be considered. Regardless, network members from the same license are co-located, and they often constitute a small group of people. These are characteristics that are commonly referred to by Lave and Wenger [1991] when they talk about CoPs, where people can learn from each other in their natural context. Again, I

wish to refer to Orr [1996] who observed how machine-repair technicians learned from each other by telling each other "war stories". Co-located network members have the opportunity to interact in the same way, naturally and without any structure imposed by the network leader. I do not say that a network leader is not necessary, because later in this section I argue for the introduction of departmental network leaders. What I wish to point out however, is that in addition to network activities like network meetings, searching databases and intranet pages, network members can meet in the hallway, visit each others offices, eat lunch and meet for coffee. They have a lot of opportunities for situated learning [Lave and Wenger, 1991], and if they do not realise this and make use of these opportunities, a network leader should help them. This can be done by preparing for informal meetings or introducing reward systems, and this will be discussed in more detail later in this section.

I would like to discuss the implications on experience transfer between network members from different licenses. Lave and Wenger [1991] commonly refer to characteristics of CoPs as small, informal groups where members are co-located. They also mention the possibility of geographically spread out members, but this has not been given much consideration. Professional network members from different licenses do not meet on a day-to-day basis, and frequent opportunities for natural interaction and telling of "war stories" are non-existent. In other words, they do not often meet face-to-face, and mostly at events that are formally arranged by the network leader. In some instances, two or more licenses may meet to discuss common problems, but I observed in my research that this did not seem to happen very often. Based on this observation, I argue the importance of IT to connect geographically spread out network members. I observed however, that IT was by most members not perceived as particularly useful when it comes to experience transfer. This again, can be due to the fact that knowledge cannot be represented without the practice that constitutes it [Lave and Wenger, 1991]. Of course, more explicit forms of knowledge are easier to transfer electronically, but it is important to remember that for IT-based knowledge sharing to be successful, members must see the benefits in advance. And this is only natural, seeing that members who are not used to share their knowledge will not start doing it just because an IT system enables this [McDermott, 1999]. I agree with McDermott [1999] that members must see the benefits from knowledge sharing, and argue that this can be achieved by organising events where members can meet face-to-face and chat informally about their work and experiences in that respect. I observed in my research that such informal meetings have not been prepared for by the network leader. Hence, network members from different licenses only get the chance to swap "war stories" at formal events arranged by the network leader. This is an issue that should be taken into consideration, as I agree with Lave and Wenger [1991] that knowledge sharing is most successful when it happens in its natural context. I also think that the

lack of communication between network members from different licenses proves that it is not just about having access to a CoP [Lave and Wenger, 1991]. First of all, members must want to participate. Next, they must see the benefits from participating, and the benefits achieved by participating must outweigh the efforts involved. Last, they must feel welcome in the community. If these conditions are all fulfilled in addition to having access, a solid basis exists for experience transfer to be successful.

This report has explored experience transfer in professional networks, and several methods have been identified that enable experience transfer between network members. In general, the use of IT and face-to-face interaction are the two extreme points, and I have discussed earlier that facial interaction is happening more frequently when network members are co-located. When it comes to experience transfer between geographically spread out members, it is therefore of interest to take a closer look at the use of IT. I observed in my research that the current IT solutions used in professional networks are intranet pages and databases. In general, these solutions seem to be perceived as more useful to newcomers in professional networks than oldtimers, and I have argued throughout this report that this is due to how their personal networks differ in size.

When conducting my research, I spoke with a wide range of network members. Some were relatively new to the organisation, while others have been working there for a long time. Both oldtimers and newcomers spoke warmly of network meetings as an opportunity to meet new people and learn about who knows what in the organisation; to build personal networks. Lunch and coffee-breaks during these meetings also allows for informal conversations and story telling, but other than that, little informal interaction was observed. Personal networks are useful for example when a network member encounters a problem during an operation that none of the co-located network members have the answer to. The network member can then call someone that he/she has once met at a network meeting and ask for help. This clearly shows the importance of building personal networks, but this alone is not sufficient for maximising experience transfer between network members. I argue that all organisations depend on IT to efficiently spread relevant information to all network members, since it would be time consuming if for example the network leader should ring up all network members and tell them. This proves the importance of designing useful IT solutions that correspond both to the needs of the network leader and the network members. This is also an issue that has not been given much consideration in the CoP-theory, and will be discussed further in Section 7.3 and 7.4.

In general, professional networks differ in size and are geographically spread out, and I have just discussed how this impacts experience transfer between network

members. Another thing that is important to mention here is members characteristics. According to Lave and Wenger [1991], CoP members have different interests, make different contributions to activity and hold varied viewpoints. I argue that this proves the importance of embodying network members from different licenses into a professional network. Only by discussing different experiences and different conditions for experiences, can network members learn from each other. And, only by encountering problems and applying various experiences, may new solutions be found. This also proves the importance of organising experience transfer between network members that are spread out geographically. Currently, four methods for experience transfer between network members from different licenses have been identified:

1. Network meetings, arranged two times per year
2. Network intranet pages; .Workplace and Earthweb
3. Databases; DBR experience, Synergi and Dokumap
4. Brainstorming meetings and workshops

Of the four methods listed above, brainstorming meetings was only mentioned by one of the network members, and these are arranged for discussing how to perform a particular operation. To arrange such meetings, you have to know who to invite, and this is easier for oldtimers who have continuously enlarged their personal network over the years. This is again in conformance with the principle of legitimate peripheral participation, where Lave and Wenger [1991] talk about the process of integrating newcomers into a CoP. Only by active observation and participation will newcomers learn and gradually become full participants and hence oldtimers. What I am trying to say here is that personal networks are enlarged through active participation, and this proves the principle of legitimate peripheral participation. This also proves the importance of arranging network activities like brainstorming meetings, where network members from different licenses can participate to learn from each other. Workshops are also considered valuable when it comes to experience transfer between licenses, and are often arranged to gather specialists around a special topic. Workshops can result in a best practice document, which can be considered a boundary object that enables communication between network members. Boundary objects are by Thompson [2005] introduced to make people identify with a community and its values, and best practice documents are doing this by introducing guidelines on how to perform a particular job.

I would like now to go further into the use of IT for experience transfer between network members, as I have argued its importance for connecting geographically spread out network members. My research suggests that the network leader is

considered a "knowledge editor" in his professional network, and one of his/her responsibilities is to keep intranet pages updated. The network leader is hence the only person responsible for spreading information to network members, and this is a serious limitation; if the network leader does not do his/her job, network members will not receive updated information. My research also suggests that the twenty percent time allocated to spend on managing the network is not sufficient for network leaders to fulfil all their responsibilities. This dependence on one person to spread information to all network members indicates why not all professional networks are perceived as useful by their members. CoPs on the other hand, are glued together by the common passion of their members and do not have this dependence. Lave and Wenger [1991] argue that once newcomers have been given access to a CoP, they become full participants by observing and participating in the CoP. What they do not mention however, is how newcomers can participate and the role of IT as a tool for embedding these newcomers into the community. I argued in Section 3.8 that the process of introducing IT in a CoP is similar to the introduction of new members. People in the community must have a need for the new IT system, and they must welcome the new solution. Then, as members start using it, it gradually becomes embedded in the community, and becomes part of the daily lives of members. I think this highlights that it is not just about giving newcomers access to a community, but that oldtimers must also change their work habits to integrate newcomers.

For firms that engage in collaborative ventures involving intensive knowledge sharing and technology transfer, many of the difficulties encountered cannot easily be resolved through the appropriate design of governance structure. This is due to the nature of knowledge itself and its social embeddedness Lam [1997]. In other words, different organisations have different cultures, and this is what constitutes the value of knowledge as a competitive resource. Lam [1997] highlights this with an empirical study of how the socially embedded nature of knowledge and organisations systems can impede joint work between a british and a japanese firm. What Lam [1997] basically says, is that knowledge will have different characteristics in different settings, and she argues that the japanese and british firms explored were characterised either by an organisational or professional model for skills formation.

The organisational model, employed by the japanese firm, is closely connected to the development of skills through "On-the-job training" on a long term basis [Lam, 1997]. In this model, learning principles are similar to apprenticeships, and this is in accordance with Etienne Wenger [1987], who originally looked at apprenticeship as a learning system. According to Nonaka [1994], such knowledge is highly tacit and context bound, and people tend to work in large groups. As a result, knowledge is not owned by individuals but is rather embedded in groups

and teams. This also means that this knowledge is only accessible through social interactions [Lam, 1997].

In the professional model used by the british firm however, knowledge formation is associated with the external market, and it is therefore of interest to generalise and standardise knowledge to make it applicable to different contexts [Lam, 1997]. Explained differently, this knowledge type is more formal and explicit, and is easier to transfer. The professional model also emphasizes individual specialisation and job differentiation, e.g. work in small groups. As a result, people do not have the same opportunity to learn from each other, and this makes joint collaboration a challenging task since it encourages ownership of knowledge. This puts the organisation in a vulnerable position when individuals leave, and this calls for systems where knowledge can be abstracted and stored to make it accessible to newcomers [Lam, 1997]. In general, the japanese firm studied by Lam [1997] rely on practical knowledge while the british firm base their expertise on abstract theoretical knowledge.

I argue that for an organisation to maximise experience transfer, a mixture of the organisational and professional model should be employed. The organisational model is better for transferring tacit knowledge, while the professional model is better for transferring explicit knowledge. When it comes to using IT for experience transfer in professional networks, several people should co-operate to write reports and publish relevant information. I argue that knowledge should be developed in groups. By doing this, the organisation will not be so vulnerable if one person leaves. In professional networks, workshops, courses and network meetings are arranged where people can meet to discuss their experiences. Workshops are particularly useful when it comes to generating new knowledge. The outcome of workshops are sometimes best practice documents, but these documents are however not perceived as particularly useful by network members. I believe that this is because the knowledge presented is highly tacit and that it may be read by people from different cultures. As Lam [1997] explained, people from different cultures are likely to have different interpretations of things. The professional model for knowledge formation [Lam, 1997] is said to produce knowledge that is more formal and explicit and thereby easier to transfer. I argue however that one shortcoming with this model is that when people become specialists within a topic, their personal knowledge is highly tacit, and hence hard to express in a report. It is accordingly difficult to understand for the reader of the report. In general, I have observed that professional networks are divided into large groups and are practice-based, e.g. members participate at workshops, courses, and are asked to present their experiences at network meetings. Network members working within the same license are also co-located, and have daily opportunities for interacting face-to-face. Network members working in different licenses are however geographically spread

out, and are dependent on IT for daily experience transfer. When network members meet face-to-face, the potential for transfer of tacit knowledge is maximised. Transferring tacit knowledge via IT however remains a challenge, but I agree with Lam [1997] that the degree of tacitness and ease of transfer can differ. Also, when transferring experiences via IT, the value of IT can be evaluated from the extent to which knowledge can be structured [Lam, 1997], e.g. its explicit component. Another challenge involved with transferring experiences between network members from different licenses, is the possible existence of different cultures. According to Lam [1997], people from different cultures interpret knowledge in different ways. I argue however that network members posit similar, specialised knowledge, and according to the professional model, such knowledge is easy to transfer. This shows that professional networks correspond to a mixture of the organisational and professional model, with large, practice-based groups of specialised workers.

In professional networks, intranet pages exist where information is stored about members and technical equipment. According to network members, the intranet pages are seldomly updated, and are therefore not often used. It is important to mention however that some network leaders keep their intranet pages up to date, but the majority fail to do this. Oldtimers in the networks also explained how they know who to call when they have a technical question, and therefore do not see the value of these intranet pages. This shows again the importance of a dedicated leader, and it also indicates that careful consideration should be made with regards to what content to publish. This is again an issue of the social embeddedness of knowledge [Lam, 1997], and I argue that codifiable knowledge can be shared on intranet pages, whereas tacit knowledge is best shared through facial interaction and discussion. In professional networks, I therefore believe that the introduction of online discussion forums will increase the value of the intranet for experience transfer between licenses.

Best practice documents are available in a database called DokuMap, and these documents are by many network members perceived as useless, and oldtimers are more sceptical than newcomers. This may have two reasons:

1. Oldtimers know the standards on how to perform operations
2. The complex substance of best practice documents

One of the network members explained the difficulty of expressing personal knowledge on a piece of paper, and to be successful, the person writing it must make a clear presentation of his personal knowledge. In addition must the person reading have enough previous knowledge, e.g. tacit knowledge, to understand what is written in the document. Both the reader and sender of knowledge must also share a similar knowledge culture for experience transfer to be successful. In one of the

networks, I spoke to newcomers only, and they seemed to use best practice documents more than the members interviewed from other networks. Again, I think this proves the value of IT for newcomers.

DBR and DBR experience are databases used in professional networks to store reports about operations and experiences about successful/unsuccessful operations. Synergi is a database where information about unexpected incidents is stored. It is important that people in licenses take time to add their experiences about operations in these databases, and it seemed that most network members took time to do this. When it comes to using the database to read about the experiences made by people from other licenses however, newcomers use the databases more than oldtimers. Again, this is due to the fact that oldtimers know more people in the organisation, and it is easier to get an explanation over phone than to read about it in a report. Another problem discovered when talking to network members was about adding information about successful operations. This was by members perceived as unnecessary, and they did not see the value of adding such experiences. I argue here that it is equally important to learn from each others good experiences as bad experiences. Something must therefore be done to motivate members to add such experiences, and I suggest a reward system where for example those who have added most experiences compared to operations performed are rewarded.

7.1.1 Network structure

My research suggested that experience transfer between licenses often is non-existent. This weak relationship has proved the problems that can occur when an entire network is dependent on one, dedicated leader. This corresponds to structural hole theory where all knowledge in a network flows through one central actor [Van Wijk et al., 2005]. In natural communities, an individual or a small group takes on the job of holding the community together [McDermott, 1999] by keeping members informed. This role is critical to the existence of intentional communities, but it needs to be designed. I agree that small communities may be coordinated by one leader, but some of the professional networks have several hundred members. The task of connecting and distributing knowledge to several hundred members is challenging for just one leader, and I therefore argue that the management of professional networks should be re-designed. Figure 7.2 shows a possible redesign.

It became clear during my research that the network leader has a lot of responsibilities, and the 20 percent working time allocated to run the network is not enough for one network leader to fulfil all these responsibilities. This is definitely an evidence that the professional networks are not functioning as they are supposed to, and Figure 7.2 therefore suggest a change in structure where the responsibilities of the leader are divided among several leaders. I argue that solutions are found

through discussions, and when there is only one network leader, he/she does not have any to discuss the management of the network with, for example about what topics are currently relevant and should be focused on.

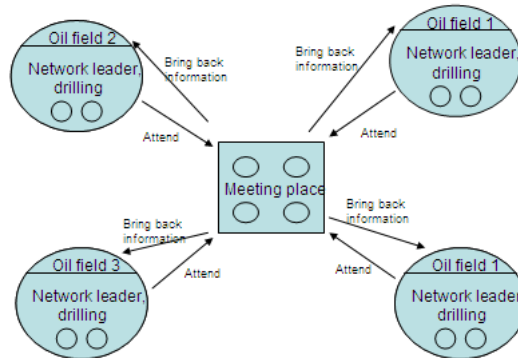


Figure 7.2: Suggestion on the redesign of professional networks

An example of how to distribute responsibilities between several people, is to have one network leader in each department. These network leaders can then meet frequently to discuss network issues and the planning of network activities. Each network leader will be responsible for spreading information to network members in his/her department, and for arranging frequent meetings, both formal and informal. One example is to gather network members for lunch, and pick one member to present his/her current work. The other responsibilities can be divided among the network leaders as suitable. Figure 7.3 shows an example of how experiences can be transferred between licenses with the new structure. As you can see, members receive information from both network leaders, and this decreases the dependence on one leader.

This section has discussed the IT solutions used for experience transfer between members, and in Section 7.2 I wish to explore their use as a seeding structure.

7.2 IT - a seeding structure?

Throughout this report, I have argued that IT can be considered a seeding structure for newcomers in a community, but it has become more and more obvious that as members move from newcomer to full participant, the perceived value of IT decreases. This is particularly true when professional network members are co-located. But, when members have participated actively for a long time, their personal network gradually expands, and this will also improve interaction between network members that are geographically spread out.

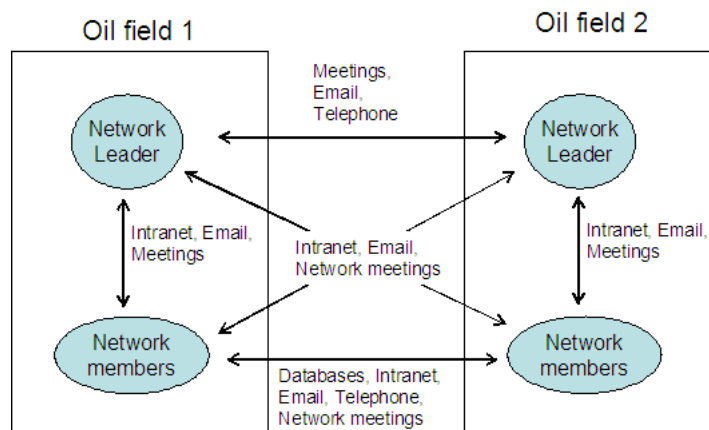


Figure 7.3: Example of experience transfer between licenses

Figure 7.4 shows how the personal network expands when a network member moves from newcomer to full participant in the network. As you can see, the personal network expands when the network member participates actively and attends network activities where network members meet face-to-face. Based on the importance of personal networks for connecting geographically spread out network members, I argue that IT can not be considered a stand-alone solution for experience transfer in professional networks, but should rather be considered a remedy. However, interaction only at the personal level can be very inefficient, and as I have argued earlier, IT should be introduced to enable efficient knowledge transfer between network members and the network leader.

Professional networks are introduced by Statoil to spread knowledge to network members. CoPs have the same purpose, but are established naturally [Lave and Wenger, 1991]. Professional networks on the other hand, have a structural component since they are introduced by the organisation Hayes and Walsham [2001]. Hayes and Walsham [2001] introduced two organisational structures; seeding and controlling structure. Since I have argued throughout this report that IT can be used as a seeding structure in professional networks, it is interesting to discuss this further in this section. When evaluating the different IT systems used for experience transfer in professional networks, it is important to remember that different IT tools have different value, and it is therefore essential to identify those that are of greatest importance to network members. According to Thompson [2005], too much structure will have a negative effect on knowledge sharing in CoPs. Since this may have a negative effect on knowledge transfer in professional networks, I

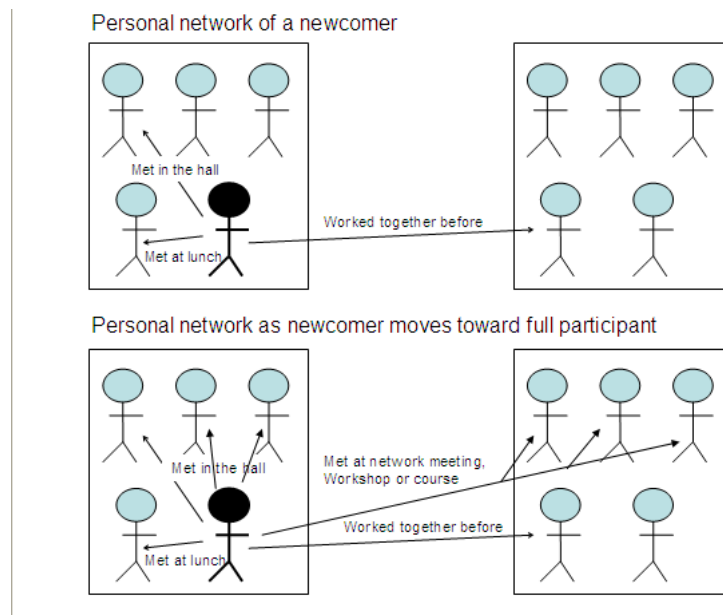


Figure 7.4: Example on how experience transfer between licenses is improved as personal networks are enlarged

therefore argue the importance of determining the value of IT as either a seeding or controlling structure.

It has been argued throughout this report that tacit knowledge is best shared through facial interaction, while IT is best used for transferring explicit knowledge. I would like to discuss the implications this has for experience transfer between members within and between licenses. As I have argued earlier, network members working in the same license are co-located and can easily meet to discuss current problems or to tell each other stories about their jobs. Network members from different licenses are however geographically spread out, and do not get a chance to meet on a daily basis. I rather observed in my research that they seldomly meet other than at formal activities arranged by the network leader. Hence, to enable frequent communication between geographically spread out members, knowledge management solutions (KMS) are necessary. The rest of this section will therefore evaluate the current IT solutions used by network members and see if they can be used as seeding structures or controlling structures. Professional networks currently use intranet pages, databases and best practice documents for experience transfer between geographically spread out network members.

Intranet pages are webpages where information of relevance to network members is published. Access is restricted to network members only, and a username and

password is required to gain access. Once access is gained, network members can find information about the network, network members, technical equipment etc. The purpose of intranet pages is hence to spread relevant information to members. When speaking to network members, it became obvious however that intranet pages are not always updated by the network leader, and that it is not always easy to trust published information. When updated however, intranet pages were considered particularly useful for finding information about courses, workshops and network meetings. In other words, it serves its purpose as a tool for spreading explicit knowledge. Intranet pages also provide information about other network members, but none of the network members I asked used intranet pages for example to find contact information about members with similar work experiences. Network members rather prefer to make use of their personal network in cases where problems or questions occur. Network members also said that they did not always trust the information stored about network members, since the members themselves are responsible for updating this information. And this represents one of the main challenges involved with the use of IT for experience transfer - how do you make people use it? Lave and Wenger [1991] do not say anything about how CoP members are motivated to use and trust IT for knowledge transfer, and I think this is due to their assumption that CoP members are co-located. And when members are co-located, they do not have the same dependence on IT as geographically spread out members.

Based on these observations, I suggest that when it comes to spreading information about network activities, intranet pages can be considered to have preexistent material that indirectly enables communication. In this regard, intranet pages can be considered a seeding structure, especially since it efficiently spreads relevant information to all network members simultaneously. It is important however to notify network members when new information is published, and some network leaders do this I interviewed did this by sending out an email with a link to the page where updated information has been published. One of the biggest challenges identified with intranet pages is that they are not always updated by the network leader. When intranet pages are not updated, they will not be perceived as useful by members. This also affects their use as a seeding structure, and is due to the dependence in professional networks on one leader to serve the role as a "knowledge editor". One of the network leaders explained that if he did not publish information in a way that minimises the need for updating, he simply does not have time to keep the intranet pages up to date. To overcome these difficulties, I suggested in Section 7.1.1 a redesign of the role of the network leader. If the responsibilities of spreading information to network members and keeping intranet pages updated are divided among several network leaders, intranet pages will achieve the potential use as a seeding structure.

In professional networks, the databases currently used for experience transfer are DBR, Synergi and Dokumap. In general, databases are often referred to as knowledge repositories, and contain knowledge about topics that are of importance to the organisation. I have argued earlier that the existence of CoPs is intrinsic to knowledge, and this can be one of the reasons why many KMS are said to be ineffective when it comes to knowledge sharing. I argue that this is due to their inability to present knowledge in its natural context. I also argue that databases developed to suit organisational needs rather than needs at the network level may not be attractive to users. Some network members also explained that finding information in databases is problematic, since there is no structure in where information is stored. Available reports were also sometimes erroneous. I think this proves how time-consuming it can be to search a database, and why oldtimers prefer using their personal networks. Newcomers do not always have a choice, if they have yet not enlarged their personal network. I therefore argue the importance of designing user friendly solutions that correspond to user needs.

DBR is a database where people from different licenses store daily reports on performed operations and the use of technical equipment on platforms. A database called DBR Experience is used to add more definite experiences about the success/failure of an operation. DokuMap is a database of best practice documents and Synergi is a reporting system for unexpected incidents. All these databases store important information about the operations performed by licenses, and should therefore be considered useful tools for network members to learn from each others experiences. My research however suggested that network members would rather contact someone in their personal network and ask for information than search for and read a report. I argue that this is because of the time involved with searching through large databases. More importantly, this shows the inability of databases to represent the practice of knowledge. Hayes and Walsham [2001] confirm this by saying that databases can capture "knowledge bytes", but that they are unable to present the social processes that constitute the actual practice. And this proves why network members would rather make a phone call to the person who has written the report, because tacit knowledge is easier transferred via discussion. When it comes to adding experiences in DBR, some licenses have started doing this regularly, while other licenses fail to see the usefulness of such knowledge repositories. Again, my research suggested that newcomers use DBR, Synergi and Dokumap on a frequent basis, while oldtimers will rather pick up the phone and call the person who has written the report. I also suggest that the reason why newcomers use databases to find information and oldtimers do not is in fact that oldtimers are reluctant to use new IT systems, and they are not as familiar with IT as younger people. Now of course, an oldtimer in a professional can be the same age as a newcomer, but my general argument here is that the person who has been part of the organisation the longest, is most reluctant to learn new things. This also implies some difficulties

with introducing new IT systems into an organisation (see Section 7.4). One of the biggest problems with databases is however not to make network members use them to add reports, because often this is compulsory. The problem lies however in making network members search databases to find information about and learn from each others experiences. I have argued above that the main reasons for this is that:

1. It is a time consuming job
2. Databases fail to capture the social processes that capture knowledge

This clearly shows a need to design databases with search functions that are easy to use, but it also proves the importance of meeting face-to-face, because you do not come far without access to other facilities than the electronic. It is also important to make network members understand the importance of learning not only from each others mistakes, but also from the performance of successful operations. This can save the organisation a lot of time in the future, and network members should therefore be motivated to use knowledge repositories like databases. I argue that one of the main reasons why databases are not currently realising their full potential for knowledge transfer, is that they are developed to suit the needs of the organisation. This leads to a gap between the needs of network members and the efforts required to use the databases.

The above discussion revealed that databases fail to capture the social processes that capture knowledge, and as a result, network members who find information in databases may fail to integrate the information found with other sources. Also, I suggest that the databases currently used in professional networks are developed to suit the needs of the organisation, and therefore fail to motivate network members into using them. Reward systems should be considered that give network members a price when they add an experience or make use of an experience stored in a database. If this is done, databases may be considered a seeding structure. But, I argue that the problems observed with making network members use databases is due to the tacit component of knowledge, which is best shared through discussion, and I therefore argue that the current use of databases can be considered a controlling structure.

If the network structure of professional networks is redesigned and network members are motivated to use databases for experience transfer, the use of IT as a seeding structure may be achieved. In general, I have suggested the use of IT as a seeding structure for newcomers in professional networks, while oldtimers perceive it more as a controlling structure. The dependence in professional networks on one dedicated leader has also proved to affect the use of IT as a seeding structure. I argue this because the network leader has a role as a "knowledge editor",

and when the "knowledge editor" then fails to do his/her job, it will affect the value of IT as a seeding structure. There is no doubt however, that great consideration must be taken when it comes to designing IT solutions; if they do not correspond to the needs of the users, they will not be used. They must also be simple to use, otherwise no one will use them. So, for IT to be considered a seeding structure, these considerations must be made. Section 7.4 will talk more specifically about the design and introduction of IT in professional networks.

7.3 CoP-theory

Section 6.4 concluded that professional networks can be considered CoPs, and they are also considered a seeding structure when it comes to experience transfer between members. Throughout this report, I have made a comparison between professional networks and CoPs. In this section, I would like to take a closer look at how this focus on CoPs has affected my research, and to discuss the differences identified between CoP-theory and professional networks.

My research showed that not all professional networks are perceived as valuable to their members, and this is a clear evidence of what can happen when a leader is not dedicated. Lave and Wenger [1991] do not say anything about how CoPs can be organised and how people should relate to each other in CoPs. Thompson [2005] argues that CoPs should not have any structure, but I argue that some structure should exist to hold the CoP together. Of course it is not possible to develop one structural framework that can be applied to all CoPs. What I mean is rather that professional networks proved to have a network structure with the network leader as a central actor. All network members seemed to depend heavily on this central actor to spread and manage their knowledge. I have discussed earlier that this is a shortcoming, since it leaves the professional network in a vulnerable position if the network leader leaves. Figure 7.2 shows the current structure of professional networks and the dependence on the network leader to hold the network together. Based on this observation, I suggest that the CoP-theory should discuss in more detail how CoPs can be physically organised and how members should relate to each other. Later in this section I refer to the physical organisation of professional networks as 'how to structure networks'.

Another aspect that I would like to highlight from the CoP theory is motivation. Lave and Wenger [1991] argue that once a person is given access to a CoP, he/she can become a full participant by observing and participating. They further argue that members learn through repeated participation in the community, and that this ability to learn is in itself what motivates members to participate. In other words, learning is in itself a motivational factor. I agree that learning can be a motivation for individuals who wish to increase their personal knowledge within a topic. But

I wish to highlight here the challenge of motivating people to do something that is good for the organisation. For example, what a network member learns from participating at a workshop or network meeting is perhaps of greater value to the network member than the organisation. There is no doubt that people working in a license will have a different focus and different preferences than people working at the head office in Stavanger. The challenge then, becomes for the organisation to motivate members to use of and share their personal knowledge to fulfill the objectives of the organisation itself. I hence argue the importance of motivational factors for the existence and success of communities, and this has the following implications:

1. Newcomers must feel welcome to participate, and they only learn through participation. Lave and Wenger [1991] have argued that learning is motivational, and I therefore suggest that participation is motivational.
2. Members must be motivated to do something good for the organisation, not just for themselves.

I observed in my research that nothing was done by the organisation to motivate members to participate in network activities. Especially in one department, I also observed a competitive culture where people were reluctant to share their knowledge. This clearly shows the need for a reward system where members are compensated for participating and sharing experiences. This should also be done when it comes to adding experiences in for example databases. One example of a reward system is to have a competition of becoming the 'best knowledge sharer'. Members can then nominate someone they have observed as a good 'knowledge sharer' the last month, and the person who wins gets a reward. Now, you can argue that this will never work in professional networks, since they are large, spread out geographically and dependent on one leader to organise this. This is also an issue that has not been given much thought in the CoP theory, except for McDermott [1999], who said that the role of CoP leaders must be designed. In Section 7.1.1 I have therefore suggested a redesign of how professional networks should be structured.

Some network members explained that not all the information presented at network meetings is of similar interest, and this shows that some of the networks may have a scope that is too broad. All professional networks should therefore consider the possibility of splitting into more specialised units where this is possible. This may also decrease the network size, which will make it an easier job for the network leader to manage. When it comes to the dependence on one network leader, the structure of the networks should be changed, and a suggestion on how to do this was given in Section 7.1.1.

In professional networks, I have argued that IT should not be the only tool for

experience transfer, but that it should be used in addition to face-to-face interaction between network members. IT is however considered necessary when it comes to connecting and spreading information to network members who are geographically dispersed. CoPs are also introduced by Lave and Wenger [1991] to spread knowledge to members of the community, but they do not say much about how IT can facilitate this, other than intranets and databases being common methods. Lave and Wenger [1991] fail to say anything about the introduction of IT and in CoPs and how it should be designed to suit the needs of members. I think this inattentiveness to the use of IT in CoPs is due to the fact that when Lave and Wenger [1991] refer to CoPs, they talk about small groups of co-located workers that interact on a daily basis. Huysman and Wulf [2005] explained how the role of IT in CoPs is to help people get and stay connected, and that it is of interest to identify how IT can play a role in building and sustaining CoPs. Nothing is however written about how this achieved through the use of IT, and Walsham [2002] has rather focused on the problems with use of IT in CoPs, which is basically the inability of IT to depict the practice that constitutes knowledge, which makes it challenging for people to understand. I argue that more attention should be paid to how IT can be used to improve knowledge transfer between CoP members that are geographically spread out, and that it is important to focus on the possibilities rather than the limitations. In Chapter 2 I described how Alavi and Leidner [2001] have different views of knowledge, and that IT will have a different role, depending on how knowledge is viewed. I suggest here that to identify how IT can be used to improve knowledge transfer between members, the different views of Alavi and Leidner [2001] should be taken into account.

In this section, I have talked about differences between the CoP-theory and professional networks. Another thing that is important to mention here, is how my continuous focus on CoPs has affected the evaluation of my research results. When first presenting my research results, I did it without thinking about CoP-theory. This was done deliberately, to avoid the possibility of being 'blinded' by CoPs and thereby miss other important problems or characteristics. When analysing the results however, this was done by searching for similarities with CoPs, and this may have affected the results slightly. As discussed above however, the CoP theory fails to say much about how CoPs can be structured with regard to how people relate to each other. When it comes to motivational factors in CoPs, Lave and Wenger [1991] argue that learning in itself is what motivates members to participate. They fail however to say anything about how an organisation can benefit from what members learn in CoPs, and here I suggested reward systems as a possible approach. In general, by first presenting professional networks without comparing them to CoPs, I was able to detect important characteristics that are not given great consideration in CoP-theory.

The strong focus on CoPs throughout this report has made me realise both how important it is that people can interact in their natural environment, but also how much we can really learn from informal chats and story telling. Most of all, the focus on CoPs has made me understand how important it is that organisations prepare for an environment where members can interact informally. Again I would like to highlight the study Orr [1996] made of how machine-repair technicians learn from each other. I think this proves the importance of co-locating people with similar interests and experiences. I have however argued in Chapter 3 that CoP is a concept that sounds good in theory, but that it is hard to achieve in practice. I think this is mainly because organisations have different structures and cultures, and this must be taken into consideration. In conclusion, I would to say that CoPs can serve as a good starting point for organisations who wish to locate and share knowledge between members. I want to highlight however, that existing guidelines on how to achieve successful CoPs should not be followed blindly. They should rather be taken into consideration and adopted to organisational structure and culture.

7.4 Role and design of IT

Different professional networks have a different focus, and thereby different needs. According to Lam [1997], this is also something that can inhibit knowledge transfer between organisations. Throughout this chapter I have argued the importance of considering user needs when designing IT solutions. If potential users do not perceive an IT solution as useful, they will not use it. In professional networks, current IT-solutions seem to be the result of a top-down decision, and hence correspond more to organisational needs than the needs of network members. Some network members I spoke to explained how they are never asked before a new IT-solution is introduced. The current introduction of TeamSites is a good example of this, since some parts of the organisation have started using it while others have not. Those who have started using TeamSites however, have encountered problems, and I argue that this is because it is not based on their needs.

My research showed that IT is not considered to be the best instrument for experience in professional networks, but that it is nevertheless important for connecting network members from different licenses. By attending face-to-face meetings, members can enlarge their personal networks. Network members seemed to prefer the use of personal networks instead of IT when questions occur. I argue however, that for newcomers who do not have a large personal network, IT is a good help. IT is also helpful for efficiently spreading explicit knowledge to network members. This proves the importance of designing IT solutions that are easy to use, and that correspond to the needs of the users. If this is achieved, more people may start using IT for experience transfer, even oldtimers. Statoil is a large organisation, and IT decisions are made top-down. I argue that it is impossible for the organisation

to understand the needs of all employees, and hence to find a solution that is suitable for members in all professional networks. I therefore suggest a decentralised infrastructure where decisions are made based on the needs of each separate professional network.

In this section, I would like to mention the importance of how IT is introduced to new users. First of all, it is important to remember that a knowledge sharing culture should exist in an organisation before introducing IT, and members should be motivated in advance to share their experiences. This is important for building trust between members, so that they can easier trust information stored in databases or intranet pages. Then, when an IT solution is introduced, it may easier be welcomed by members. Before making a decision, the IT solution should be discussed with members to see if it suits their needs and requirements. If it does not, either a new solution should be considered, or perhaps a tailor-made solution is possible. Once an IT-solution has been chosen, all members must be trained. In professional networks where TeamSites is going to be introduced, only one person from each department is trained. This person will then become a superuser that is responsible for helping other people in the department. I argue that this is not enough, all members should be trained sufficiently to feel comfortable with a new system being introduced. Member should also be followed up to see if they are happy with the new system.

One final aspect that is important to remember here, is that ideally, all professional networks should use the same IT solutions, otherwise they will encounter problems when trying to communicate electronically. My suggestion is therefore that when it comes to sharing experiences within professional networks, tailor-made solutions can be considered. When sharing experiences between professional networks however, similar solutions should be made. A few members from some of the networks can then be invited to talk about their needs. In conclusion, I would like to say that it is important not to rely just on IT for experience transfer, because it will never fully capture the social embeddedness of knowledge, and should therefore be supplemented by facial interaction.

7.5 Summary: Recommendations

Section 7.1 discussed the current methods for experience transfer in professional networks. Section 7.2 evaluated the current IT solutions used for experience transfer in professional networks, to see if they can be considered seeding or controlling structures. In Section 7.3, the usefulness of the CoP-theory for evaluating professional networks was discussed, and finally, in Section 7.4, the role and design of IT in professional networks was suggested. From the discussion conducted in this chapter, the following recommendations were made on how to improve experience

transfer between network members working in different licenses:

1. **Re-designing the role of the network leader and network structure**

By re-designing the role of the network leader and the network structure, the responsibilities of network leaders can be divided among one network leader in each department. They can also be responsible for organising informal meeting places within the department where co-located network members can meet to discuss their experiences.

2. **Network activities** All network activities should be well planned in advance, for example network meetings must have an exciting agenda to motivate members to participate. Workshops should also be compulsory, since this is a meeting arena that enables the sharing of tacit knowledge.

3. **Informal meetings** To build trust between members, teambuilding activities or informal meetings must be arranged. Once members trust each other, they are also more likely to trust the reports added by network members in databases or at intranet pages. A lack of informal meetings was observed in professional networks, and I argue that this is due to the dependence on one network leader and that networks are geographically spread out. To enable story telling and situated learning, informal meetings between network members should be prepared for.

4. **Physical organisation** Most network members working for the same license are co-located, They should be placed close to each other to enable regular meetings, both formal and informal.

5. **Coaching** New network leaders must be coached on how to do the job. This could for example be by the introduction of apprenticeship, where the newcomer learns from the oldtimer in the network. They must learn how important it is to spend time on managing the network.

6. **Online discussion forums** Intranet pages exist to spread information to network members, but are often not updated. Introducing online discussion forums will facilitate the sharing of tacit knowledge between members, since this is a place where they can meet to discuss their experiences.

7. **Reward systems** To encourage members to share their experiences, rewards should be given. Currently, no such system exists in professional networks. Another way of motivating members is to invite them to hold presentations about their experiences. This is currently done in one of the professional networks, and should be introduced to the other networks as well. Some of the professional networks seemed to have too broad a scope. Where possible, networks should be divided into more specialised units to be more suited to the special needs of members. This can also be considered a motivational factor.

8. **Design of IT** IT solutions must correspond to the needs of the users and must be easy to use, otherwise they will not be used. To achieve this, a decentralised infrastructure is suggested, where decisions are made based on the needs of each separate professional network. For IT to be successful for transferring experiences, a knowledge sharing culture must exist in advance, and users must be motivated to use IT. The introduction of a new IT solution must be discussed with users, and when a decision is made, they must be given sufficient training. Tailor-made solutions can be introduced for communication within a professional networks, but with regard to communication between professional networks, similar solutions should be developed.

Chapter 8 will sum up the findings discussed in this report, and see how they correspond to the objectives defined in Chapter 1.

Chapter 8

Conclusions

In Statoil, professional networks are established to enable experience transfer between members, and members are self-selected, based on similar interest. In a large organisation like Statoil, members are spread out geographically, and this leads to a challenge when it comes to sharing experiences between members who are not co-located. It is however essential that members co-operate and share their knowledge, and the focus of this report has been to identify how knowledge is shared between members in professional networks. Because of the geographical dispersion of network members, this has proved a particular challenge when it comes to transferring tacit knowledge. The usefulness of IT in this regard has therefore been evaluated, as IT is said to be best suited for the transfer of explicit knowledge.

My research revealed that the IT solutions used for experience transfer in professional networks were intranet pages, best practice documents and experience databases. When it comes to facial interaction, members meet at network meetings, workshops and/or courses. I also observed that in addition to being co-located or geographically spread out, network members can range from newcomers to old-timers. This is similar to the principle of legitimate peripheral participation described by Lave and Wenger [1991].

It has been essential in this report to investigate the similarities between communities of practice and professional networks. This is due to the fact that they both aim to spread knowledge to members, and it has been interesting to compare characteristics and shortcomings. The results from the research conducted were therefore continuously compared to CoP theory, and Chapter 6 concluded that although minor differences exist, professional networks are similar to CoPs. I discovered however some shortcomings with CoP-theory, then in particular the lack of theory about network structure, motivating members to do something good for the organisation and the use of IT.

After a conclusion was made that professional networks can be considered CoPs, it was essential to look at organisational structure. In CoPs, organisational structure is namely said to have a negative effect, and it is interesting to identify how much support an organisation can provide without interfering too much. The professional networks were evaluated to have a seeding structure, mainly because the network leader has the role as a "knowledge editor". One major drawback observed, was however the dependence in professional networks on one dedicated leader. I also argue that this is why some professional networks are not successful. Other problems encountered with the organisation of professional networks were their large size, broad scope, the gap between perceived value of participating and efforts required, the ability to trust electronic information and the lack of informal meetings. These characteristics are all likely to affect the usefulness of professional networks.

In CoPs, members organise themselves, and to avoid the current problems with professional networks, I came up with a suggestion on how the structure of professional networks and the role of the network leader can be re-designed. The redesign suggested a division of responsibilities between one network leader in each department. In other words, all professional networks will have one responsible person in each department, and this will remove the dependence on one network leader.

When newcomers are given access to CoPs, they learn by observing and participating. This is also the case in professional networks, but a problem encountered was that geographically spread out members do not meet face-to-face on a frequent basis. Another problem detected was that a lot of members did not participate actively in network activities. Reasons for this was that the learning process had not properly started in the network, benefits are not yet clear, participation is time-consuming, the network leader fails to motivate members and the non-existence of apprenticeship. To overcome these problems, reward systems have been suggested. Mentor-mentee relationships should also be introduced between newcomers and oldtimers.

Using IT for experience transfer is a challenging task. In professional networks, IT was perceived as more useful by newcomers than oldtimers, and I have argued that this is because oldtimers have larger personal networks. In general, most members did not see the value of adding experiences in databases, and they did not take time to read about the experiences of other members. I therefore concluded that the current use of databases can be considered a controlling structure. Again, reward systems should be introduced, but an evaluation should also be made on ease of use and how well the database corresponds to the needs of the members. All professional networks have intranet pages, and these can be considered a seeding structure as long as the network leader keeps the pages updated. Alavi and Leidner

[2001] identified different views of knowledge and suggested different roles of IT . I think this is a smart way of classifying knowledge, and it is a great starting point for organisations that wish to use IT for knowledge transfer. One challenge with the use of IT for knowledge transfer is however that different organisations or parts of an organisation may have different cultures that constitute tacit knowledge. As a result, people may have different ways of interpreting things, and this can lead to misunderstandings when facial interaction is missing.

All members seemed to prefer facial interaction to the use of IT, and this proves that IT can not exist alone. IT should rather be considered a remedy for the transfer of explicit knowledge between members who are not co-located. I therefore recommend that professional networks should be organised more around informal meetings. This can be enabled by redesigning the structure of professional networks, with smaller size, a narrower scope and where the responsibilities of one network leader are divided among several network leaders, e.g. one in each license. The network members working within the same license can then interact more often, and can thereby learn from each other while in their natural context. When it comes to experience transfer between licenses, it will mainly be the responsibilities of the network leaders in each license to meet to discuss similarities and provide network members with relevant information. Network members from different licenses who share similar experiences should also be introduced to each other and requested to co-operate. Co-located network members should be placed close to each other in their working department.

This research is an important contribution to information technology because it highlights the difficulties with designing and introducing IT in large organisations like Statoil. It proves the importance of identifying user needs and requirements before developing and introducing a new IT system, and it has also proved that top-down decisions may have a negative effect. When introducing IT systems to large organisation, a bottom-up approach may be a better solution, since it is likely to better capture needs at the individual level.

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Appendix A

Interview guide

- Description of work/position in the organisation
- Description of relevant professional networks
- The use of professional networks in daily work
- Experience transfer between co-located network members
- Experience transfer between network members who are spread out geographically?
- How do you share your experiences?
- What does it take for you to trust electronic knowledge?
- What are the premises for a successful network?
- What are the reasons for unsuccessful networks?
- What qualities must a good network leader have?
- What do you think about network meetings/workshops? what's their purpose and what do you gain from participating?
- What motivates you to participate in networks and share your experiences?
- The use of IT for sharing experiences
- Other tools for experience transfer?