



NTNU – Trondheim
Norwegian University of
Science and Technology

How do companies learn from internal/external experience?

Tom André Mahle

Safety, Health and Environment

Submission date: June 2013

Supervisor: Eirik Albrechtsen, IØT

Co-supervisor: Vegard Grimstveit, ACONA

Norwegian University of Science and Technology
Department of Industrial Economics and Technology Management

Preface

The master thesis was written at the Department of Industrial Economics and Technology Management at NTNU, in the last semester of the specialization program Health, Environment and Safety (HSE). The thesis was written in cooperation with Acona which is a consultant company, mainly within the oil industry.

The researcher wants to give thanks to several people:

- Eirik Albrechtsen did a great job as the internal supervisor by enabling a good start on the thesis by giving advice regarding relevant theory on the field, and emphasized regular meetings to ensure a continually development.
- The internal supervisor Vegard Grimstveit, was proactive in guiding the thesis in a desired direction and made appointment with personnel within the oil industry which gave the basis for the empirical material.
- Ranveig Kviseth Tinmannsvik, who took time to have a meeting and provided input to the theoretical material.
- The interviewees were helpful in sharing their experiences which enabled a good thesis.
- The employees at the HSE specialization program, which ensures a good study program by being engaged in their respective subjects.
- My family which always have been supportive of me.

Summary

The thesis is a response to the fact that the Norwegian Petroleum Safety Authority questions the learning ability of the petroleum companies that are operating on the Norwegian continental shelf, despite that this is something that has been focused on for decades. The issue of learning has recently become increasingly important because of the increasingly number of oil & gas companies operating on the Norwegian continental shelf.

The thesis aims at study factors of importance for the learning ability of companies (the thesis is not necessarily just aimed at oil companies) with regards to internal/external experience. The terms internal/external experience is explained more in detail in the introduction chapter.

In order to reveal inhibitors/promoters towards a learning organization it where created following research questions:

- What characterizes a learning organization?
- What inhibitors to learn from safety experience exist?
- What promoters to learn from safety experience exist?
- What general and specific advices can be given to promote learning from internal/external experience?

In order to answer these questions, it where chosen a qualitative research approach based on a semi-qualitative interview guide which aimed at reveal the experience of nine employees within three different oil companies with regards to learn from unwanted incidents/conditions, as well as systems to assure learning within their current employer.

The interview results provided the basis for the empirical part of the thesis by using grounded theory to code the results in order to find out which issues that were repeatedly mentioned, in order to reveal patterns and also to see what issues that were not given so much thought. The empirical results where then compared to prewritten theory, which was developed by study known literature within organizational learning. It where on the basis of this comparison developed recommendations for how to learn from internal/external experience. The recommendations are applicable for the oil industry as a whole, and could probably also be used by companies in other industries.

The main findings in the thesis can be summarized to the following content:

- Cooperate across internal/external boundaries in order to learn from each other and ensure that everyone/as many as possible are able to participate/express their concerns and take signals from different actors seriously
- Be open for criticism even of established systems
- Ensure clarity regarding information, expectations, responsibilities, connections with following measures, distinguishing of incidents and different types of knowledge
- Make things easy to follow/summarize
- Ensure that investigations performed and procedures developed are backed by existing ground rules

- Map inabilities, long time issues and take into account conflicting interests as well as different assumptions
- Ensure enthusiasm to new solutions and avoid giving blame
- Important with a proactive management which do not back down from problems but instead engages in issues
- Develop arenas where the aim is to study improvements

Table of contents

Preface	1
Summary	2
1 Introduction	6
1.1 Background.....	6
1.2 Objective.....	7
1.3 Research questions	7
1.4 Clarification and limitations	7
2 Theory on how to create a learning organization	8
2.1 A general introduction to learning	8
2.2 System thinking	12
2.3 A learning culture	13
2.4 Strategies to achieve a learning organization	16
2.5 Inhibitors and promoters toward a learning organization.....	20
3 Methods	29
3.1 Description of the research process	29
3.2 Theory on qualitative research	30
4 The empirical results	35
4.1 Deviations that causes incidents	35
4.2 The outcome of the learning	37
4.3 What created the learning?	39
4.4 Challenges/Barriers with the learning	42
4.5 Systems to ensure learning and how to follow up reports/issues	45
4.6 How to become better able to learn? How to implement the measures? How to see the improvements?.....	49
5.1 Inhibitors in becoming an learning organization	54
5.2 Promoters towards a learning organization	60
5.3 Recommendations	65
6 Conclusion.....	68
Bibliografi	70
Appendix A: the interview guide	74
Appendix B: the interview results	77
B.1 Interviewee A.....	77

B.2 Interviewee B	81
B.3 Interviewee C	83
B.4 Interviewee D	85
B.5 Interviewee E	88
B.6 Interviewee F	91
B.7 Interviewee G	93
B.8 Interviewee H	95
B.9 Interviewee I	99
Appendix C: the interview results separated into categories	104
C.1 Deviations that causes incidents	104
C.2 Outcome of the learning	105
C.3 What created the learning	106
C.4 Challenges with the learning	107
C.5 How to be better able to learn?	109
C.6 Barriers against learning	111
C.7 How to see improvement	113
C.8 Systems to ensure learning	113
C.9 How to follow up reports	116
C.10 How to implement measures	117

List of figures

Figure 1: David Kolbes cycle on experimental learning	11
Figure 2: Argrys & Schøn single vs. double loop learning model	11
Figure 3: Power relations	19
Figure 4: The context between learning processes and sources to barriers	22
Figure 5: Nonaka and Takeuchi`s knowledge spiral	27

1 Introduction

This chapter is dedicated to give a brief introduction to the background for the thesis, and what is going to be explored.

1.1 Background

To learn from experience is a well-known challenge for many companies. This goes for both internal and external experience and applies in many industries. The issue of learning gives the basis for this thesis.

The term internal experience in this context means experience that companies obtain from field study of their internal operations, and experiences related to internal incidents. External experience covers study of incidents among competitors. It can for example be that employees of a company have been on a seminar where they have been studying a certain incident in order to learn from it, or it can be participation in forums that aims at exchange experience within a specific business field, for example a HSE forum.

The thesis aims at develop general recommendations for how to establish and facilitate a learning organization related to safety. The recommendations are based on a combination between general theory for how to ensure organizational learning and empirical results based on nine semi-qualitative interviews of personnel within three different oil companies in order to reveal their views for how to learn from internal/external experience, as well as systems that exist at their current employers that have the aim of promote learning.

In practise it appears that lack of shearing of knowledge and experience is a common factor that inhibits learning in many companies. Analyses at Statoil revealed that underlying causes to incidents are not necessary the same as direct causes (Hansen & Leknes, Læring av hendelser i Statoil, 2011). Underlying causes might not be dangerous apart and an organization can live with them for a long time without something happens. The challenge is to reveal these underlying incidents before an accident occur. In Hansen & Lekenenes report it were revelled that Statoil had problems with different tools like IT- systems which did not work as it were intended to and that information of relevance for the employees where seen as unavailable. Organization and coordination were also seen as a challenging.

In the Norwegian continental shelf it has been made analysis of incidents with regards to learning, one of them are in relation to well C-06 A on the Gullfaks A platform. One common way of separating challenges are to divide them into two parts, one are related to deviation, while the other are related to possibilities for improvements. The incident on Gullfaks proved that there was inadequate follow-up of documentation that regulates the policy of the company. Thus requirements to methods, exchange of experience, quality assurance of plans and processes, requirements to training and involvement of relevant personnel (Gundersen, 2010). Even though Statoil analysed this incident afterwards, it were revealed that several of the key personnel were not involved and did not know about the content in the analysis, which

cannot be claimed to promote learning. Several employees of the company thought also that the incident should have been investigated.

The thesis is a response to the challenge with regards to learning with the aim of assuring that incidents like Gullfaks do not occur in the future and to ensure proper analyses/investigations if incidents are to occur.

1.2 Objective

The objective of the thesis is to come up with recommendations with regards to internal/external learning. The thesis is divided into six parts. The first part gives an introduction into how the work is performed, and what the expected results of the study are. The second part aims to describe relevant theory on the field. The third part is dedicated to describe methods that are used when working with this thesis. The fourth part consists of an empirical study based on nine semi-qualitative interviews of employees at three different oil companies, where identification of what inhibit and promote learning where the goal. The fifth part consists of a discussion where the theory and the empirical findings are compared; the aim is to come up with recommendations in order to learn from internal/external experience, the recommendations are meant to be a helping tool for the oil industry as a whole, but could possibly also be applicable in other industries. The last part is a brief conclusion of the main features for how to ensure a learning organization based on the work performed in the thesis.

1.3 Research questions

- What characterizes a learning organization?
- What inhibitors to learn from safety experience exist?
- What promoters to learn from safety experience exist?
- What general and specific advices can be given to promote learning from internal/external experience?

1.4 Clarification and limitations

As mentioned this study aims at come up with recommendations in order to learn from internal/external experience. Since this is going to be achieved through a combination of general theory and empirical studies, the challenges lies in choosing the right theoretical material as well as have a good empirical study.

With regards to the theory, this is a field that can be related to several reports and books, therefore the clue is to narrow it down and try to think of how to use the theory in practise.

In general when doing empirical studies the challenge lie in choosing the right amount of cases/interviewee in order to get a broad perspective of the issue. In addition to this the quality of the studies/interviewees plays a crucial role in order to get an accurate picture of where the challenges lie.

These are the main factors that bring limitations to the result and the recommendations developed.

2 Theory on how to create a learning organization

As a result of more complex organizations and shifty environments, the attention towards organizational learning has increased. It is important for an organization that wants to become successful and have the ability to achieve innovation are aware of this, so that they do not fall behind in the competition with competing actors on the market.

This chapter aims at describe factors that ensure organizations to not fall in the trap of getting stuck in old patterns and established ways of thinking, but instead undermine the goal of being dynamic and successful also in the future.

2.1 A general introduction to learning

Learning is about changing either through changed knowledge or behavior. From a psychological point of view learning is a result of experiences that changes our behavior (Reber, 1995). This means that learning is not something that can be achieved only through collect of information, but rather something that have to be tried. This implies that when we learn we re-creates ourselves by coping something that we before couldn't handle (Senge, 1990).

Many definitions have been made in order to describe an learning organization, but perhaps the best definition is by Senge (1990:3) who defines learning organizations as *“organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together.”*

There is no general consensus regarding what organizational learning really is. It can be claimed that organizational learning is a process where an organization and its sub-units changes as a result of experience. Learning can be at an internal level where members of an organization learns by studying their own experiences or at external level where learning is achieved through studying of similar departments. When studying the performance of units it can be made a distinction between learning that aims at correcting failure and learning aiming at including errors and see them as inevitable (Hollnagel, 2011) which is something that is achieved by acquiring of knowledge and adapt behavior as a result of the new knowledge (Garvin, 2000).

Another view is that organizational learning is about change of organizational knowledge. This can be achieved for example by convert knowledge into routines that provides guidelines for how to behave. The aim here is to understand the processes behind the change of organizational knowledge, and the effects it has (Schults, 2002).

2.1.1 Different values in an organization

How organizations work can hardly be controlled through written guidelines but rather through the members understanding on how the organization works, and which set of values that exist. It is a local reality that controls us; this is what is called *action theory* (Levin & Klev, 2002). The action theory is developed through practical training and experience. It is a complex interaction between what we consciously reflect and what are controlled by our

silence knowledge that has been developed through training and experience (Argyris & Schön, 1996). To be able to change this behavior gives the basis for a learning organization.

Another value is *theory in use*, which is a form of everyday theory that reveals the real actions of the participants. This makes it possible to study the tension between what employees in a company say they do (*theory espoused*) and what they really do (theory in use). To solve the counterpart between theory espoused and theory in use gives the basis to develop strategies (Argyris & Schön, 1996).

As mentioned *theory espoused* is a description by the members in the organization of how they really want the other members to think, thus the desired value of the organization.

2.1.2 To be able to learn

Before an organization can learn there are some important assumptions that have to be considered.

2.1.2.1 Purpose

Before evaluating the learning ability of organizations it is important to understand what purpose the learning has. One purpose can be related to the aim of achieve improvement by increase the favorable results. Another purpose can be to see learning as recordings, where conclusions are maid on the background of experiences and that these conclusions are formalized into routines, procedures, conventions, technologies and strategies. The third purpose emphasizes learning as an evolution of knowledge over time and how this is to be distributed to sub – units (Schults, 2002).

2.1.2.2 See the context

Since every organization is a part of a social and historical continuity it is important to see the context the organization is in, organizations tends to avoid/reduce uncertainty by negotiating their own environment by follow tried and tested approaches/methods within the industry. In this environment members of the organization are forced to act upon more or less complete information, which might lead to that the members will reduce uncertainty by reducing complexity, based on the criteria they feel they are evaluated on (Baumard, 1999). As a result of that organization often develops filters against incoming signals, in order to make sense of their environment and constraints (Cyert & March, 2006). This can result in that the organization develops a misinterpreting system. It can for example be that an organization uses a worldview based on past behavior as an equipment to understand the current situation (Daft & Weick, 1984). In this environment knowledge are a changeable and delicate thing, and will if drawn from its application be lost if it is moved from its context (Baumard, 1999). The environment of the organization are especially enlightened when facing a major accident which results in that expectations arise from many different actors that demands results. It can after a major incident be appropriate to study the period right in front of the accident in order to study why an organization does not correct its view even though the organization probably have seen signs on that the world view might not be correct (Turner & Pidgeon, 1997).

2.1.2.3 Pressure

A certain pressure is healthy for an organization, since it highlights important issues that an organization has to improve, however it is important to be aware that this pressure may only affect external features of the organization, and have a little impact on the core concept or in the sharp end. This can be as a result of that measures are taken fast with little pre assessment, the actions taken are purely in a symbolic nature, or it could be the media which often uses exaggerating and catastrophe techniques (Hovden, 2011) may affect the agenda.

2.1.2.4 Conditions and tools to ensure learning

In the past learning has been seen as something restricted to individuals, but has in later years also been seen as a key concept for organizational development. There have been written papers that explore learning related to human, technological and organizational issues (Størseth & Tinmannsvik, 2011). To be able to learn it is important to realize that the biggest barriers against learning often are that members don't want to learn. This can be as a result of that members don't want to admit they are wrong because of the fear of being punished, or because of other defense mechanisms we have been growing up with and that hierarchical organizations have thought us (Argyris & Schön, 1996).

To be able to learn Størseth & Tinmannsvik (2011) describes different conditions in an organization that have to be in place.

- **Cooperation:** It is necessary that different actors cooperate across different sectors.
- **Motivation:** It is important that the members of the organization are willingly to confront the problem with an open mind in an honest effort to learn.
- **Trust:** It is of importance that the different segments have a trust in each other. So that they can share with others what they do wrong.
- **Participation:** Try to incorporate all key personnel and segments, so they can contribute at develop measures

(Størseth & Tinmannsvik, 2011).

The main difference between organizational and individual learning is that organizational learning means a change in the shared understanding between members of the organization. An important model developed to describe learning in organizations is the *learning by experience model* (Kolb, 1984). This model identifies the processes that are important in order to be able to learn in a good and effective manner.

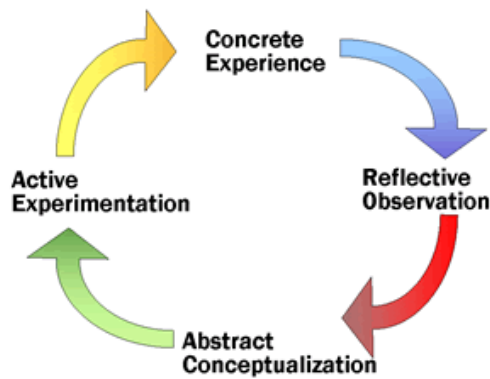


Figure 1: David Kolbes cycle on experimental learning (Amstron & Fukami, 2009).

The figure shows a learning cycle where concrete experiences are being reflected to build up an understanding of what really happens, and afterwards use these new understandings as a basis for new actions, experiences and so on.

2.1.3 Different goals with the learning

When discussing learning it is important that the organization reflects what they are trying to achieve. For example distinguish between single loop and double loop learning.

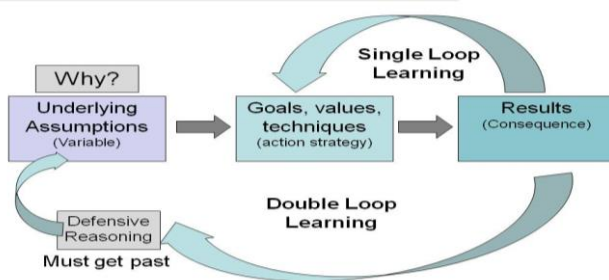


Figure 2 Argry's & Schön single vs. double loop learning model (nwlink.com, 2010).

As the figure shows single loop learning is a form of instrumental learning that changes the *action strategies*, but leaves the values of a theory unchanged. For example an inspector which identifies a defective product and conveys that information to a product engineer who may change the product specifications and methods to correct the defect. It is an adjustment of the action strategies, while the basic values and goals are still the same.

Double loop learning also changes the values of *theory in use (action theory)* as well as the strategy of action. This double loop connects the observed effect of action with strategies and values served by strategies. This form of learning may be carried out by individuals, when their inquire leads to a change in the values of their theory in use or by organizations, when individuals inquire on behalf of an organization. This form of learning asks not only if the issues are done the right way but also if the right things are done (Klev & Levin, 2009).

2.1.4 Problems with learning

We have to be aware of that not all kind of learning is positive. It can be that locally based learning have provided good results in a local area and therefore becomes repeated several times. This is something that tends to happen when there is a lack of compliance with

procedures and rules to ensure the system as a whole, and units develops ways to act based on practical trying and failing. How centralized a system should be organized has to be based on how tight the connections in the system are (Perrow, 1999). With tight connections failure will spread rapidly and there is a little room for slack in the system. The contraction to this is a system with loose couplings. Here there is room for slack and failure spreads slowly, in this kind of system organizations might not need a very coordinated structure. Also when studying connections in an organization it is important to be aware that organizations might outsource activities in order to learn more about their core concepts. This can cause problems in shearing information across organizational boundaries.

Another problem with learning is that it can be developed a culture within an organization that over time adapts dangerous situations and accepts hazards by learning to handle them instead of do something about it. This often occurs when the framework is incomplete (Vaughan, 1996), and it within this develops procedures and an understanding of the system that weakens the risk control.

When an organization tries to develop an identity among members and attach them to experiences, a discipline process is important. This process however might have a bi effect in form of fear of sanctions among members, and may undermine the flow of information within the organization.

2.2 System thinking

If a company rely too much fait on the system it can result in that errors become traced back to individuals in the system and that the focus becomes directed against the users of the system, rather than focus on the system that might have issues to be dealt with (Hansen & Lekenes, Læring av hendelser i Statoil, 2011).

In order to develop a learning organization it is crucial to implement the so called fifth discipline, which is system thinking. This discipline aims at integrate different disciplines and melt them together as a unit of theory and practice. To be able to develop a good system strategy in an organization it is important that following four disciplines operates simultaneously, that is; personal mastery, mental models, common visions and group learning (Senge, 1990).

- **Personal mastery:** with personal mastery it means not just competence and skills, but also spiritual expression. The discipline can be divided in two, one is a continual mapping of what is right for us, and the other one is related to how we clearer can see our present reality. The system perspective will map the structures that characterize personal mastery, but also the more subtle sides like integration of reason and common sense in order to see more of our relation to the world, compassion and commitment to see the whole.
- **Mental models:** the reason for that new ideas often fails and organizations are kept from learning is that new insight do not become considered because that it contradict with old and ingrown performances about how the world works. Therefore it is important that organizations explore this discipline in order to achieve change. This

can be done by use of institutional new ways of thinking so that new skills can become regular.

- **Common visions:** common visions enable an organization to focus on a subject, and it provides the group with energy to continue the work. It is impossible to create generative learning without the members feel that something really matters for them. Therefore it is important that the members feel a commitment towards the vision, and that it is not just something that is forced upon the employees of a company from the top management. When developing such visions it is important that the visions are not restricted to an outer issue like benchmarking with a competitor in world class (Stapenhurst, 2012), because this can restrict the creativity when the goal is completed. The key is continually improvement of the processes regardless of how good the organization is compared to competitors. After clarifying the vision it is important that people starts to talk about it and create enthusiasm, enthusiasm can also be strengthen by early successes, in seeking the goal.
- **Group learning:** this is the process of fine – tuning and development of the organization`s ability to create desired results. This is a discipline that focuses on developing of individuals as well as collectives that contributes to collaboration across functions. The discipline consists of three main parts. The first one is to find out how they can use all the brains in the organization, in order to release the full potential. The second is to coordinate the interaction between the individuals. The third are the impact that the group members have on other groups, that is encouraging other groups to do the same.

The purpose of these disciplines is to ensure a synergy effect where the combined result of the measures exceeds the sum of its parts (Senge, 1990).

2.3 A learning culture

In order to develop a learning organization it is not enough to have the right formal strategies and tools in place, it is also important that the organization have the mind set to undermine an intelligent and learning organization. This is important because culture reflects the product of individual and common values, competence and behavior pattern that determines the degree of commitment to the strategy of the company (Kongsvik, 2012). This issue has often not become prioritized because the main focus has been on technical solutions. To develop a learning culture aims at develop knowledge systems that underlines an effective spreading and exploiting of knowledge. It can be several reasons that make this problematic; it can for example be that people do not want to shear knowledge because of the fear of their own position (Rekdal, Fledsberg, & Hansen, 2002).

2.3.1 Definition and different levels of culture

How to define organization culture is not always easy, Bang (1995:97) says “*organizational culture is a set of sheared norms, values and perception of reality that develops in an organization when the members interacts with each other and the environment*”. When studying the culture of an organization as a whole it can be a beneficial to divide the culture into three different levels (Schein E. H., 1987):

- **Artifacts and products:** This is the most visible level in a culture. It can be products that the group delivers, spatial design, the language that are used and the observable behavior among the members. To observe these artifacts are easy, the challenge is to understand what they mean, the relation between them and the patterns they represent. Therefore it is important to study artifacts over a long time scale in order to understand the real culture.
- **Values:** When a group faces a problem with no common consensus on how to determine if this solution will work or not, the selected solution will reflect the value of the group. If the solution achieves a consensus that it works, it will go through a cognitive transformation so that it first will be regarded as a perception, and so as an assumption. Therefore cultural learning can to some extent be regarded as a reflection of personal values. The value can thus reveal the climate in the organization, which is a snapshot of the culture.
- **Basic underlying assumptions:** One of the main reasons that organizations do not renew themselves is because they take for granted certain assumptions which leads to that they do not see other solutions. This is often because that certain solution approves to be appropriate several times, and it gives the basis for how the members of a group should think, act and feel. To reveal what kind of assumptions that exists in an organization it is not enough to study artifacts and values, but should also interview key personnel to reveal the real culture.

2.3.2 How to create a learning culture

An organization can have the best tools in the world to achieve continually learning. This is not good enough without having a culture that emphasizes learning. In order to achieve this it is several elements that have to be considered.

2.3.2.1 Inhibitors towards a learning culture

How to understand a culture can sometimes be difficult. Culture is not something statically that can be completed, but are rather something that are expressed through what we do together and are under continually development. The disadvantageous side by having a strong culture in an organization is that it might affect the ability to think outside the box (Rosness & Nesheim, 2013), which might affect the ability the organization have to acquire knowledge. This because that the collective identity is so strong that the members are afraid to come up with ideas that violates what's normal practice. This can be further underlined with a blaming culture that aims at find persons to be held responsible, and which do not provide possibilities to test causals and other solutions. On the other hand a weak collective identity can result in that the members are most concerned with their own interests and do not provide anything extra for the group or the organization, and as a result of that have little to contribute with.

2.3.2.2 Cooperation and participation

Culture are very seldom a common entity, but are usually divided in different subcultures. It is not an individual property but is developed in relation between people and certain frameworks (Gherardi & Nicolini, 2006). In order to develop a culture, it is important that people with different views work together so that the organization accumulates ideas and becomes more

dynamic. It is important that organizations that want creative contributions from their members have a tolerance for new ideas and encourage exchange of oral experience, creativity and fantasy in order to develop safer work (Petroleumstilsynet, 2002). To ensure that the members of the culture do not feel that something are unjustified it is important to prevent unjustified blame, that is to develop an predictable and acceptable policy in order to separate unjustifiable errors from errors that are caused by systematically deviations (Kongsvik, 2012).

2.3.2.3 Think outside the box

Myths are something that is embedded into many groups/individual and prevents learning, the key is to identify and dispel them in order to change behavior (Short, 2007). Therefore it is important to not only train on the same scenarios, but also develop the training programs so it enables the training programs to learn and develop. The training programs should also provide flexibility to the organization, in order to improvise in difficult situations. This can be undermined by training first line leaders in situations that demands improvisation, mix members with different background and stimulate to direct communication.

2.3.2.4 Measure the learning ability

To ensure that a culture is healthy and learning it is important with a clue on how to measure it. This can be answered by asking following questions (Antonsen, 2009):

- Can a learning culture be observed by studying individuals or interactions, or is the culture about basic assumptions?
- Can it be developed a tool to measure the extent of the learning culture?
- Can the management of a company specify and implement the learning culture?
- Are there some signs to look for that characterizes a learning culture?
- Is the learning culture dependent on the organization culture as a whole?

2.3.3 Create a reporting culture

To maintain an intelligent organization it is important to develop an information system that embrace learning from incidents, accidents and other relevant experiences (Pidgeon, 1998). It is therefore important to develop a good reporting system.

2.3.3.1 Ensure participation

In a reporting culture the focus is on mapping critical incidents and near accidents. To be able to reveal factors like that in an organization it is important to build trust so that members in an organization do not fear of the consequences if they choose to report the incident. One way of assuring trust can be to ensure confidentiality to they who report, but on the long term the goal has to be to ensure a strong confidence in the organization so that confidentiality does not become necessary. It is important that the members know that in the reporting system the intention is to learn rather than sanction members that do mistakes (Petroleumstilsynet, 2002). In addition to this the Norwegian petroleum authority focuses on that the reporting must be seen as something meaningful, and not something that stands as a counterpart to more profound based analyses. Also to ensure that the reporters feel appreciated it is important with

a fast follow-up of the reporting (Reason, 1997) so that the reporters see that changes occur rapidly and does not become delayed.

It is important that the reporting practice have strategies to cope with conflicting interests among different actors (authorities, jurisdictions, industry, private companies), therefore it can be necessary with several separated reporting systems (Le Coze, 2013). In addition the reports should be easy to make, so it do not consume too much time.

2.3.3.2 Select what to be investigated

After reporting Le Coze underlines the importance of selecting which incidents to be investigated more thoroughly, this can be done by looking for patterns, see connections, look after something new, as well as deviations. The results and subsequent recommendations from these investigations must be implemented in an appropriate way that takes into account the regulatory regime and its ability to adapt and transform public policies. It is important that the management is willingly to take the necessary steps to implement changes that are indicated by the information system, so that the reporting stands as something useful and is taken seriously.

2.4 Strategies to achieve a learning organization

Before an organization implement tools to undermine learning it is important that the organization have the adequate strategies to achieve this.

2.4.1 Problems

To develop strategies for handling the underlying causes is not always easy. This because the root causes for accidents are often complex and developed in the interaction between actors at different levels in socio-technical systems (Rasmussen & Svedung, 2000). Also when develop strategies it is important to divide between two types of knowledge. One is *exploitation* which is about improving existing routines, working methods and procedures. This kind of knowledge is usually related to increased efficiency and improvement of productivity. The other type of knowledge are *exploration* where an entity are learning something new, by seeing things differently and find new opportunities and options in doing tasks (Levitt & March, 1988). Especially the last form of knowledge can be useful when a company needs to innovate processes or products. These two types of knowledge promotes a challenge regarding achieving a balance between them (Rosness & Nesheim, 2013).

2.4.2 Different activity and organizational characteristics

Another important factor to keep in mind when analyzing organizations, in order to develop strategies is to understand what characterizes the activities. Some activities might be characterized by that they are often repeated and have no time limit, while other tasks might be more special and unique and have a clear date for when to start and when it ends. In organizations with repeatable tasks, it would be preferred an organization with parts (departments, production or functional entities) that can save and spread knowledge.

A typical example of an organizational solution to maintain more time limited activities is a project organization. This type of organization can be implemented in many ways; it can be intended as a supplement, or as a lasting production, or even as a main contributor to the work

in the organization. The actors are here more variable and isolated from the organization, and include usually internal and external members. In such project based organizations the challenge is to learn between projects, it can be documentation of practices in different part of the project, experience with suppliers and customers, and identification of experts at the area.

To maintain an organization as a collective it is important to keep in mind that even though the members are in possession of important knowledge this do not ensure an intelligent organization. It is therefore important that knowledge held by individuals enters into the organizational thoughts and actions (Argyris & Schön, 1996). We have also the counterpart that is when organizations perform better than the skills of the members would imply. This can be a result of that structure, procedures and memories are well integrated into the organization, like in the army. In an organization like that the organization becomes the behavioral setter. Even though this approach are reached the problem are still to link individuals to organizational processes. To solve this problem there are different approaches that have to be considered.

2.4.3 Different strategic approaches

When developing a learning strategy it is several contradictions that have to be considered.

2.4.3.1 Who contribute to the learning?

When developing strategies for learning in an organization one decision could be if the organization are going to rely on one key person or to see the organization as clusters/groups that learn from each other.

When seeing the executive as the key person to ensure learning in the organization. The key is to have effective communication patterns between the executive and the employees. The managers should encourage learning through a transparent communication, where the benefits of participate in learning becomes highlighted, in order to ensure motivation (Jones & Cox, unspecified). The top management can affect learning in many ways and are important in the learning process, since they provide formal authority. The skills of the top management also play a role in learning, because it is important that the necessary changes in overall policy and strategies are performed with care and not just performed randomly in hoping for the best.

The approach when organizations are seen as clusters of individual members, the key is that members in the clusters/groups learn from one another through interaction with each other. The challenge then is to spread the knowledge within the group throughout the organization and enter it into the stream of debates and deliberations that affects an organizations policy, program or practice.

2.4.3.2 System logic

Another contraction has to do with the system logic. The contraction here is to see systems as a string of sequence vs. systems as a patch work of parallel systems (Kelly, 1994).

In the approach of seeing a system as a string of sequences the logic are in a more machinelike manner where the measures are performed as a parade of movements of time. Here the system is seen as a series of critical individual actions. In the approach where the

system works as a parallel of processes the logic are in a more bio-logical way that emphasizes a collective pattern, where the system consists of a number of different actions that happens simultaneously. The measures in this system are performed as an untidy cascade of interdependence. The two systemic approaches must not be taken literally but rather as to underline a sharp distinction between the two extremes.

The most likely approach is a combination of the two extremes. In this lies the assumption that to look after a demarcation point with regards to learning are useless. Instead the goal is to look for forces and dynamics in learning processes (Størseth & Tinmannsvik, 2011).

2.4.3.3 Add thinking, knowing and learning to an organization

In order to add thinking, knowing and learning into an organization there are according to Argyris & Schön (1996) two strategies involved.

- 1) Adopt the stance of a distant spectator.
- 2) Se the entity as an impersonal agent.

(Argyris & Schön, 1996)

The first strategy may be necessary to be able to treat an organization as a monolithic, impersonal agent. As an example economics tend to see the business from a great distance which enables them to see the organization as a whole. The goal is to see the firm as an agent which competing with other firms, adopting or changing strategies in order to gain competitive advantage. Even though these distant theories may be helpful in economic and policy analysis it is important to realize that this strategy do not describe and explain the process within an organization that give rise to patterns of activity.

The second strategy allows adopting a kind of machine language. These type of language increases usually when the influence from computers increases. It is a kind of computer language that refers to phenomena that used to be attributed to thoughts, will, deliberation, feelings, or habits. The use of computer language like “I am in sales mode” or “I am not programmed for this task” underlies the growing tendency to treat organizations and their parts as impersonal agents. This strategy aims at reducing the personal side in the organization in order to develop a more understandable and marketable language that can be understood within the organization as well as by external actors.

2.4.4 Organizational learning at different stages

In making it clearer where in an organization learning can be achieved, it can be appropriate to describe the organizational learning at different stages (Carroll, 2004). The first stage is locally based where knowledge is a result of the members experience and skills within the organization. This kind of knowledge is often hard to transfer, since learning is decentralized within individuals and/or groups and is most often based on single-loop learning (Argyris & Schön, 1996). The second stage aims at achieving conformity, through exploration of the known factors; this can be achieved through a set of routines. The third stage aims at involve the members in the process; by for example make them come up with questions to reflect over; however with a rapidly changing environment this approach may be too slow. In the fourth phase the aim is to create an understanding among members of the deep, systemic

causes and provide a wide range of possibilities for action to address these causes. It does that by building further on the third phase and adding more capacity for double-loop learning. This makes the individual capable to transcend the level of component understanding and develop a system thinking skill as well as mental models (Carroll, 2004).

2.4.5 The presence of power in an organization

In an organization power are seen as the ability to act and improve. Power in an organization is not something that is easy to describe in words, and it exists many different views of what power is. However it is beyond now doubt that power is necessary in order to implement measures in an organization. It is claimed that power aims at transforming insight of groups and individuals into the organization (Lawrence, Mauws, Dyck, & Kleysen, 2005).

In order to develop strategies for learning it is important to know how changes can be achieved, therefore it is of interest to study different power relations. Despite that power are attached to formal positions and control systems, it is important to realize that power can lie in the capacity to affect premises and understanding of situations and of that reason is it important to also study informal network and relations (Hansen & Lekenes, Læring av hendelser i Statoil, 2011). When it comes to interpretation this part of learning are affected of whether the actors have political skills and the ability to use techniques for its influence.

The easiest shapes of power in an organization are attached the four learning processes that are illustrated in the figure below.

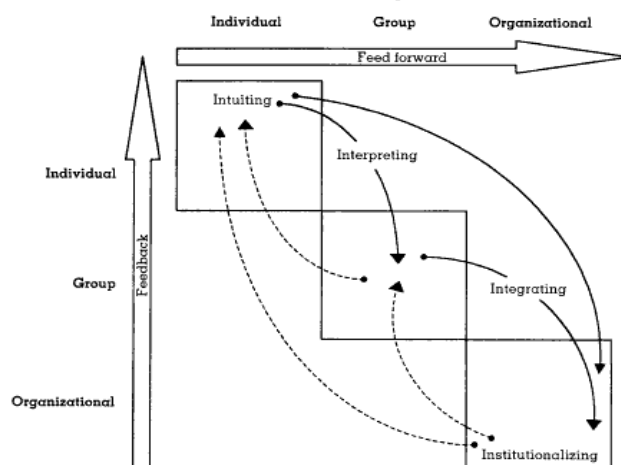


Figure 3: Power relations (Crossan & Lane, 1999)

2.4.5.1 Influence and force

Influence will be most effective in the interpreting phase, since influence can affect benefits that the members can attach specific interpretations of a new idea. To exercise influence different measures like negotiation or persuasion can be used. In the integration phase, the most effective power is the use of force, thus to limit alternatives that are in position of the members in order to create accept and understandings for the new ideas. This can be done by

affecting the agenda of formal and informal agendas and neutralize opponents. Influence and force are types of power that relates to concrete, strategic actions performed by the actors that wants to secure their interests.

2.4.5.2 Dominance and discipline

In the institutionalization phase dominance is the most effective power, since it contributes to reduce number of actions. Dominance is usually attached organizational systems that aims at assure control of the members in the organization by exerting pressure to assure accept of measures. The next form of power is discipline which is most effective in the learning process of intuition. Discipline aims at develop individual expertise and experiences within a specific field, and also to affect the members identity and attach them to experiences. Discipline practices can for example be in the form of socialization or teamwork. When using discipline it is important to be aware of the purpose with it, is it to force members into actions or is it to assure trust and identification among the members in the organization by encourage informal groups to support the policy of the organization (Clegg, Courpasson, & Phillips, 2006). It can be concluded that these two forms of power, thus dominance and discipline are systematical and affects learning through routines, and practices in the organization.

2.4.5.3 Challenges

If formal power in an organization is misused the result can be that changes stops. This is often a result of reluctance against changes among members with positions of power in organizations, since they fear to lose ownership of their unique knowledge. However if power are to be used proactively, the result could be that an organization enables changes (Borum, 2005). A well-known scenario is that line managers struggles against changes because of the fear that their department are going to lose repute (Hussein, 2013). The reason for that power has such big influence on learning is that it affects both participation and collective reflection processes. By participation it means the fact that some within the organization have to give up some of their influence for the benefit of the new decision takers, this is crucial in order to develop organizations. The collective reflection contributes to development of knowledge in interaction between members of the organization with the aim at contribute to learning (Levin & Klev, 2002).

In organizations with strong personalities there will almost guaranteed occur conflicts between different actors. This can result in different interests, hidden agendas and motives, which can undermine the conditions that promote learning. However different views in how to perform activities can be healthy, especially in a transparent organization that aims at creating discussions. If it is to low accept for discussions and different views this can have a negative effect in searching for alternatives.

2.5 Inhibitors and promoters toward a learning organization

In the modern world changes occur frequently, therefore it is crucial to create a learning organization in order to cope with a changing environment. Any organization that slows down on the search for alternative ways of doing things is in the danger zone of falling behind in the competition. Therefore it is important that management and employees is proactive in contributing to continually improvements by being critical to their own practices

(International Atomic Energy Agency , 2002). In order to do so it is important to understand what inhibits and what promotes learning so the problem can be attacked from an appropriate point of view (Jones & Cox, unspecified).

2.5.1 Barriers against learning

Barriers in this chapter are not meant as barriers towards a specific action, but rather as something that prevents developing of new ways to think and act.

2.5.1.1 Get stuck in the past

A common scenario for many organizations is that they get stuck in old patterns in ways of doing things. This is often a result of when a major change in an organization is announced it creates an uncertainty that leads to that member of the organization tries to block these changes (Edmondson & Moingeon, 1999). This can result in that the organization negotiates its own environment by following tried and tested approaches for the industry. This approach is common because this seems like an easy way out of the problem they feel they are evaluated on (Baumard, 1999). To comply with these issues companies tends to develop shields against new ways of thinking which undermines the desire of keeping things as they are. Another factor to keep in mind is that the fear of being blamed and punished may also block learning (Turner & Pidgeon, 1997). Therefore organizations have to make tradeoffs between organizational learning and responsibility. It is also important to keep in mind the old not-intervene here problem, where new interpretations and propositions might meet resistance from the other units because of the fear for their positions.

2.5.1.2 Systemic reasons

There can be many systemic reasons that prevent learning. It can be a pressure toward following the rules, too much focus on responsibility, difficulties because of changes towards more automation, and difficulties for the human operator and dysfunctional roles for the regulatory organ (Ballesteros, 2007). In growing organizations it will often develop problems regarding sharing of knowledge. This is often a result of that members have not built relations to each other (Mueller, 2012), and problems regarding who knows what arise. In dynamic organizations there will often be a need to perform projects which develop barriers in form of restrictions at the budget, and also a lack of discussion among project members after the project is finished (Disterer, 2002) because that project members tends to end the project at different times and is then off to other assignments.

2.5.1.3 Wrong focus

Also when implementing measures to reduce risk of future accidents it is of importance to avoid the mistake of focusing too much on a certain problem. This can be regarded as a barrier because too much emphasis on one problem may lead to lack of focus on another issue. As an example BP were a champion in preventing small accidents because of a high focus on issues attached the individual. This led to that they forgot the issues of importance for the system as a whole, which lead to a high number of fatalities (Hopkins, 2008).

2.5.1.4 Relationship between sources to barriers and the learning processes

When studying barriers that keep an organization from learning it can be beneficial to break it up to study how the different sources to organizational learning affects the different learning processes, like the figure below shows.

Learning processes/ Sources to barriers	Intuition	Interpretation	Integration	Institutionalization
Individual actions	Superstition Controlling	The innovator have low trust Loss of ownership and knowledge	No support from the management Lack of formal authority	Lack of competence Indifferent leadership
Structural actions	Monolithically culture Blaming culture High level of specialization	Status culture Norms to prevent failure Strong or weak collective identity	Resistance from other departments Competence traps A internal and stabile based culture	Lack of time and resources Huge turnover Decentralization Unclear responsibility Lack of control mechanism
The environment of the organization	Complex, dynamic environment Ambiguous knowledge	Lack of compliance with dominating and professional knowledge.	Deviation from industry standards Too long response time	Rapidly technological change What's typical for management

Figure 4: The context between learning processes and sources to barriers (Rosness & Nesheim, 2013).

2.5.1.5 Conflicting objectives

A common barrier against learning can be developing of conflicting objectives. Often organizations are forced to set different views up against another in order to do the job fast and effective. Therefore all organizations have to do a fairly trade between doing a job effective vs. being thoroughly. This is referred to as the efficiency - through trade of principle (ETTO) (Hollnagel, 2011). If thoroughness dominates there might be too little time to carry out the action, this is often preferable in operations with high demands to safety. In such high reliable organizations there is a tendency towards unique problems like lack of a major learning strategies as well as trial and errors since errors cannot be contained. This can result in that the organization will have little knowledge regarding the events that might be damaging to them (Weick, 1995). Failure can therefore have a positive effect since it contributes to that members of the organization will face difficult situations and learn from it (Sitkin, 1990), and therefore cope better to surprisingly incidents. If efficiency dominates, the actions may be badly prepared; this is preferable in routine operations with high productivity (Hollnagel, 2011).

This theory has its limitations in that it can't foresee any unexpected situations, so called Black Swans. This is a term that is used for unexpected situations that have no known knowledge attached to it and might lead to a major setback for the business and even a complete failure (De - Risk Blog, 2009). In practice some lessons regarding conflicting objectives might be worth mentioning (Rosness, 2011):

- Conflicting objectives are dealt with all the time by individuals, groups and organizations.
- Adaption over a long period might solve conflicting objectives.
- Pressure from external actors and constraints might routinize explicit decisions.
- Patterns of distributed decisions where the actors do not know how the actions of other actors affect the consequence of their own actions might cause accidents.

2.5.1.6 Information flow and political disagreements

In any organization there might occur problems regarding flow of information as well as political games within the organization. These two factors might develop to be a barrier against learning. The information barrier describes the fact that incidents might have problems regarding uncertainty. This can be related to wrong assumptions regarding hazards; knowledge regarding hazards might be spread among several persons or units, unclear rules and how to act if rules are broken, or trivialization of warnings. The political barrier relates to the fact that actors might blame each other; it might be done steps to protect themselves, or other strategic reasons. These two barriers might cause faulty reporting, secrecy or normalization of deviation.

2.5.1.7 Cultural crash

In any organization it is important to be aware of that barriers can arise as a result of crash between different cultures like; the operation culture, the engineering culture and the management culture, in form of different understandings regarding similar issues (Schein E. H., 1996).

- The operation culture has mainly its roots within experiences they do internally within the company, and their skills are locally based in the organizations core technology.
- The engineering culture has their knowledge mainly in the basic design and in the use of technology. They have often high expectations about the operators' possibilities to adapt the systems. The assumptions in this culture are that engineers are mainly impersonal and optimistic, prefer quantitative thinking, and want solutions based on a minimum of human operators.
- The management culture relates to different actors with economical interest, and has to think profit.

Under normal conditions these contractions are often hard to see, but arise when organizations seek to learn in new ways as a result of that current systems is outdated.

2.5.2 Implementing measures

After identified the obstacles that prevents learning the challenge is to implement the new measures in a way that are sustainable for the future. This means that in addition to follow up the recommendations it important to anticipate future conditions and situations that might occur. This requires a focus on looking ahead, in search for new safety threats, by looking outside the box. This makes the organization capable to be prepared on future threats as well as seeing new possibilities in ways of handling issues. It is therefore important to have an open mind about future threats that goes beyond what the organization to date can handle (Hollnagel, Woods, & Leveson, 2011). In order to train on different scenarios it is important with a close relationship with external parties that are experts on the field of risk training (Falck Nutec, 2013). This ensures that the organization in addition to getting drilled in known issues also gets drilled in new and possible scenarios.

2.5.2.1 Hierarchical breakdown

When implementing measures that undermine the learning ability of an organization, it can be beneficial to break the reaction strategy down in a hierarchical structure. This can for example be in a first, second and third order reaction strategy. First order reaction can be to improve the parts of a machine; second order can also be to improve the parts but in addition change organizational plans like maintenance plans. In the third order the measure can be to change the goal itself (Hale, Wilpert, & Freitag, 1997). One example of a goal can be to introduce a zero goal theory. This is a known theory from the traffic sector. In this theory the goal is zero killed and injured in the traffic, in order to do this it is necessary to have first and second order measures in place. A first order reaction can be separation fences between meeting cars, while a second order measure can be to change the driving patterns on the road by lower the speed limit from 80 km/t to 70 km/t (SikkerTrafikk.no, 2012), the third order refers to the zero goal theory. To be able to learn, organizations have to see the relations between these reactions patterns which can be seen as learning loops in the safety management system. The concept of these learning loops describes how to learn in a multilevel learning approach (Hovden, Størseth, & Tinmannsvik, 2010).

2.5.2.2 Formal system

To undermine the goal of a learning organization it is important to have a formal system which contribute to a free float of information among members, and encourage transparency (Jones & Cox, unspecified) to ensure that every department is updated on what is being done/implemented and the changes that comes with it in form of affects to other parts in the system. In this lays the need for an experienced feedback system (Kjellen, 2002) that collects, analyze and interprets the data, and that have a filter that strainers away unnecessary information. In addition it is important that the information reaches the right people.

2.5.2.3 Safety culture

Even though a company have the best systems to ensure learning, this is not good enough without the support from its members. It is important that the members of an organization do not become too reluctant on the current situation so that they stop searching for failure in order to come up with possible improvements. Therefore it is important that the whole organization is aware of the safety issue (Tinmannsvik, 2012). To undermine this it is

important to ensure a safety culture in an organization where members are proactive in asking questions about the current practice (Petroleumstilsynet, 2002), so that the organization does not get stuck in old patterns. This helps in develop correct assumptions about hazards, and have realistic interpretation regarding different signals. A proactive measure could be to reward safe behavior, by tying safe behavior and career development together (Short, 2007).

Another important factor is to assure a fair organization, thus to avoid a blaming practice even though responsibilities are to be assured. This can be achieved through measures like negotiating when conflicts arise, legal protection of whistleblowers, establish a network of trust relations, support asking questions regarding issues that generally are avoided. There can be raised a lot of questions regarding current practice, the challenge is then to identify which issues that are most critical and develop long term strategies related to these issues. This demand for a long time commitment from the management related to priorities these issues and allocates resources to them (Jones & Cox, unspecified).

It is important to make sure that different actors/cultures have a mutual understanding of each other (Schein E. H., 1996), in order to assure that their different assumptions do not cause problems when they are to be coordinated, but rather create mutual trust. This can be done thru dialog and training programs that are fitted the different culture.

2.5.2.4 Learning across boundaries

As mentioned earlier, learning can be something that goes across company boundaries because of an interactional organization system. The key when having a system like that is to have control systems which are not restricted to a company boarder, but rather develop tools that coordinates and controls the organization across company boarders in order to learn in inter organizational relations, which consists of high level of complexity, more hierarchical systems, different identities, and different goals. In systems like that it is important with an active leadership of knowledge (Meier, 2010). It can be advantageously with alliances that contribute to sheared ownership, personal network, and trust among actors. In addition it will be important to develop a learning network and common training programs, shearing of technology and staff, and to visit each other.

2.5.2.5 Institutionalization

After identified the measures it is important that they become institutionalized in the organization. This can be done with the use of new or audited procedures. It is important that these procedures are followed-up in practice to see if there are gap between procedure and practice (Tinmannsvik, 2008). It is a common problem that these procedures becomes to detailed, which often results in deviation (Reason, 1997), since in the daily work operators have to do activities that deviates from the procedures of practical issues (Nathanel & Marmaras, 2008). These tensions between procedures and practice can be regarded as a possibility to learn. The clue is to ensure a dialog in the conflict between practice and procedures, so that procedures is understood and becomes a habit. The management also has to be informed about this issue.

2.5.3 Spread knowledge within an organization

In big organizations where it is a need to shear knowledge across different entities, projects and geographical locations, it is crucial to exchange experiences across organizational borders. In practice this has proven to be problematic because that tool like IT – systems do not work as supposed and information of relevance for the members is not available. Also in the interface with other actors, tools like documentations and follow – up of suppliers is not contributing to sheer knowledge and learning across the organization (Hansen & Lekenes, Læring av hendelser i Statoil, 2011).

To spread knowledge is a process where one unit in an organization is affected by experiences in another part of the organization. This can be a direct sharing of experience or more indirect sharing of knowledge (Dalkir, 2011).

2.5.3.1 How knowledge can be held

In practice organizations works as holding environment for knowledge, for example in the mind of the members. The problem if knowledge is only held this way is that the organization becomes vulnerable, since members are not guaranteed to stay in an organization, thus if important key personnel leaves the organization it might have a ruining effect. To protect itself from this an organization should hold knowledge in several ways, it can be in form of files and maps in order to make the organization understandable for themselves and for the environment. Organizational knowledge may also be held in physical objects, where employees of a company use physical objects to think (Scribner, 1997).

Routines and practices may also integrate organizational knowledge, which can be difficult for members to describe in words. This enables organizations to carry out complex tasks, which gives the basis for the so-called action theory that has been mentioned earlier (Argyris & Schön, 1996). It can be concluded that an organization that wants to become sustainable for the future should formalize its knowledge. A challenge however is that formalized knowledge and standardization of working processes can give a silent or implicit character, since it can be attached specific experiences, working contexts or cultures, which can result in restricted opportunities to store knowledge.

2.5.3.2 Nonaka & Takeuchi knowledge spiral

To develop and spread knowledge is an important contributor to a learning organization. This gives the basis for the theory behind *the knowledge creating company* (Nonaka & Takeuchi, 1995).

Nonaka and Takeuchi's knowledge spiral gives the basis for four main steps:

- 1) **Socialization:** The purpose with this step is to share secrets and personal skills among members in the organization. This is a process where members study each other and learn over time. This learning requires physical proximity, and is therefore limited to a few numbers of persons.
- 2) **Externalization:** In this step the already known knowledge are transformed to an understandable and interpretable form, so that it can be used by others. This to make individuals able to know how, why and to care why.

- 3) **Combination:** The aim in this step is to improve what have been gathered so far by developing concepts and broader entities in a way that the content is organized logically.
- 4) **Internalization:** Here the goal is to convert or integrate shared and/or individual experiences and knowledge into individual mental models.

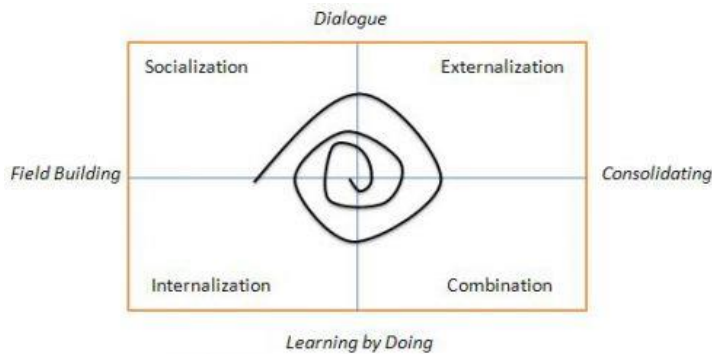


Figure 5: Nonaka and Takeuchi's knowledge spiral (Nonaka & Takeuchi, 1995).

To summarize this model the goal is to convert silent knowledge into a socialization process where new members learn from it and then transform it back to silent knowledge for the new members. For an organization it is especially externalization and internalization that have the biggest learning potential. If the organization succeeds in stimulating such learning, it can achieve that silent and explicit knowledge will strengthen each other.

2.5.3.3 Arena

To undermine the process of exchange experience among members it is important to create an arena where members can exchange experiences. Nonaka (2002:105) says *“It is a critical matter for the organization to decide when and how to establish such a field of interaction in which individuals can meet and interact”*. The goal is to establish possibilities for dialog between cooperative or potential cooperative actors so that development of new understandings can be made. This can for example be that a director organizes weekly tours where he and leaders of different departments performs inspection of the work place. After the tour the director and the leaders discuss what they think about what they were witnessing. This following discussion gives the basis on how to behave when facing different situations, like if they are to intervene or not. After the meeting the leaders act as they were agreed to, and discuss the implemented measures on the following tour (Hussein, 2013). What can be concluded from this is that dialog can create new ideas and contribute to sustainable decisions, but to reflect whether new collective behavior is achieved there have to be possibilities for practical training and reflections over the experiences. Therefore consciously design of arenas to exchange experience is important (Levin & Klev, 2002).

One important type of arena is the *communities of practice* which is a network of informal relations between employees, which contributes to a collective learning within a field of subject or a specific competence internal at companies and link its working identity towards this competence (Brown & Duguid, 1991). The learning stands in a context and cannot be

exchanged through abstract knowledge from one individual to another. The communities of practice work as little societies, where information is sheared by common discussions and activities. Over a period of time they develop common tools to solve problems. This development can find place through many different activities like problem solving, mapping of knowledge, and it exists in several forms, for example size, localization and organizational placing (Wenger & McDermott, 2002). In order to connect the communities of practice it is important with boundary objects that the communities can relate to. An easy example of this is a written contract between an operator and a service company, where the different actors has to relate to this contract even though there might be different views of what a contract really is, how it should be used, and what makes a contract good (Forseth, Rosness, & Aamnes, 2011).

3 Methods

This chapter is aimed at giving a description of the research process used in this thesis, including general theory on how to make a good qualitative thesis. This provides the reader with capability to consider how trustworthy the thesis is. There are different approaches in qualitative research, in this thesis it where used an interviewee guide based on a semi-qualitative approach, and afterwards used grounded theory to look for patterns.

3.1 Description of the research process

The process started with a request from Acona, whom were interested in having students from the HSE program at NTNU to write a master thesis for them. They provided different topics to choose between, with different supervisors for each task. After looking at the propositions there were mainly two topics to choose between, one regarding emergency response and one regarding how companies can learn from internal/external experience, mainly within the oil industry, but the task where later made more general. The election felt on the learning task, since this topic seemed to be the most useful topic with regards to the literature studied in the HSE program.

After the task were elected, the job on making a master contract started, as well as starting to develop research questions. In parallel with this the rules for how to ensure continuous progress started. In order to ensure continuous progress it were decided to have weekly meetings with the internal supervisor Eirik Albrechtsen, where feedback where given on the work performed to date.

After the contract was in place the job on develop a project plan started. In this period it was especially important with feedback from Albrechtsen, as well as the external supervisor Vegard Grimstveit to ensure a good start of the project.

Afterwards the job on looking for relevant theory started. Since this is a broad topic with much paper on the field, the challenge was to choose the most relevant theory and restrict it down. The job of choosing relevant theory started with recommendations from Albrechtsen, which gave the basis to start with the theory. To ensure the quality of the theoretical material it were decided to consult with known names on the field, therefore it were arranged a meeting with Ranveig Kviseth Tinmannsvik, who looked over the work so far and provided some new theory on the field which were used as a supplement to what have already been written.

After finishing the theory it was important to start with an interview guide whom had to be made in a manner understandable for the interview objects. After conferring with the supervisors, the interviewee guide where made in a manner that emphasized concrete incidents, with follow-up questions in order to ensure that the empirical result were comparable with the theory.

When performing the interview it were focused on revealing the interviewee`s experience, therefore it were allowed a free conversation that not always followed the interview guide. On the same time it where tried to steer the interview in a desired direction in order to achieve

some system in the conversation. It were used a tape recorder during the interview which made it easier to go back after the interview to reveal factors that promote/inhibit learning.

The following analysis where based on grounded theory (Bryman, 2012) where the focus was on reveal if there were any patterns that repeated itself by the interview objects. It were used the same questions for each interview objects to see how the answers suit each other in order to reveal patterns and factors that is not given so much thought.

After performing the empirical study, the empirical findings where matched up with the theory and it was discussed what inhibits and what promotes learning. The discussion gave the basis for developing of recommendations for how companies can maintain a learning organization. Afterwards it where written a short conclusion that brought up the main elements in the discussion as well as discussed possible reasons for the differences in the study.

3.2 Theory on qualitative research

In this chapter it will be given a theoretical introduction to qualitative research, this includes steps, purpose, criteria, tools to conduct a qualitative research process and problems with qualitative research.

3.2.1 The steps in qualitative research

Qualitative research is a research method that emphasizes description among different actors in order to come up with solutions (Andersen & Bendal, 2012). In general, qualitative methods consist of following steps (Bryman, 2012):

- 1) **General research questions:** It where developed research questions that emphasized in revealing; characteristics, inhibitors, promoters and developing of recommendations. These questions gave the basis for the whole assignment, which are to be answered through the task.
- 2) **Selection of relevant sites and subjects:** it is important to do a thoroughly pre assessment so that right sites are to be studied and right tasks are chosen, this was mainly done by considering for which task relevant theory from the master program could be used the most.
- 3) **Collection of relevant data:** it is important to consult with people that have a background on the field, so that right data can be collected in order to ensure that the data are reliable. It where arranged a meeting with Ranveig Kviseth Tinmannsvik, which contributed with inputs as well as regularly meetings with the internal supervisor Eirik Albrechtsen.
- 4) **Interpretation of the data:** after collecting the data it is important to interpret it. This was mainly done by discussions. It was as mentioned discussed with Tinmannsvik regarding theoretically terms, as well as discussions with the interviewee objects regarding the significance of the questions in the interview guide which was based on the theory. This is important to see if the questions in any way can be problematic.
- 5) **Conceptual and theoretical work:** this step combined with the interpretation of the data forms the study findings. This includes tightening of the research questions as

well as collecting of further data, which where done by separate the discussion into inhibitors, promoters and recommendations.

- 6) **Writing up findings/conclusions:** this where done by tighten the empirical results together with the theory. The goal is to convince the audience about the credibility and significance of the interpretations.

3.2.2 The main purpose of qualitative research

The main purpose of qualitative research unlike natural science is the purpose of study the meaning of events and the environment. This emphasizes the importance of description as well as explanation to reveal details of significance for the subject. In that context it is important with *why* questions, in order to find out why things are in the way it is (Skeggs, 1997). Therefore it is important to study the people in an attempt to *see through their eyes* with regards to events and the social world. In order to do so it is important with face to face interaction and to participate in the mind of the research object. It can be revealed that issues that seem to be a problem for the outside world might not be seen as a problematic by the members of a community (Foster, 1995). This implies that it is impossible to understand the behavior of members of a social group other than in the context of the specific environment.

Even though it is important to understand the insiders view, it is important to pursue the goal of what is studied. It is therefore important to evaluate whether the research see through only the eyes of some people, and the risk of participating in questionable activities (Armstrong, 1998).

Although description is important, it is important to realize that if a research becomes to descriptive this may lead to that too much irrelevant information overshadows the essence in the thesis (Lofland & Lofland, 1995).

3.2.3 Criteria in qualitative research

In the following sub-section it will be given a description of different criteria that is used to map the trustworthiness of qualitative research processes.

3.2.3.1 Reliability and validity

Reliability and validity are two criteria that can evaluate the qualitative research process. Both reliability and validity can be separated in an internal and external meaning (LeCompte & Goetz, 1982).

Internal reliability: refers to whether there is more than one observer on a case where it exist a consensus regarding what they observed. It was in the thesis emphasized in have thorough discussions with the internal and external supervisor in order to develop reliable interview questions.

External reliability: refers to the degree a study can be replicated, which probably could be done if a new researcher are thorough in screening the marked after relevant actors to contact.

Internal validity: means the degree the researchers' observations match with the theoretical ideas. Internal validity tends to be strong in qualitative research, which also reflect this thesis

since the empirical findings were easy to match with the theory as well as it were confirmed by the interviewees that the interview questions (based on the theory) were good and covered a wide range of important topics.

External validity: means the degree the findings can be generalized across social settings, which must be said to be the case in this thesis since the interviewees said that many of the issues are applicable for the industry as a whole and also to some extent in other industries.

3.2.3.2 Trustworthiness and authenticity

Trustworthiness and authenticity are two criteria that also can evaluate the qualitative study (Guba & Lincoln, 1994).

Trustworthiness is built up of four criteria:

- 1) **Credibility:** it was arranged meetings with Tinmannsvik which have been involved in several investigations to ensure that the research is performed according to standards of good practice and it was discussed with the interviewees to confirm that the investigator has correctly understood the social world.
- 2) **Transferability:** even if it was just oil companies in this thesis, the problem frame are applicable in many industries, therefore the findings can be transferred to other milieux.
- 3) **Dependability:** audit through the process that proper procedures are being followed, which was done by continually conferring with the internal and external supervisor especially in the starting phase.
- 4) **Conformability:** the researcher is a student with no attachments to the companies involved; it is therefore ensured that personal values don't affect the research and the findings.

The criteria of authenticity can be separated in five parts: Not all of these parts are relevant for this thesis.

- 1) **Fairness:** it was interviewed a broad range of people from different companies and at different levels in the organizations to ensure that different points of view were represented among different social settings.
- 2) **Ontological authenticity:** help members to understand better their social milieu.
- 3) **Educative authenticity:** ensure that members better appreciate perspectives of different members.
- 4) **Catalytic authenticity:** try to engage the members to action in order to change circumstances.
- 5) **Tactical authenticity:** the interviewees were able to speak freely in the interviews, which enabled the members to engage into action.

3.2.4 Tools in qualitative research processes

There are different tools that can be used to collect and interpret qualitative research data. In this thesis it has been used semi-qualitative interview to collect the data combined with

grounded theory in order to interpret the results. Therefore it will be given an introduction to these tools here.

3.2.4.1 Semi-qualitative interview

A qualitative interview is characterized by that it is open for description by the participant(s). Unlike quantitative interview which tends to be structured, qualitative interview emphasis more general research ideas and the researchers own perspective to maintain reliability and validity (Bryman, 2012). Since qualitative interview is about mapping the participants concern it is encouraged to talk freely about issues that might go beyond the initial questions, in order to ensure rich and detailed answers, which provides flexibility to the interview.

In the thesis it were used an semi-structured interview, this means that the questions had sub-questions in order to achieve some sort of systematics, but it were emphasized also that the conversation should go outside the questions if the interviewer picked up interesting things said by the interviewees.

In order to perform a successful interview there are some guidelines that are important to consider (Kvale, 1996):

- **Knowledgeable:** it is important to be familiar with the focus of the interview, which was done by developing questions in cooperation with the supervisors that aimed at revealing a broad range of topics.
- **Structuring:** clarify the purpose with the interview and listen to if the interviewees have questions, which were done by allowing the interviewees to freely come up with questions under the interview.
- **Clear:** it where developed sub-questions as a supplement to the main questions in order to keep the questions short and be clear of what it is asked for.
- **Gentle:** even though it was tried to steer the interview in a desired direction, it where never interrupted and it was a high tolerance for letting the interviewees finish.
- **Sensitive:** listen carefully to what is being said and how it is said.
- **Open:** it where allowed for the interviewees to speak freely about their concerns in order to be flexible for what is important for the interviewee.
- **Steering:** it where developed sub-questions to steer the conversation in a desired direction in order to reveal useful information.
- **Critical:** the researcher used mainly the prewritten theory to challenge the answers from the interviewees.
- **Remembering:** try to use what has been said to what is currently being said in order to reveal patterns, which was mainly done by interject earlier mentioned answers.
- **Interpreting:** the theory where used as a basis in the interviews in orders to understand the meanings of the statements.

3.2.4.2 Grounded theory

Grounded theory is the most used framework in studying of qualitative data. The theory consists of following tools (Bryman, 2012):

- **Coding:** after the initial data are collected the data are broken down in component parts where each is given a unique name (labels), which were done to see what issues that are seen as most important by the interviewees. This provided parts of theoretical significance, within the social world that is being studied, based on numbers of interviewees that saw the different topics as important.
- **Theoretical saturation:** this tool relates to two phases.
 - 1) The coding reaches a point where there is no point in further review the data to see how well they fit with the concepts/categories.
 - 2) Collection of data reaches a point where new data are no longer illuminating the concept/categories.
- **Constant comparison:** constantly compare the data being coded under a certain category in order to achieve theoretical elaboration of that category; this resulted in developing of a broad range of issues related to some of the categories.

3.2.5 Problems with qualitative research

When conducting qualitative research some issues are important to keep in mind. A common criticism is that qualitative research are affected by an unsystematically view about what is important. This might lead to that qualitative research becomes too subjective towards the view of persons that are involved in the research. This is often an increasingly problem because of the problem with replicating the study, which is a result of lack of standard procedures, and the fact that the focus in the research is mainly decided by the researcher's view of what is important.

Other issues to be aware of is the fact that qualitative research is reliant upon few cases which might not be representable for other cases, and the fact that it can be difficult to understand exactly how the researcher ended up with the conclusions it ended up with because of lack of transparency. Lack of transparency can be the result of ambiguities regarding how people were chosen for interview/observation, and also regarding the process of the qualitative data analysis (Bryman & Burgess, 1994).

4 The empirical results

The empirical result in this thesis is a result of nine semi-qualitative interviews with personnel within three different oil companies. Interviewee A, B, C and D from company 1, E and F from company 2 and G, H and I from company 3. The interviewees have different background and degree of experience. The interview focused on revealing the past experiences of the interviewees with regards to learning, and to map the situation in the company they are currently working in. The empirical study are separated into different categories where the results from the different interviewee are sat together and broken down in key words in order to reveal patterns to see what is repeating and eventually what they have not given so much thought.

What is common for the three companies are that they have a relatively small organization here in Norway and is therefore dependent of several actors, for example external actors that design their wells, and also that none of them are operators at the Norwegian continental shelf. Company 2 however is the biggest owner on an oil field which is operated by another oil company. A distinguishing factor may be related to the culture, where especially company 3 emphasized a challenging culture where no final decisions is made until everyone have poked on the issue and are satisfied with the result.

4.1 Deviations that causes incidents

The first category is related to deviations that cause incidents to happen. Since many of the interviewees are new in the current company, the results are mainly from past experience. More filling explanations are to be found in appendix C.1.

Interviewee/Deviations	A	B	C	D	E	F	G	H	I	Total
Information	*	*		*	*	*	*	*		7
Compliance	*	*		*				*	*	5
Risk understanding	*	*					*		*	4
Management		*		*			*		*	4
Documentation	*							*		2
Conflict			*				*			2
Design			*		*					2
Safety culture	*									1
Misinterpreting		*								1
Execution			*							1
Whole picture				*						1
Measures				*						1
Interaction							*			1
Planning								*		1
Effective							*			1

4.1.1 Lack of information transfer

The results from this interview show that there are several issues that have led to incidents. However one factor that seems to repeat is the lack of information transfer that results in lack of knowledge about the tasks that are conducted and the working area as a whole. Interviewee A says: *“in the shipping industry it is a well-known problem that it lacks knowledge regarding what is on board the ships, or clear information regarding what should be done with dangerous waste onboard the ships, this as a result of bad information transfer between the*

rig and the ships". It is several examples of that ships go back and forth between shore and rigs with dangerous waste from the rig on board, even though this is supposed to be removed as fast as the boat is reaching shore. It is even shoved that tasks that might ignite the waste have been given working permits by the captain, this shows that the lack of knowledge are something that goes all the way up to the management of the working area. Another common cause that often causes incidents or conflicting work is when information regarding changes is not provided to other actors. This might cause actors to perform work that is in conflict with each other and might cause incidents. As an example interviewee E says: "*it is several examples that it is an inadequate transfer of changes when working groups cycles*". Especially when small changes are made without verifying the possible consequences changes are often not communicated to others. Interviewee G also point out the lack of information regarding interpreting signals. He says: "*before the Deepwater Horizon incident it was sign to a possible blowout; weeks, days, and even hours before the incident*". This shows the importance of that competence regarding interpreting signals is spread throughout the organization. Interviewee I implies that it is even examples of that results from investigations have not been communicated out to the organization adequately and therefore no actions have been made to improve the situation.

4.1.2 Inability to comply/follow procedures/rules properly

Another issue that seems to be reputable in the interview results is the problem regarding comply/follow procedures/rules properly. Interviewee D says: "*it is a well-known problem that procedures are hard to follow since they often are big and complex which makes it hard for the employees to comply with them*". Among the operators it is often limited academically knowledge, which might lead to difficulties in interpreting long and complex procedures made mainly by engineers without the participation of operators. Another problem mentioned by interviewee H is that procedures might not be in compliance with the basic rules; since the procedures have been developed without roots in the existing ground rules developed by the authorities. This can lead to that people are questioning the procedures and choose not to follow them adequately. It is also among the interviewees a perception that new procedures/guidelines are not followed because employees consciously choose not follow them as a result of resistance to changes. A common scenario are when things have been done several times with good results, it can be hard to get the employees to renew themselves and doing things differently. As interviewee A says: "*when habits are created and incorporated into working groups it is often challenging to change attitudes and enable compliance with procedures*".

4.1.3 Lack of risk understanding

A third factor that is repeatedly mentioned by the interviewees is the lack of ability to understand risks. This issue can in some cases be related to the lack of/poor documentation that have in some cases resulted in false safety feeling. Interviewee A says: "*it is examples that suppliers of equipment's have provided documentation that the equipment has been used in the past, even though this is not true*". The receiver of the equipment has then used the equipment in good faith, and as a result a near fatality incident occurred. But in general the lack of risk understanding seems to be a result of that employees have not experienced the

dangers with what they are working with combined with little brainstorming around anticipating what could happen and also train on handle unwanted incidents. This is often a scenario that occurs when the time to act exceeds the time to think.

4.1.4 Poor Management

The issue of assuring a thoroughly risk understanding is mainly a management issue, which is another factor the interviewees repeats. Interviewee D says: *“it is often a shortcoming in leadership that assures that topical risk issues are brought up at the agenda and trained on in community”*. Also it is mentioned by interviewee B that management often tends to bring up HSE goals at dinner tables etc. without really put force behind the statements. This is confirmed by interviewee I who mentions that he several times have experienced lazy managements with regards too really do something about dangerous working areas. Interviewee G says: *“managements tend to put the blame on each other when several companies are involved”*. This implies that when several actors are involved it increases the difficulty to really do something about dangerous working areas.

4.2 The outcome of the learning

The second category describes different outcomes as a result of learning processes. The outcome can for example be formal tools or it can be new ways the employees act/interact with each other. The results are mainly based on the interviewees past experience in other companies. More filling explanations are to be found in appendix C.2.

Interviewee/Outcome	A	B	C	D	E	F	G	H	I	Total
Working methods	*	*	*	*		*		*	*	7
Dialog		*	*						*	3
Formal tools			*					*		2
Risk understanding	*	*								2
Rules			*	*						2
Interaction					*		*			2
Forums	*									1
Brainstorming	*									1
Focus	*									1
Secure operations	*									1
Review	*									1
Risk assessment		*								1
Practices			*							1
Investigations					*					1
Communication								*		1
Management			*							1

4.2.1 Stopped/changed working methods

The factor that repeats itself the most is the fact that as a result of the learning working methods where changed or stopped performed. There are several ways to achieve this; it can be to use more expertise that is especially trained at performing tasks that are demanding or dangerous to perform. Interviewee I mentioned that a company he had worked for in the past took a drastically step when they got rid of a task by outsource it to another supplier, because they felt that the internally expertise where not good enough to handle the working process. Although this is positive it is mentioned by interviewee D that it usually have to happen an

incident before drastically steps like this are taken. This where exemplified by interviewee A who said: *“the supplier where forced to take the equipment off the marked after a near fatality incident happened”*. This implies that it takes a determined and tough management to decide something like this without an incident to happen first. Change of working methods can also be as mentioned by interviewee H be related to a success by the management in implementing guidelines down through the organization, in form of achieving more consciousness when/before performing tasks. It can be that the employees as a result of a campaign think twice before they conduct a task as well as more carefulness when conducting tasks. Interviewee B also mentions that learning have resulted in more us of risk assessment and decision trees before conducting tasks as a part of the working method, as well as reviews if the assessments have the right/proper content.

4.2.2 More dialog

Dialog is repeatedly mentioned to be a result of learning processes. As a result of incidents employees have often become more aware of the need to ensure transparency across the organization and to constantly exchange experiences. Internally in small organizations this is rarely a problem since people see each other all the time and exchange experiences. But in major organizations and in the interaction with externally suppliers this can be a challenge. To solve this problem interviewee B mention that transfer of informal mail between employees across organizations are widely used to communicate with one another and to provide a description of incidents that have occurred. As interviewee C says: *“after incidents it tends to develop many discussions regarding that things are not in the way it should be, however the challenge is rather to keep these discussions regularly and continually”*. The increased dialog between actors is thus a result of the will of apply more awareness all over the organization, especially after incidents.

4.2.3 More use of/improved formal tools

After incident investigations some of the interview objects points out that learning usually results in increased use of/improving of formal tools or developing of tools that can easily map the order in which the incident took place. For example interviewee C had experienced development of event trees that has a clear and logical structure for how the incident took place and what barriers that breached before the incident happened as a direct consequence of an incident. It can also be as mentioned by interviewee H that the management conducts an audit of the whole control system in order to achieve proper procedures that comply with rules and are manageable by the users of the procedure.

4.2.4 Increased risk understanding

Increased risk understanding are mentioned by interviewee A and B as an outcome of learning processes, which often are released by incidents. The interviewees mentions that meetings with emphasize on increasing the risk understanding often are used as a tool, another measure are developing of risk assessments that clearly aims at revealing the potential consequences if a task fails.

4.2.5 Clearer rules

In order to distinguish between incidents and separate how they should be addressed interviewee C and D points out that clearer rules and refinement between incidents are developed to make sure a tightening of the system so that the correct people are performing the correct tasks and that responsibilities/consequences are shared correctly among the internal/external actors.

4.2.6 Better/increased interaction

Also it is mentioned better/increased interaction as a result of learning. Interviewee E says: “*it is a tendency among organizations that want to continually learn to have close relations with companies that have developed an expertise within a field*”. In addition interviewee G mentions that for example oil companies and external suppliers have improved their interaction as a result of learning processes.

4.3 What created the learning?

The third category is dedicated to reveal how the organizations achieved the results they did and improved the situation. More filling explanations are to be found in appendix C.3.

Interviewee/Created learning	A	B	C	D	E	F	G	H	I	Total
Dialog	*	*	*	*	*	*	*		*	8
Management	*			*		*	*		*	5
Focus	*	*	*	*			*			5
Investigation	*			*	*	*				4
Brainstorming	*					*	*			3
Clarity				*				*	*	3
Forums	*							*		2
Formal tools				*				*		2
Admission			*							1
Flexible			*							1
Campaigns				*						1
Indicators				*						1
Ownership									*	1
Culture								*		1
Discipline	*									1
Objectivity								*		1

4.3.1 Dialog

The factor that seems to repeat itself the most among the interviewees as a factor that created learning is the need for good dialog between internal/external actors. Interviewee G brought up the example of the Deepwater Horizon incident which had enormous consequences in form of oil pollution to the sea and led to an enormous interaction between oil companies worldwide with the aim of prevent it from happening again. It were arranged seminars where actors from several oil companies got together, exchanged experience and discussed what they had learned so far. This increased awareness among oil companies around the globe regarding potential consequences of oil spills and reasons for an incident like that could happen. To undermine this, interviewee I brings up the benefits with an overall system that sends out information regarding forums/seminars that are set to happen. Interviewee D adds

that forums provides learning best if the knowledge obtained are implemented well into the organization by having a good documentation practice.

At the internal level in many companies the incident led to a sharpening of the rules for how to encounter dialog across company boundaries. As an example management of change procedures were changed in a way that requires more dialog between different actors before tasks can be conducted. Interviewee C says: *“changes in a cement job in a well cannot be conducted without a thoroughly verifying of that changes have been made, this include dialog between the service provider, the rig owner and the oil company”*. This is to assure that everyone knows what is going on as well as ensuring consensus regarding measures that are taken. More use of dialog can also be that the management is more involved in discussions with the operators by being more directly involved in the daily operations. Interviewee D says: *“in company 1 the management is directly involved in operations by having one representative from the management available for the operators/line managers to contact if incidents happen or issues occur”*. This ensures a close connection between the management and the daily operations and not just delegate it to local suppliers. Regularly dialog between experts across companies involved in operations, are also mentioned as important in order to develop for example HSE methods. Interviewee F highlights the importance of conducting informal conversations daily to continually learn from each other, especially with people which have tried different approaches in ways of doing things. In more formal dialog it is important as interviewee I mentions, with logs that describes who are going to communicate what in the organization.

4.3.2 Dynamic management

Another factor that often repeat itself among the interviewees is the need for a dynamic management that are committed to achieve results, instead of just bring up HSE questions into for example dinner speeches without really put any action behind the words. This can be in form of a total makeover of different formal systems in the company. Interviewee D brought up an example where changes were made in one part of a system without thoroughly thinking of other parts in the system. This lead to an accident where equipment where damaged and resulted in huge costs for the company. After this incident the management looked closely at system breaches that could cause incidents to happen as a result of planed changes conducted by operators in the company. This resulted in that the management took a close look at and reviewed the management of change procedure in order to develop procedures that clearly define which changes that can be conducted in the system without the need for formal improvement and which ones that needs formal improvements. This resulted in more clearness in the organization regarding which measures that can be taken without thinking of the system as a whole, and which measures that needs a more thoroughly risk assessment. This had positive effects in two ways. One is that smaller changes can be conducted more effectively without the need to confirm with others and check if the changes cause unwanted effects in other parts of the system. The other is that changes that can cause unwanted incidents in the system are not conducted without a thoroughly assessment of the possible consequences and bi effects of the change.

The management has also the power to decide how much effort it is going to be made in HSE work. Interviewee A says: *“after an incident at a rig, the management decided to ensure that safety coaches were deployed at the rig and deliver weekly reports to the management regarding the conditions at the rig”*. This is an example of an initiative that the management can do to show it takes HSE seriously. Also management can be more directly involved as mentioned by interviewee D earlier, in form of having one from the management as a phone guard, as well as being tough and specific as mentioned earlier by interviewee I by take critical decisions when needed.

4.3.3 Right focus

Right focus is another factor that repeatedly is mentioned by the interviewees as something that provides learning. After incidents like the Deepwater Horizon, the focus seems to be continually. Interviewee G says: *“this is a result of not only the cost of the clean-up work but also that the incident will be in the justice system for several years and that the reputation of the company takes a long time to build up”*. As a direct result of the Deepwater Horizon incident, several oil companies developed project teams consisting of internal personnel that had the task of study the Deepwater Horizon incident and to learn from it by study different independent investigations, and also participate in seminars that specifically had this incident at the agenda. A measure that underlines the increased focus internally among companies is as mentioned earlier by interviewee A the increased tendency to use safety coaches that are deployed at the rigs. They have the responsibility of conducting daily reports to onshore personnel regarding the HSE conditions on the rig, and also keep dialog with the offshore operators in order to obtain safe behavior. Right focus can be undermined by what was mentioned earlier by interviewee D, by directly involve the management in HSE factors at the working field by being available to for example line leaders.

4.3.4 Good and transparent investigations

Good and transparent investigations are also seen as important by the interview objects. When conducting such investigations it is underlined the importance of investigate all the way back to the design process to reveal root causes. As mentioned by interviewee D this was crucial to prevent a particular failure from happen again, since it had been made changes in one part of the design without assessing the consequence on the system as a whole, thus this was something that could happen because of a breach in the system not because of failure among employees. However this is something that not often is performed since it demands more effort of the team in form of resources. Interviewee H says: *“investigations are successful if the investigation goes all the way back to the regulations and are continually measured up against this”*. This ensures a correct and objective investigation which is immune against prejudices and personal motivations among different actors. Investigations like this often require a tough and experienced investigation leader which can take the investigation back to the roots of the investigation rules provided by the authorities. Interviewee F also highlights the importance of ensuring that all involved actors participate in the investigation.

4.3.5 A challenging culture

Culture was not brought up often as something that ensures learning in the different companies; however this is something that is underlying to achieve results. Interviewee H

mentioned that in company 3 it exist a challenging culture which never closes investigations without a thoroughly poking on the issues in order to satisfy everyone and continually challenge the current system. This undermines the tendency to brainstorm (which is mentioned repeatedly as a factor that has created learning) around issues and enable individuals to come up with solutions and also ideas to alternative scenarios to train on so that scenario trainings do not become to unilateral.

4.4 Challenges/Barriers with the learning

The fourth category is dedicated to reveal factors that were challenging with regards to achieve organizational learning as well as identification of barriers against learning. More filling explanations are to be found in appendix C.4 and C.6.

Interviewee/challenges and barriers	A	B	C	D	E	F	G	H	I	Total
Resistance to change	*		*		*	*	*	*	*	7
Formal tools	*	*		*	*	*				5
Time		*		*			*		*	4
Admission			*	*				*		3
Focus	*				*				*	3
Management		*				*	*			3
Interact				*		*			*	3
Complexity				*	*		*			3
Culture	*						*			2
Data/statistic				*					*	2
Anticipate				*						1
Seriousness				*						1
Objectivity	*									1
Respect								*		1
Ownership							*			1
Save		*								1

4.4.1 Resistance toward change

The challenge/barrier that seems to repeat most often is resistance toward change in organizations. This is often a result of that people wants to maintain things as they are, since habits have been settled and people feel safe in the way they execute tasks. As mentioned by interviewee A earlier, it is in the shipping industry a problem regarding ways in handling waste onboard ships, this is typically a result of that for example captains have adapted ways of doing things that are in conflict towards regulations since he have done the same thing several times and it has always gone well. Resistance towards change is typically a phenomenon among employees that have worked in the business for several years, since they through a long time have adapted habits, and as interviewee H points out developed arrogance with regards to knowledge. Inhibitors to change can also be a result of resistance to interact with each other. This often is a result of cultural collisions that occurs when internal departments or externally actors are to be sat together and are forced to cooperate in new and close ways. As an example interviewee A mentioned that in the oil industry it still are examples of actors that do not cooperate as an entity even though it is several years ago the companies merged. He says: *“it is even examples that employees from the old company before the merge, meets regularly and discuss issues without participation of employees from the*

company/companies they merged with". This is a disadvantageous side by having an excessive cultural ownership since it inhibits new ways to interact and as interviewee G mentions making it hard for an external actor to come in and criticize existing methods. Another reason for resistance can be as mentioned by interviewee I a result of conflicting motives among actors, this goes especially between externally actors. It is in the oil industry many examples of that oil companies are not interested in integrate reports among sub-contractors in their internally reporting system. This can be of fear of not satisfying HSE goals, or lack of interaction for what to report and how to report it. Interviewee I highlights also that it among the sub-contractors also can exist poor reporting because of conflicting motives.

4.4.2 Lack of/poor formal tools

Another challenge/barrier that several times has been mentioned is the lack of or poor formal tools. As an example interviewee A said: *"after a near incident where equipment felt down and nearly killed three men there were a lack of clarity regarding how to deal with these employees, since they had no physical injuries"*, thus no routines in handling people which may be in shock, also how to address the issue to the supplier it existed ambiguities about. Interviewee D mentions that formal tools might also be challenging for the operators since they often can be huge and complex with much content since content often are added without evaluate the procedure as a whole. This can lead to miss understandings among the operators since they might not have so much academic education and have trouble in interpreting procedures that requires good reading and analytical skills. Interviewee D implies that this also might lead to ignorance of the procedures. Formal tools might also work against its intension since when problems occur it is often a focus towards study if procedures exists, which interviewee D says: *"might lead to neglect if things in detail are performed correct"*. The contradiction to this is the problem regarding lack of formal tools. As an example interviewee E mentioned that adequate systems that ensures discussion around knowledge obtained from different seminars/courses don't exists. This problem can be hidden for a long time, but comes to light when experienced personnel leaves the company and new employees needs to absorb knowledge to be able to work in the organization.

4.4.3 Lack of time

Challenges/barriers with regards to learning can also be in the form of lack of time to participate in learning activities. Interviewee D says: *"it can be challenging to balance the time to participate in seminar/forums and the time to perform tasks"*. Also as mentioned by interviewee B inhibitors to learning can be a result of lack of time to sit down and reflect in plenum over what have been learned after for example seminars and forums. It is regularly one meeting right afterward, the problem seems to be to arrange new meetings and discuss the same subjects to see if the company have learned. Even though it exists regulations that ensures documentation over what has been learned in the seminars/forums several of the interview objects feels that the content are rarely discussed in later occasions. Interviewee B also expresses concern regarding transfer of knowledge from past projects over to new projects. This is often a result of that evaluation of projects mainly are done by more inexperienced personnel which might not have been participated much in the projects, but

rather evaluates the project based on statements from involved personnel, since the more experienced personnel often do not have the time to be a part of the evaluation but are rather off to new projects. Interviewee I say: *“it is common that when a project is at close to ending it is regular that people look forward too new projects, instead thinking of how to evaluate the project”*. This is a common barrier that prevents learning from one project to another.

4.4.4 Unwillingness to admit

Admission is another key word that describes barriers with regards to learning. Interviewee D say: *“a well-known scenario that creates incidents is when inexperienced personnel perform tasks without conferring with supervisors, or insures that they are monitored by supervisors”*. It is many examples from different industries that incidents caused by apprentices have been explained as a result of inexperienced personnel performing the job without addressing the issue of why the supervisor where not involved and the lack of supervision. The lack of ability to admit deviations in procedures is something that prevents organizations from develop and learn. Another source to lack of admission is when internal/external actors are to achieve consensus regarding the actual conditions. Interviewee H mentions that this often are strengthened when the fact basis are faltering by not being tightened enough to the regulations provided by the authorities. If this is not achieved it might be given room for doubt and difficult to achieve consensus and admission.

4.4.5 Wrong focus

Wrong focus can also be a barrier towards learning. Interviewee A mentions that he many times have experienced what he refer to as wrong focus in the oil industry. It can for example be that a company initiates stair walking courses to its employees to underline the importance of always holding in the railing. Interviewee A say: *“stair walking courses is something that Norwegians tend to see through, but can harm the organization since it can lead to less focus on more important issues, mainly by the management”*. It exists several examples of that companies are good at preventing small incidents like falling accidents or similar issues, but at the same time proven to be unable to foresee and act to prevent huge disasters with multiple fatalities. This is something that is strengthened if the management is not taking signals from the employee’s seriously regarding measures like for example stair walking courses. Another problem is according to interviewee E that focus in investigations are often on pure material assets since this requires limited resources, this lead to that root causes rarely are investigated.

4.4.6 Complexity and troubles in interaction

The barrier regarding complexity and interaction are closely related. In the oil industry it is often many actors involved in operations therefore problems in interaction can become a barrier. This is especially true for small oil companies that are often very dependent on external companies to for example build wells. Interviewee D says: *“this complexity in itself can become a barrier if it lacks clear leadership in how to interact, since it is many actors to communicate and achieve consensus between”*. Interviewee G highlights that it is hard to reveal deviations in barriers when systems are very complex. This can often lead to misunderstandings, or poor cooperation because of different goals, since as interviewee E mentions actors can have different political views.

4.4.7 Lack of ability to anticipate

Even though it is only mentioned by interviewee D, the issue of anticipation is here highlighted, since it is regarded by the researcher to be important. Interviewee D mentions that it in general has been a problem in the industry to anticipate and assess possible long term damages. He says: “*it has been a poor assessment of long term injuries as a consequence of chemical exposure*”. Regularly investigations are related to short time injuries; thus a poor anticipation of possible long term damages.

4.4.8 Culture

Culture is another issue rarely mentioned, but is implicit in many of the other barriers/challenges. The culture is as interviewee A says: “*important in order to maintain a safety trend also when the tabloid part of an incident is over*”. He says if this is missing it is hard to maintain a continually improvement.

4.4.9 Poor data/statistic

Also it is worth mention the issue of poor data/statistic. According to interviewee D statistics are often not covering the lack of ability to conduct tasks/projects, since it is common that people often are given new time limits, this might cause lack of indication on the performance, which in turn might give poor indications on major incidents to arrive.

4.5 Systems to ensure learning and how to follow up reports/issues

The fifth category aims at revealing systems that are meant to ensure learning in the different companies, and how to follow up what is learned. Note that interviewee A, B, C and D represent company 1, interviewee E and F represents company 2 and interviewee G, H and I represent company 3. More filling explanations are to be found in appendix C.8 and C.9.

Interviewee/Systems	A	B	C	D	E	F	G	H	I	Total
Documentation	*	*	*	*	*	*	*	*		8
Gatherings	*		*	*	*	*		*	*	7
Forums	*		*	*	*	*	*		*	7
Benefits	*			*	*	*				4
CARE	*		*	*			*			3
Management of change							*	*	*	3
Review					*			*	*	3
Informal dialog		*						*		2
Management	*									1
Culture								*		1
Training		*								1
Observation/brainstorming	*									1
Routines	*									1
Education							*			1
Web sites							*			1
Local expertise								*		1
Save			*							1

4.5.1 Documentation system

Documentation is the most used system to ensure learning. The most regular form of documentation mentioned by the interviewees is the CARE system which is a HSE follow up system that ensures that every task has one responsible person which has to comment what

have been done, and describe possible failures with the tasks performed. This gives a reminder of what actions that is left to be performed. The system also provides possibilities for the operators to come up with qualitative judgment regarding how to improve processes. Documentation systems are also used to document what has been learned at different forums/seminars with the aim of ensuring that the knowledge are not forgotten but rather to be discussed among the participants afterwards and spread out to the rest of the organization. Interviewee C mentions that it in addition to forums it is important to continually share knowledge between companies; which in his company are done by so called safety bulleting's where copies of all relevant incidents are sent between actors to check if external actors have experienced similar incidents. When learning new ways in performing tasks it is also important to document this, several of the interviewee objects mentions lessons learned reports that aim at ensuring that lessons learned are not forgotten.

4.5.2 Gatherings

Gathering is another tool to ensure learning. One regular form of gathering is in form of morning meetings where for example CARE reports are discussed. Interviewee A says: *“morning meetings between onshore and offshore personnel or other non - present personnel with the help of video transferring are important in order to ensure that different employees are updated on the daily drift”*. This kind of system undermines the need for transparency and shearing of knowledge in organizations. Another successful form of gathering mentioned by interviewee I are so - called awareness sessions which is based on voluntarily attending. In these meetings current issues are communicated out to the organization. The time where these sessions take place is essential in order to ensure that as many as possible shows up. Interviewee I say: *“30 minutes before lunch is regarded as a good timing”*. It were also mentioned by interviewee E more formal gatherings like quarterly meetings with external actors and quarterly inter functional meetings where employees within the same company from different countries within a specific field meet and exchanged experiences. Interviewee I mentions that in company 3 it is common with teleconference between actors globally every fourteenth day with one leader which describes the incident, also he mentions project meetings to ensure that all have an understanding about what has been done to date in a project.

In the daily drift interviewee C mentions that all involved actors in an activity should meet and go through HSE factors before start to work on an activity, and also a general discussion is important which interviewee H says: *“can be in so-called reference groups”*.

4.5.3 Forums

Another popular system to ensure learning is the use of forums, where people from different companies meets to exchange experiences. Interviewee G says *“forums where people with the same background meet and exchange experience is the most effective forms of forum since this enables possibilities to improve within a specific field”*. Forums where people within different business department meet where regarded as forums where the subjects had a more superficial presentation, but still interviewee D mentions that forums across business units also are used by his company. Interviewee A says: *“it is usually leaders from different departments that participate in forums. Afterwards they spread the knowledge within their*

department”. Interviewee F adds that forums usually have a library in which all data and reports are saved.

4.5.4 Benefits

The interview objects also mentions that companies tend to promote learning by offering benefits when different key performance indicators (KPI’s) are reached. Interviewee A says: “the personal salary can be based upon personal KPI’s which includes different HSE factors”. He mentions this is mainly based on statistically data’s. Interviewee E mentions that the salary also can be based on numbers of management visits and audits offshore. The interviewees disagree in how well this type of measure works. Interviewee I do not mention benefits as a tool in company 3, his view is rather that it might work against its intentions since people might feel that bonuses are given unjustified and also that it is more important to ensure ownership to activities. Interviewee F adds that to evaluate individual performance on the background of the tasks they have performed are often more useful since statistics/data might hide facts and lead to unjustified bonuses.

4.5.5 Management of change

By all of the interviewee in company 3 it where mentioned that the management of change procedure is important, which is aimed at reveal deviations from plans, strategic direction and the design.

4.5.6 Reviews

Also it where repeatedly mentioned the yearly review of the overall management system to ensure that proper procedures exists.

4.5.7 Culture

An organization can have the best systems in the world to enhance learning; this provides no good results unless the organization has a culture that undermines the ability to learn. As mentioned earlier interviewee H said: “in company 3 it exist a challenging culture that always tries to improve the current situation by continually challenge the current system”. The issue of always trying to improve the current status can also be undermined by what interviewee B says about training on interpreting signals combined with what interviewee H says about the challenging culture in company 3 since it enables renovation by always train on new scenarios.

Interviewee/Follow up	A	B	C	D	E	F	G	H	I
Matrix	*	*	*	*			*	*	*
Gathering	*							*	
Type				*	*				
Self-assessment					*	*			
Consensus	*							*	
Continuality							*		
Closure	*								

4.5.8 Matrix system based on the ALARP - principle

When it comes to how the companies follows up incidents/issues it existed few factors that repeatedly were mentioned, however one factor that were mentioned by almost all where the matrix system. This is a matrix that is based on the combination of probability and consequence, thus the ALARP-principle (Rausand, 2011). Incidents are separated in red, yellow and blue incidents. When a red incident occurs the working task is immediately stopped performed and measures are taken, this type of incidents also requires management involvement in the assessment. Yellow incidents might also be stopped in order to improve the situations, while the work continues with a blue incident all though as interviewee B said: *“it is a focus toward maintaining a continually improvement even though the incident is blue”*. It where a broad consensus that this principle where satisfactory, and it where little discussion around this principle, however interviewee D expressed concern over this one dimensional way of thinking. He believed that in some cases the probability factor had to be set aside and just focus on the potential consequences, since probabilities could in many cases be hard to predict, and contribute to that nothing is done to improve dangerous conditions, since the probability part in many cases is sat low and therefore the condition is sat at the yellow or even blue part of the matrix.

4.5.9 Self - assessment

Even though the ALARP - principle where dominating in assessing what to be followed up it still where room for self - assessment which were mentioned by two of the interviewees. Interviewee E mentions that in company 2, HSE specialists stationed onshore receives reports from offshore personnel, they then make a self-assessment regarding the importance of the issues and if it is to investigate any further. Interviewee F adds that this is often determined by the experience of the HSE specialist. This close connection between on and offshore is something that have increased later years since a lot of tasks that before where performed offshore now are being performed onshore, therefore it is important with a close connection between on and offshore on how to follow up incidents, for example as mentioned through video conferences every morning, and special meetings if things are seen as important enough.

4.5.10 Depend on the type of incident

Another factor to be aware of when deciding whether an incident is to be followed up is what kind of incident that took place. Interviewee E says: *“organizations/employees tend to be more on the alert regarding equipment that has been involved in earlier incidents”*. This implies that incidents usually results in more focus toward specific issues the challenge are tough to maintain a continually focus.

4.5.11 Gather and discuss

Interviewee A and H underlines the importance of gather and discuss what to be followed up. This can be done by regular meetings or specific discussions with the aim of for example determine the probability of incidents to happen.

4.6 How to become better able to learn? How to implement the measures? How to see the improvements?

The sixth and last category is dedicated to reveal the interviewees view regarding how organizations can become better able to learn. It is also revealed how measures are implemented in the companies they are currently working for and how the companies register if improvements have been made with regards to learning. More filling explanations are to be found in appendix C.5, C.10 and C.7.

Interviewee/How to be better?	A	B	C	D	E	F	G	H	I	Total
Formal tools	*	*		*	*	*	*	*	*	8
Dialog	*	*	*			*	*	*	*	7
Forums	*	*	*			*		*	*	6
Management			*				*	*		3
Focus			*	*			*			3
Documentation		*						*		2
Save					*			*		2
Ownership			*	*					*	3
Re-design						*				1
Investigation								*		1
Culture								*		1
Standards								*		1
Baldness								*		1
Anticipate			*							1
Competence							*			1

4.6.1 Better and more consistent formal tools

The factor that repeats itself the most as an improvement potential is the need for better and more consistent formal tools. Several of the interviewees agree that it should be better and clearer routines for when to gather with internally and externally actors to repeat and discuss tasks to ensure a good development. It however exist some formal gatherings, in addition to more informal gatherings, the needs according to interviewee A is to develop even more formal meeting places for when to meet and discuss different tasks, interviewee I adds that it should also be a formal system that ensures more regular meeting and discussions regarding what have been learned from for example participate in forums.

Also in the daily drift it seems to be a lack of formal tools. As an example interviewee B expresses a wish to develop a formal system with regards to saving of informal mail. Mail is a very common way to exchange experiences, the problem seems to be to have an overview over important mail, interviewee B says: *“it should be made a system where mails are categorized after importance, where important mails are saved in a folder, and less important mail might be treated as regular mail and deleted as the inbox gets larger”*. Another urging system to get in place is according to interviewee F the need for a formal system that ensures a transfer of experiences between projects, since old projects tends to be forgotten before they even are finished, since people wants over to new projects and focus forward to new tasks. Interviewee G also mentions the importance of ensuring good and formal early warning

system with belonging obligatory measures since it enables detection of signals to failure as well as have clear procedures for what to do if signals are interpreted. The Deepwater Horizon incident illustrates the potential consequences of not having an adequate formal system to deal with early warnings. Interviewee G says: *“it where signals that a blowout could happen in the months, weeks, days and even hours before the incident”*. With a good early warning signal this would have been avoided. Also it is addressed by interviewee H a general need in the oil industry for develop very clear procedures that are capable to dismiss all uncertainties and possibilities to argue against it. This can be done by tighten the procedures more to the root regulations developed by the government in order to dismiss all prejudices and easier achieve consensus. Further interviewee D mentions a general wish within the oil industry to enable more judgment from the operators, so that procedures are not made only by engineers or others that might not be so much involved in the daily process. This is mainly to ensure that procedures are made easier to follow. Interviewee D says: *“developing of checklists not unlike the one in the airline industry can be made as an attachment to procedures, to ensure that all important measures are made before conducting a task”*. This he implies will ensure more compliance with procedures.

4.6.2 Better able to keep dialog

Another improving potential that repeats itself among the interviewees is the need to be better able to keep dialog with each other in order to ensure that everyone are updated on issues; this is mainly to ensure more awareness regarding for example the internal working environment. As an example mentioned by interviewee A to ensure that everyone on a cargo boat knows about what has been loaded on the boat and make them aware of the dangers with it by being open and honest about the problem.

Another issue is to ensure thoroughly brainstorming/conversation among operators before performing a job, especially as mentioned by interviewee B in doubtful situations but should also be performed as a habit before all kinds of jobs. It is important that all personnel involved in the operation are able to come with input regarding what is going to be performed, in form of facts and thoughts. After incidents interviewee C says: *“evaluation of incidents with external suppliers are in many cases done very fast”*, this can for example be since actors across company lines may not know how to properly behave toward each other after incidents and are therefore to some extend limited when exchanging experiences with each other.

Another issue that goes internally is the problem regarding dialog between technical personnel and the management; this is often a problem since technical personnel often uses very technical language when addressing problems to the management. The clue, according to interviewee F is to communicate to the management in a way that they understand the problem easily and see ways on how to improve the situation. The problem of making the message understandable is not just something that might occur between the management and technical personnel, but might also be between several actors. Interviewee I say: *“the clue is to avoid being to specific when communicate, but rather be more general so that all actors can familiarize themselves with the problem and are able to come up with helpful contributions to solve the problem”*. Thus the main reason for performing a good dialog with each other is to achieve more knowledge and clearer orders, which also enables according to

interviewee H more possibility to achieve consensus among several actors as well as it enables a good documentation basis.

4.6.3 More use of forums

Several of the interviewees called for more use of forums. As mentioned by interviewee A it is for example in the shipping industry proven that even if one incident occurs and one company learns from it, this does not ensure that the learning are spread around the industry and that other companies learns from it. This indicates that it should be more use of forums in general that enlightens the issue of possible consequences of not being aware of the working conditions, for example more participation into HSE forums. It is mentioned that it is important that forums are addressing issues that are topical; therefore it is important that signals are given from different companies to the forum speakers, regarding issues to address. Also it is mentioned that it is important to save knowledge obtained from forums, this is regularly done the improvement potential however lies according to interviewee F and I to gather more regular afterwards with the involved actors to reflect over if the companies have learned of the forums.

Interviewee H expresses a wish to develop forums that goes across industries. Interviewee H says: *“the nuclear industry has brought many lessons to the oil industry, especially in terms of thoroughness”*. To take up again these bonds and arrange for common forums with actors from the nuclear and the oil industry are seen as potential very beneficial for the oil industry in order to be more thorough when developing different safety tools. He adds that it is probably no need to be as thoroughly as in the nuclear industry, but that the nuclear industry probably still can provide important inputs to the oil industry.

4.6.4 Management participation

It is now doubt that improvements can't be achieved without participation from the management. Interviewee C says: *“the management must give strong signals about how they want things to be as a part of an overall business vision”*. This implies that changes have to come from the management as a part of an overall business strategy with high focus on HSE issues and a high degree of commitment to achieve different goals. As an example interviewee G says: *“it is often a need to shake the organization in order to make people go together and overcome resistance towards change”*. Thus a strong and clear management are a provider to draw things in the right direction and achieve improvements.

4.6.5 Keep right focus

Right focus as mentioned before is also a key to make organizations become better with regards to learning. Interviewee C says: *“it is important to focus just as much to what is going right as it is to focus on what is going wrong and focus just as much if the right things are done compared to if the things are done right”*. As an example interviewee D calls into question the unilateral use of the ALARP - principle, since probabilities can be hard to determine. Thus it is important to also evaluate incorporated measures.

4.6.6 Ensure ownership

The question of ownership is also important, often more important than use of benefits in form of bonuses. In order to achieve the best results interviewee C underlines the importance

of not force measures upon an organization, but rather ensure that people feel an individual ownership to processes. Interviewee I adds that his experience was that plans were implemented best when the lines themselves had the full/most responsibility and felt a great deal of ownership to the plan.

Interviewee/Implementing	A	B	C	D	E	F	G	H	I	Total
Communication	*	*	*	*	*		*		*	7
Short sight	*	*	*		*	*	*			6
Parallel		*					*			2
Series								*	*	2
Series and parallel	*									1
Documentation	*							*		2
Ownership							*		*	2
Anticipate				*	*					2
Continuity		*								1
Transparency				*						1
Training					*					1
Bowtie principle								*		1

4.6.7 Good communication

One of the purposes with the interview was to map how the companies are implementing measures. It was hard to see many patterns here but one factor mentioned repeatedly is the importance of good communication. Interviewee A says: *“it is important to ensure mutual understanding between operators, HSE responsible (engineers) and the corporate side, since these three actors might have conflicting motives”*. Another reason according to interviewee B, are to ensure that different departments have an overview of each other’s activities in order to enable a good coordination since many activities are done simultaneously, and are dependent on each other. When communicating with external actors it is a general view in the oil industry to be clear on expected performance and the time frame on different tasks, especially offshore. For example interviewee C mentions that when performing a job on a rig it is seen as important to have clear restrictions and expectations to the job, since the cost of renting a rig is several hundred thousand US dollars a day. Before the management decides to implement plans down the organization, interviewee D says: *“it is crucial that the management develops a thoroughly vision which is communicated down the organization before project plans are developed and performance indicators are set, and that the overall company plan is closely tightened to the different project plans”*. In addition it is seen as important to communicate with the aim of achieve consensus and overcome different barriers.

4.6.8 Short time vs. long time view

The activities that the interview objects is involved in are mainly developing of wells and side project attached this. It where mentioned that it is not so much focus on whether solutions is sustainable for the future since the wells have a limited/short timeframe/lifetime. Usually the time horizon for anticipating the future where set to one year.

4.6.9 Series vs. parallel

Whether things were done in parallel or series where something the interviewees had different opinions about. Some mentioned a mixture, while some meant that thing mainly where done

in parallel across different departments/companies, and that many tasks were complex, which demanded as mentioned earlier good communication.

Another version where that thing mainly was done in series, this was more the overall activities. Interviewee H said: *“it typically started with an assessment, then plans were made and decisions taken based on the assessment, then the focus was on ensure knowledge and spread this by develop systems that enhanced good communication, afterwards the measures were implemented, and at last the results were monitored to see if the plan/plans were properly performed”*.

Interviewee H added that it also were discussed afterwards whether the right things were done, but regularly among the interview objects it were only mentioned the discussion regarding if things were done right.

Interviewee/See improvements	A	B	C	D	E	F	G	H	I	Total
None		*				*	*			3
Number of incidents			*		*			*		3
Tests								*	*	2
Open investigation				*						1
Benchmark	*									1

4.6.10 Number of incidents

The interview also aimed at revealing if the different companies had any tools/methods to register improvements regards to learning. This was something that was dismissed by most of the interviewees to in best case be very limited. Nevertheless it were mentioned a few measures. The most repeated measure is to monitor different parameters internally for example HSE parameters and then make trends too see if the type of incident are increasing or decreasing in number. Interviewee E added that such monitoring can be followed by investigations to see why things happen in order to reveal if the root causes to incidents still are the same or if they have changed, this can also be done by regularly meetings between the departments as mentioned by interviewee H.

4.6.11 Net based tests

The most regular measurement according to interviewee H and I are individually based in form of net based tests after participating at seminars/forums so that the individuals could have a clue of how much they had learned. These net based learning’s were often logged, and it were developed goals for what to be accomplished each quarter.

4.6.12 Keep investigations open until the effects of the measures have been checked

Interviewee D brought up; that keeping investigation open after measures have been taken until the effects is checked is a form of registration of how well it has been learned since it enables to check the effects of the measures.

5 Discussion

This chapter is dedicated to discuss the empirical findings by linking it up to the theoretical material. The chapter is separated in three parts; where the first two parts are aimed at discuss respectively the inhibitors and promoters towards a learning organization, while the third part aims at come up with recommendations in order to ensure continuous learning for the companies.

5.1 Inhibitors in becoming an learning organization

In this subsection it is discussed the barriers towards learning that most often are mentioned by the interviewees. In addition it will be discussed some barriers that where not mentioned so often among the interviewees but that are seen as important in the theory.

5.1.1 Lack of information flow

From the empirical results the first inhibitor mentioned by several of the interviewees was the lack of information flow among actors. Interviewee A used the example of poor information transfer between personnel at rigs and captains on boats that loads waste from rigs. This results in lack of awareness among the crew about the dangers in their working environment. Regarding the main responsibility for this lack of information transfer interviewee A says: *“the captain have the responsibility to ensure knowledge regarding the content on their ships, and the main risks with them”*. Why captains are not ensuring information adequately and follow the steps needed in order to handle different waste cannot be because they lack knowledge regarding possibilities for dangerous waste, since captains mainly have long experience. The problem lays rather in the fact that captains often have done the same procedure several times in many years and therefore they develop habits in ways of doing things. This can be referred to what Schein E. H. (1987) describes about basic underlying assumptions, which basically states that many organizations do not renew themselves because they take for grounded certain assumptions which leads to that they see no other solutions. Interviewee A indicates that it regularly have to happen an incident before captains changes their attitudes, since ways of doing things are so well incorporated in their way of working. This is further undermined by the theory of Baumard (1999), which describes that members of an organization tend to negotiate its own environment by following tried and tested approaches for the industry and it may be developed filters against incoming signals (Cyert & March, 2006). As a result of this, existing practices may be in conflict with authority rules and guidelines from the management of a company.

Lack of information transfer where also mentioned by interviewee E to be a problem when working group cycles. Referring to Nonaka & Takeuchi, (1995) it seems to be that the breach occurs in the first step, thus the socialization process, where members are to share knowledge between each other when the cycles are rotating. This was according to interviewee E often an issue when small changes where conducted without verifying possible consequences. Perhaps this implies that the physical proximity between actors when working group cycles often is too relentless and is not being taken seriously enough. Failure in Nonaka & Takeuchi (1995) socialization process can also be related to what interviewee G mentions about lack of competence sharing between actors in order to enable people to interpret signals of failure,

which would enable employees to see things differently and find new opportunities and options of doing things (Levitt & March, 1988). It has in fact been proven by investigations that accidents like the Deewater Horizon incident could have been avoided if signals had been interpreted adequately.

5.1.2 Inadequate compliance

The next inhibitor mentioned is difficulties in complying with regulations/procedures. Interviewee D mentioned that since many operators might have limited academically knowledge it might lead to that some operators are not able to follow procedures adequately. Referring to Rosness & Nesheim, (2013) this might be a result of structural actions by the management in the intuition process, where a high level of specialization reflects the procedures and might cause difficulties for operators to follow them. This is a typically a result of too much control by groups like engineers without participation from the operators or others in the forming of procedures, and setting the basis for further practices. This is often a problem since engineers and operators might have different understandings regarding similar issues and therefore clashes between these groups occur (Schein E. H., 1996). In addition to lack of understanding regarding procedures, lack of operator participation might also lead to that operators out of practical issues choose not to follow the procedures, since procedures might be inadequate adapted the practical drift. Referring to Nathanel & Marmaras, (2008) deviations might occur since operators in the daily work have to do activities that deviate from the procedures out of practical issues. This is a common problem in many industries (Reason, 1997) which provides a huge potential to learn by study the gap between procedures and what is really being done.

Interviewee H mentioned that even procedures might not be in compliance with existing authority rules, since it has been a poor control to ensure that the procedures are tightened to current rules. This can possible be related to structural actions in the institutionalization process (Rosness & Nesheim, 2013) where it may lack control mechanisms which ensures a tightening to public regulations. This in turn might give critical employees in the company ammunition to argument against procedures and undermine the respect for them. Referred to Vaughan (1996) it can over time develop a culture in an organization that emphasizes on handle hazards instead of doing something about them; this is especially true when the framework is incomplete.

Both the issue of complex procedures and procedures without roots in regulations might have the effect that employees choose to not follow them, but instead develops their own way of perform tasks. This in turn might lead to ways of doing things that might be inherited by new employees and it forms habits in ways of performing tasks that might be hard to change when they have been thoroughly incorporated into working groups.

5.1.3 Lack of risk understanding

Lack of risk understanding can also be an inhibitor towards a learning organization. Several of the interviewees implies that many employees have little experience with the hazards attached to the tasks they are working with in addition to little brainstorming around possible risks, especially when things are urging to be done. The issue of lack of risk understanding can be

related to what Senge (1990) describes about the importance of creating common mental models. It can be that risks are not considered to be dangerous as a result of that it contradicts with old and ingrown performances about how the world works (Baumard, 1999), and as a result of this new ideas are kept from provide learning. This can lead to employees feeling that there is little to gain from brainstorming and from suggest changes. The issue of urging tasks can be referred to the ETTO principle Hollnagel (2011), which describes if efficiency dominates; the action might be inadequate performed. In many time limited tasks this is a reality since actors can be pressured to perform tasks in a hurry to comply with different timeframes, which may go on the expense of the security since actors do not have the time to adequately think through possible dangers. However if it is too little time to perform the activity, it may be given a new time limit by the management. The challenge then mentioned by interviewee D is to register the inability to perform projects/tasks and not just give them new time frames without any questions and without a registration of the inability to perform projects. This form of registration might be useful in order to develop tools to measure the learning ability of an organization (Antonsen, 2009), and also develop project plans that consider taking into account being thorough when performing tasks.

Interviewee A ads that lack of risk understanding also can be a result of poor documentation which might give a false safety feeling. This is often a result of poor communication with suppliers of equipment in order to ensure that the documentation is adequate. Thus it lacks an active leadership of knowledge (Meier, 2010) in order to develop a trustfully relationship with suppliers to secure accurate documentation.

5.1.4 Poor Management

The reason for lack of risk understanding is according to many of the interviewees that it lacks leadership from the top management. This can be because of laziness to do something or it can be that managements in different companies put the blame on each other; this implies that the threshold to do something tends to be more difficult when several companies are involved in operations. Laziness by the management can be expressed in many ways; one way is that the management leaves it up to local expertise to handle incidents which may inhibit the involvement of the management into investigations. This implies that it lacks participation by all actors (Størseth & Tinmannsvik, 2011). The reason why conflicts arise between companies can be because of different business agendas or it can be because of cultural collisions between managements (Schein E. H., 1996). This issue tends to occur when an organization tries new ways to incorporate learning since current systems might be outdated. Thus it can be that new ways of assuring thoroughly risk understanding among employees can be difficult because managements do not dear to go into conflict with external actors. Conflicts like this tends to arise when there are difficulties in coordination which is something that regularly arises when it don't exist an adequate strategy to ensure good dialog and training programs that are fitted the different cultures, thus lack of a inter organizational system that go across company boundaries (Meier, 2010).

5.1.5 Resistance towards learning

The reason why many organizations are hard to change in a desired direction is because it exist an embedded resistance towards learning in the organization. Interviewee A says: "*it is*

several examples of resistance towards changes inhibit learning since habits have been settled and people feel safe in the way they execute tasks.” Interviewee H adds that resistance towards change is something that especially goes for older and more experienced personnel because they tend to develop knowledge arrogance.

Reluctance towards change can have many reasons, for example fear of losing ownership to their unique knowledge, fear of being punished (Turner & Pidgeon, 1997) or that locally based learning have given good results repeatedly and is therefore still performed. It is however crucial for an organization to continually search for failure in order to come up with improvements, this cannot be done if employees do not support this proactively but instead rely too much on the current situation (Tinmannsvik, 2012). This must be undermined by employees that are proactive in asking questions about the current practice (Petroleumstilsynet, 2002). Resistance towards change can also as mentioned by interviewee A, be a result of reluctance between actors to cooperate with each other. Cooperation between actors across different sectors is necessary for an organizations ability to learn (Størseth & Tinmannsvik, 2011). It is in general a strong cultural pride that causes resistance to interact, which can be between internally as well as externally actors. This can be linked to basic underlying assumptions which inhibit an organization to renewal, since employees want to keep things as they are (Schein E. H., 1987). This is as interviewee G mentions the disadvantageous side by having a very strong cultural ownership, since the norms, values and perceptions of a reality (Bang, 1995) might cause difficulties in change and interact with new groups. This problem is often strengthened if the management doesn't do anything about it, for example as interviewee G indicates, shake in the organization in order to make groups work together and secure a mutual understanding of each other (Schein E. H., 1996). This is an issue that it often has been focused little on since it has been a high degree of focus toward technical solutions (Kongsvik, 2012), this reflects also the interview results since cultural factors is rarely mentioned neither as an inhibitor or as an promoter towards learning. However this is important since developing of a learning culture aims at develop knowledge systems that underline an effective spreading and exploiting of knowledge (Rekdal, Fledsberg & Hansen, 2002). The lack of awareness about the importance of this issue can in fact itself be regarded as a barrier.

Another resistance barrier can be illustrated by the lack of willingness by companies to integrate sub-contractor reports at their internally reporting system. This can lead to underreporting since it may lead to that many external employees do not feel that their reporting are being appreciated (Reason, 1997). Lack of reporting among sub-contractors might also be a result by lack of separate reporting systems (Le Coze, 2013) that cope with conflicting interests. In addition reports might be hard to make and consume much time, which might lead to that employees have a high barrier for reporting incidents.

5.1.6 Inadequate/missing formal tools

Lack of awareness for how to behave towards different tasks/incidents can be a result of lack of/poor formal tools. It can for example be as interviewee A mentioned lack of routines for how to deal with employees involved in a near incident, and also how to communicate/investigate the incident towards the supplier. This type of problem regularly

occurs when routines and practices which are integrated in the organizational knowledge are not formalized (Argyris & Schön, 1996). However it is important to be aware of that formalized knowledge might be attached specific experiences, working contexts or cultures which can restrict the opportunities to store knowledge. This will be an increasingly problem if it lacks regularly discussions and follow - ups regarding if tools are adapted the current situation (Tinamannsvik, 2008).

Interviewee I adds that it lacks a formal system to ensure a regularly discussion of knowledge obtained from forums/seminars to study if the organization are taking wisdom from the forums. It is therefore important to consciously design arenas in order to exchange experience (Levin & Klev, 2002). The importance of good formal tools often comes to light if experienced personnel are not present in a situation or if they are to leave the organization. An inhibitor toward knowing how to handle things can also be because it lacks formal systems that contributes to a free float of information among members and assures transparency (Jones & Cox, unspecified). It is also important to keep in mind what interviewee D mentioned regarding that formal tools might work against its intention, since procedures might lead to neglect if things in detail are performed correct if the focus purely is on performing things in compliance with procedures.

5.1.7 The time constraint

Time is a key barrier that inhibits members of an organization to develop their personal knowledge. This is illustrated by interviewee D who says: *“it can be challenging to balance the time to participate in seminar/forums and the time to perform tasks”*. And also as interviewee B mentions to reflect over what have been learned at forums/seminars, thus a problem in the tradeoff between achieving knowledge and performing working tasks (Hollnagel, 2011). This barrier is strengthened if there lacks predictability for when and how such meetings are going to take place. Nonaka (2002:105) says: *“it is a critical matter for the organization to decide when and how to establish fields where individuals can meet and interact”*. If this is not done it will thus be hard to plan in advance that these meetings are not colliding with working tasks, which decreases the probability for employees to participate in these gatherings.

Also internally in organizations the time constraint might seek to that knowledge is not being shared properly. An example of this is the issue of not ensuring enough time to transfer experiences between projects, since experienced personnel often have a tough timeframe and that people tend to lock forward on new projects instead of evaluating the past project, this starts often even before projects are finished. In the theory this can be related to lack of motivation to learn (Størseth & Tinmannsvik, 2013), since it lacks an effort to confront the problem with an open and honest effort to learn. Also Disterer (2002) describes that in dynamic organizations it is often a lack of discussion regarding project results, since employees tends to end the project at different times and is off to other assignments. In this lays that project participants often are little aware of the importance of taking time to summarize projects after they are finished, thus little thoroughness in exchanging experiences from one project to another.

5.1.8 Reluctance to admit

Barriers towards learning can also be because of reluctance to admit problems, for example as interviewee D mentions that employees tend to come up with alternative explanations to why things go wrong if they fear the consequences (Rekdal, Fledsberg & Hansen, 2002), especially if procedures have been broken. This can be related to lack of a reporting system that emphasizes learning instead of punishment (Petroleumstilsynet, 2002). Another inhibitor to achieve admission is as interviewee H mentioned when investigations are not going back to the roots in regulations, since it might give skeptical employees ammunition to resist new solutions. This can be because of too little use of dominance in the institutionalization phase (Crossan & Lane, 1999) because of too little effort in order to reduce the number of possibilities in developing of investigations.

5.1.9 Wrong focus

In order to ensure a learning organization it is important to ensure that an organization have the right focus. Wrong focus can according to interviewee A be that a company is trying to become world leading in preventing small incidents, which might undermine the effort related to studying root causes related to huge incidents. Easy measures like that can also as mentioned by interviewee E reflect the company in the way that investigations is mainly on pure material assets because this do not require so much resources. According to (Hopkins, 2008) it exist examples of companies that have been in the world league in preventing small accidents because of a high focus on issues linked at individuals. As a result of this they have forgotten issues of importance for the system as a whole. This problem can be further undermined if the management is not taking into account views/signals from the employees regarding the measures (Størseth & Tinmannsvik, 2011).

5.1.10 High degree of complexity and failure to interact

In the oil industry it is in general a high degree of complexity since it is often a need to interact between several companies, this can according to interviewee D become a barrier in itself. A common failure that might occur in interaction between actors is that tools like IT – systems do not work as supposed, as well as documentation and follow up of suppliers (Hansen & Lekenes, 2011). Interviewee G points out that it might be hard to reveal deviations in barriers when systems are complex as well as the fact that different actors might have different goals. This will be increasingly difficult if it lacks clarity between actors for what they are trying to achieve. For example is the purpose of the learning to only adjust the action strategy or is the goal also to change the underlying values (nwlink.com, 2010). In addition it will be even harder for companies to interact if employees have not built relations to each other (Mueller, 2012) and developed alliances for how to interact and deal with different political views in order to achieve consensus between each other.

5.1.11 Lack of anticipation

Another barrier that were mentioned very rare in the interviews but although are mentioned here is the issue of anticipate future risks. Interviewee D said: *“it has been a poor assessment of long time injuries”*. This he especially linked to the possible consequences of chemical exposures. This acquires to look outside the box in order to anticipate future conditions and situations (Hollnagel, Woods & Leveson, 2011). If an organization lacks proactive members

in participating (Størseth & Tinmannsvik, 2011) in coming up with contributions this can lead to that organizations to late takes affaire when signs to unwanted consequences occurs. Lack of anticipation skills can be a result of lack of marked monitoring to see what the competitors are experiencing and doing. In addition it might be a lack of ability to try to expect new scenarios (Black Swans) that have not happened before (De – Risk Blog, 2009), which can be done in cooperation with external safety suppliers (Falck Nuteck, 2013).

5.2 Promoters towards a learning organization

This subsection is aimed at discussing the promoters that most often are mentioned by the interviewees. In addition it will be discussed some promoters that might not be mentioned so often among the interviewees but that are seen as important in the theory in order to create a learning organization.

5.2.1 Dialog

Dialog is regarded as crucial among the interviewees in order to enable a learning organization. It can be as interviewee G mentions, dialog between external actors in form of seminars where employees from different companies meets and study incidents that have happened among each other. This increases the awareness of potential incidents among actors which can result in a higher degree of learning in the current industry as a whole, thus adapt the behavior as a result of new knowledge (Garvin, 2000). An example of a tool developed as a result of participating in seminars can be as interviewee C mentions procedures that ensure that changes cannot be conducted without thoroughly verifying that everyone is updated on what is going on. To undermine this, it is as interviewee I indicates important with an overall system that sends out information to actors regarding when such gatherings are meant to find place, in order to coordinate between actors for when to meet which ensures cooperation and exchange of experience between as many actors as possible (Størseth & Tinmannsvik, 2011).

Dialog can also be related to the daily drift internally at companies as well as between a company and its supplier. The clue here is to be clear on the expectations in order to achieve correct performance from involved actors. Interviewee D mentioned that he see it as positively that the management are directly involved in operations and not just delegate this to local expertise, this will undermine to prevent what is referred to in the theory as developing of locally based learning which can be hard to transmit, and also make it easier for technical personnel and the management to keep dialog in a language that they both understand by being aware of each other's technical/corporate knowledge. This can for example be done by that a member of the top management organizes weekly tours with different department leaders where they in community inspect the working place. After the tour they can sit down and discuss in order to achieve consensus about what they saw and develop guidelines for how to behave in different situations (Hussein, 2013). It is also important that it is encouraged discussion among the employees at the daily basis in order to come up with alternative solutions and have a thorough discussion of HSE factors before conducting a job. In more formal communication, interviewee I highlight the importance of clarity regarding who are going to communicate what in the organization. If the management is to communicate it is important with effective and transparent communication patterns between the executive and

the employees where the management encourages learning and ensures motivation (Jones & Cox, unspecified).

5.2.1.1 Gatherings

To undermine the importance of keeping dialog with each other it is important with regular gatherings. This can be as interviewee A mentions by morning meetings, where different actors gather, this include use of video conferences to ensure participation of non-present personnel for example with offshore personnel, which will ensure a tighter connection between onshore and offshore personnel as well as between a company and its external suppliers (Perrow, 1999). This contributes to a higher degree of understanding among different groups like operators, engineers and the management in order to avoid barriers resulted by crash between different working cultures (Schein E. H., 1996) and also a transparency of each other's performance.

Another form of gathering is what interviewee I refer to as awareness sessions which are based on voluntary participation, where internally personnel meet, for example once a week and presents what they regards as important issues, thus construct an arena where issues that employees believes is important are addressed (Nonaka, 2002). In order to achieve this it is important that companies delegate time and resources to such measures (Roseness & Nesheim, 2013). The management should also try to set the awareness sessions to when it is best regarded by the interviewees. Thus it may not be a fixed time every week but rather a flexible time for when it is best suited by the interviewees. By the experience of interviewee I it was regularly best fitted 30 minutes before lunch. It should be a rotation in who performs what in the awareness sessions to ensure that every employee gets to participate (Størseth & Tinmannsvik, 2011) and come up with their views. Interviewee E brings up more regular and formal meetings as important in order to develop the company. It can be quarterly meetings with external actors to undermine the alliance building, which is important in order to develop consensus and discuss different political views (Meier, 2010). It can also be in form of gatherings internally in big international companies where employees within a specific field meet and exchange experiences. An idea for how to act in these yearly gatherings can be to use Kolb's experience model (Kolb, 1984) as a tool to ensure reflecting of the experiences, get consensus around the understandings and use this to initiate new actions. To ensure transparency around progress in projects, project meetings where seen as important by interviewee I. In addition to discuss the progress it should be discussed what have been learned so far and also what could be transferred of experiences to new projects.

5.2.1.2 Forums

In addition to seminars that regularly relates to specific incidents, forums is another form of arena. Forums usually aim at gather employees from different companies within a specific subject field in order to develop expertise knowledge. This is in the theory referred to as *communities of practice*, which is a network that is based on informal relations between employees, which might collectively contribute to learning within a field of subject (Brown & Duguid, 1991). In these societies knowledge are shared through common discussions and activities, which over time will develop tools to solve tasks (Wenger & McDermott, 2002), therefore it is important to consciously design arenas to exchange experiences (Levin & Klev,

2002). Interviewee G felt that the most effective form of forum is so called subject-forums where people from the same background meet and exchange experience. This might be because it is easier for people within the same subject to develop shared mental models (Senge 1990) and develop ideas for new solutions, since they talk the same language when referring to thoughts, will, deliberation feelings, or habits (Argyris & Schön, 1996).

It is as interviewee A implies important that the knowledge obtained from these forums are spread internally at the company. This can be by ensuring regular saving of the knowledge in addition to discuss the knowledge obtained regularly, for example link it to the previous mentioned awareness sessions in order to study the results from the forums.

Interviewee H mentioned that it could be useful to develop forums where personnel from different industries meet an exchange experiences. He reminded of that the atomic industry had provided much knowledge to the oil industry, and it probably still could have something to contribute with. New inputs from the atomic industry could ensure that the oil industry do not get stuck in old patterns (Edmondson & Moingeon, 1999), and develop new learning tools.

Interviewee A underlined the importance of giving signal to the forums regarding which issues that is urging to be addressed, this is important to ensure that the issues that are addressed are adapted the current challenges. After participated in forums it is important that the knowledge are saved and discussed. It seemed to be clear procedures for how to save knowledge and also discuss the content right afterwards. However it where claimed that it where a lack of formal gatherings afterwards to see if the knowledge obtained had provided results in the companies, which might lead to increased motivation (Størseth & Tinmannsvik, 2011) if seeing positively results.

5.2.2 Dynamic management

The need for a dynamic management is regarded by the interviewees to be a huge contributor towards a learning organization. As interviewee D mentioned it where crucial that the management in a former company he worked for reviewed procedures in order to provide clarity regarding what changes that can be conducted in an organization without the need for formal improvement and which one that needs formal improvement, which clearer separates unjustifiable errors from errors that are caused by systematically deviations (Kongsvik, 2012). This underlines the importance of participation by the management in addressing issues when needed (Størseth & Tinmannsvik, 2011). The example also underlines the importance of that the management have a view that not only focus on tracing errors back to individuals but also ask if the system is adequate (Hansen & Lekenæs, 2011).

The management can in several ways show that it takes HSE questions seriously. It can for example be as interviewee A mention deploy safety coaches at the rigs. The safety coaches can contribute to undermine the discipline of *group learning* in system thinking (Senge, 1990), by helping in develop individuals as well as collectives in order to contribute to collaboration across functions. Another way can be that one representative from the top management is attachable as a phone guard in which the employees can call if an incident occur, this ensures directly involvement by the management which makes it easier for the

management to develop what Senge (1990) refer to as mental models that is adapted the reality. It is important to keep in mind that good leadership means not just to implement changes in a good and effective way with regards to different schedules; it also means to ensure an understanding regarding what is being done and to develop a ownership feeling among the employees, so that for example line managers do not feel that their department are going to lose repute (Hussein, 2013). As interviewee D highlights it is important that a management develops a thoroughly vision which is communicated out in the organization. This enables the organization to develop common visions (Senge, 1990) which is important in order to develop understanding toward changes and ensure loyalty.

5.2.3 Keep right focus

To keep right safety focus which is the next promoter are closely related to the management issue since the management have to ensure that proper measures are taken. After big disasters like the Deepwater Horizon incident interviewee G mentioned that the oil industry across the globe focused on this incident in the long term also after the tabloid part of the incident was over (Hovden, 2011). This was done by develop project teams which had the task of studying the Deepwater Horizon incident in order to learn from it. This form of *communities of practice* (Brown & Dugid, 1991) are specially aimed at studying a special incident in order to learn from it and interpret signals to ensure that something like this does not happen again. This form of learning focuses on recordings and drawing of conclusions based on the background of experience and then formalize these in routines, procedures, conventions, technologies and strategies (Schults, 2002).

In order to decide the right focus, it is important to take signals from the employees in order to avoid too much focus on a certain problem (Hopkins, 2008) but rather have a variety of issues to address and see the interaction between. As interviewee A mentioned he had several times experienced that companies have started what he calls useless courses like for example stair walking courses, without conferring with the employees first. In order for an organization to become learning it is important that the management gets the employees to participate (Størseth & Tinmannsvik, 2011) by enable them to come up with their own judgment regarding the measures that are taken and that the management take these judgments seriously. Interviewee D also calls for an evaluation of the risk matrix tool. He believes that this tool often can be inaccurate since probabilities can be hard to determine, and therefore in some cases it should be an excluded focus on the consequence part without regarding the probability side. This implies an increased degree of self - assessment in many cases. This kind of questioning of incorporated tools undermines an organization ability to develop and not just rely on tools developed in the past (Daft & Weick, 1984).

5.2.4 Culture that emphasize a continual improvement

Even though it is important with good and concrete measures, which was mainly mentioned by the interviewees, it is also important to have the right mind set in place in order to build an intelligent organization by ensuring that knowledge and thoughts held by individuals enters into the organizations thoughts and actions (Argyris & Schön, 1996). In order to obtain this interviewee H believes that it is important with a challenging culture which never closes investigations without a thoroughly poking on the issues in order to satisfy everyone and

challenge the system, thus a high tolerance for new ideas and fantasies for possible scenarios (Petroleumstilsynet, 2002). This encourage the employees to think outside the box (Roseness & Nesheim, 2013) which contributes to that employees continually are dedicated to try to come up with ways to improve the current situation and as interviewee B mentioned to always think of new scenarios. This also undermines the employees to not only consider if tasks are performed correct but also if the right tasks are performed (Klev & Levin, 2009). It can also be related to undermining the learning by experience model (Kolb, 1984), since it underlines the importance of active experimentation.

5.2.5 Benefits/Bonuses

The interviewees disagree in what benefits that is most effective. Benefits could be in form of bonuses given when different goals within a department are reached or it could be more individual based goals. This could be done by tying safe behavior and career development together (Short, 2007), which could lead to more proactive members with regards to asking questions about the current practice (Petroleumstilsynet, 2002). Interviewee I believed that ensuring ownership to tasks is more important than bonuses. He mentioned that his experience is that best results are obtained when line leaders are given much responsibility and ownership feeling to the tasks. This implies that an organization should use its power proactively in order to achieve change (Borum, 2005).

5.2.6 Better/changed formal tools

In the daily drift it where mentioned by interviewee B a wish to develop better routines for how to save knowledge obtained from informal mails which is often send between employees. He mentioned that he wanted a system where important mail could be saved directly in a folder so that the important mails could be easier to bring up again when needed. This would make it easier to take up again important knowledge when needed, and undermines the importance of an effective information system (Pidgeon, 1998). Better formal systems can also be related to a good and formal early warning system, that have clear connections between incidents/signals observed and the measures that have to be taken related to this, thus a form of signal tree. This will be a helping tool in the determination of what patterns too look for that might provide unwanted results (Le Coze, 2013). Interviewee D calls for more formal tools that make it easier for operators to perform tasks, since procedures can be long and complex. He mentions that procedures are more likely to be followed if the operators and the engineers have cooperated in making of the procedure. This is in the theory described as challenging since different cultures might have different understandings regarding similar issues (Schein E. H., 1996).

5.2.6.1 Good documentation system

To ensure that knowledge obtained from different seminars/forums are integrated in the company it is as interviewee C points out important with a good documentation system that saves the knowledge in order for the participants to gather later and discuss what have been learned and what is still the challenges. This can be related to (Schuls, 2002) third purpose of learning, thus to emphasize learning as an evolution of knowledge over time and disturb this to the organizations sub - units. As mentioned it where highlighted among the interviewees more need to gather and discuss what have been learned from participating in forums. This

could be done by develop a formal system for when and where to gather and discuss if the knowledge obtained have provided the results it should.

Documentation is also important at the daily drift since it ensures an overview over which tasks that has been performed and which ones that is still to be performed. It where mentioned by some of the interviewees that some of the registration systems emphasized qualitative judgment in order to obtain improvement. This is important in order to ensure participation by the operators so that they can contribute to an optimization of the procedures (Størseth & Tinmannsvik, 2011), and not just rely on tools mainly developed by engineers. This undermines the effort to avoid crash between the engineering and the operation culture (Schein E. H., 1996). Also it seemed to be a need for a formal system that ensures a transfer of knowledge between projects, thus important to register after every project meeting experiences that can be brought to next project.

5.2.6.2 Transparent and good investigations

In order to reveal the root causes to incidents it is important with good and transparent investigations. In this lays as mentioned by interviewee D a need to investigate all the way back to the design process, in order to reveal root causes. This underlines the need for a thoroughly system thinking (Hansen & Lekenæs, 2011), so that errors are not only being traced back to individuals but also see the system as a whole in order to reveal if it is the system that causes incidents. Also it is important to be aware of what interviewee H says: *investigations are successful if the investigation goes all the way back to the regulations and are continually measured up against this*". To achieve this it is important with a strong and active leadership (Meier, 2010), which is active and tough enough to take the assumptions in procedures and investigations back to the ground regulations provided by the authorities

5.2.7 See the improvements

Tools to see how well an organization has learned were something the interviewees mostly had no knowledge about. This is something that it obviously exist a huge improvement potential on. It is mentioned that it is a lack of discussion regarding knowledge obtained from different forms/seminars. This may be an improvement potential; by create formal meeting places (Levin & Klev, 2002) for when to meet and discuss what have been learned some months afterwards in addition to discuss the net based tests mentioned by interviewee H and I. However it is important that the organization have a clear strategy for how to measure learning, this can be done by asking themselves about the questions that Antonsen (2009) addresses in the theory.

5.3 Recommendations

In this subsection it will be given recommendations regarding how companies can learn by external/internal experience. The recommendations are basically aimed as a tool for the oil industry, but may be applicable also in other industries.

5.3.1 Dialog

- Include as many internal/external actors as possible at morning meetings, for example captains and bring up issues that to date are urging, as well as getting feedback from operators at the sharp end regarding procedures
- Collaborate with other companies in which seminars to participate in and have regularly discussions if knowledge obtained are giving results for the companies
- Establish awareness sessions where employees are rotating in presenting their issues
- Take up the contact with the nuclear industry with the aim of construct common forums for the oil and nuclear industry
- Make things general and understandable for each other, and be clear on the expectations
- Be proactive in giving signals to forum speakers regarding issues to be addressed

5.3.2 Formal tools for learning

- Develop procedures that clearly defines who needs to approve what, and let the procedures be open for qualitative judgment from operators at the sharp end
- Develop a formal system that separates important mails from more less important mails. Thus a saving system for important informal mails
- Develop signal trees that illustrates clear connections between incident/signals and the following measures
- Develop check lists as a supplement to procedures, which the operators have to follow every time they are going to perform a task, as well as checklists for what to go through when working groups cycles
- Evaluate if the probability side of the risk matrix are preventing issues to be addressed
- Ensure that investigations has its roots in authority regulations
- Develop a registration system that maps the inability to perform projects within deadlines in order to develop more realistic projects in the future that takes into account time to brainstorm and reach consensus
- Develop separate reporting systems that takes into account conflicting interests and keep the reports easy to make
- Perform risk assessments on long time injuries

5.3.3 Dynamic management

- Ensure that line leaders/operators feel ownership to new solutions
- Shake the organization if needed to make different actors work together
- Do not punish employees that are reporting about their own mistakes
- Have one from the management as a phone guard, which employees on a field can call if an incident are to occur
- Be proactive in develop training programs that are fitted different actors and consider signals from employees at management meetings

- Have a close relationship with suppliers of security training with the aim of developing training programs that continually develops and train on new scenarios
- Take signals from the employees regarding safety measures seriously
- Have fixed people from the management to regularly meet with different departments leaders and discuss the challenges, preferably with direct observation

5.3.4 Time

- Plan in advance to ensure that working tasks are not colliding with seminars/forums
- Plan in advance to ensure that project meetings are sat at times where most people are able to participate

5.3.5 Keep right focus

- Encourage employees to come up with their views regarding safety measures and take these signals seriously

5.3.6 Benefit/Bonuses

- Continue with bonuses related to achieve HSE goals but also ensure that employees/line leaders are given much responsibility and ensure ownership feeling to new solutions

5.3.7 Culture

- Develop a culture that constantly questioning implemented solution until everyone are satisfied, thus a challenging culture

5.3.8 See the improvements

- Regularly discussions regarding if knowledge obtained from participating in forums/seminars have provided results
- Individual meetings with employees to map if they feel improvements

6 Conclusion

Based on the empirical results from the semi-qualitative interviews it can be concluded that it exists some repetitive factors which is seen as important in order to develop a learning organization.

Dialog was such a factor. Dialog can be difficult to perform adequately because of the complex composition of different actors that cooperates across company sections. This goes especially for small oil companies that are dependent on several external actors to perform its tasks. It is a field that has a huge improvement potential by finding new ways and arenas to cooperate, not only across company boundaries, but also to some extent between industrial boundaries. This is important in order to share experiences, discuss improvements made and being updated about what is the current issues in order to develop modern systems/tools to cope with this. Also internally in companies it is important with dialog that enables everyone to be updated and correct each other by giving feedback. It is important with regularly meetings and to communicate in a way that everyone understand, in order to assure that everyone is working towards the same goal.

Another factor that was seen as important is the issue of develop proper formal tools in order for operators to perform their tasks in a best possible way and also to ensure an optimal interaction between internal/external actors. It also here exist improvement potentials, by for example make it easier to perform tasks, saving of important information, take into account long time impacts, increased clarity regarding connections and associated measures, develop solid tools with clear roots in the regulations, continually evaluate incorporated tools as well as formalize informal routines and also ensure a continuous development by develop systems that ensures feedback regarding procedures, projects as well as individual performance.

A factor that is seen as important in the theory, but not mentioned often in the interviews is the issue regarding developing of a culture that undermines continuous improvement by continually challenge the current system. The reason why this is not mentioned more often is unclear, however culture is an important element in order to undermine many of the other issues and enable a freely anticipation of possible future treats and risks.

How to measure the degree of learning achieved internally at companies, was also rarely mentioned. This is something that the companies should offer more thought, in order to study if the developments are going in the right direction.

To undermine the previous mentioned issues it is important with a proactive management, since they have the key to ensure enthusiasm for different goals internally in companies. This requires a tough management that do not back down from problems, but instead is involved and resolute and not just delegate things to other groups. In addition it is important to be open for criticism so that the management also can correct its own actions, and also enable employees to report of their own mistakes without fearing the consequences.

In the discussion it where found that the empirical results could be related too much of what has been written in the theory, which consists of a wide range of references from leading writers on the field. Although some of the theory could not be related directly to the empirical

results, all of the theory were used to make an interview guide that aimed at revealing a broad range of issues.

At the end it is important to point out that the different views among the interviewees can be a result of different background and degree of experience. It is registered that the more experienced interviewees had more thorough answers and went more in the dept since they had participated in several investigations of incidents, while the more inexperienced interviewees had a tendency to be more superficial and based their answers more on systemically knowledge without so much knowledge regarding how things tend to develop in practice.

The recommendations developed can be used as a supplement in helping the companies involved in the thesis develop new ways in order to ensure continuous learning in the future. The recommendations are general applicable for the oil industry, but could possibly also be applicable in other industries.

7 References

- Amstron, S. J., & Fukami, C. V. (2009). *Management, Learning, Education and Development*. London; Thousand Oaks; New Delhi: SAGE.
- Andersen, G. R., & Bendal, S. (2012). *Kvalitativ metode*. (G. R. Andersen, & S. Bendal, Artister) NTNU, Trondheim.
- Antonsen, S. (2009). *Safety Culture: Theory, Method and Improvement*. Ashgate.
- Argyris, C., & Schön, D. A. (1996). *Organizational learning II*. Addison-Wesley Publishing company.
- Armstrong, G. (1998). *Football Hooligans: Knowing the Score*. Oxford: Berg.
- Ballesteros, J. S.-A. (2007). *Improving air safety through organizational learning*. Ashgate.
- Baumard, R. (1999). *Tactic knowledge in organizations*. SAGE Publications Ltd.
- Borum, F. (2005). Sygehuset - en omstridt institusjon. *Nordiske Organisasjonsstudier*, ss. 114-130.
- Brown, J. S., & Duguid, P. (1991). Organizational Learning and Communities of Practice: Toward a Unified View of Working, Learning, and Innovation. I J. G. March, *Organization Science* (ss. 40-57). INFORMS.
- Bryman, A. (2012). *Social Research Methods*. New York: Oxford University Press Inc.
- Carroll, J. (2004). Learning from organisational experience. I M. E. Smith, & M. A. Lyles, *Handbook of Organizational Learning and Knowledge Management*. Wiley.
- Clegg, S. R., Courpasson, D., & Phillips, N. X. (2006). *Power and Organizations*. London; Thousand Oaks; New Delhi: SAGE Publications.
- Crossan, M. M., & Lane, H. W. (1999). *An Organizational Learning Framework: From Intuition to Institution*. *Academy of Management Review*.
- Cyert, R., & March, J. (2006). Behavioral theory of the firm. I J. B. Miner, *Organizational behaviour 2* (ss. 60-68). New York: M.E Sharpe, Inc.
- Daft, R. L., & Weick, K. E. (1984). *Toward a model of organizations as interpretation systems*. *Academy of management*.
- Dalkir, K. (2011). *Knowledge Management in Theory and Practice*. Massachusetts Institute of Technology.
- De - Risk Blog. (2009). Avoiding black swans.
- Disterer, G. (2002). *Management of project knowledge and experiences*. MCB UP Ltd.
- Edmondson, A., & Moingeon, B. (1999). Learning, Trust and Organizational change: Contrasting Models of Intervention Research in Organizational Behaviour. I M. E. Smith, L. Araujo, & J. Burgoyne, *Organizational learning and the Learning Organization* (ss. 157-173). SAGE Publications Ltd.

- Falck Nutec. (2013). Falck Nutec. Bergen
- Forseth, U., Rosness, R., & Aamnes, M. B. (2011). *Rammebetingelser for HMS som etableres i kontrakt . En intervjustudie*. Trondheim: Sintef.
- Foster, J. (1995). INFORMAL SOCIAL CONTROL AND COMMUNITY CRIME PREVENTION. *The British Journal of Criminology*, ss. 563-583.
- Garvin, D. A. (2000). *Learning in action- A guide to putting the learning organization to work*. Harvard buisness school press.
- Gherardi, S., & Nicolini, D. (2006). *Organizational Knowledge: The Texture of Workplace Learning*. Malden; Oxford; Victoria: Blackwell Publishing.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing Paradigms in Qualitative Research. I N. K. Denzin, & Y. S. Lincoln, *The Sage Handbook of Qualitative Research* (ss. 105-117). SAGE.
- Gundersen, J. (2010). *Tilsynsaktivitet med Statoils planlegging av brønn 34/10-C-06A*. Bergen, Stavanger: Petroleumstilsynet.
- Hale, A., Wilpert, B., & Freitag, M. (1997). *After the event*. New York: Pergamon.
- Hansen, K., & Lekenes, E. (2011). *Læring av hendelser i Statoil*. Bergen: Statoil.
- Hollnagel, E., Woods, D. D., & Leveson, N. (2011). *Resilience engineering: Concepts and precepts*. Ashgate.
- Hopkins, A. (2008). *Failure to learn. The BP Texas city refinery disaster*. CCH.
- Hovden, J., Størseth, F., & Tinmannsvik, R. K. (2010). *Multilevel learning from accidents - Case studies in transport*. Trondheim: NTNU; Sintef. Safety Science vol. 49, no. 1
- Hussein, B. A. (2013). *Jobbrotasjon i en bedrift*. Trondheim: NTNU.
- International Atomic Energy Agency . (2002). *Safety culture in nuclear installations*. Vienna: IAEA.
- Jones, B., & Cox, S. (unspecified). *Facilitators and hindrances to individual and organisational learning within the nuclear sector*. Lanchaster: Lancaster University Management School.
- Kelly, K. (1994). *The New Biology of Machines*. Fourth Estate.
- Kjellen, U. (2002). *Prevention of Accidents Through Experience Feedback*. Taylor & Francis.
- Klev, R., & Levin, M. (2009). *Forandring som praksis: Endringsledelse gjennom læring og utvikling*. Fagbokforlaget Vigmostad & Bjørke AS.
- Kolb, D. (1984). *Experiential learning*. learningfromexperience.com
- Kongsvik, T. (2012). *Sikkerhetskultur og Sikkerhetsklime: Innhold og Utvikling*. (T. Kongsvik, Artist) NTNU, Trondheim.

- Kvale, S. (1996). *InterViews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks; London; New Delhi: SAGE Publications Inc.
- Lawrence, T. B., Mauws, M. K., Dyck, B., & Kleysen, R. F. (2005). *The politics of organizational learning: Integrating power into the 4I Framework*. *Academy of Management Review*.
- Le Coze, J.-C. (2013). *Outline of a sensitising model for industrial safety assessment*. *Safety Science*.
- LeCompte, M. D., & Goetz, J. P. (1982). Problems of Reliability and Validity in Ethnographic Research. *Review of Educational Research*, ss. 31-60.
- Levin, M., & Klev, R. (2002). *Forandring som praksis - læring og utvikling i organisasjoner*. Bergen: Fagbokforlaget.
- Levitt, B., & March, J. G. (1988). *Organizational Learning*. Stanford: Department of Sociology and Graduate School of Business, Stanford University.
- Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: a guide to qualitative observation and analysis*. Wadsworth.
- Meier, M. (2010). *Knowledge Management in Strategic Alliances: A Review of Empirical Evidence*. *International Journal of Management Reviews*.
- Mueller, J. (2012). *Knowledge sharing between project teams and its cultural antecedents*. Emerald Group Publishing Limited.
- Nathanel, D., & Marmaras, N. (2008). Work practices and prescription: A key issue for organizational resilience. I E. Hollnagel, C. Nemeth, & S. Dekker, *Resilience engineering perspectives*. Ashgate.
- Nonaka, I., & Takeuchi, H. (1995). *Nonaka and Takeuchi knowledge management cycle*. Oxford university press.
- nwlink.com. (2010). *OODA and Double-Loop Learning Activity*.
- Perrow, C. (1999). *Normal accidents: Living with high - risk technologies*. Princeton Paperbacks.
- Petroleumstilsynet. (2002). *HMS og kultur*. Stavanger: Petroleumstilsynet.
- Pidgeon, N. (1998). Safety culture: Key theoretical issues. *Work and Stress*, ss. 202-216.
- Rasmussen, J., & Svedung, I. (2000). *Proactive risk management in a dynamic society*. Swedish rescue services agency.
- Rausand, M. (2011). *Risk Assessment: Theory, Methods, and Applications*. Wiley.
- Reason, J. (1997). *Managing the Risks of Organizational Accidents*. Ashgate.
- Reber, A. S. (1995). *Penguin Dictionary of Psychology*. Penguin.
- Rekdal, M., Fledsberg, C., & Hansen, C. W. (2002). *Hvordan skape en lærende IT-organisasjon: bakgrunnsteori og begrepsavklaring*. Trondheim: NTNU.

- Schein, E. H. (1987). *Organisasjonskultur og ledelse: Er kulturendring mulig?* Mercuri Media Forlag.
- Schein, E. H. (1996). *Three Cultures of Management: The Key to Organizational Learning*. Sloan management review.
- Schults, M. (2002). Interorganizational learning. I J. A. Baum, *The Blackwell Companion to Organizations* (s. chapter 18). Wiley.
- Scribner, S. (1997). *Mind and social practice*. Cambridge University Press.
- Senge, P. M. (1990). *The fifth discipline. The art and practice of the learning organization*. New York: Doubleday.
- Short, J. (2007). *The Role of Safety Culture in Preventing Commercial Motor Vehicle Crashes*. Transportation Research Board.
- SikkerTrafikk.no. (2012). Nullvisjonen.
- Sitkin, S. B. (1990). *Learning Through Failure: The strategy of Small Losses*. Austin: Department of Management, University of Texas at Austin.
- Skeggs, B. (1997). *Formations of Class & Gender*. London, Thousand Oaks, New Delhi : SAGE Publications.
- Stapenhurst, T. (2012). *Benchmarking Book*. Taylor and Francis.
- Størseth, F., & Tinmannsvik, R. K. (2011). *The critical re-action: Learning from accidents*. Trondheim: Sintef.
- Turner, B., & Pidgeon, B. (1997). *Man made disasters*. Butterworth-Heinemann.
- Vaughan, D. (1996). *Challenger Launch Decision*. Chicago, London: The University of Chicago.
- Weick, K. E. (1995). *Sensemaking in Organizations*. Thousand Oaks, London, New Delhi: Sage Publications, Inc.
- Wenger, E., & McDermott, S. W. (2002). *Cultivating Communities of practice*. Harvard Business School Press.

Appendix A: the interview guide

Appendix A consists of the interview guide used in the thesis, to reveal the empirical results. The guide is written in Norwegian since the interviewees speak Norwegian as their primary language.

Intervju med:	
Organisasjon:	
Dato og tid:	
Sted:	

Referent:

Innledning

Denne intervjuguiden tar sikte på å avdekke læringsevnen til et utvalg case – bedrifter, basert på hendelser/nesten hendelser. Resultatene av intervjuene skal benyttes til å skrive en empirisk del i en masteroppgave som omhandler læring. Ved å sette allerede skrevet teori opp mot denne empirien skal det utvikles retningslinjer for hvordan selskaper kan være lærende. Det kan være generelle retningslinjer for case bedriftene dersom mønster finnes, eller spesifikke retningslinjer for den enkelte bedrift. Bedrift og intervjuobjekt forblir anonyme.

Innledende spørsmål

- Hvilken bakgrunn har du?
- Hvor lenge har du arbeidet i selskapet?
- Hvilken stilling har du i dag, hva er dine viktigste oppgaver og hva kjennetegner dine viktigste oppgaver?

Spørsmål angående læringens praksis

Nevn et eksempel på en hendelse/nesten hendelse som dere lærte av

- Beskriv hendelsen
- Hvordan ble det lært?
- Hva var utfordringen med læringen?
- Hva skapte læring?

Nevn et eksempel på en hendelse med utilstrekkelig læring

- Beskriv hendelsen
- Hvorfor ble det ikke lært?
- Hva skal til for å bli bedre til å lære?

Hvilke barrierer opplever du mot læring? (egenrådighet, automasjon, tenke selv...)

- Hvorfor oppstår de?
- Hvordan løses de?

Er dere gode til å lære av hendelser/nesten hendelser?

- Hvorfor er dere gode/ikke gode?
- Er det utført målinger av læringsgraden til bedriften, hvordan utføres i så fall det og skal det repeteres?

Nevn et eksempel på et uønsket forhold

- Beskriv forholdet
- Hvordan lærte dere av det?
- Hva var utfordringen med læringen?
- Hva skapte læring?

I forhold til dine viktigste oppgaver, hvilke feil kan oppstå?

- Hvordan er fokuset i forhold til å gjøre tingene riktig vs. å evaluere om de riktige tingene gjøres?
- Hvordan koordineres oppgaver mellom ulike aktører?
- Hva er prosedyren når feil oppstår?
- Hvordan evalueres oppgavene i bedriften?
- Hva gjøres når tegn til feil oppstår?

Hvilke rapporteringssystemer for hendelser/nesten hendelser eksisterer i bedriften?

- Hva er praksisen ved rapportering og oppfølging av dem?
- Hvordan avgjøres hva som skal følges opp?

Når bedriften har fastslått et ønsket HMS mål, hvordan implementeres dette inn i organisasjonen?

- Gjøres tiltak parallelt?
- Hvor langt fram i tid tenker dere?
- Hvordan er fokuset i forhold til å inkludere feil vs. korrigere feil?
- Hvordan er fokuset i forhold til å gjøre tingene riktig vs. å evaluere om de riktige tingene gjøres?
- Hvordan engasjerer dere ansatte i arbeidet?
- Hvordan samarbeider dere med eventuelle eksterne aktører? (allianser)

Har du et eksempel på motstand mot endringer i bedriften?

- Hvorfor oppsto det?
- Hvordan ble det løst?

Hvilke arenaer/rutiner har dere for utveksling av erfaringer?

- Hvordan gjøres dette?
- Hvorfor gjøres det?
- Føler du det er effektivt?
- Hvordan sikres det at kunnskapen ikke glemmes?
- Hva benyttes kunnskapen til?

Hvordan deles informasjon mellom aktører i bransjen?

- Hvor i virksomheten deles info?
- Hvordan tar bedriften lærdom av det?

- Hvorfor gjøres det?

Hvilke rutiner er det for å vurdere formelle systemer/prosedyrer opp mot virkelig drift?

Appendix B: the interview results

After performing nine semi-quantitative interviews with employees from three different oil companies the following results are provided. Note that interviewee A, B, C and D are from company 1, interviewee E and F from company 2 and interviewee G, H and I from company 3

Appendix B is a summarizing of the answers from the interviewee. Each chapter starts with a short introduction to the interviewee.

B.1 Interviewee A

B.1.1 Introduction to the interview object

Interviewee A are graduated within offshore techniques, and he's working experience are primary based on working offshore. He is new in the current company and has only been working here for seven weeks as a drilling super intended. He's primary working tasks are in the planning phase where he provides a cooperative company with advice on how to perform drilling activities.

Drilling is a task it exist very clear rules for how to perform and there is little room for deviations.

B.1.2 Findings from interview A

Categories	Interviewee A
Deviations that causes incidents	<ul style="list-style-type: none"> • Falsely documentation (might give false risk understanding) • Unclear information about what going on • Lack of compliance with procedures, since habits are created • Poor culture related to safety
How was it learned	<ul style="list-style-type: none"> • The employees became more knowable about what they were doing and the dangers with it • Participated more in forums to learn from one another • More thinking of ways to improve • Dangerous equipment were removed from the marked • More focus on doing

	<p>things right after an incident have occurred</p> <ul style="list-style-type: none"> • Accomplished an secure operation • More reviews to correct an equipment before failure occur
<p>What created the learning</p>	<ul style="list-style-type: none"> • Investigation • Learning tends to occur after an incident have happened • More HSE personnel in teams • Safety coaches on the working place • Always think twice before operation are conducted • Spread the awareness about the importance of always think twice • Used discipline to force changes but in addition explain why
<p>The challenges with the learning</p>	<ul style="list-style-type: none"> • How to deal with the direct involved employees in the incident • How to deal with the supplier in form of being objective • To maintain an safety trend (ensure that issues do not get forgotten) • Members want to maintain old ways of doing things
<p>How to be better able to learn</p>	<ul style="list-style-type: none"> • More use of forums to spread knowledge externally • More awareness/information about the working environment among all internal actors • Be open and honest about the problems • Gather and repeat tasks in order to maintain a good development

Barriers against learning	<ul style="list-style-type: none"> • Automation in ways of doing things since things goes well several times • A desire of doing things easy • Wrong HSE focus
How to see improvement	<ul style="list-style-type: none"> • Make trends on all key performance indicators related to HSE and benchmark against likeable world class
Systems to ensure learning	<ul style="list-style-type: none"> • CARE which is a HSE follow up system that ensures that every task has one responsible person which have to go in in the system and comment what he have done, and describe possible failure with it. • A matrix system to separate different incident after how serious they are (possibility/consequence) • The management have to go inn and lock so called red actions this ensures that the whole company are updated on what is happening • Daily evaluate the processes • The personal salary are based upon personal KPI's which include different HSE factors • Different forums that calls inn leaders from different departments and companies to ensure a discussion about important issues. The results are spread by the leaders within its department • Go through CARE reports on morning meetings

	<ul style="list-style-type: none"> • Save the lessons learned in documentations • Go through existing procedures before performing an activity • After performed an activity it is performed an “as done procedure” to see possible changes/ improvements that can be achieved in the existing procedure. These observations are logged and discussed among on and offshore. The new and improved procedure gives the basis next time the activity are to be performed
How to follow up reports	<ul style="list-style-type: none"> • Daily meetings between onshore and offshore personnel • Weekly closure and follow up of reported incidents • Assure consensus among actors, involve leadership if it is a red incident
How to implement measures	<ul style="list-style-type: none"> • A mixture of series and parallel • Think both on the long sight and in the short sight • After correcting a failure it is important to make a lesson learned to document what learned • Go through lesson learned later • Important with communication between operators, HSE responsible personnel and economists

B.2 Interviewee B

B.2.1 Introduction to the interview object

Interviewee B has his graduation from math studies at NTNU. His experience from the working life is as a risk manager of drilling activities. This is a task that lies in the crossroad between HSE and drilling activities, the task includes modeling of physical causal factors in the wells.

He have been working one year in the current company, as a HSE advisor with regards to internal drilling projects, which involves participate in the planning processes of wells. This involves initiate with projects if it exist indicators that indicates tasks it have to be focused on.

B.2.2 Findings from interview B

Categories	Interviewee B
Deviations that causes incidents	<ul style="list-style-type: none"> • Lack of risk understanding throughout the organization even though procedures exists • Lack of compliance with procedures • Misjudge situations • Lack of clarity regarding who perform which tasks among different companies • Management tends to bring up HSE questions at different occasions without any meaning behind the words
How was it learned	<ul style="list-style-type: none"> • Performs more risk assessment • More risk understanding among all involved in activities • Informal conversations among employees • More us of decision trees to see the hierarchical connection • Some tasks where stopped performed
What created the learning	<ul style="list-style-type: none"> • More focus on certain issues • Dialog internally at the office to modernize working tasks • Ensure dialog internally with use of mails • Petroleum authority's sends out mail to all actors on the marked if it is something they want focus on or equipment that have to be exchanged
The challenges with the learning	<ul style="list-style-type: none"> • Give the organization properly resources to learn adequately • New people may have new ideas that

	<p>make sure that the learning are forgotten</p> <ul style="list-style-type: none"> • Often decisions are based on they whom “shout” highest
How to be better able to learn	<ul style="list-style-type: none"> • Make sure that actions are properly documented in order to make sure that the learning are not forgotten • Have a good discussion in doubtful situations • Participate more in forums with employees in external companies to learn from on another • Better ways in storage of mails and categorization of them
Barriers against learning	<ul style="list-style-type: none"> • Lack of time to sit down and reflect over the learning • Often the lessons learned reports are made by people that lack knowledge about the situation, since they with knowledge do not have time • It is a tendency that when a task have been performed well once it is hard to do it differently the next time • Strict rules may prevent that procedures are made easy and understandable
How to see improvements	<ul style="list-style-type: none"> • No system
Systems to assure learning	<ul style="list-style-type: none"> • Lessons learned reports • Training of people to interpret precursors to errors • Informal mail are sent between employees to exchange experiences and also attachments with working processes performed are sent
How to follow up reports	<ul style="list-style-type: none"> • Transfer most serious incidents from an external actor to the company system <p>(all incidents that lead to damage on people as well as serious near misses are registered and cases that relates to quality on equipment that the company have contract to)</p>
How to implement measures	<ul style="list-style-type: none"> • Tasks are often performed on the crossroad between departments and things are done simultaneously, by communicate between departments • It is a relatively short time horizon the tasks are performed on • Continuous planning are performed to see beyond when things are done

B.3 Interviewee C

B.3.1 Introduction to the interview object

Interviewee C is graduated as a petroleum engineer from at the University of Stavanger. He has been working in the current company for five months as a drilling manager. The working task is to ensure that the company has the resources needed to perform their activities, this includes making resource plans, develop strategic plans and to facilitate for the others in the drilling department.

B.3.2 Findings from interview C

Categories	Interviewee C
Deviation that causes incidents	<ul style="list-style-type: none"> • Incorrect execution of working tasks • Conflict between different actors • Wrong choose of design in the planning phase
How was it learned	<ul style="list-style-type: none"> • Developed proper routines • The management become more involved in daily operations • Developed proper practices • Develop procedures where it lacked • Spreading awareness regarding what is the focus • Discussion regarding that things are not in the way it should • Changed working methods • Common rules where made
What created the learning	<ul style="list-style-type: none"> • Admission of deviation • Go through what happened with involved actors in order to achieve consensus about what is the problem • Be flexible in changing • Excursions to benchmark with experts on the field • Sat focus where it should be a focus
The challenges with the learning	<ul style="list-style-type: none"> • Admission that there are deviations in the procedures, this goes for both the performers of the task as well as the responsible • Be honest instead of going in defense position • Be able to think of unexpected situations
How to be better able to learn	<ul style="list-style-type: none"> • Be better able to exchange experiences when going through incidents, with external suppliers • Participate in forums to share with others what is the challenges • The management must give strong

	<p>signals about how they want thing to be in order to achieve a good culture</p> <ul style="list-style-type: none"> • Focus just as much about what going right as what going wrong and focus just as much if the right things are done compared to if the things are done right • Focus more on the future and monitor the development in the marked • Ensure that people feel ownership to a solution, so that changes do not become forced upon an organization
Barriers against learning	<ul style="list-style-type: none"> • Lack of honesty • Following traditional solutions • Doing things in the same way it always have been performed (resistance to change/afraid of new measures)
How to see improvement	<ul style="list-style-type: none"> • Measure different HSE parameters (LTI, other absence injuries parameters and study the development)
Systems to assure learning	<ul style="list-style-type: none"> • Safety bulleting's that ensure that copies of all relevant incidents are sent between actors to check if the external actors have had similar incidents • Investigation of incidents • CARE: registration system to follow up actions (a reminder of outstanding actions) • Double reporting (external actors reports are brought in in the company's system) • Go through HSE factors before starting one a activity • Ensure meetings to exchange experience regarding internal operations • Weekly meetings where the risk register are reviewed to see if things are looked and see if goals are reached • Meetings with suppliers once a quarter to go through the services that have being performed • Action log to save experiences • Subject forums (for example drilling management forums) to exchange

	experience, this include communication of case historic within the company
How to follow up reports	<ul style="list-style-type: none"> • Matrix system to define the seriousness in order to define the measures
How to implement measures	<ul style="list-style-type: none"> • Working through contractors • Clearly specify measures • Limited time horizon

B.4 Interviewee D

B.4.1 Introduction to the interview object.

Interviewee D has been working with HSE for 36 years, among the task has been as a safety leader for an oil field and also at the department of oil where he was involved in developing of new regulations for the oil industry. He has no formal education but has rather worked his way up in the system as an operator. He has however been taking safety subjects at the University of Stavanger. He has been working in the current company for five months as a HSE manager which consists of participate in leadership meetings as well as develop plans for the system, which means that the working tasks are characterized by leadership as well as making sure that small pieces in the system works as it should, he adds that an extensive focus on details can contribute too little focus on the overall strategy. He has also been called in to contribute to develop guidelines in the atomic industry.

B.4.2 Findings from interviewee D

Categories	Interviewee D
Deviations that causes incidents	<ul style="list-style-type: none"> • Automatic process did not work as it should, since changes in design were made in one part of the system without thinking of another part • The results from investigations becomes pure operational measures, that is in form of recommendations in the risk analysis (be careful of, etc.) • Lack of knowledge among actors about changes • Lack of supervision on inexperienced personnel (apprentices) • Ways of doing things becomes automatic • Lack of leadership • Complex procedures might be hard to follow
How was it learned	<ul style="list-style-type: none"> • Clearer rules and refinement between incidents • Drastically steps taken after incident occur

<p>What created the learning</p>	<ul style="list-style-type: none"> • Investigated all the way back to the design process • Created a new management of change procedure that had clearer rules and where clearer of what type of changes and repairs that can be conducted • Initiate campaigns • Went through procedures • Marks high potential incidents without consequences by involving top management in the investigation (not just rely on local expertise) • Developed an indicator to see the ability to perform the tasks • Gatherings to benchmark with one another to obtain best practice learning and use it to develop standards • Management directly involved
<p>The challenges with the learning</p>	<ul style="list-style-type: none"> • Often a single incident is not enough to ensure big structural changes in the system as a whole • Changes becomes to extensive problems often require a total re-design • Incidents are often seen as a result of an inexperienced operator • Operators tends to have too much focus on issues that covers their own safety, and they forget the big potential accident focus • It is often too much focus on better the procedures, which may make the procedures big and complex • People are often focusing too much on easy measure parameters • Find a balance between using time on being updated by exchange experience and doing the working tasks • It is often a need to do activities in interaction between different actors
<p>How to be better able to learn</p>	<ul style="list-style-type: none"> • Focus more on possible consequences (possibilities can be hard to foresee), possible consequences should trig an investigation, independent of an the probability of it • Less threshold to change practices and procedures

	<ul style="list-style-type: none"> • More focus on factors that might give long term damages, not just on acute issues • Assess if it is the procedure is good not just if the procedure is followed (procedures can be to extensive, and inadequate adaption to what is critical) • Develop checklist to obey the procedures more easily • Develop individual based goals in addition to team based goal (so that all contributes and see the meaning of it) • Better planning of when to perform tasks so it is easier to participate in forums
Barriers against learning	<ul style="list-style-type: none"> • Often consequences have to be severe before changes are maid • Too much focus on the possibility of an incident, (can be hard to judge the possibility) • Long term issues are rarely investigated (chemical exposure) • Poor follow-up of mappings,(new mappings are started instead), leads to incomplete action plans • Often operators might not be able to absorb writhed information (lack of education) • The data tool (CARE) are difficult to change, it requires change globally (the system handles only incidents, not technical deviation, quality deviation, etc. in order to follow up audits as well as incidents, register not unwanted conditions) • The statistic do not covers lack of ability to conduct tasks(people often gets a new time limit, to predict major accidents it is also important with performance indicators) • Lack of clearly leadership in coordination of different external actors • Different companies might be in different developing stages, this can contribute to that suggested measures by one company are outdated fast in

	another company
How to see improvement	<ul style="list-style-type: none"> • Keep the investigations open after measures are taken until effects of measures are checked (do not lock cases after measures are taken)
Systems to ensure learning	<ul style="list-style-type: none"> • CARE: electronic system where incidents are recorded • Monthly internal gatherings with presentation of issues that are to be discussed in plenary • Yearly employee conversation • Bonuses that are based on the performance • People with same background meets in yearly forums to discuss and address issues (every business unit have their own yearly gatherings) • Safety forums where different actors participate across business units • Participation in presentations of current problem issues
How to follow up reports	<ul style="list-style-type: none"> • Based on the incident (is it a well-known incident) • ALARP-principle
How to implement measures	<ul style="list-style-type: none"> • The top management develops visions, which are communicated further down in the organization. It is then developed project goals and performance indicators based on this • Focus on seeing alternative ways of performing things • Contracts with external suppliers, that provides services, make sure that tasks are transparent so that coordination between actors are possible

B.5 Interviewee E

B.5.1 Introduction to the interview object

Interviewee E is graduated as a construction engineer at NTNU in Trondheim. Afterwards he started to work at the water resource laboratory at Sintef, and further as a consultant within the oil industry. He has been working in the current company for seven months as a HSE specialist, which consists of mainly two tasks, one is to ensure that the company follows the HSE rules that exist, and the other is to follow up the operator they share ownership with. The tasks are characterized by a high degree of consideration of the further approach since incidents that can change the agenda tend to occur.

B.5.2 Findings from interviewee E

Categories	Interviewee E
Deviations that causes incidents	<ul style="list-style-type: none"> • Poor design • Lack of information transfer to next working group
How was it learned	<ul style="list-style-type: none"> • Increased training of external actors • Investigation of root causes (technical, organizational)
What created the learning	<ul style="list-style-type: none"> • Contact/inform the supplier of services about the incident • Thoroughly investigation of root causes
The challenges with the learning	<ul style="list-style-type: none"> • Often focus in investigations are on pure material assets (root causes are rarely investigated since often complex composition) • When reorganizing the organization it can be difficult to see if the right things are done • When systems are complex it can be difficult to address the investigation correct in the jungle of actors and procedures
How to be better able to learn	<ul style="list-style-type: none"> • Allocate time and work with issues that have happen, and study the learning process afterwards • Bring in external people to look at issues to get new views • Discuss/brainstorm more if the right things are being done • Better able to interpret signs to failure (instead of judge mistake separately it is important to see the whole picture to see if bigger things is behind) • Better to anticipate unthinkable issues • Better routines in saving of knowledge achieved from different gatherings
Barriers against learning	<ul style="list-style-type: none"> • Pride among individuals (ownership to design) • Different political views among actors • People tends to forget the last project since they want to focus on a new project • Resistance in going over to new and unknown systems • Lack of formal systems to save knowledge from gatherings which will lead to longer time for new employees

	to learn their tasks
How to see improvement	<ul style="list-style-type: none"> • Monitor development of number of incidents followed by investigation of why things happen (to see if/why the same issue repeats)
Systems to ensure learning	<ul style="list-style-type: none"> • Lessons learned sessions • Deploying own personnel in external companies • Close connection with partners, where risk analyses are been done in plenum • Synergy system: event/quality deviation system, where incidents and the potential consequence of incidents are being registered • When high potential events occur it is sent out a signal to all HSE personnel in the company • Weekly safety sessions, where it is a rollover in who presents what's in the sessions • Bonuses related to number of management visits and audits offshore • Quarterly meetings with external operator • Quarterly internal functional gatherings where employees from different countries within a specific field meets and exchange experiences • Different forums where different actors from different companies in the same situation (in form of size) meets and exchange experience, this experience are mediated within the company • Yearly review of management systems • Start campaigns (where one particular issue are focused on)
How to follow up reports	<ul style="list-style-type: none"> • HSE specialists onshore receives reports from offshore personnel and make a self-assessment on if the reports are of interest to investigate any further • Often more alert on equipment that have been involved in earlier incidents
How to implement measures	<ul style="list-style-type: none"> • Training, which are evaluated later • Audits against the operator to see if things are done right/right things are done • Relatively short time horizon (one year) • Dialog with operator to reveal differences and achieve consensus

B.6 Interviewee F

B.6.1 Introduction of the interview object F

Interviewee F is graduated within the field of reservoir and production, and has been working within that field for several years. She has been working in the current company for little over two years, as an advisor within the field of reservoir. This working task includes being updated on strategies and plans within the oil field that the company is a co-owner in, thus an optimization of the oil field.

B.6.2 Findings from interview F

Categories	Interviewee F
Deviations that causes incidents	<ul style="list-style-type: none"> • Assures of things that cant be hold • Uncertainty about what should be done
How was it learned	<ul style="list-style-type: none"> • Revealed what have to be done different
What created the learning	<ul style="list-style-type: none"> • Went together in an investigation (different actors) • Review of the overall system at the management level • Talk with each other at a regular basis • Transfer experiences from one project to another (no formal system) • Try to develop alternative ways in doing things • Involve people which have tried different approaches in ways of doing things
The challenges with the learning	<ul style="list-style-type: none"> • To long time from identification of the problem to it is taken seriously by the management • Regular it is only focused on if procedures exists not if things in detail are done correct
How to be better able to learn	<ul style="list-style-type: none"> • Technical personnel must be better to communicate problems upwards in the organization • The organizational structure should be re-designed to easier be able to spread knowledge within the company • Problems should go around in the organization to achieve consensus around what is the problem and how to address it • Construct a formal system for

	<p>experience exchange from one project to another project</p> <ul style="list-style-type: none"> • Better to discuss with each other what have been learned from seminars
Barriers against learning	<ul style="list-style-type: none"> • Difficult to enable communication upwards in the system and across the departments • Difficult to transfer knowledge to the top level in the company • Things are often done in wrong order, since conflict occur between long time and short time views • Huge resistance to change within different technical milieu
How to see improvement	<ul style="list-style-type: none"> • None
Systems to ensure learning	<ul style="list-style-type: none"> • Safety meetings • Communicate wishes/priorities to the operator (done through resource committees) • Working/informal meetings where different issues are presented • Synergy system if incidents/quality deviations occur • System to evaluate all the employees on the background of duties that were supposed to have been done in the past year (grades based on the duties, are given by evaluation in the year and total evaluations after the year is finished) • Forum where actors from different companies meets to exchange experience within a subject (the forum have a belonging web site with a library in which all reports and data are saved) the information is used to make it easier for new personnel within the firm and also spread the knowledge out to other actors in Norway • Seminars where different issues are addressed
How to follow up reports	<ul style="list-style-type: none"> • Personal experience, gives the basis for what is addressed to the operator
How to implement measures	<ul style="list-style-type: none"> • Risk matrices on functions are gathered in a total package

B.7 Interviewee G

B.7.1 Introduction of the interview object

Interviewee G is graduated as an engineer within the field of electronic, and have had economical subjects added to his education. He has over 30 years of experience from working in the oil industry. He started within quality insurance of oil fields and has had many leading roles within that field. He is currently hired within this company and started one week ago as a senior advisor within quality assurance, which consists of developing of management systems with regards to different projects the company is involved in. The work is characterized by establishment of procedures and evaluating of existing procedures, which is mainly done by studying earlier and similar projects.

B.7.2 Findings from interview G

Categories	Interviewee G
Deviations that causes incidents	<ul style="list-style-type: none"> • Bad management (shortcoming in interaction between several actors) • Pressure from corporate interests on operators on the field to be effective • To many inexperienced personnel/ lack of monitoring of inexperienced personnel • To little knowledge in interpreting signals that can lead to an incident • Lack of monitoring of working processes • Lack of risk awareness combined with economic interests • Do thing as cheap and effective as possible • Lack of verifying of changes (in order to see consequences of even small changes) • Interaction problems between different actors (lack of respect for each other)
How was it learned	<ul style="list-style-type: none"> • Better internal/external interaction
What created the learning	<ul style="list-style-type: none"> • Change of focus within the management • Better awareness within the industry • Study of crucial incidents (actors are curious of what happened) • Get things up at the agenda (morning meetings, other meetings) • Brainstorming around different scenarios to exercise on • Active in searching of others that might have done similar activities
The challenges with the learning	<ul style="list-style-type: none"> • Competence management (ensure

	<p>that people involved in operations have the correct knowledge)</p> <ul style="list-style-type: none"> • Complex systems makes it hard to reveal deviations in barriers • Convince personnel about new ways of doing things (change attitudes) • When mix cultures it can be hard to achieve consensus (afraid of new things) can be internal departments or external companies
How to be better able to learn	<ul style="list-style-type: none"> • More training in interpreting of signals • Develop of good early warnings systems • Respect for experience and competence (right competence to right place) • The top management must have focus on HSE questions • Often it is a need to shake in the organization in order to make people go together • Ensure ownership to processes • Train more on unusual incidents and brainstorm around them • Ensure that all involved personnel can come up with inputs • More transfer of experience between projects
Barriers against learning	<ul style="list-style-type: none"> • Lack of time (often very focused in doing the task so it is forgotten to evaluate the tasks) • Management have too much focus on effectiveness • Difficult to exchange experiences (since little time to do this, often just one meeting) • Difficult to come in as an external and criticize existing methods (internal actors goes into defense positions)
How to see improvement	<ul style="list-style-type: none"> • None
Systems to assure learning	<ul style="list-style-type: none"> • Management of change procedures • CARE system (open for qualitative judgment) • Different forums to exchange experience (people with the same background shear experience is the most effective)

	<ul style="list-style-type: none"> • Documentation of what learned in forums • Education of personnel • Web sites specially directed to actual incidents/issues • Regular audits (quality factors)
How to follow up reports	<ul style="list-style-type: none"> • Matrix system (ALARP) • Continually third part risk evaluation (to see development in mainly the probability development)
How to implement measures	<ul style="list-style-type: none"> • Capture the immediate needs and develop plans based on this (short sight) • Take a round with different actors to achieve an common plan • Things are mainly done in parallel because of complex interactions (a need to communicate well) • Do things known before implementing change • Go through every other year the management system • Ensure individual ownership to ensure support around things • Licenses to ensure partnership, the operator are the main force, but the other actors are following what is being done • Continually adherence with belonging consequences to ensure that actors are adapting new measures

B.8 Interviewee H

B.8.1 Introduction of the interview object

Interviewees H is graduated as an electronics engineer but have a multiple background as a diver, soldier, pilot and have worked a lot with maintenance in the army. He has been in the oil business for 23 years, where he has worked in both private companies and also in the agency of oil where he has been involved in developing of investigations paragraphs, mainly by studying of the Swedish nuclear industry. He has been working in the current company for little more than one year, as a HSE and quality manager. His most important tasks are to build teams, knowledge, systems and resource set projects. The tasks are characterized by leadership and enable systems and people to do tasks instead of being directly involved in them himself.

B.8.2 Findings from interview H

Categories	Interviewee H
-------------------	----------------------

Deviations that causes incidents	<ul style="list-style-type: none"> • Lack of compliance (breach in rules and procedures) • Lack of planning • Bad communication • Control of the work permit system (tasks go into another shift without follow up that the interaction are adequate) • Inadequate documentation of tasks
How was it learned	<ul style="list-style-type: none"> • Companies change procedures • The industry as a whole took the experience from an incident with them and new standards where developed • Guidelines for further direction where sat
What created the learning	<ul style="list-style-type: none"> • The incident became an industrial issue • Developing of incident trees that on the minute maps what happens (important to get people to admit the factual course of event) • Good communication between different actors to ensure consensus about the task • Objective input (objective when addressing an issue) • Clear documentation that can dismiss prejudices (deviation treatment if things are done otherwise) • Challenging culture that ensures continually challenge towards what have been established
The challenges with the learning	<ul style="list-style-type: none"> • Many people seems to believe that they are experts in investigation • Hard to get people to go back to the roots of the investigation regulations • The focus on learning goes away when the tabloid part of the incident are in the past • Get a consensus regarding the actual conditions (admission) often difficult when the fact basis are faltering • Can be difficult to tell about inadequate work (requires a certain use of force), often more inexperienced personnel have problems with this
How to be better able to learn	<ul style="list-style-type: none"> • Develop forums where different

	<p>industries can meet and exchange experiences (mainly nuclear and oil industry)</p> <ul style="list-style-type: none"> • Ensure more knowledge to enable a good documentation basis in order to reveal and get consensus around course of events • Ensure that investigations are linked to the regulations and gives answers to the main points in it • Develop very clear procedures • Develop good investigation competence • More commitment from the management • Create a culture where learning conditions are seen as something understandable, and as a common denominator in the company (must have strong people to achieve this) • Commitment from the management • More commitment to agreements • Training on and more clearly standards for how to document issues • Change of attitudes (campaigns) • Operator have to tell how it is • More brainstorming with external safety supplier • Knowledge an baldness in taking discussions back to the frame work, when meeting resistance • Investment in documentation • More informal practice in saving of informal mail
<p>Barriers against learning</p>	<ul style="list-style-type: none"> • Conflicting issues/different motives (different motives, for example economic, political issues) • Lack of clarity in the industry that learning is a part of a continuous improvement • Arrogance with regards to knowledge (people think they know, especially the older generation) • Often the respect for line leaders are to big • Corruption (the industry have difficulties in documenting this) • Different motives can affect subjective reviews which affects the

	<p>follow-up</p> <ul style="list-style-type: none"> • Groups/individual do not like new influence (individual motivations) • Seek for an easy way out (afraid that new ways are difficult to handle) • Afraid to challenge an established system • Too much respect for individuals, groups, so that deviations are not pointed on
How to see improvement	<ul style="list-style-type: none"> • Tests after people have been on a course to see how well they have learned • Study development of reports (meetings every week were the department are measured after different standards)
Systems to ensure learning	<ul style="list-style-type: none"> • Management of change procedure: (deviation from plans, strategic direction, design) • Terms of reference: the investigation task are described for the investigation leader and team what they are supposed to do and deliver • HSE responsible checks what he have ordered is what he gets, and sends back the document if this is not adequate (can be external or internal actors) • Discussions (reference groups, investigation part) • Improvement processes to ensure frame work for investigation procedures (involves several actors in discussions, check and balance) • Nonconformance (deviation) • Incident system: document that a single task where performed wrongly • Miss system: condition reveals possible risks • Near miss: near incidents • Safety coaches on the rigs that constantly monitors the conditions (daily conversations, meetings every week to judge existing procedures) • Challenging culture (company challenges itself all the time, are challenged by external partner) • Uses the involving principle (safety

	<p>representative, developing programs over time, half an over sessions every Thursday where knowledge are cheered)</p> <ul style="list-style-type: none"> • Participate in networks to exchange experiences • In Norway it is one strong coordinating supervisor authority (controls the other twelve) • Audit plans/documentation • Informal discussions • Yearly reviews to judge the existing overall control system • Constantly judgment of existing procedures • Local expertise
How to follow up reports	<ul style="list-style-type: none"> • Risk matrix (ALARP) • Discussion within different perspective (determine the probability) • Special meetings if issues are important enough
How to implement measures	<ul style="list-style-type: none"> • Important to evaluate both if the right things and done and if things are done right • Documented what to do (compliance with rules, no need to go further up in the system, unless very serious incident) • Dimensioned plans to achieve different goals (risk assessment of different actions, dimension of measures) • Things are done in series (assessment-make plans/decide-develop knowledge and systems-implementation-monitoring), well established method • Following the bowtie principle (are aware of what is on the probability side and what is on the consequence side)

B.9 Interviewee I

B.9.1 Introduction of the interview object

Interviewee I is graduated as a construction engineer at NTNU (NTH), and started his working career at SINTEF safety and reliability, afterwards he worked offshore as a HSE leader for four years, then he started at the sales and marketing department within the oil

industry. He has been in the current company for one year, as a HSE advisor, which includes controlling of all HSE activities within the company's exploration drilling. This involves ensuring that all demands from the authorities are fulfilled. The task are characterized by compliance with Norwegian rules as well as corporate guidelines, in this lies systematically planning of activities and documentation of what have been done.

B.9.2 Findings from interview I

Categories	Interviewee I
Deviations that causes incidents	<ul style="list-style-type: none"> • Lack of awareness about issues • Results from investigations are not communicated and no actions are made • Lazy management over dangerous working areas • Fails to follow rules/procedures
How was it learned	<ul style="list-style-type: none"> • Awareness all over the organization • Subcontractor took over a dangerous working task (drastically measure)
What created the learning	<ul style="list-style-type: none"> • The line itself investigated (the lines problem therefore themselves have to front the investigation, this include training of own personnel) • Logs that described who are going to communicate issues out in the organization • Tough management (addressed issues when needed) • Internal evaluation of tasks to ensure properly execution • Ensure information from suppliers about items in order to use this proactively • Overall system that sends out information regarding when forums are set to happen
The challenges with the learning	<ul style="list-style-type: none"> • Learning comes at the top of all other issues (other priorities) • Communication often becomes very specific, since it is often used technical peculiarities • Tendency when finished one project people run to a new project • Huge data materiel when measuring learning • Difficult to highlight concrete experiences
How to be better able to learn	<ul style="list-style-type: none"> • Avoid being to specific when communicate issues so that all

	<p>understands (doing things more general)</p> <ul style="list-style-type: none"> • Make thing relevant and transferable to other departments/companies • Ensure that all actions have one owner and a time limit attached it • Make it mandatory to summarize projects/activities • Involve actors before changes occur (can be just a little debrief of what is about to happen) • Ensure local ownership • Meet and reflect over experience from different forums • Share more information between each other when performing an activity • Fully audit of the overall management system to enable more judgment from the operators regarding existing procedures (make them as easy as possible in addition to follow Norwegian law/requirements)
Barriers against learning	<ul style="list-style-type: none"> • Lack of planning of experience transmission activities • Focus change rapidly (all see forward to new activities which unable a summarizing of old activities) • Many are not interested in reporting incidents among sub-contractors (conflicting motives) • Often lack of exchange of experience (forums becomes down prioritized because of lack of time)
How to see improvement	<ul style="list-style-type: none"> • Keep logs over net based learning (goal each quarter for what are to be accomplished)
Systems to ensure learning	<ul style="list-style-type: none"> • Teleconference between actors all over the world every fourteenth day with one leader which described the incident (quality check of the investigation as well as the line get to submit its issue) • Use of common project plan (drilling, logistics, purchase) to ensure that all work in the same direction (mutual dependence of each other) • Project meetings to ensure transparency regarding what have

	<p>been done</p> <ul style="list-style-type: none"> • GAMAB: system where all incidents are registered (includes reports by external supplier) • Systems must be easy to update • Train on worst case scenarios (cooperate with external actors), brainstorm what could happen • Awareness sessions to communicate important issues out in the organization (30 minutes before lunch once a week, all were invited and came if they could) have to be aware of the time when performing this as well as it do not take too long time • Meetings with partners in the license • Different forums within the industry to exchange experience (people within the same field for example HSE meets and exchange experiences) • Update processes, plans when achieve new knowledge • Gathering with people from different fields/suppliers (HSE, drilling) to ensure that everyone knows what is happening in a process and are updated • A continually update between companies when performing an activity • Yearly audit of the overall management system • Management of change procedures
How to follow up reports	<ul style="list-style-type: none"> • Corporate guidelines (risk matrix) • Important to distinguish what the line itself are going to do and what HSE support functions are going to do
How to implement measures	<ul style="list-style-type: none"> • Use old projects as a basis for new ones (exchange experience from old projects) • Use a overall plan for the company as a support for the project plan • Do the things that can be done first to be sure of completion of projects • Yearly management meetings to make plans for further activities and communicate this down the organization

- | | |
|--|--|
| | <ul style="list-style-type: none">• Things tend to be done in series |
|--|--|

Appendix C: the interview results separated into categories

Appendix C is a gathering of the results provided from appendix B into categories.

C.1 Deviations that causes incidents

The first category is related to deviations that cause incidents to happen.

Interviewee	Answers
A	<ul style="list-style-type: none"> • Falsely documentation (might give false risk understanding) • Unclear information about what is going on in the sharp end • Lack of compliance with procedures, since habits are created • Poor safety culture
B	<ul style="list-style-type: none"> • Lack of risk understanding throughout the organization even though procedures exists • Lack of compliance with procedures • Misjudge situations • Lack of clarity regarding who perform which tasks among different companies • Management tends to bring up HSE questions at different occasions without any meaning behind the words
C	<ul style="list-style-type: none"> • Incorrect execution of working tasks • Conflict between different actors • Wrong choose of design in the planning phase
D	<ul style="list-style-type: none"> • Automatic processes do not work as it should, since changes in design where made in one part of the system without thinking of another part • The results from investigations becomes pure operational measures, that is in the form of recommendations in the risk analysis (be careful of, etc.) • Lack of knowledge among actors regarding changes that are incorporated • Lack of supervision of inexperienced personnel (apprentices) • Ways of doing things becomes automatic • Lack of leadership • Complex procedures might be hard to follow
E	<ul style="list-style-type: none"> • Poor design • Lack of information transfer to next working group
F	<ul style="list-style-type: none"> • Assures of things that can't be hold • Uncertainty regarding what should be done
G	<ul style="list-style-type: none"> • Bad management (shortcoming in interaction between several actors) • Pressure from corporate interests on operators in the field to be effective • To many inexperienced personnel/lack of monitoring of inexperienced personnel • To little knowledge in interpreting signals that might lead to an incident • Lack of monitoring of working processes • Lack of risk awareness combined with economic interests • Seek in doing things as cheap and effective as possible • Lack of verifying of changes (in order to see consequences of even

	<p>small changes)</p> <ul style="list-style-type: none"> • Interaction problems between different actors (lack of respect for each other)
H	<ul style="list-style-type: none"> • Lack of compliance (breach in rules and procedures) • Lack of planning • Bad communication • Control of the work permit system (tasks go into another shift without follow up that the interaction are adequate) • Inadequate documentation of tasks
I	<ul style="list-style-type: none"> • Lack of awareness about issues • Results from investigations are not communicated and no actions are made • Lazy management over dangerous working areas • Fails in following rules/procedures

C.2 Outcome of the learning

The second category describes different outcomes of the learning.

Interviewee	Answers
A	<ul style="list-style-type: none"> • The employees became more knowable about what they were doing and the dangers with it • Participated more in forums to learn from another • More thinking of ways to improve • Dangerous equipment where removed from the marked • More focus on doing things right after an incident have occurred • Accomplished an secure operation • More reviews to correct an equipment before failure occur
B	<ul style="list-style-type: none"> • Performs more risk assessment • More risk understanding among all involved in activities • Informal conversations among employees • More use of decision trees to see the hierarchical connection • Some tasks where stopped performed
C	<ul style="list-style-type: none"> • Developed proper routines • The management became more involved in daily operations • Developed proper practices • Developed procedures where it lacked • Spreading awareness regarding what is the focus • Discussion regarding that things are not in the way it should • Changed working methods • Common rules where made
D	<ul style="list-style-type: none"> • Clearer rules and refinement between incidents • Drastically steps taken after incident occur
E	<ul style="list-style-type: none"> • Increased training of external actors • Investigate more on root causes (technical, organizational)
F	<ul style="list-style-type: none"> • Revealed what have to be done different
G	<ul style="list-style-type: none"> • Better internal/external interaction

H	<ul style="list-style-type: none"> • Companies change procedures • The industry as a whole took the experience from an incident with them and new standards were developed • Guidelines for further direction were set
I	<ul style="list-style-type: none"> • Awareness all over the organization • Subcontractor took over a dangerous working task (drastically measure)

C.3 What created the learning

The third category are related to how organizations achieved the results they did and improved the situation of the organization.

Interviewee	Answers
A	<ul style="list-style-type: none"> • Investigation • Learning tends to occur after an incident have happened • More HSE personnel in teams • Safety coaches on the working place • Spread the awareness about the importance of always think twice (forums) • Used discipline to force changes but in addition explain why
B	<ul style="list-style-type: none"> • More focus on certain issues • Dialog internally at the office to modernize working tasks • Ensure dialog internally with use of mails • Petroleum authority's sends out mail to all actors on the marked if it is something they want focus on or equipment that have to be exchanged
C	<ul style="list-style-type: none"> • Admission of deviation • Go through what happened with involved actors in order to achieve consensus about what is the problem • Be flexible in changing • Excursions to benchmark with experts on the field • Set focus where it should be a focus
D	<ul style="list-style-type: none"> • Investigated all the way back to the design process • Created a new management of change procedure that had clearer rules and where clearer of what type of changes and repairs that can be conducted • Initiate campaigns • Went through procedures • Marks high potential incidents without consequences by involving top management in the investigation (not just rely on local expertise) • Developed an indicator to see the ability to perform the tasks • Gatherings to benchmark with one another to obtain best practice learning and use it to develop standards • Management directly involved
E	<ul style="list-style-type: none"> • Contact/inform the supplier of services about the incident • Thoroughly investigation of root causes
F	<ul style="list-style-type: none"> • Went together in an investigation (different actors) • Review of the overall system at the management level

	<ul style="list-style-type: none"> • Talk with each other at a regular basis • Transfer experiences from one project to another (no formal system) • Try to develop alternative ways in doing things • Involve people which have tried different approaches in ways of doing things
G	<ul style="list-style-type: none"> • Change of focus within the management • Better awareness within the industry • Study of crucial incidents (actors are curious of what happened) • Get things up at the agenda (morning meetings, other meetings, forums) • Brainstorming around different scenarios to exercise on • Active in searching of others that might have done similar activities
H	<ul style="list-style-type: none"> • The incident became an industrial issue (forums) • Admission of the factual course of event (incident trees that on the minute maps what happen) • Good communication between different actors to ensure consensus about the task • Objective input (objective when addressing an issue) • Clear documentation that can dismiss prejudices (deviation treatment if things are done otherwise) • Challenging culture that ensures continually challenge towards what have been established
I	<ul style="list-style-type: none"> • The line itself investigated (the lines problem therefore themselves have to front the investigation, this include training of own personnel) • Logs that described who are going to communicate issues out in the organization • Tough management (addressed issues when needed) • Internal evaluation of tasks to ensure properly execution • Ensure information from suppliers about items in order to use this proactively • Overall system that sends out information regarding when forums are set to happen

C.4 Challenges with the learning

In the fourth category it is aimed at reveal factors that were challenging with regards to achieve organizational learning.

Interviewee	Answers
A	<ul style="list-style-type: none"> • How to deal with the direct involved employees in the incident • How to deal with the supplier in form of being objective • To maintain an safety trend (ensure that issues do not get forgotten) • Members want to maintain old ways of doing things
B	<ul style="list-style-type: none"> • Give the organization properly resources to learn adequately • Personnel might be exchanged so that the learning are forgotten • Often decisions are based on they whom “shout” highest
C	<ul style="list-style-type: none"> • Achieve admission that there are deviations in the procedures, this goes for both the performers of the task as well as the responsible

	<ul style="list-style-type: none"> • Get people to be honest instead of going in defense position • Be able to think of unexpected situations
D	<ul style="list-style-type: none"> • Often a single incident is not enough to ensure big structural changes in the system as a whole • Changes becomes to extensive problems often require a total re-design • Incidents are often seen as a result of an inexperienced operator • Operators tends to have too much focus on issues that covers their own safety, and they forget the big potential accident focus • It is often too much focus on improving the procedures by adding more to it, which may make the procedure big and complex • People are often focusing too much on easy measure parameters • Find a balance between using time on being updated by exchange experience and doing the working tasks • It is often a need to do activities in interaction between different actors
E	<ul style="list-style-type: none"> • Often focus in investigations are on pure material assets (root causes are rarely investigated since often complex composition) • When reorganizing the organization it can be difficult to see if the right things are done • When systems are complex it can be difficult to address the investigation correct in the jungle of actors and procedures
F	<ul style="list-style-type: none"> • To long time from identification of the problem to it is taken seriously by the management • Regular it is only focused on if procedures exists not if things in detail are done correct
G	<ul style="list-style-type: none"> • Competence management (ensure that people involved in operations have the correct knowledge) • Complex systems makes it hard to reveal deviations in barriers • Convince personnel about new ways of doing things (change attitudes) • When mix cultures it can be hard to achieve consensus (afraid of new things) can be internal departments or external companies
H	<ul style="list-style-type: none"> • Many people seems to believe that they are experts in investigation • Hard to get people to go back to the roots of the investigation regulations • The focus on learning goes away when the tabloid part of the incident are in the past • Get a consensus regarding the actual conditions (admission) often difficult when the fact basis are faltering • Can be difficult to tell about inadequate work (requires a certain use of force), often more inexperienced personnel have problems with this
I	<ul style="list-style-type: none"> • Learning comes at the top of all other issues (other priorities) • Communication often becomes very specific, since it is often used technical peculiarities • Tendency when finished one project people run to a new project • Huge data materiel when measuring learning • Difficult to highlight concrete experiences

C.5 How to be better able to learn?

In the fifth category it is aimed at reveal factors that contribute to a learning organization.

Interviewee	Answers
A	<ul style="list-style-type: none"> • More use of forums to spread knowledge externally • More awareness/information about the working environment among all internal actors • Be open and honest about the problems • Gather and repeat tasks/discuss in order to maintain a good development (formal routines for this)
B	<ul style="list-style-type: none"> • Make sure that actions are properly documented in order to make sure that the learning are not forgotten • Have a good discussion in doubtful situations • Participate more in forums with employees in external companies to learn from on another • Better ways in storage of mails and categorization of them
C	<ul style="list-style-type: none"> • Be better able to exchange experiences when going through incidents, with external suppliers • Participate in forums to share with others what is the challenges • The management must give strong signals about how they want thing to be in order to achieve a good culture • Focus just as much about what going right as what going wrong and focus just as much if the right things are done compared to if the things are done right • Focus more on the future and monitor the development in the marked • Ensure that people feel ownership to a solution, so that changes do not become forced upon an organization • Get people to be honest instead of going in defense position • Be able to think of unexpected situations
D	<ul style="list-style-type: none"> • Focus more on possible consequences (possibilities can be hard to foresee), possible consequences should trig an investigation, independent of an the probability of it • Less threshold to change practices and procedures • More focus on factors that might give long term damages, not just on acute issues • Assess if it is the procedure is good not just if the procedure is followed (procedures can be to extensive, and inadequate adaption to what is critical) • Develop checklist to obey the procedures more easily • Develop individual based goals in addition to team based goal (so that all contributes and see the meaning of it) • Better planning of when to perform tasks so it is easier to plan for participating in forums/exchange of experiences
E	<ul style="list-style-type: none"> • Allocate time and work with issues that have happen, and study the learning process afterwards • Bring in external people to look at issues to get new views • Discuss/brainstorm more if the right things are being done, also in gatherings with external companies

	<ul style="list-style-type: none"> • Better able to interpret signs to failure (instead of judge mistake separately it is important to see the whole picture to see if bigger things is behind) • Better to anticipate unthinkable issues • Better routines in saving of knowledge achieved from different gatherings
F	<ul style="list-style-type: none"> • Technical personnel must be better to communicate problems upwards in the organization • The organizational structure should be re-designed to easier be able to spread knowledge within the company • Problems should go around in the organization to achieve consensus around what is the problem and how to address it • Construct a formal system for experience exchange from one project to another project • Better to discuss with each other what have been learned from seminars/forums
G	<ul style="list-style-type: none"> • More training in interpreting of signals • Develop of good early warnings systems • Respect for experience and competence (right competence to right place) • The top management must have focus on HSE questions • Often it is a need to shake in the organization in order to make people go together • Ensure ownership to processes • Train more on unusual incidents and brainstorm around them • Ensure that all involved personnel can come up with inputs • More transfer of experience between projects
H	<ul style="list-style-type: none"> • Develop forums where different industries can meet and exchange experiences (mainly nuclear and oil industry) • Ensure more knowledge to enable a good documentation basis in order to reveal and get consensus around course of events • Ensure that investigations are linked to the regulations and gives answers to the main points in it • Develop very clear procedures • Develop good investigation competence • More commitment from the management • Create a culture where learning conditions are seen as something understandable, and as a common denominator in the company (must have strong people to achieve this) • Commitment from the management • More commitment to agreements • Training on and more clearly standards for how to document issues • Change of attitudes (campaigns) • Operator have to tell how it is • More brainstorming with external safety supplier • Knowledge an baldness in taking discussions back to the frame work, when meeting resistance • Investment in documentation

	<ul style="list-style-type: none"> • More informal practice in saving of informal mail
I	<ul style="list-style-type: none"> • Avoid being too specific when communicate issues so that all understands (doing things more general) • Make thing relevant and transferable to other departments/companies • Ensure that all actions have one owner and a time limit attached it • Make it mandatory to summarize projects/activities • Involve actors before changes occur (can be just a little debrief of what is about to happen) • Ensure local ownership • Meet and reflect over experience from different forums • Share more information between each other when performing an activity • Fully audit of the overall management system to enable more judgment from the operators regarding existing procedures (make them as easy as possible in addition to follow Norwegian law/requirements)

C.6 Barriers against learning

The sixth category is dedicated to reveal the interviewees view of possible barriers towards learning.

Interviewee	Answers
A	<ul style="list-style-type: none"> • Automation in ways of doing things since things goes well several times • A desire of doing things easy • Wrong HSE focus
B	<ul style="list-style-type: none"> • Lack of time to sit down and reflect over the learning • Often the lessons learned reports are made by people that lack knowledge about the situation, since they with knowledge do not have time • It is a tendency that when a task have been performed well once it is hard to do it differently the next time • Strict rules may prevent that procedures are made easy and understandable
C	<ul style="list-style-type: none"> • Lack of honesty • Following traditional solutions • Doing things in the same way it always have been performed (resistance to change/afraid of new measures)
D	<ul style="list-style-type: none"> • Often consequences have to be severe before changes are maid • Too much focus on the possibility of an incident, (can be hard to judge the possibility) • Long term issues are rarely investigated (chemical exposure) • Poor follow-up of mappings,(new mappings are started instead), leads to incomplete action plans • Often operators might not be able to absorb writhed information (lack of education) • The data tool (CARE) are difficult to change, it requires change globally (the system handles only incidents, not technical deviation,

	<p>quality deviation, etc. in order to follow up audits as well as incidents, register not unwanted conditions)</p> <ul style="list-style-type: none"> • The statistic do not covers lack of ability to conduct tasks(people often gets a new time limit, to predict major accidents it is also important with performance indicators) • Lack of clearly leadership in coordination between different external actors • Different companies might be in different developing stages, this can contribute to that suggested measures by one company are outdated fast in another company
E	<ul style="list-style-type: none"> • Pride among individuals (ownership to design) • Different political views among actors • People tends to forget the last project since they want to focus on a new project • Resistance in going over to new and unknown systems • Lack of formal systems to save knowledge from gatherings which will lead to longer time for new employees to learn their tasks
F	<ul style="list-style-type: none"> • Difficult to enable communication upwards in the system and across the departments • Difficult to transfer knowledge to the top level in the company • Things are often done in wrong order, since conflict occur between long time and short time views • Huge resistance to change within different technical milieu
G	<ul style="list-style-type: none"> • Lack of time (often very focused in doing the task so it is forgotten to evaluate the tasks) • Management have too much focus on effectiveness • Difficult to exchange experiences (since little time to do this, often just one meeting) • Difficult to come in as an external and criticize existing methods (internal actors goes into defense positions)
H	<ul style="list-style-type: none"> • Conflicting issues/different motives (different motives, for example economic, political issues) • Lack of clarity in the industry that learning is a part of a continuous improvement • Arrogance with regards to knowledge (people think they know, especially the older generation) • Often the respect for line leaders are to big • Corruption (the industry have difficulties in documenting this) • Different motives can affect subjective reviews which affects the follow-up • Groups/individual do not like new influence (individual motivations) • Seek for an easy way out (afraid that new ways are difficult to handle) • Afraid to challenge an established system • Too much respect for individuals, groups, so that deviations are not pointed on
I	<ul style="list-style-type: none"> • Lack of planning of experience transmission activities • Focus change rapidly (all see forward to new activities which unable a summarizing of old activities)

	<ul style="list-style-type: none"> • Many are not interested in reporting incidents among sub-contractors (conflicting motives) • Often lack of exchange of experience (forums becomes down prioritized because of lack of time)
--	--

C.7 How to see improvement

In this category it is revealed how learning is being measured, if it exist such methods.

Interviewee	Answers
A	<ul style="list-style-type: none"> • Make trends on all key performance indicators related to HSE and benchmark against likeable world class
B	<ul style="list-style-type: none"> • None
C	<ul style="list-style-type: none"> • Measure different HSE parameters (LTI, other absence injuries parameters and study the development)
D	<ul style="list-style-type: none"> • Keep the investigations open after measures are taken until effects of measures are checked (do not lock cases after measures are taken)
E	<ul style="list-style-type: none"> • Monitor development of number of incidents followed by investigation of why things happen (to see if/why the same issue repeats)
F	<ul style="list-style-type: none"> • None
G	<ul style="list-style-type: none"> • None
H	<ul style="list-style-type: none"> • Tests after people have been on a course to see how well they have learned • Study development of reports regarding incidents (meetings every week were the department are measured after different standards)
I	<ul style="list-style-type: none"> • Keep logs over net based learning (goal each quarter for what are to be accomplished)

C.8 Systems to ensure learning

Here the systems to ensure learning in the three companies are mapped. Note that interviewee A, B, C and D belong to company 1, E and F to company 2 and G, H and I to company 3.

Interviewee	Answers
A	<ul style="list-style-type: none"> • CARE which is a HSE follow up system that ensures that every task has one responsible person which have to go in in the system and comment what he have done, and describe possible failure with it. • The management have to go inn and lock so called red actions this ensures that the whole company are updated on what is happening • Daily evaluate the processes • The personal salary are based upon personal KPI's which include different HSE factors • Different forums that calls inn leaders from different departments and companies to ensure a discussion about important issues. The results are spread by the leaders within its department • Go through CARE reports on morning meetings • Save the lessons learned in documentations • Go through existing procedures before performing an activity

	<ul style="list-style-type: none"> • After performed an activity it is performed an “as done procedure” to see possible changes/ improvements that can be achieved in the existing procedure. These observations are logged and discussed among on and offshore. The new and improved procedure gives the basis next time the activity are to be performed
B	<ul style="list-style-type: none"> • Lessons learned reports • Training of people to interpret precursors to errors • Informal mail are sent between employees to exchange experiences and also attachments with working processes performed are sent
C	<ul style="list-style-type: none"> • Safety bulleting’s that ensure that copies of all relevant incidents are sent between actors to check if the external actors have had similar incidents • Investigation of incidents • CARE: registration system to follow up actions (a reminder of outstanding actions) • Double reporting (external actors reports are brought in in the company’s system) • Go through HSE factors before starting one a activity • Ensure meetings to exchange experience regarding internal operations • Weekly meetings where the risk register are reviewed to see if things are looked and see if goals are reached • Meetings with suppliers once a quarter to go through the services that have being performed • Action log to save experiences • Subject forums (for example drilling management forums) to exchange experience, this include communication of case historic within the company
D	<ul style="list-style-type: none"> • CARE: electronic system where incidents are recorded • Monthly internal gatherings with presentation of issues that are to be discussed in plenary • Yearly employee conversation • Bonuses that are based on the performance • People with same background meets in yearly forums to discuss and address issues (every business unit have their own yearly gatherings) • Safety forums where different actors participate across business units • Participation in presentations of current problem issues
E	<ul style="list-style-type: none"> • Lessons learned sessions • Deploying own personnel in external companies • Close connection with partners, where risk analyses are been done in plenum • Synergy system: event/quality deviation system, where incidents and the potential consequence of incidents are being registered • When high potential events occur it is sent out a signal to all HSE personnel in the company • Weekly safety sessions, where it is a rollover in who presents what’s in the sessions • Bonuses related to number of management visits and audits offshore • Quarterly meetings with external operator

	<ul style="list-style-type: none"> • Quarterly internal functional gatherings where employees from different countries within a specific field meets and exchange experiences • Different forums where different actors from different companies in the same situation (in form of size) meets and exchange experience, this experience are mediated within the company • Yearly review of management systems • Start campaigns (where one particular issue are focused on)
F	<ul style="list-style-type: none"> • Safety meetings • Communicate wishes/priorities to the operator (done through resource committees) • Working/informal meetings where different issues are presented • Synergy system if incidents/quality deviations occur • System to evaluate all the employees on the background of duties that were supposed to have been done in the past year (grades based on the duties, are given by evaluation in the year and total evaluations after the year is finished) • Forum where actors from different companies meets to exchange experience within a subject (the forum have a belonging web site with a library in which all reports and data are saved) the information is used to make it easier for new personnel within the firm and also spread the knowledge out to other actors in Norway • Seminars where different issues are addressed
G	<ul style="list-style-type: none"> • Management of change procedures • CARE system (open for qualitative judgment) • Different forums to exchange experience (people with the same background shear experience is the most effective) • Documentation of what learned in forums • Education of personnel • Web sites specially directed to actual incidents/issues • Regular audits (quality factors)
H	<ul style="list-style-type: none"> • Management of change procedure: (deviation from plans, strategic direction, design) • Terms of reference: the investigation task are described for the investigation leader and team what they are supposed to do and deliver • HSE responsible checks what he have ordered is what he gets, and sends back the document if this is not adequate (can be external or internal actors) • Discussions (reference groups, investigation part) • Improvement processes to ensure frame work for investigation procedures (involves several actors in discussions, check and balance) • Nonconformance (deviation) • Incident system: document that a single task where performed wrongly • Miss system: condition reveals possible risks • Near miss: near incidents • Safety coaches on the rigs that constantly monitors the conditions (daily conversations, meetings every week to judge existing

	<p>procedures)</p> <ul style="list-style-type: none"> • Challenging culture (company challenges itself all the time, are challenged by external partner) • Uses the involving principle (safety representative, developing programs over time, half an over sessions every Thursday where knowledge are cheered) • Participate in networks to exchange experiences • In Norway it is one strong coordinating supervisor authority (controls the other twelve) • Audit plans/documentation • Informal discussions • Yearly reviews to judge the existing overall control system • Constantly judgment of existing procedures • Local expertise
I	<ul style="list-style-type: none"> • Teleconference between actors all over the world every fourteenth day with one leader which described the incident (quality check of the investigation as well as the line get to submit its issue) • Use of common project plan (drilling, logistics, purchase) to ensure that all work in the same direction (mutual dependence of each other) • Project meetings to ensure transparency regarding what have been done • GAMAB: system where all incidents are registered (includes reports by external supplier) • Systems must be easy to update • Train on worst case scenarios (cooperate with external actors), brainstorm what could happen • Awareness sessions to communicate important issues out in the organization (30 minutes before lunch once a week, all were invited and came if they could) have to be aware of the time when performing this as well as it do not take too long time • Meetings with partners in the license • Different forums within the industry to exchange experience (people within the same field for example HSE meets and exchange experiences) • Update processes, plans when achieve new knowledge • Gathering with people from different fields/suppliers (HSE, drilling) to ensure that everyone knows what is happening in a process and are updated • A continually update between companies when performing an activity • Yearly audit of the overall management system • Management of change procedures

C.9 How to follow up reports

Here it is revealed how the companies follow up reports.

Interviewee	Answers
A	<ul style="list-style-type: none"> • Daily meetings between onshore and offshore personnel

	<ul style="list-style-type: none"> • Weekly closure and follow up of reported incidents • Assure consensus among actors, involve leadership if it is a red incident • A matrix system to separate different incident after how serious they are (possibility/consequence)
B	<ul style="list-style-type: none"> • Transfer most serious incidents from an external actor to the company system (all incidents that lead to damage on people as well as serious near misses are registered and cases that relates to quality on equipment that the company have contract to)
C	<ul style="list-style-type: none"> • Matrix system to define the seriousness in order to define the measures
D	<ul style="list-style-type: none"> • Based on the incident (is it a well-known incident) • ALARP-principle
E	<ul style="list-style-type: none"> • HSE specialists onshore receives reports from offshore personnel and make a self-assessment on if the reports are of interest to investigate any further • Often more alert on equipment that have been involved in earlier incidents
F	<ul style="list-style-type: none"> • Personal experience, gives the basis for what is addressed to the operator
G	<ul style="list-style-type: none"> • Matrix system (ALARP) • Continually third part risk evaluation (to see development in mainly the probability development)
H	<ul style="list-style-type: none"> • Risk matrix (ALARP) • Discussion within different perspective (determine the probability) • Special meetings if issues are important enough
I	<ul style="list-style-type: none"> • Corporate guidelines (risk matrix) • Important to distinguish what the line itself are going to do and what HSE support functions are going to do

C.10 How to implement measures

How measures are implemented is here mapped.

Interviewee	Answers
A	<ul style="list-style-type: none"> • A mixture of series and parallel • Think mostly short sight • After correcting a failure it is important to make a lesson learned to document what learned • Go through lesson learned later • Important with communication between operators, HSE responsible personnel and economists
B	<ul style="list-style-type: none"> • Tasks are often performed on the crossroad between departments and things are done simultaneously, by communicate between departments • It is a relatively short time horizon the tasks are performed on • Continuous planning are performed to see beyond when things are done
C	<ul style="list-style-type: none"> • Working through contractors • Clearly specify measures by good communication

	<ul style="list-style-type: none"> • Limited time horizon
D	<ul style="list-style-type: none"> • The top management develops visions, which are communicated further down in the organization. It is then developed project goals and performance indicators based on this • Focus on seeing alternative ways of performing things • Contracts with external suppliers, that provides services, make sure that tasks are transparent so that coordination between actors are possible
E	<ul style="list-style-type: none"> • Training, which are evaluated later • Audits against the operator to see if things are done right/right things are done • Relatively short time horizon (one year) • Dialog with operator to reveal differences and achieve consensus
F	<ul style="list-style-type: none"> • Risk matrices on functions are gathered in a total package • Plans for the living time of the well
G	<ul style="list-style-type: none"> • Capture the immediate needs and develop plans based on this (short sight) • Take a round with different actors to achieve an common plan • Things are mainly done in parallel because of complex interactions (a need to communicate well) • Do things known before implementing change • Go through every other year the management system • Ensure individual ownership to ensure support around things • Licenses to ensure partnership, the operator are the main force, but the other actors are following what is being done • Continually adherence with belonging consequences to ensure that actors are adapting new measures
H	<ul style="list-style-type: none"> • Important to evaluate both if the right things and done and if things are done right • Documented what to do (compliance with rules, no need to go further up in the system, unless very serious incident) • Dimensioned plans to achieve different goals (risk assessment of different actions, dimension of measures) • Things are done in series (assessment-make plans/decide-develop knowledge and systems-implementation-monitoring), well established method • Following the bowtie principle (are aware of what is on the probability side and what is on the consequence side)
I	<ul style="list-style-type: none"> • Use old projects as a basis for new ones (exchange experience from old projects) • Use a overall plan for the company as a support for the project plan • Do the things that can be done first to be sure of completion of projects • Yearly management meetings to make plans for further activities and communicate this down the organization • Things tend to be done in series • Ensure ownership to tasks

