Dedicated to my Parents

Preface

This master thesis is outcome of the research work conducted under the course TPK4920, Project and Quality Management, during spring 2019 at the department of Mechanical and Industrial Engineering at Norwegian University of Science and Technology. This research work is done in collaboration with AkerBP, ASA. The purpose is to review Ivar Aasen project and suggest improvements for organisational learning processes.

My educational background in Petroleum Engineering made it easy for me to understand technical aspects and gave me new perspective of organisational management.

I would like to thank AkerBP and all respondents for taking out time from their busy schedule. Special thanks to Bjorn Sundfaer, for managing all interviews and giving me an opportunity to work on this topic.

Continuous support, knowledge on the subject and encouragement from my supervisor, Associate Professor Bassam Hussein has been valuable for me through out the whole process. I am obliged to learn from the experience of my supervisor.

Waqas Mushtaq

Trondheim, July 30th 2019

Summary

This master thesis addresses the topics of organisational learning, lessons learned and challenges for their implementation for project based organisations. The purpose is to encourage lessons learned practices at AkerBP through the evaluation of Ivar Aasen field. This is done by doing qualitative analysis of information from respondents through surveys and interviews. The aim is to provide AkerBP with the best possible approaches for lessons learned to improve organisational learning. The findings and recommendations of this thesis will be guidelines for the case company for future projects.

The surveys were conducted through two questionnaires and interviews were followed up after first online survey. The questions in questionnaires and interviews were focused on the challenges which had their impact on HSE (Health, Safety and Environment), Operational Costs, Working Environment, Resource Productivity and Collaboration on Site (One Team). Questions related to management response and support, measures taken for technical and organisational challenges and possibility of avoidance of challenges were also asked. Second survey was conducted after interviews which was mainly focused on existing lessons learned practices and their implementation in the organisation. The interviews were conducted face to face and audio recorded. The findings are based on the information from 17 respondents.

The literature review covers all basic concepts and challenges for organisational learning and competitive advantage through capturing, storing and transferring lessons learned effectively. Types of learning and management of lessons learned have also been discussed. Many possible approaches have been described based on different theories and categories which are helpful in selecting appropriate approach for organisational learning. It also focuses on the limitations and impediments to lessons learned practices.

The findings suggest that people are willing to share and contribute in learning processes but there have been several challenges for them. The management also encourages learning on all levels, whether it is with internal or external resources or even informal discussions among employees. But the structure and processes appears to be a bit weak for learning and organisational culture of the case company. The challenges mentioned by respondents include excessive workload, reduced resources, lack of guidance, multiple systems interfaces and inefficient transfer of lessons learned across all levels.

This master thesis is important for the case company as it identifies and highlights challenging factors in their existing processes. This thesis will contribute to improve their lessons learned practices and to achieve organisational learning to the highest level. It

gives them a third party's opinion as the recommendation for improvements will give them an initiative for future projects.

Moreover, this thesis will fill the gap in research work especially the literature related to lessons learned practices during operation phase. It will be a valuable addition as a guideline for similar projects.

Keywords: Organisational learning, Lessons leaned, Post project reviews, Approaches for lessons learned, Oil and gas, Knowledge management, Lessons learned challenges, Impediments to organisational learning

Table of Contents

List of Tables

List of Figures

Abbreviations

LL	=	Lessons Learned
BoE	=	Barrels of oil equivalent
DNO	=	Det Norske Oljeselskap
TQM	=	Total Quality Management
CoP	=	Communities of Practice
CKO	=	Chief Knowledge Officer
EG	=	Edvard Grieg

Chapter 1

Introduction

This chapter is divide into following parts.

- Background for this thesis report, case company and Ivar Aasen field.
- Scope of work explains the basis for this thesis report and why the case company opted to do research on this topic.
- Research objective is defined through research questions.
- Thesis structure explaining the details of content in all chapters

1.1 Background

This thesis report is an extension work of the specialisation project report submitted in autumn 2018 at the department of Production and Quality Management at Norwegian University of Science and Technology. The title of report was *"Lessons Learned during Operation Phase"*. It was completely focused on lessons learned practices during operation phase for Ivar Aasen field.

The purpose of this thesis report is to get an insight into lessons learned practices, usability and implementation of these practices in the case company for both operation and project phases. The thesis primarily looks into the question: How valuable and important these lessons learned have been for individual and collective improvement of organisation? Therefore, this extended research work gives a better understanding of lessons learned practices and organisational learning for this particular field of the case company. This thesis will be a guideline for the improvement of organisational learning for similar projects and it will open new horizons for companies through implementation and usability of lessons learned.

1.1.1 The Case Company

This master thesis is written in collaboration with AkerBP ASA. The company went through some organisational changes over the period of time. It was founded in 1971 as Det Norske Oljeselskap, DNO. It got merged with Aker Exploration in 2009. Later in 2014, Det Norske Oljeselskap bought Marathon Oil Norway. In 2016, Det Norske Oljeselskap had merger with BP Norway and changed their name to AkerBP ASA. It became one of the biggest exploration and production companies of Norway. Now, AkerBP is engaged in exploration, production and development activities not only in Norwegian Continental Shelf but in other parts of the world as well.

AkerBP wants to improve the process of lessons learned capturing, usability and knowledge sharing to strengthen the organisational learning. They have their own formal process to capture, review and store lessons learned with the intention to transfer knowledge and experience from previous projects to the future projects. The achievement of this goal will give them a competitive advantage over their competitors through organisational learning.

1.1.2 Ivar Aasen Field

Ivar Aasen is the first large oil field for AkerBp as operator. It was discovered in 2008 and production was started in December, 2016. The other partners in Ivar Aasen field are Statoil, Bayrengas, Wintershall Norge, VNG Norge, Lundin Norway and OKEA (AkerBP-ASA, 2016).

The Ivar Aasen field is located in the northern part of the North Sea, about 175 km west of Karmy, close to Lundin's field Edvard Grieg. Due to close proximity of these two fields, government demanded a close coordination between them. Figure 1.1, showing both fields are located close to each other. Ivar Aasen gets the power from Edvard Grieg and in return

transport produced hydrocarbons after first stage separation. Further separation is done at Edvard Grieg.

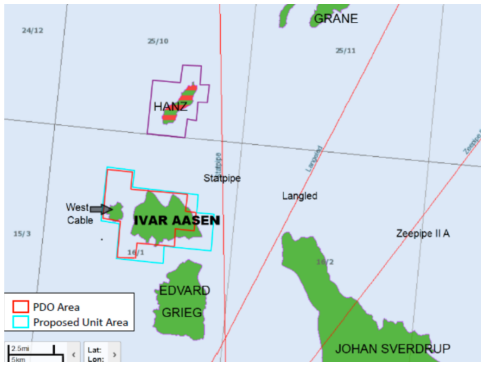

Figure 1.1: Map Showing close Proximity of Ivar Aasen and Edvard Grieg (AkerBP-ASA, 2018)

Ivar Aasen was developed and operated mainly from Trondheim office. In the early plan, it was estimated to have production that approximately contains around 186 million barrels of oil equivalent (boe), excluding Hanz, for the anticipated economic life of twenty years (AkerBP-ASA, 2016).

1.2 Scope of Work

Ivar Aasen has been the biggest project for AkerBP so far. It has been important and critical for the company to be able to review the project and identify where the project succeeded and where it could have been improved by looking at success and failure factors. Therefore, AkerBP has always been keen to look into progress through learning and feedback processes. Lessons learned gave an insight and review of the project to identify the areas with more challenges. AkerBP has a database of lessons learned from the project phase and is available to everyone in the lessons learned database.

Lessons learned sessions were conducted after the project phase of Ivar Aasen in the form of workshops, meetings and discussions. But there has been no such exercises during more than two years of operations so far. AkerBP wanted to re-collect all lessons learned for operation phase and they are planning to conduct lessons learned sessions. They are also interested to look into the factors due to which they have not been able to capture lessons learned during the operation phase. This report covers the reasons, limitations and factors affecting to conduct lessons learned practices in general and particularly in the case of Ivar Aasen field. The results and recommendations from this thesis will be helpful for the case company to conduct lessons learned sessions on regular basis and implement relevant lessons in future projects to attain higher level of organisational learning.

1.3 Research Objective

The objective of this thesis report is to improve lessons learned practices and find out important factors for this. All of this has been done by focusing on the following research questions.

1.3.1 Research Questions

The research questions are as follows:

1. What is the best time to collect lessons learned in the operation phase?
2. What type of lessons learned do we need to collect?
3. How can we make sure that lessons learned from operation are sent back to the project department and through which channel?

1.4 Thesis Structure

This thesis comprises seven chapters. The content in all chapters is in accordance to their respective titles and written with a perspective to form a basis to answer research questions.

Chapter 1

This chapter is about the introduction to this master thesis, background of company and case study field. The scope of thesis and research questions are also presented in this chapter.

Chapter 2

Chapter 2 describes the research approaches for the compilation of the data required for this thesis report. It explains why qualitative method has been used and how the data has been collected through surveys, interviews and other sources. The quality and validity of obtained data and limitations for this thesis report have also been described.

Chapter 3

This chapter is about the literature review for the basic concepts of learning, organisational learning and lessons learned. These concepts are essential for readers to have a better understanding of the topic.

Chapter 4

Chapter 4 presents the extended view of literature review. It is mainly focused on the organisational theories and approaches to achieve organisational learning.

Chapter 5

All the findings and results from surveys and interviews are presented in this chapter. This chapter highlights the technical and organisational challenges faced by the respondents and how they reflected towards company's performance. It also contains the information about the current lessons learned practices and their implementation within the company. The challenges to capture and transfer of lessons learned across different levels have also been highlighted.

Chapter 6

Chapter 6 is based on the discussion of the findings I obtained from surveys and interviews. It contains the elements of lessons learned and information about how lessons learned practices can be improved within company. The basis for this chapter is to relate challenges from findings with the theory presented in earlier chapters.

Chapter 7

The last chapter presents concluding remarks and recommendations for future work. These recommendations are about better approaches towards organisational learning and lessons learned practices within the organisation.

Chapter 2

Research Methodology

This chapter is divide into following parts.

- Research approach for literature search and a brief introduction to case study.
- Data collection: How data has been collected through surveys and interviews and number and list of respondents.
- Quality and Ethical consideration for data collection.
- Limitations to collected data and information

In this chapter, the methodology for the selection of data and relevant literature for this thesis have been described. I have identified methods for data collection and data analysis using the chosen research methodology. I have ensured the high quality and originality of data and research through proper and detailed data analysis. Lastly, I have also presented limitations for this research work.

2.1 Research Approach

This section contains the detailed description for the selection of appropriate approach, literature review approach and collection of data through questionnaires and interviews.

2.1.1 Qualitative Research

The theme of this thesis report is to understand the impact of lessons learned on organisational learning and culture. Therefore, qualitative research approach was selected as it analyses data direct from fieldwork observations, interviews and written documents (Patton, 2005). It is also characterised by human behaviour, situations, problems and phenomena (Kumar, 2011). Qualitative research approach helps to find out new ways to work on real life challenges rather than assumed cases. It does not begin with preconceived hypothesis but helps you to discover relationships, concepts and ideas about topics for data collection and analysis (Hill et al., 1997).

So, given the scope of this thesis, qualitative research approach was most appropriate. The research is based on a single case study and combination of questionnaires and interviews.

2.1.2 Literature Search

The search for literature has mainly been conducted through Oria.no and Google Scholar. Oria.no is an electronic search engine for NTNU students and staff. It gives you access to worldwide journals, books, articles and scientific papers. It also gives you the option to look within the university library database. I also used Google Scholar to look for some extra material that I could not find through Oria.no. Through the combination of these two search engines, I was able to find good quality literature for this thesis. Some main keywords used for literature search were;

- Lessons learned
- Organisational learning
- Lessons learned during operations
- Impact of lessons learned
- Approaches for lessons learned
- Post project reviews

Other search words included organisational complexity, uncertainty, project management, project success, oil and gas, communication and lessons learned processes. These words have been used in many combinations with each other and some other words. Snowball referencing has also been used which is reviewing the used references in other articles. Some of the literature books were also recommended by my supervisor.

2.1.3 Case Study

The basis for this thesis is the case study for a particular field of an oil and gas company. According to Bryman (2016), case study research explores the complexity and nature of case being studied. This specific case was chosen by the company as it was their first biggest project and they wanted to study all organisational aspects and take guidelines for the future projects. Keeping this perspective in view and my educational background in petroleum engineering, I chose this topic as it was easy for me to understand technical terminologies during interviews. But most important factor was that it gave me an opportunity to study organisational structure, management challenges and organisational learning processes of an oil and gas company. It is beneficial for the case company as they will have guidelines for the improvement of organisational learning.

2.2 Data collection

This section describes the methods through which data has been collected for this particular case study. The basis for data collection approach is qualitative. The data collection methods are described in detail in following subsections.

2.2.1 Questionnaire

A questionnaire consists of a series of questions in which respondents read the questions, interpret and write their answers according to their interpretation (Kumar, 2011). For this purpose, I prepared two questionnaires to collect information from all respondents. These questionnaires were prepared with the help of my supervisor. It was shared with company respondents through online database of NTNU. The first questionnaire was shared with contact person in company who shared it with whole team of Ivar Aasen. The responses came directly to me and my supervisor.

First questionnaire was an online questionnaire. All the responses were collected through NTNU's online database. The purpose of this questionnaire was to get information about all the challenges they have faced during project and operation phases. The questions were related to technical challenges, organisational challenges and lessons learned. The respondents were also asked to write about the impact of those challenges and how those challenges could have been minimised or avoided. They were also given the option to write any related comments other than questions. The responses from the first questionnaire made a basis for the follow up interviews. This questionnaire is attached in Appendix A.

The answers from the first questionnaire made me think about another questionnaire to

get more information about lessons learned practices within AkerBP. The purpose was to get detailed information only about the lessons learned practices, the role of respondents, challenges in capturing lessons learned and their usability after storing them in database. It was shared with respondents after interview session.

I chose lessons learned only to keep more focus on the scope of this thesis. The respondents were given an option to chose only one option among "strongly agree, agree, neutral, disagree, strongly disagree and not applicable". So, they chose one of the options against respective questions. Not applicable option was included if the respondents did not want to answer that particular question or that question is not related to their expertise or discipline. The respondents filled this questionnaire after the interview. It took only five to seven minutes as this did not include detailed answers from respondents. The responses from second questionnaire were directly collected by me. The questionnaire can be found in Appendix B.

2.2.2 Interviews

The interviews were conducted after the responses from first questionnaire. The interview questions were prepared after reviewing all the responses from questionnaire. The purpose of conducting interviews was to get a detailed insight of all the issues mentioned by the respondents.

According to Burns (2000), an interview is a verbal interchange either face to face or through telephone in which interviewer tries to take information, beliefs or opinions from another person. Interviews could be structured or semi-structured. For this thesis, I chose semi-structured interview approach. Semi-structured interviews are used to enable the researcher to keep an open mind about what he or she is looking to answer (Bryman, 2016). The interviews were framed in same format but the questions varied from person to person. It was due to nature of their jobs, responsibilities and challenges mentioned in the first questionnaire. But overall the objective of the interviews was same.

A total of 17 interviews were conducted. All the interviews were conducted in English but in two phases. First phase was during the semester project report and 4 interviews were conducted from September 2018 to December 2018. The second phase of interviews was conducted for this thesis report from March 2019 to May 2019. During the second phase 13 interviews were conducted. All these interviews were audio recorded except one due to un-comfortability of one respondent. The interviews lasted between 35 and 60 minutes each.

The next step was transcription of all these recorded interviews which turned out to be a comprehensive task. I listened to each interview three to four times to capture each and every word and not to miss a small bit of it. It was a bit time consuming task but the sensitivity and genuity of information was a big motivation for me. Transcription of interviews gave me good knowledge and overview of collected data. I was able to differentiate between several sections, challenges and other important aspects for interviewee.

2.2.3 Other Data Sources

Apart from surveys and interviews there were some informative documents shared by my company contact persons. These documents include lesson learned database and some operational reports. The history of company and project were obtained from company's website.

2.2.4 Respondents

This thesis is related to Ivar Aasen field of AkerBP. So, only those respondents were chosen who have been related to Ivar Aasen in any way. The respondents were selected by the contact person at AkerBP, Bjorn Sundfaer. These respondents were from different disciplines so there has been diversity on information from all the departments. To keep the anonymity of respondents, I have mentioned their positions and departments instead of their names. The role of some respondents is not the same as of today because it has been changing over the time. The following list gives an overview of diversity of respondents.

Table 2.1: List of Respondents

Reliability and Maintenance Engineer
Instrumentation Engineer
Operations Supervisor
Operations Engineering Manager
Maintenance Manager
Warranty Follow up
Maintenance Supervisor
Buyer/Purchaser
Asset Operation Manager
Control System Engineer
Operational Support Maintenance
Handover Co-ordinator
Hookup and Commissioning
Electrical Systems Engineer
Engineering Manager
Asset Planner

2.2.5 Ethical Consideration

All respondents were informed in the beginning that all the details of their information through surveys and interviews will be kept confidential and anonymous. No details of surveys and interviews will be published and shared with anyone. Quoted citation from respondents in this report are without names.

2.2.6 Quality of Data

The quality of information in this thesis has been kept high. All interviews were conducted face to face so it was easy to evaluate and consider honesty and trustworthiness of the interviewee. The interviewees provided with realistic information based upon their observation and experience. So, the overall quality of data is reliable and valid.

2.3 Limitations

The interviews were conducted after more than two years of operations. So, there is a possibility that respondents might have missed some important information over this long period of time.

Information in this report is completely based on provided information by respondents. So, if some information is missed by them, it is not covered in this report.

Most of the information is related to project phase. Since, there has been no formal sessions for capturing lessons learned during operations, so not much information from operations is included in this report.

Chapter 3

Literature Review

This chapter is divide into following parts.

- Definitions of basic concepts for learning and organisational learning
- Difference between organisational learning and learning organisation
- Types of learning on the basis of different aspects
- concepts of levels of learning, knowledge management, continuous improvement, innovation and creativity and learning traps
- Lessons learned, their importance and management
- post project evaluations
- Impediments to Lessons learned

3.1 What is Learning?

In literature, learning has been defined in many ways by researchers. All definitions in this report are in accordance with the organisation learning. According to Boreham and Morgan (2004), learning is a process that can be obtained from anywhere and it is an essential part of generative social practices. Learning is believed to be present on social and cultural environments and it can be achieved by those who want to explore them. Therefore, it can be referred to as a socio-cultural embedded thing. According to Argyris and Schön (1996), learning process consists of acquiring, processing and storing the information.

There are two main levels of learning, individual and collective learning. Individuals learn by themselves or as groups. These individuals and groups transfer their knowledge to organisation. The organisations transfer this knowledge to other groups and individuals, establishing a learning environment within the organisation. Expansive learning is a type where the group constructs new working practices by reflecting collectively on the historically determined contradictions in the activity system that led to the failure, and by expanding its collective understanding of both the object of its activity and the means of attaining it (Boreham and Morgan, 2004). Learning is the development of insights, knowledge and associations between past actions, the effectiveness of these actions and future actions (Bapuji and Crossan, 2004). According to Crossan et al. (1999), learning is the dynamic process occurring over time and across levels, that involves a tension between new and existing learning.

3.2 Difference between Organisation Learning and Learning Organisation

Before we go into the detailed description of organisational learning concepts, it is important to know the difference between “organisation learning” and “learning organisation”. The origin of organisational learning is traced back to the organisational development movement of the late 1960s and early 1970s (Matlay, 1998). Organisational learning is a process of creating values, gaining knowledge and acting according to those values.

Learning organisation is described as an outcome or product of organisational learning (Odor, 2018), which is complex and multidimensional in approach. Pedler et al. (1991) defined a learning organisation in terms of continuous transformation and improvement through the leaning activities of all its employees. The focus of a learning organisation lies in its values and individual’s development in order to ensure the continuous transformation. Learning organisations become prominent through their learning capabilities, innovative approach, competitive advantage, resources and knowledge management which help them to successfully control the market share. Garvin (1993) defined learning organisations are those which have the capability of learning from their experiences, acquiring and transferring new knowledge and modifying their behaviour to new knowledge and insights.

Learning organisation and organisational learning are generic terms and often used interchangeably (Romme and Dillen, 1997). Weick (1991) argued that both these terms are

synonymous as both originate from psychological concept and usage of individual learning. The theory of learning organisations tries to distinguish these definitions in two types as normative and descriptive (Matlay, 2000). Normative definitions focus on prerequisites which learning organisations must fulfil (Dixon, 1999) whereas, descriptive definitions acknowledge that all organisations learn, consciously or otherwise (Levinthal and March, 1993).

3.2.1 Organisation Learning

There could be many ways to define organisational learning. But it is not easy to define it in simple words as many researchers have defined it in many different ways based on theories, concepts and facilitating factors. In general, organisational learning is the process of finding and correcting the errors within organisation. The organisations change or modify their models, rules, values, processes or knowledge to maintain or improve their performance (Chiva et al., 2013).

Some researchers, described organisational learning as cognitive and behavioural approach (Odor, 2018). According to cognitive approach , organisational learning is the process of developing open-minded inquiry and informed interpretation (Day, 1994). An organisation can acquire knowledge without a corresponding change in behaviour, but some researchers defined organisation learning as a change in the range of potential behaviour (Huber, 1991). Researchers consider cognitive-behavioural approach effective for organisational learning. They believe that belief in system and behaviour by the way of action must be involved (Odor, 2018).

According to Mayo and Lank (1994), learning is all about taking actions. We cannot conclude anything as learning by only acquiring knowledge without implementing it in our daily activities.

Organisational learning is the change in the organisation's knowledge base that occurs due to past experiences (Fiol and Lyles, 1985). According to Scott (2011), organisational learning is a multilevel process where members individually and collectively acquire knowledge by acting and reflecting together. In hyper-dynamic business context, organisation learning is a process by which organisation constantly questions existing products, process and systems, identifies strategic positions and applies various modes of learning to achieve sustained competitive advantage (Wang and Ahmed, 2003).

A recent view of organisational learning defines it as the development of insights, knowledge and associations between past actions, the effectiveness of those actions and future actions (Odor, 2018). It is the process of improving actions through knowledge management and better understanding.

3.3 Types of Learning

In literature, there are many types of organisational learning based on different criteria by the researchers. For example, Bapuji and Crossan (2004) classified learning on the basis of boundary conditions, internal and external experiences. Argyris and Schön (1996),,

classified as single loop, double loop and triple loop learning. Some important types are included in the following subsections.

3.3.1 Single Loop Learning

Single loop learning consists of one feedback loop in which strategy is modified in response to the error correction. It is the basic incremental learning representing behavioural change to fix the objective within the existing organisational structure. It does not require any change in the structure of the system to make the system better. Through a single feed back loop, the strategies and assumptions are modified in order to keep the organisational performance within organisational norms and values (Argyris and Schön, 1996). There is no change in norms and values in single loop learning.

Instrumental learning changes strategies of actions or assumptions underlying the strategies in ways that leave the values of a theory of action unchanged (Argyris and Schön, 1996). Single loop learning develops an adequate solution by comparing the existing problems to the organisational norms and values. In the following figure 3.1, blue coloured arrow depicts an illustration of single loop learning.

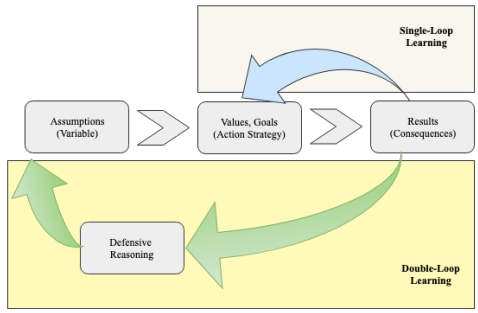

Figure 3.1: Illustration of single and double loop learning

3.3.2 Double Loop Learning

In double loop learning, the values, strategies and assumptions are changed to correct error or to solve the unexpected situation. It is also known as re-framing. It is about questioning the purpose and function of the task being done in the organisation. Double loop learning is concerned with task completion rather than making the process more efficient for completion. It does not take existing structure of organisation for-granted. Double loop learning results in the change of values of theory in use along-with their strategies and assumptions (Argyris and Schön, 1996). The double feedback loop connects the effects of actions with strategies and assumptions. In figure 3.1, green coloured arrows illustrate double loop learning process.

3.3.3 Triple Loop Learning

It is also referred to as transformational learning. Triple loop learning is about the questioning not just the process and basis for the tasks within an organisation but also the reflexive actions of individual's attitude and point of view. Triple loop learning encourages the questions to existing products, processes and systems by strategically asking where the organisation should stand in future marketplace (Wang and Ahmed, 2003). Figure 3.2 shows the process of triple loop learning.

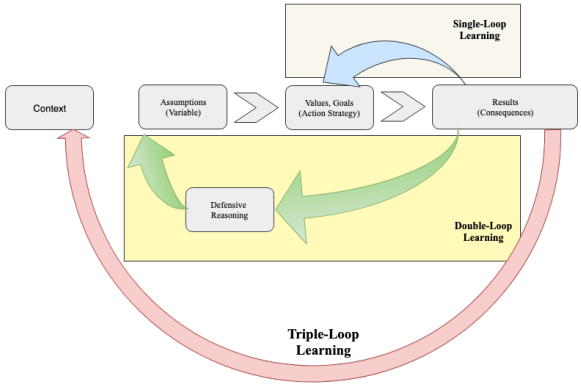

Figure 3.2: Illustration of Triple-loop Learning

3.3.4 Internal and External Learning

Learning processes can be carried out within the organisation and from other organisations in the form of knowledge sharing. Internal learning is usually done by knowledge sharing with colleagues through procedures and systems, cross-functional communication, leadership and team work within the same organisation. This could give a narrow perspective of learning but some organisations keep their successful learning factors within the organisations while external learning is more vibrant. The best example of external learning is benchmarking. Organisations share experiences and success factors with similar organisations. They learn from each other and try to follow similar strategies.

3.4 Important Concepts for Organisational Learning

The concept of organisational learning covers various aspects of organisational management. The identification of levels for organisational learning helps in implementation of learning approaches within an organisation. Following are some important aspects or areas which are important for organisational learning.

3.4.1 Levels of Learning

In any organisation, learning starts from individuals. In organisational theory literature, much of the emphasis has been given on individual learning. Many of the researchers stated this as the most important aspect for organisational learning (Shrivastava, 1983). Organisational learning considers individuals as ”agents” for organisations to learn (Argyris and Schön, 1996).

How individuals learn? The individuals in a organisation learn when they come a cross a problematic situation and they seek for the solution on behalf of the organisation. These situations are created when there is a mismatch between actual and expected outcome. In the process to eliminate this mismatch, individuals learn and restructure their values thus, changing the organisational theory-in-use (Wang and Ahmed, 2003). The main factor that encourages individuals and organisations to learn is the competitive advantage. The individuals coordinate with each other through the process of knowledge sharing and as a result of experiences learned. Therefore, a learning organisation should focus on values, managing and enhancing the development of individuals within the organisation (Scarbrough et al., 1999). This brings the idea of collective learning that occurs in addition to the learning process at individual level and may even occur independently of each individual.

Individual learning might not contribute to the success of an organisation. There is possibility that individuals might learn something negative or learn something for their own personal learning (Field, 1997). Therefore, the relationship between individual learning and collective learning in one of the most important aspects for an organisation to learn (Matlay, 2000). So, a strong relationship or coordination must be made between individual and collective learning to enhance organisational learning.

3.4.2 Process or System

Organisations must have a learning process or system to follow within the organisation. Organisations acquire information and then interpret, distribute and store by having an efficient learning process.

Within the system view, there are two categories of organisation systems known as closed system and open system. In a closed system organisations, information or learning is contained within the organisations. While in open system organisations, they include inter-organisation learning as a vital part of their system. knowledge is acquired from both internal and external sources. The highest stage of learning contains three aspects which include adaptation to their environment, learning form the people and contributing to learning of a wider community or context of which they are a part (Pedler et al., 1991). But in system view, there is lack of flexibility, innovative-ness and creativity which makes it a challenge for organisations to succeed (Wang and Ahmed, 2003).

3.4.3 Culture or Metaphor

The relationship between culture and organisation has been referred as an independent and internal variable which plays an important role in the success of organisations (Smircich, 1983). Culture enables the organisation to utilise the experience and knowledge and achieve the desired goals. Knowledge is not limited to people in managerial or professional positions, but it lies with every individual associated with the organisation. Then its the culture of the organisation that can make the best use of that knowledge. However, having many knowledgeable individuals in a organisation does not guarantee success. Organisations with open communication culture seem to have more interaction between project participants which helps them to achieve their goals (Zidane et al., 2016). It is their open communication culture that has to be right to promote knowledge sharing and learning from experiences across all levels.

Traditional hierarchical cultures undermine the ability of organisation to compete and survive in the global market therefore, referred to anti-learning and anti-training (Jones, 1996). Collective team approach and skills are always associated with effective learning.

3.4.4 Knowledge Management

The concepts of organisational learning and knowledge management go parallel to each other (Wang and Ahmed, 2003). Organisational knowledge is stored in two forms. First, is the knowledge and experience possessed by the individuals. While second, is stored in organisation's database in the form of documents, videos, interviews and visuals. The possession of knowledge is worthless if it is not managed efficiently. To be a successful organisation and gain effective learning, an organisation should manage learning experience from individuals in the form of explicit learning database. Organisational memory maintains the organisational knowledge and acts as the foundation of knowledge accumulation and presents the absorptive capability of organisation. Therefore, knowledge management is necessary to create a learning environment between individuals and organisations.

3.4.5 Continuous Improvement

For an organisation to be successful, it must strive for continuous learning and improvement. The success factors for any organisation changes over time. So, it is important to keep looking for innovative-ness and improvement in all the processes. Learning organisations should intentionally and continuously facilitate individual learning in order to continuously transform the entire organisation and its context (Pedler et al., 1991).

Wang and Ahmed (2003) suggest that the adoption of total quality management (TQM) is a milestone towards learning organisation. TQM focuses on continuous improvement by focusing on meeting and satisfying customers needs. All this can be done by improving processes, implementing organisational training and development, focusing on cost efficient methods, involvement of individual employees and improving the quality. TQM and learning organisations are mutually dependent (Ford, 1991). To move to the higher level of organisational learning, organisations need to have a strong backup based on single and double loop learning and absorptive capability of the organisation.

3.4.6 Innovation and Creativity

To improve the learning processes and culture, organisations are encouraged to improve their learning systems. Organisations relying on traditional success factors for a longer time, cannot prolong the success. Such organisations find it difficult to achieve competitive advantage. In turbulent organisation environments, competitive advantage is anchored in the company's ability to innovate its way temporarily out of consistent market pressures (Ghoshal et al., 1999).

Organisations need to create more degree of flexibility, pro-activeness, innovativeness and modern skills to succeed in new business environments. Organisational learning can help them to learn new changes and facilitate them into their structure to achieve competitive advantage. Triple loop learning can be one of the approaches towards the higher level as it questions the existing products and processes to influence the future marketplace. Organisations also need to focus in individual's current beliefs and to encourage them to adopt new innovative and creative approaches. This process will help eventually to boost knowledge creation which is a core competency to move to higher level of competitive success (Wang and Ahmed, 2003). Innovative capacity is a result of continuous process of knowledge creation (Nonaka and Takeuchi, 1995a).

Creative thinking and competence based strategies drive the organisations to build up competitive advantage by doing better and with creative thinking. The purpose should be to make current competition irrelevant and and open new market opportunities.

3.4.7 Learning Traps

Another important factor in organisational learning is the understanding of learning traps. Organisations stick to their successful factors which may not be the same over a significant period of time. It is due to reliance of organisations on excessive exploitation or exploration that makes them fall into self destructive learning traps (Argyris and Schön, 1996). Organisations should adopt latest technologies and new strategies for the achievement of internal and external learning. Ahuja and Lampert (2001) mentioned three different learning traps. First, is the familiarity trap which has the tendency to employ the known solutions to the problems. Second, is maturity trap which enables the organisations to employ proven solutions. Third, is propinquity traps which make organisations to employ solutions closer to the known solutions. The innovation in these cases comes mostly from new organisations as compared to older organisations (Bapuji and Crossan, 2004) as they tend to improve by learning and knowledge sharing. These traps can be avoided by adopting emerging and pioneering technologies (Ahuja and Lampert, 2001).

3.5 Lessons Learned

Organisational learning can be achieved and found in many forms, for example, lessons learned, existing procedures, processes, manuals (Keegan and Turner, 2001), after action reviews, project debriefings and post project reviews (Chirumalla, 2016). All methods have their own importance for organisational learning, but in this thesis main focus is on

lessons learned practices. So, it has been discussed in detail in the following subsections.

Lessons learned are defined as acquiring knowledge during the execution of a project which shows how projects events were addressed or should be addressed in future projects for improved performance (Rose, 2013). Lessons learned does not necessarily have to be positive, rather it includes both negative and positive lessons. According to Weber et al. (2001), lessons learned are result of either positive or negative experience. They help to acquire knowledge in an effective way and then use it for planning and execution for the future projects. There are several ways to capture, share and store lessons learned but White and Cohan (2016) described lessons learned practices into five simple steps. These processes are presented in figure 3.3.

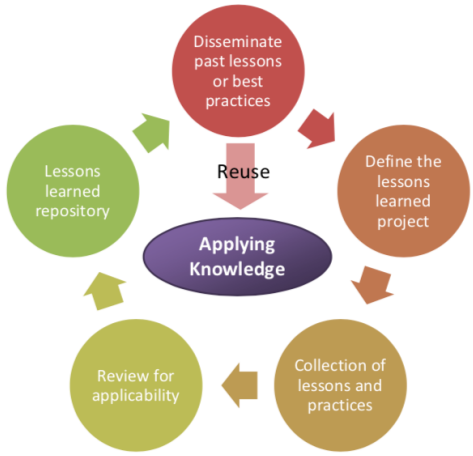

Figure 3.3: Five Steps for Lessons Learned Practices (White and Cohan, 2016)

The above figure 3.3, describes all steps for capturing, reviewing, storing, sharing and re-using lessons learned.

3.5.1 Importance of Lessons Learned

There are many reasons to highlight the importance of lessons learned. Lessons learned are important to disseminate knowledge within the project team, to other project teams and then ultimately to the organisation. The learning can be advantageous for personal growth and for the team as well. Some researches show that majority of the project personnel gain explicit and tacit knowledge through experimental learning (Turner et al., 2000), which in turn enhances organisational learning capabilities. The importance of lessons learned is considered as a staged gate for new product development in a way that one phase provides the guidance for next phase (Kumar and Terpstra, 2004).

3.5.2 Management of Lessons Learned

The effectiveness of lessons learned can be observed by proper management of lessons learned in lessons learned database or repositories. Managing lessons learned is as important as collecting them. Most of the organisations have a systematic way to report and capture lessons learned from projects but very few actually refer to those lessons learned in future projects. There could be several reasons for this. These could be the lack of time, assigning personnel to new project immediately, lack of culture of not conducting post project review meetings, workload and time management. The other reason could be the lack of generalisation of lessons for similar projects. Busby (1999), mentioned this as a limitation towards the effectiveness of lessons learned. He explained that sometimes the reviews are shallow, remedies are planned at very superficial level and explanations of events are overly specific (Busby, 1999) .

To learn from projects, it is better to manage lessons from projects and integrate them into project management processes as a standard practice (Ayas, 1996). Support from management is very important for lessons learned (Hussein, 2018) because without their active involvement, it is hard to manage lessons learned. Individual learning can be achieved through personal experiences and observations. But for the teams and organisations, it has to be documented in a database. Then, it is organisation s responsibility to make the best use of these lessons by arranging post project review meetings or lessons learned session to share and document experiences for organisational development.

3.5.3 Lessons Learned Through Post Project Evaluations

Post project reviews are another way to collect lessons learned from projects. Post project review meetings are highlighted as one of the main strengths of disseminating knowledge within project teams (Williams, 2007). Projects can be evaluated during different stages depending on the situation and type of project. Cleland (1985) classified project evaluation into following three types.

a) Pre-Project Evaluation: This evaluation is appropriate for those projects which reflect overall strategy of enterprise.

b) Evaluation of Ongoing Project: These evaluations are performed during the life cycle of a project. This could be the best approach for the evaluation of projects similar to the case study of Ivar Aasen's operation phase in this thesis.

c) Post Project Evaluation: These evaluations are usually performed at the end of projects. They represent the assessment for the success and failure factors after project termination (Anbari et al., 2008). The main characteristics include, documented procedures and guidelines, effective communications with project team, positive and blame-free culture and a balance of cost and benefits for organisation.

3.5.4 Impediments to Lessons Learned

There are many significant challenges for capturing, reviewing, sharing and storing lessons learned. But some of very common impediments have been mentioned in this thesis.

a) Time Management

Time management is one of the key elements for lessons learned practices. Time pressure can cause a delay in documenting lessons learned and thus reducing the effectiveness for previous acquired lessons learned (Turner et al., 2000). People should get enough time to ponder on lessons learned practices and find a way to make them more effective. Importance of lessons learned is often underestimated by spending more time resources on other tasks.

b) Deferral

Deferral is the most important factor especially in context to operation phase of Ivar Aasen. Deferral means that learning in the projects is often postponed until the end of the project or completion of particular assignment (Keegan and Turner, 2001). Not a lot of focus is given to to lessons learned practices during operations. So, there is a chance of missing some valuable information or lessons during these operations.

c) Centralisation

Centralisation of lessons learned means that the lessons learned are the responsibility of some key or managerial personnel within the company (Keegan and Turner, 2001). Employees believe that it is only management's responsibility to document lessons learned and then transfer to other departments and employees. The solution to this issue could be the informal networks and session to disseminate lessons learned within the organisation. It should be everyone's responsibility to play their role equally in lessons learned practices.

Chapter 4

Organisational Theories and Approaches

This chapter is divide into following parts.

- Organisational Theories
- Approaches; Theory based, process based and people based
- Selection of appropriate approach

In this chapter, the approaches have been described on the basis of three criteria. These criteria are theory based, process based and people based. The purpose is to make it easily understandable for readers. Some of the approaches might have similar purposes but they have been mentioned wherever they have their importance. Theory based approaches are mainly based on theory and their practical implementation is limited. Process based and people based approaches are modern and more practical approaches. These approaches are written in a way that they also present the evolution of organisational learning processes.

4.1 Approaches for Organisational Learning

Approaches for organisational learning do not necessarily provide the basis for the success of organisations, but these approaches try to define a path and identify factors that can be vital for the success of organisations. Absence of adequate learning processes may lead to misleading implications. So, in order to learn, organisations try to implement systematic approaches to gain effective and systematic learning through competitive advantage. Competitive advantage is the central essence for organisational learning (Basten and Haamann, 2018). These systematic approaches provide practical guidance for organisational learning implementations to achieve the competitive advantage. The best idea to define approaches for organisational learning is to combine the theoretical and practical ways by matching the characteristics of selected competencies (Basten and Haamann, 2018).

The understanding of knowledge management is another important aspect of organisational learning. It is a systematic process to improve the productivity and effectiveness of individuals and organisations through systematic acquisition and communication of knowledge (Alavi and Leidner, 1999). Knowledge creation, achievement of high level and transfer processes are important for knowledge management and organisational learning.

Figure 4.1, is showing how lessons learned approached have been classified and described in this thesis.

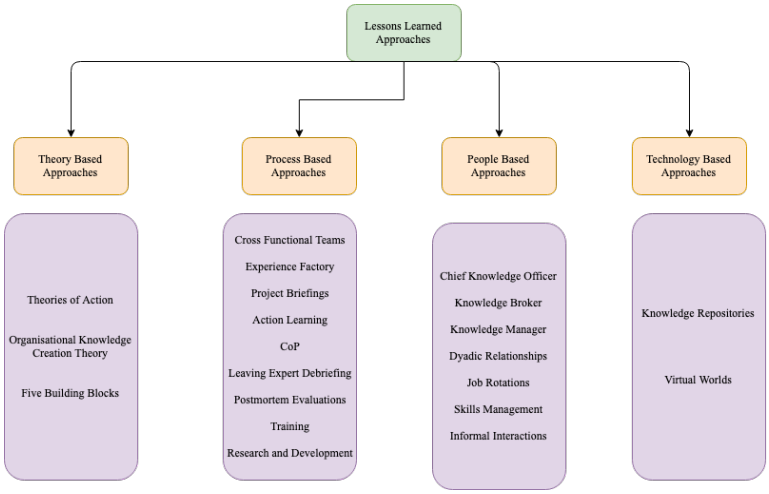

Figure 4.1: Lessons Learned Approaches

4.2 Theory Based Approaches

Theory based approaches include single loop learning, double loop learning, theories of action (Argyris and Schön, 1996), organisational knowledge creation theory (Nonaka, 1994), and five building blocks by Garvin (1993). These theories are presented in details in the following sub sections.

4.2.1 Theories of Action

Argyris and Schön (1996) presented theories of action for the understanding of organisational learning. According to them, organisational learning is the product of organisational inquiry (Argyris and Schön, 1996). Organisational inquiry means the understanding and evaluation of the outcomes and effective actions from those understandings. Organisational inquiry acts as a catalyst for creating or refining knowledge for the search of insight and competency (Cavaleri and Reed, 2019). Theories of action contain three elements which include the strategies of action, the values that govern those strategies and the assumptions on which they are based.

Theories of action are based on the set of rules which provide a framework for the action to be taken. Humans create, store and retrieve actions to achieve their intended results. The understating of Argyris and Schön (1996) is based on two theories.

a) Individual Espoused Theory

The individual espoused theory is based on the individual's beliefs, attitudes and values. They create, store and retrieve designs that advise them how to act if they are to achieve their intentions and act consistently with their governing values (Argyris, 1995). This

is important to understand human actions. This theory also guides through the core instructions of the organisation to handle the challenges. These instructions are normally narrowly focused and specific which make individuals to define their path of action. In simple words, espoused theory is about what organisations want from employees to do in their specific ways. Figure 4.2, shows the general instructions for problem solving using espoused theory.

Figure 4.2: Instructions to Solve Problem through Espoused Theory (KMT, 2019)

b) Theory in use

Theory in use provides an environment that is conducive to learning and easy for individuals to interact with their working environment (Argyris, 1995). Theory in use is based on the application of knowledge by individuals. Theory in use governs what is actually done. Figure 4.3 shows the process how a problem can be solved using theory-in-use. There are two models of theory in use.

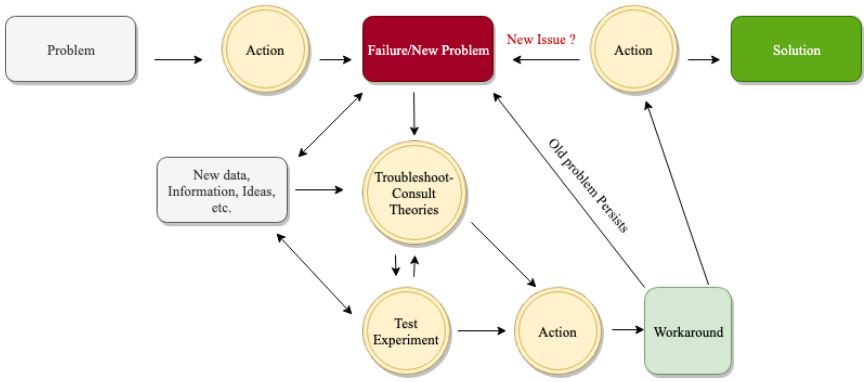

Figure 4.3: Process of Problem Solving through Theory-in.use (KMT, 2019)

Model I Theory in Use

The four governing rules of model I theory in use are:

- Achieving the intended purpose
- Maximise winning and minimise loosing
- Suppress negative feelings
- Behave according to what you think is rational

The general action strategies for Model I are:

- Backup and maintain your position
- Evaluate your own thoughts and actions and anticipate others
- Credit the causes of what you are trying to understand

The actions should be taken in a way to achieve minimum level of being in control and on the winning side. These actions should be in accordance with the governing rules. Model I enables individuals to craft their positions, evaluations and attributions, so that they inhibit inquiries into them and tests of them with others logic (Argyris, 1995). The consequences of model I strategies are defensiveness, misunderstanding, self full-filling and self sealing processes (Argyris, 1982). The challenge with the defensive routines is that it protects individuals from experiencing embarrassment or threats. As a result, they are unable to find the causes of these embarrassments or threats. So, the learning in this model is all about self centring and protecting yourself without knowing threats. In short, it overprotects individuals and organisations. The defensive theories are caused by the circular processes in which strategies are bypassed or covered-up which reinforces individuals theory in use (Argyris, 1995). This implies that organisational routines cannot be changed without changing the routines of individuals. Some social values such as support, care and integrity are consistent with Model I. It means that organisations are not likely to recognise the counter productive consequences of Model I theory in use.

Model II Theory in Use

To overcome the challenges of Model I theory, Model II theory in use was introduced. The purpose of Model II theory in use was to help individuals transform their espoused theories into theories in use by learning a new set of skills and new set of governing rules (Argyris, 1995). The governing values of Model II are:

- Valid information
- Informed choice
- Careful monitoring of implementation of the choice to detect and correct errors

Model II behaviour strategies are crafted in such a way that actions reach to their evaluations and attributions and then encourage inquiry and testing by others (Argyris, 1995). In Model II theory-in-use, embarrassment and threats are not bypassed or covered-up, instead they are engaged. As a result, defensive routines are interrupted and starts an organisational process which encourages double loop learning.

As a starting point of intervention, Argyris (1995) proposed a way to bring the theories in use into actions. He named it as ”The left and right hand column method”. The method starts with writing a paragraph about a key organisational problem. Then write a paragraph about how you would begin to solve the problem with your strategy and with whom you want to start. The next step is to split your page into two columns. In the right column, write how you would begin the meeting and what would you say. Then write what you anticipate from others. Then write your response to their response and continue this exercise to few responses. In the left hand column, write any idea or feeling that you would

not be able to communicate for whatever reason. This whole exercise makes everyone involved in the whole process and results in better communication and to the solution of key organisational problems.

The next stage is to redesign the actions of individuals. The executives take a step forward and try to keep the conversation focused on the key problem. It is very important to avoid any irrelevant or new discussions. As a consequence of all these steps and discussions, the individuals become more supportive and constructive and their conversation becomes more conclusive towards the solution of problem. Thus, this behavioural change leads to new values and organisational structures.

4.2.2 Organisational Knowledge Creation Theory

Organisation learning is a dynamic process consisting of tacit and explicit knowledge. Explicit knowledge is a type of knowledge which can be explained, codified and communicated through symbols and languages. It can also be documented. Whereas, in the case of tacit knowledge, it is not possible to articulate or document in any effective way. Tacit knowledge is considered as highly personal knowledge which presents an individual's commitment to a specific context. It has both technical abilities and mental models which shape how we perceive the world around us (Nonaka and Takeuchi, 1991).

Organisational knowledge creation theory explains the relationship between tacit and explicit knowledge. It also reflects their impact on individuals, groups and organisations. Over the period of time, the organisation knowledge creation theory is continuously repeated in four phases (Basten and Haamann, 2018). These four phases are described further.

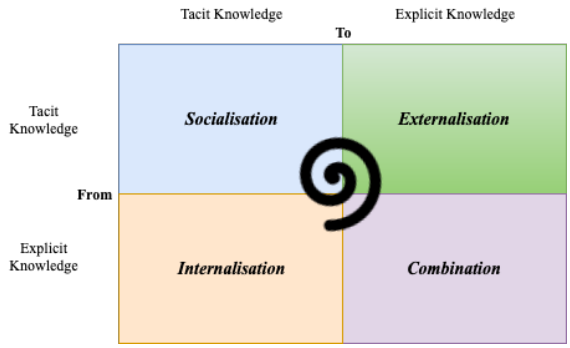

Figure 4.4: Modes of Knowledge Creation Theory (Nonaka and Takeuchi, 1991)

Socialisation

Socialisation is the sharing of tacit knowledge among the individuals; either through mentoring or personal observation. This cannot be transformed into explicit knowledge and

cannot benefit the organisation at large. So, this is limited organisational knowledge sharing.

Externalisation

Externalisation requires the transformation of tacit knowledge into explicit knowledge by some means. These could mean expressing ideas or images as words, concepts, metaphors, analogies and visuals (Nonaka and Konno, 1998). It transforms highly individualised and professional knowledge into an explicit form.

Combination

It involves the distribution of knowledge among the members of organisation through meetings or other communication channels. Explicit knowledge is transformed into more complex and explicit knowledge by recombining, sorting or categorising bodies of explicit knowledge held by different individuals (Nonaka, 1994). The knowledge of a group can also be combined with external sources.

Internalisation

The last phase internalisation is the transformation of explicit knowledge into organisation's tacit knowledge. Relevant explicit knowledge is gathered and extended as their tacit knowledge. Then tacit knowledge is re-framed as documented and verbalised experiences facilitate the internalisation of knowledge.

4.2.3 Five Building Blocks

Garvin (1993) presented the concept of five building blocks to understand organisational learning, its effectiveness and competitive advantage. Garvin tried to overcome previous literature which he observed as too idealistic and unpractical (Easterby-Smith, 1997). The concept of five building blocks include:

a) Systematic Problem Solving

Diagnosis of problem through systematic problem solving method includes reliance on scientific methods rather than guesswork, actual data rather than assumptions and use of statistical tools to organise data. Accuracy and precision in this method is essential. It is based on hypothesis testing technique and the decisions are based on facts.

b) Experimentation

Experimentation is based on systematic searching and testing of new knowledge using the scientific methods normally through research and development unit. It does not only focus on current difficulties but also explores more opportunities and new horizons. It has two types;

Ongoing Programs are designed to produce incremental gain in knowledge through continuing series of small experiments. The characteristics of ongoing programs are new ideas and incentives to take risks.

On the contrary *Demonstration Projects* are larger, complex and usually designed from scratch. They involve holistic, system wide changes and are often undertaken with the purpose of developing new organisational capabilities (Garvin, 1993). Their characteristics include severe test of commitment from employees. They are developed by strong multi-functional teams and have limited impact on the rest of the organisation; if they are not followed by explicit strategies for learning transfer.

c) Learning from Past Experience

Another practice for organisation learning is the constant assessment of the lessons to learn from past experiences. The companies can review lessons from the past both from their success and failure. Considering the failure as an ultimate teacher and enabler of success, companies should learn from both success and failure (Basten and Haamann, 2018). Going through the past lessons could be a time consuming process but learning must come out as a result of careful planning rather than chance.

d) Learning from Others

It includes learning within the organisation and from external sources. The learning environment around can be very insightful for the organisations to learn. A typical example is benchmarking, where organisations share knowledge with each other and learn from other's experiences. The key here, is to search for the rightful and thoughtful comparisons with other organisations. Customers can be another source of ideas as they are experts in what they do. Customers can provide insights into changing preferences, feedback and competitive comparison. Another challenge for learning is receptive environment. Organisations should be open to take both positive and negative criticism.

e) Transfer of Knowledge

The organisational learning cannot be achieved without quick and effective sharing and spreading of knowledge throughout the organisation. The impact and effectiveness of the ideas can only be observed when it goes out from few people to mass. Popular mechanism for knowledge transfer could be written, oral, visual reports, site visits and tours. These methods can be problematic as some messages can be difficult to comprehend without direct communication. Although, training can help transfer of knowledge effectively (Basten and Haamann, 2018).

4.3 Process Based Approaches

Following are some process based approaches for organisation learning.

4.3.1 Cross functional Teams

Cross functional teams help in transferring the knowledge within the organisation through the expertise of experts from different departments. Individuals from different organisational units are able to observe others working habits and therefore absorb their tacit knowledge. They are often used when emphasis is on innovation and creativity (Huang and Newell, 2003). Different functional skills are combined from experts from different organisational units to make it multi-functional process.

4.3.2 Experience Factory

Experience factory represents central repository to support ongoing projects throughout planning and execution with cross-functional experience. It supports the experience from past where project teams report their experiences and relevant documents throughout the process. This also helps to transfer knowledge efficiently.

4.3.3 Project Briefings

Project Briefings are carried out for sharing of project related details. External sources and inclusion of all stakeholders also promotes the socialisation. Project briefings are related to the transfer of explicit knowledge and documentation. These briefings could be structured or unstructured workshops to transfer project related knowledge and to use them for future projects (Basten and Haamann, 2018).

4.3.4 Action Learning

Action learning can be useful for individuals when addressing a complex problem which is difficult to solve through traditional methods. The purpose is to put knowledge instantaneously into action. Action learning is different from traditional learning as it focuses on learning how to ask questions rather than finding the answers to questions asked by others. Action learning is supposed to make useful progress upon treatment of problem or opportunity in the real world (Revans, 2011). Solving these problems involve single loop learning (Basten and Haamann, 2018).

4.3.5 Communities of Practice (CoP)

Communities of practice provides an informal learning environment where experienced members of the community interact with each other and share their experiences for being in a particular profession and learn from each other (Hara and Schwen, 2006). It focuses on sharing the tacit knowledge among the participants. The use of CoP leads to new knowledge assets which may also be used for combination of explicit knowledge (Basten and Haamann, 2018). CoP enables single loop learning through possible cost reductions, quality improvements, and technological developments as a result of community discussions (Pavlin, 2006).

4.3.6 Leaving Expert Debriefing

This approach is useful to learn and share knowledge from past experiences of an expert, leaving the organisation. The leaving expert has been contributing in organisation's success. So, learning from the expert can prolong success for organisation. The knowledge sharing could be in form of interviews or workshops and can be documented (Dow and Pallaschke, 2010), which will be helpful in the case of highly specialised workforce.

4.3.7 Postmortem Evaluations

Postmortem evaluations capture learning from past experiences as they are obtained from completed projects (Birk et al., 2002). The members reflect on their positive and negative experiences and compose their lessons learned as postmortem reports. Data can be collected from group discussions, semi-structured interviews and specific topic related discussions. This approach helps in identifying improvement opportunities and a chance to initiate sustained changes (Birk et al., 2002). This process in turn leads to single loop learning. Nevertheless, postmortem evaluations should focus on double loop learning as participants are able to focus on cause and effect relationship and propose improvement for future projects (Von Zedtwitz, 2002).

4.3.8 Training

Teaching the members of an organisation about particular skills and type of behaviour enhances organisation learning for future projects. This can be done internally within the organisation or by hiring some experts from external sources. It helps individuals to achieve maximum knowledge from the past experiences in an effective way and utilise them for the improvement of future projects.

4.3.9 Research and Development

An independent organisational unit can be established to explore the opportunities of new knowledge and effect of new knowledge on ongoing project. This way, new technologies can be developed which will define the new standards and improve current processes. The material such as patents, surveys and studies can be analysed, synthesised and integrated (Hoegl and Schulze, 2005). Research and development can support externalisation if newly developed knowledge is transferred into research reports. Each research and development initiative should also be taken as a challenge to the past assumptions and re-examine the approach to problem solving (West and Iansiti, 2003).

4.4 People Based Approaches

People based approaches explain how dedicated individuals can play an effective role in organisational learning processes. These people will be following same processes as described earlier but the only difference is that they are dedicated to their particular responsibilities which is making sure the activity of any of the processes.

4.4.1 Chief Knowledge Officer (CKO)

A chief knowledge officer (CKO) provides a critical input to the process of knowledge creation and facilitates efforts to improve such processes (Jones et al., 2003). CKO builds the infrastructure and creates a culture of knowledge sharing. This practice relates to single loop learning. CKO can make changes to core values, organisational goals, culture and individual's behaviour (Jones et al., 2003). Thus, the development of knowledge strategy leads it to double loop learning. They are not directly engaged in learning process but they may decide effective and reasonable activities for learning.

4.4.2 Knowledge Broker

Knowledge brokers create a sense of trust and facilitate the transfer of knowledge among different units of organisation (Pawlowski and Robey, 2004). Knowledge brokers make a link with organisations having special knowledge and skills and then compare it with database of employee experience (Cheng, 2009). They create a connection between knowledge buyer and knowledge seller.

4.4.3 Knowledge Manager

The role of knowledge manager is to identify information needs and to understand appropriate ways of taking information and convert it into stored knowledge. They contribute to learning from past experiences as they try to collect, organise, store and utilise information and knowledge (Karim and Hussein, 2008). Knowledge managers contribute to systematic problem solving through quantitative data analysis. Knowledge managers are specifically associated with single loop learning (Karim and Hussein, 2008) and act more proactively than the knowledge brokers.

4.4.4 Dyadic Relationships

Dyadic relationships are related to coach or mentor who is more experienced and acts as a social supporter or counsellor for less experienced individuals. The mentor is concerned about personal and career development of the junior employees. The guidance may lead to improvement of the junior employee's working processes, thus, enabling single loop learning and persistent improvement of organisational performance (Basten and Haamann, 2018).

4.4.5 Job Rotations

Job rotations means those Organisational processes in which individuals within an organisation change their positions, projects and responsibilities for different periods in order to gain experience and learning. Job rotations facilitate transfer of knowledge as the aim is to establish knowledge redundancy (Nonaka and Takeuchi, 1995b). Employees benefit from their colleague's experience while knowledge spreads conveniently throughout the organisation. Job rotation enhances individual's knowledge which increases problem

solving ability in sense of single loop learning (**?**). When employees use gained experience to modify their individual values and norms, double loop learning might also occur (Basten and Haamann, 2018). But, these changes occur at the individual level rather than organisational level.

4.4.6 Skills Management

An approach by organisation in which skills mastered by each individual in terms of expert catalogues and expert profiles are documented. Individuals describe their expertise so that others could identify and contact appropriate experts for specific problems (Basten and Haamann, 2018). It is the re-use of previously acquired knowledge within the organisation (**?**).

4.4.7 Events for Informal Interactions

Events to encourage informal knowledge sharing, open communication, conversations and dialogues where ideas can be discussed with different units of an organisation are organised. This facilitates open end communications and transfer of knowledge in an informal environment within the organisation. It also provides an opportunity for socialisation.

4.5 Technology Based Approaches

In this technological period, technology plays a vital role in success of an organisation to obtain effective organisational learning. After choosing some processes and dedicated persons, we need latest technologies to transfer and store acquired lessons. It is also important to check the validity of previously acquired lessons. Following are some approaches that are based on technology.

4.5.1 Knowledge Repositories

Knowledge repositories are used as storage for long term experiences, reusable codes and documents which are accessible for individuals and organisations. Employees participate in knowledge sharing activities and presence of knowledge repositories stimulates the externalisation of employee's tacit knowledge (Wu et al., 2010). It helps employees to find, sort and categorise different explicit knowledge and to combine them to create new explicit knowledge (Basten and Haamann, 2018). Single loop learning is supported as knowledge repositories store internally generated knowledge to improve current practices.

4.5.2 Virtual Worlds

Virtual worlds mean any computer generated physical space, represented graphically in three dimensions that can be experienced by many people at the same time (Castronova, 2005). Users can experience or modify products or features before they exist physically. The effectiveness of learning can be improved if virtual worlds are shared on inter-organisation level. Existing tacit and explicit knowledge can be shared and accessed but it

can also generate and apply new knowledge for improved modifications (Mueller-Seeger et al., 2011).

4.6 How to Select Appropriate Approach?

All the approaches described above are related to at-least any one of the organisational learning theories. The question left here is how to choose the most appropriate theory for a specific organisation. These approaches are based on diverse domains of knowledge and learning which improve the transparency of these approaches. To select the most appropriate approach, organisations must find the common grounds in relation to the approaches and organisation's norms and values. The most important factor is to implement approaches and enhance the organisational learning and knowledge sharing. Using only one approach is not promising as none of the approaches directly support all organisational theories (Basten and Haamann, 2018). So, the best strategy is to adopt several strategies to cover maximum number of organisational theories.

Chapter 5

Findings

This chapter is divide into following parts.

- Details of all technical challenges and their impacts mentioned by respondents
- Details of all organisational challenges and their impacts mentioned by respondents
- Lessons learned systems in AkerBP
- Employees behaviour towards lessons learned
- Reasons of not having lessons learned during operations

In this chapter, all the findings from surveys and interviews have been presented. These findings are in accordance to the questions asked to respondents.

This chapter has three main sections. First section represents the answers to the technical problems and their impact on different factors. Second section is about the organisational challenges and their impact that respondents faced during project and operation phases. These sections provide a glimpse of the technical and organisation issues for such projects.

Third section is about the lessons learned, which is the basis for this thesis report. This section represents the existing LL systems and their applicability in the case company. It describes important factors for the extraction, application and re-usability of LL for the project and operation phases.

I have included direct quotes from the interviews. These are marked with quotation marks and italicised letters.

5.1 Technical Challenges

All the respondents were asked if they have faced any significant challenges during the project and operation phase. Most of the answers were related to the general issues while some of them were specifically related to their particular disciplines.

It is not possible to mention all the technical challenges in this report. I will mention some major technical challenges faced by most of the respondents. The impact of these challenges has been discussed in relation to Health, Safety and Environment(HSE), Operational Costs (Expenditure), Production Capacity, Working Environment, Collaboration on site (One Team) and Resource Productivity.

I have categorised all mentioned technical challenges into different categories and presented them in Figure 5.1. These challenges are described in detail in the following section. The numbers here represent the percentage of the challenges mentioned by respondents.

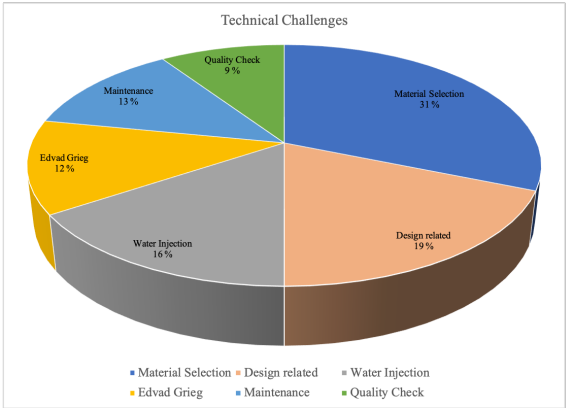

Figure 5.1: Technical Challenges mentioned by respondents

According to figure 5.1, material selection and design related issues were mentioned the most. These both make 50 percent of the technical issues mentioned. Then water injection and maintenance work formed a basis for technical challenges. Power from Edvard Grieg and quality check were also added up in technical issues.

5.1.1 Material Selection and Design Related Issues

Both these problems have their major part in technical challenges for the respondents. For some of the departments, material selection has not been at its best for Ivar Aasen. A lot of modifications and maintenance work was carried out during the operation phase due to the wrong selection of the material. Among other reasons, miscommunication with vendors and wrong specifications were mentioned by most of the respondents.

There was leakage of chemicals in coupling of some equipment. To identify the leakage, they had to remove many things which made it time consuming.

"We had leakage in couplings. Though it was not hazardous but it was hard to identify. The material selection of chemical should have been done in better way."

Some of the mentioned issues were related to the operational design of equipment. These equipment were finalised in the planning or project phase but they turned out to be problematic in the later phase. The main reason was misunderstanding or non familiarity of conditions in which these equipment were being used. Some of the specifications given by AkerBP were also wrong.

"The design basis for water injection was made a bit narrow. So, some of the injection wells and their injectivity was poor than anticipated."

Corrosion is a design related issue. They had to change many parts of several equipment due to corrosion. It was clearly time taking process that required additional resources. The reason of corrosion could have been the shape of equipment, touch up on the surface during installation or non compatibility of equipment with the fluid running into it.

5.1.2 Water Injection

Water injection system was necessary to increase the reservoir pressure to produce hydrocarbons from reservoir. It was expected to start within two years of operation but it came out quite earlier. They had to install water injection system after five to six months of operation while drilling a production well in 2017 and hit the water level. It turned out to be a big challenge as they were not ready to handle it. They were already having challenges with some maintenance related issues, so, this added to extra workload and stress for the AkerBP.

"There were a lot of activities including commissioning and hookup after the start of production. And water injection was not one of them which came soon after and became the biggest challenge."

It was not only water injection system that they had to install. Another issue was the treatment of produced water.

"It was a very hectic period that a lot of things were going on that year. We were not ready to start all operations but we had to deal with this water injection and treatment of produced water challenge."

5.1.3 Power from Edvard Grieg

To the background of this issue; Ivar Aasen platform takes electricity form Edvard Grieg and then transfers the produced oil to Edvard Grieg after first stage separation. Further separation is done at Edvard Grieg.

To run all the operations smoothly, Ivar Aasen platform needs to have continuous and un-interrupted supply of power,which has not been the case in all these years. This was mentioned as the biggest bottleneck for production.

"The major bottleneck for production is our neighbour-Edvard Grieg"

The question arises that why Ivar Aasen did not plan for having their own power generation system? To answer this; due to the close proximity of Ivar Aasen and Edvard Grieg, government made both parties to come to an agreement that power supply will be from Edvard Grieg and Ivar Aasen will transport its produced hydrocarbons to Edvard Grieg. This matter was not in the hands of AkerBP. So, they had to deal it in this way.

"That was an external problem, it is nothing that we can do about it. It is outside of our control. This decision was made when both fields were discovered and government made us to agree on this."

In some cases, power was not enough to carry out many operations at the same time. So, they had to chose between operations. This was quite frustrating for some employees and added to extra time and workload.

"We have limited power that sometimes we have to chose between operations."

For continuous water injection, a continuous supply of power is must. But interrupted supply of electricity makes it difficult to keep water injection continuous.

"For each barrel of oil, we have to inject three barrels of water and we need continuous supply of power for this. But, sometimes this goes out of our hands due to problems in power supply from Edvard Grieg. Loss of power from Edvard Grieg leads us to have low water injection."

Less amount of water injection leads to reduced production of oil. It has not been very significant reduction but still it has been affected since.

"We have lost almost 10 percent of production due to insufficient power from Edvard Grieg."

5.1.4 Maintenance Work

There has been a lot of maintenance work since the start of operation phase. They had to do all maintenance work due to wrong selection or material and chemical which was not suitable with conditions. A lot of valves and equipment had to be changed. Excessive

maintenance work had a huge impact on working environment. They had to hire some extra resources only for maintenance work.

"We hired a lot of external resources to carry out maintenance work. We had the capability to do by ourselves but we were already occupied."

5.1.5 Quality Check

According to some respondents, AkerBP was not able to do quality check by themselves probably due to high workload. They had contractors for this purpose. Not all the engineers understood the right requirement for material selection. They also lost few contractors during the project and operations. This added to more complexity and uncertainty in the form of dependency on new contractors.

"It was not easy to follow up on all quality check issues. We had contractors for this but it was important to follow up with contractors as well and do some quality check."

When asked if these problems could have been avoided, then the response was different for different challenges. They said that it depends on the nature of the challenges. Some of the problems could have been avoided while others were not in their control. Some added to the complexity of underground operations.

"I would say it is hard especially when you are dealing underground, you cannot see. So, you really do not know much."

5.2 Impact of Technical Challenges

Respondents were asked to describe the impact of above mentioned technical challenges with respect to HSE, Resources, Working Environment and Production Capacity. Figure 5.2 is graphical representation on impact of technical challenges. The number on y-axis represent the percentage of respondents. It is important to mention that some respondents chose more than one factors. According to Figure 5.2, technical challenges have more impact on resources. They had to use a lot of extra resources, internally and externally for maintenance work. Hiring external personnel increases the cost of project and operations. HSE issue was related to leakage of chemical. Though some of the respondents mentioned that it was not an HSE issues but others commented that it was a potential HSE issue.

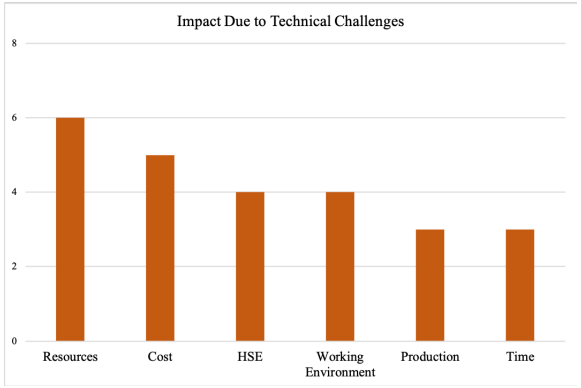

Figure 5.2: Impact of Technical Challenges

Working environment was affected due to extra workload and stress. No major production loss has been mentioned but some quoted that they have 10 percent less production due to low injectivity and less power supply from Edvard Grieg. Maintenance work caused some extra time for the completion of some tasks but overall project was in accordance with time plan. Extra resources covered up here to keep the plan on time.

5.3 Organisational Challenges

AkerBP started Ivar Aasen project as a very small company 'Det Norske'. The number of employees at that time was around 200. It increased with time as Det Norske was merged with other companies.

Some of the organisational challenges mentioned by the respondents are presented in Figure 5.3 below.

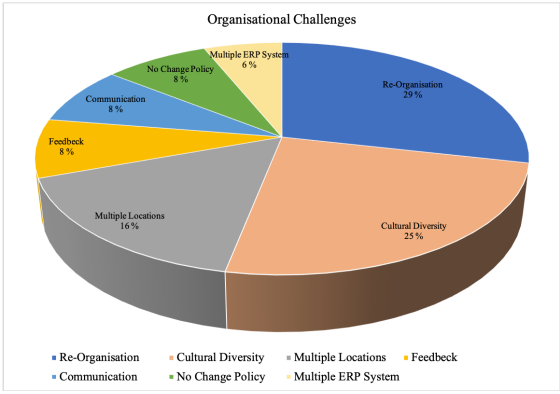

Figure 5.3: Organisational Challenges mentioned by respondents

According to this Figure 5.3, re-organisation came up as the biggest organisational chal-

lenge followed by cultural diversity. These both challenges were due to the merger and acquisition of some international companies working in Norway at that time. During the project execution phase, company worked on multiple international locations which increased the complexity of some operations and caused extra stress and intense travelling. Feedback to suppliers and communication also came up as an organisational challenge. No change policy of company and multiple ERP systems also caused problems for employees.

5.3.1 Re-Organisation

AkerBP went through significant organisational changes from a small company to a big organisational set up through merger with Marathon Oil and BP Norway. This brought huge changes in organisational setup in terms of roles, responsibilities, hierarchy and communication.

The timing of the merger was very crucial for Ivar Aasen, especially merger with BP part of Norway. This happened just before the start of production in last quarter of 2016. There was possibility of many changes in operation phase of Ivar Aasen. But the project director of Ivar Aasen made it sure that there will be no changes in Ivar Aasen project and operations.

"Project Director said: No changes in Ivar Aasen. That really helped us."

According to some respondents, the timing of merger was not optimal. It should have done well before the operations or after the operation. Re-organisation affected the operations in a way that some of the people were moved around. They had to let go their own plans and had to move with the new ones. This added to the frustration for employees and uncertainty to the project.

"It was not optimal time and setting the platform into operations because people just had to let go of sort of plans they had for how to do this. They had the responsibility for long time and they had plans for that."

As a result of re-organisation, relocation of employees and departments were big challenges. Some of the departments were moved to Stavanger and employees were given the option either they move to Stavanger or leave the job. This caused a lot of stress and uncertainty among the employees. They were already occupied in daily operations and then an additional stress of uncertain future was brought to them.

Many employees left their jobs due to relocation from Trondheim to Stavanger. Organisation was down sized and they lost a lot of competence. The management was thinking to shift all resources to Stavanger and close operations in Trondheim. There has been issues about who is responsible and whom to report. Employees in Trondheim were not familiar with the management in Stavanger. So, it has been a challenge for some time.

"They changed it so much that we lost a few people that were meant to be part of operations. We lost competence. We struggled a lot with that".

"There were a lot of meetings with HR about how we are going to work forward in this situation. It was not easy."

"I did not had any energy or motivation at all. It did not affect the start or preparations but that could have been done better. It affects you and your colleagues.

Management in Stavanger later realised that moving departments and employees is probably not a good idea. So, they reversed all the changes and it turned out to be a good decision by management.

When asked if the merger could have been avoided, respondents said that it was a decision from top management. Whatever they were thinking, it was for better future of company.

"It is more of company management thing. They were doing this as oil prices were going down and Stavanger is hub for operations. So, thought that Ivar Aasen could get more support by people being in Stavanger."

5.3.2 Cultural Diversity

Marathon Oil was US based company while BP was UK based company. Both these companies had entirely different working culture and environment. They had more hierarchy than in AkerBP. They used to stick to their procedures and processes while AkerBP was very lean, proactive and decision making was so easy. It was a big challenge for employees to adjust in a new working environment with complex chain of command and less bureaucratic.

"I think there is cultural difference between us and UK. They have more hierarchy. Norway is very flat and we work with very flat hierarchy."

"DetNorske was a bit more leaner and flatter structure. BP was with more hierarchy and more administration."

These companies have people from all around the world with different background and cultures. It was a new experience for employees of AkerBP to work with people from diverse cultures. It was very challenging in the beginning but they cope up with this challenge with time.

"The challenge was pressure culture from 3 different cultures. It was very complex."

5.3.3 Multiple Locations

During the project phase and building of platform, AkerBP had a lot of contractors in different locations. Engineering phase was being done in UK, building was being done in Singapore yard while the management was being handled in Trondheim.

Multiple locations of operations and engineering works was also a huge challenge for AkerBP. It has been very hard and hectic to follow up all the procedures and processes on all locations. There were some tasks that should have been completed in Singapore yard. But, somehow they were not finished there and then they have to complete them offshore. This increased the cost almost 10 times more than in Singapore. So, proper designing and planning could have saved a lot of money.

"I think it is domino effect. When you are delayed on documentation in engineering, then you are delayed in construction and then fabrication and then down to end activity. Then you carry it to offshore which makes it expensive."

Then there were issues with contractors in UK. They had to travel to UK and Singapore frequently. Working on multiple locations made employees to travel a lot which is time consuming.

5.3.4 Feedback to Suppliers/Vendors

One of the main reasons of repeated problems was the lack of feedback to the suppliers, manufacturers or vendors.

"Improvement is big issue for any supplier. our experience does not go back to them. So, they cannot improve it. We get issues fixed but they should get all the feedback."

In answer to the question that why they did not consider changing the supplier, they mentioned that we had the best suppliers available. It is complex to change the supplier in the middle of the project. That will add more uncertainty to the project. So, for some operations, they had to hire external resources as they already had work overload internally.

"We had to hire some extra resources to fix the transmitters. We could have done that by ourselves but instrument department was fully booked at that time."

5.3.5 Communication

After merger with Marathon Oil and BP Norge, there was a lot of communication gap between employees. It was due to new hierarchy system and new management in Stavanger. People in Trondheim were not familiar with people in Stavanger. They were not aware who is responsible and whom to contact and communicate with. Thus, creating communication gap between employees at both locations.

Another communication challenge was with UK based contractors. It was more of working culture difference. The systems were not as good and efficient as they expected. Documentation and deliveries were not on time. People over there were less responsible as they pointed fingers in all direction when they were asked.

"Contractors in UK did not communicate well. We thought they have taken all technical responsibility, which they did not. But in Singapore, communication was much better."

Another reason was different time zone at Singapore yard. There were different locations, cultures and languages. It becomes an issue when you are not familiar with them. You have to explore, learn and adopt things to get yourself familiar with different people.

5.3.6 No Change Policy

Another aspect of challenges was due to "No Change" policy of AkerBP. It was decided that there will be no changes once the plan is confirmed. But some situations changed later on and AkerBP stick to their plans to some extent. Some of the employees were not happy

with ”No Change” policy. They say that some policies always need to go with changing situations.

“We had a slogan No Change, but i think when you are in drawing phase, you can make changes. Maybe we put too much effort in no change in engineering phase and then in later phase we had short time left. It is better to make changes in early phases than in later phases. It can save money for us.”

5.3.7 Multiple ERP Systems

Regarding supply chain and control of spare parts, it was mentioned that the ERP system of vendors was not the same as that of AkerBP. Vendors used to buy spare parts in their own ERP system. So, when they had any issues with spare parts, then there was lack of information in AkerBP's ERP system. And vendors by that time were not there during operation phase.

“It is better that vendors buy stuff in our ERP system. Then we can go back and see details and decide accordingly. Then we will also have the life cycle of all the equipment.”

5.4 Impact of Organisational Challenges

The following Figure 5.4, is the representation of impact of organisational challenges on HSE, Working Environment, Production Capacity, Waste of Resources and Uncertainty to project. The numbers on y-axis represent the percentage of respondents. It is important to mention that some respondents chose more than one factors.

Figure 5.4: Impact of Organisational Challenges

According to Figure 5.4, organisational challenges have more impact on uncertainty to project, working environment and time. Uncertainty to project was also due to the uncertain future of employees during re-organisation process. Working environment was also affected by the re-organisational and diverse working culture after merger. It was also affected when people were asked to move to Stavanger or leave their jobs. After losing

competent people, some had to spend extra time to finish added tasks to them and in some cases they had to hire external resources.

5.5 Lessons Learned and Knowledge Sharing

This section is based on the answers to the questions regarding lessons learned and knowledge sharing practices within the organisation. The purpose was to get an insight of existing knowledge sharing systems and highlight the areas for the improvement.

To find out the root cause of why LL are not very effective in AkerBP, I conducted another short survey during the interviews. The questions were very specific to the process, reasons and factors related to capturing and transfer of lessons learned. Some of the questions were also related to the willingness of employees towards LL. In response to these questions, respondents had to chose one option from strong agreement to neutral and strong disagreement. Some respondents chose not to answer some questions as they either felt unrelated to them or did not feel like answering those questions. Some of the outcomes will be presented in this section below with questions. The questions were also focused on individual learning, group learning, organisational learning, re-usability and value of lessons learned. The effectiveness and factors hindering the lessons learned practices were also discussed.

5.5.1 Systems and Methods

Respondents were asked about the existing systems and methods for capturing LL within the organisation. Most of the respondents were not aware of any lessons learned system within the company. They did not know if they had any lessons learned database where they can go and take help from previous projects or share their experiences.

Some of them were familiar with existing lessons learned database. But they have never been into that system to use it or to take help from it. Some respondents mentioned that they have lessons learned database in addition to PIMS and Synergi. But both of the mentioned system are mostly related to HSE issues. They are not mainly focused on lesson learned and knowledge sharing practices. Another confusion was mixing the HSE issue with lessons learned. Some respondents had a view that lessons learned are only about HSE issues.

The following graphical representation in Figure 5.5, shows that how actively respondents have been using LL database. The numbers on y-axis represent the percentage of respondents. It is important to mention that some respondents chose more than one options.

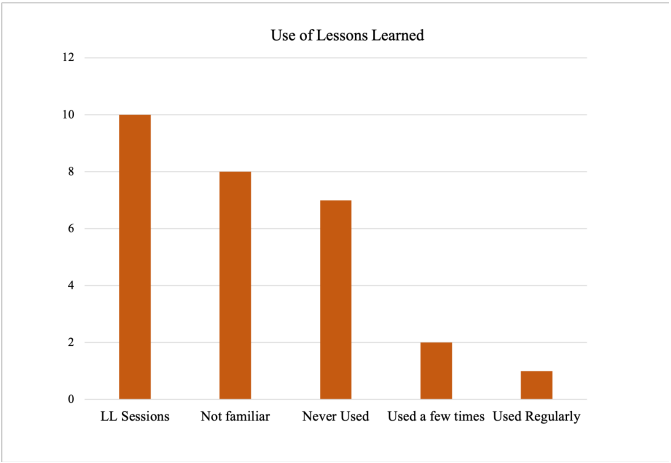

Figure 5.5: How respondents use LL

The only way of knowledge sharing has been through meetings, presentations and workshops. It is quite easy to have a session of few hours and go through all the lessons learned and knowledge sharing experiences. Most of respondents mentioned that they have no idea if they have any LL system within organisation. Some people mentioned that they have never used LL database. A few people said that they have used LL database only a few times while a very small percentage of people mentioned that they use LL database on regular basis either for taking help or to share their experiences.

5.5.2 Willingness and Dedication towards Lessons Learned

The respondents were asked questions about their willingness, openness and usefulness of lessons learned. How they share LL to counter problems and challenges? How open they are about those challenges and how these lessons can be generalised for learning? The results are presented in Table 5.1. The numbers here shows the percentage of respondents to the specific questions. Green coloured boxes showing positive results while yellows coloured boxes show mixed opinion of respondents.

Table 5.1: How LL are Treated

When we identify and collect lessons learned at AkerBP:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
we are willing to share learning about failure as well as success	27	64		9		
we avoid issues of blame		55	36		9	
we are open about problems and challenges encountered	18	73		9		
we get to the root causes of problems / opportunities	18	27	55			
we are encouraged by our nearest leader/ supervisor to share our experiences	9	64	27			
we write useful lessons learned that could be generalised to other projects		27	9	36	18	9
we write truthful lessons learned	9	55	27		9	

It clearly shows that most people are willing and open to share their problems and they are open to discuss and take actions for encountered problems. This could be about either their success or failure and they are not reluctant to share their failures as well. But on the other hand, people are not convinced if these LL will be helpful in finding the root cause of problems. Their views are also different about the generalisation of LL from one project to future projects. The positive fact here is that people value lessons learned and they are willing to play their role to capture, transfer and re-use lessons learned.

5.5.3 Transfer of Lessons Learned in AkerBP

The questions were focused on individual learning, group learning and organisational learning. How lessons learned are transferred among these three levels? Table 5.2 shows that how LL are being transferred in AkerBP. The numbers here represent the percentage of respondents to the specific questions. Red highlighted boxes here represent that most of the respondents are neutral to answer which makes it critical factor.

Table 5.2: Transfer of LL in AkerBP

How well lessons are transferred through Aker BP?	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
lessons learned move effectively from the individual to project team		9	55	27	9	
lessons learned move effectively from the project teams to the organisation		9	55	36		
lessons learned move effectively from the organisation to individuals and project teams		9	64	27		
lessons learned are applied effectively by project teams and individuals in new projects			55	45		

The numbers here are dominated by the neutral response from the respondents which does not gives us basis to chose either side. While in agreement there are only 9 percent of people who believe in effective transfer of LL among three levels. On the other hand, there is high percentage of disagreement. Therefore, we can say that high percentage of employees are either not sure about LL transfer process in AkerBP or they do not agree with the current process of LL transfer process within the organisation. This suggests that there is no effective system in place for the transfer of lessons learned among individuals, groups and organisation.

5.5.4 Factors Hampering Lessons Learned

These questions were focused on the factors hindering people from capturing lessons learned. The results are presented in Table 5.3 along-with their respective questions.

Table 5.3: Factors mentioned by respondents in survey 2

What hinders people in Aker BP from putting more efforts into the learning process (capture and transfer)?	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
I believe we are doing enough to capture, and transfer lessons learned			18	82		
I believe we lack clear guidelines on how to effectively capture and transfer lessons learned	9	82		9		
Reporting lessons learned is a time-consuming task, we lack time	18	36	45			
Reporting lessons learned is a resource consuming task, we lack resources		36	36	18	9	
The management does not support the process	9	18	27	27	18	
Lessons-learned repository in PIMS is not user friendly (not easy to record, search or retrieve)	9	9	55	9		18
I believe that the lessons collected do not have any impact on organisation's strategi or procedures		27	45	9	18	

The numbers here are in percentage of the people choosing their option. These numbers show that people have an agreement that they are not doing enough efforts to capture and transfer lessons learned and they are completely missing guidelines to do so. They are also not sure if lessons learned are going to have any impact on company's policies and procedures. That is why they are not sure if they have enough support from management or not.

Regarding time and resource consuming factors, we cannot get a clear idea if people think Lessons learned as time and resource consuming. The in Table 5.3 are from short surveys. But I got a clear idea during interviews that if people consider lessons learned as time and resource consuming. The following graphical representation in Figure 5.6 is based on the answers during interviews. The numbers on y-axis represent the percentage of respondents. It is important to mention that some respondents chose more than one factors.

Time and workload are two factors mentioned most by the respondents during interviews. People are occupied with their daily routine that they do not find time to go through lessons learned system and share their knowledge. They are only able to manage their daily workload. For them, Lessons learned is an additional work and they are only able to manage through their daily workload. Lessons learned are not prioritised over daily work routine.

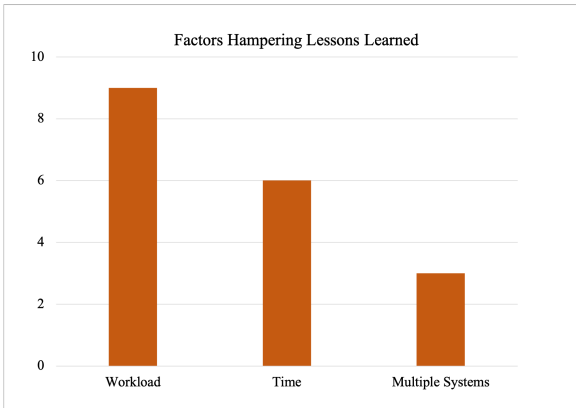

Figure 5.6: Factors Hampering Lessons Learned

People feel that they have been working on many interfaces that it made their work complicated. There has been many systems introduced within the organisation. So, they find it really hard to go through each system and write down their experiences and share with other colleagues.

5.6 No Lessons Learned in Operations

There were lessons learned practices, sessions, workshops and meeting after the project phase. People shared their experiences and learning in these sessions and everything was documented in lessons learned database. But there is no lessons learned session in two years of operations.

There have been several reasons of not doing the lessons learned during operations. According to some respondents, LL have never been a focus area or priority for operations. They have been extremely busy in their daily operations.

Another factor was starting of a lot of operations with oil production. There were so many things that came up at the same time that they never had the time to think about lessons learned. A lot of things were left unfinished from the project phase which came up as even bigger issues during operation phase. For example, water injection was anticipated in two years of operations but it came up within six months. A lot of equipment had to be changed because of wrong material selection. A lot of maintenance work had to be done to keep the production up to the target. All these factors kept people away from doing any LL practices.

"They said that we will have LL in one year of operation. But it went so fast. And suddenly it's been two years. It has been difficult to put up some time on LL."

Chapter 6

Discussion

This chapter is divide into following parts.

- Discussions of challenges including both technical and organisational challenges
- Elements of lessons learned in relation to Ivar Aasen
- Challenges for lessons learned during operation phase

This chapter is based on the factors I consider to be most important to handle technical and organisational challenges and to improve lessons learned practices within organisations. The connection of these challenges has also been discussed in accordance to the theory described in earlier chapters. The reason I consider these factors important is that they have been mentioned repeatedly in surveys and interviews, directly and indirectly.

I have chosen these factors on the basis of information I got from surveys and interviews. The responses to some questions clearly mentioned the areas that need to be worked on. I have highlighted those number in red.

Before I start writing about challenges and factors, I would like to mention the basis for this section. During a discussion with my supervisor for this thesis report, he mentioned, "There is never any technical problem. Behind every technical problem, there is always an organisational issue that caused that technical problem". So, keeping this in mind I will discuss all the challenges and important factors that caused problems regardless of being technical or organisational issue.

This also made the basis for one of the research questions mentioned in Chapter 1, Section 1.3.1. There is small possibility that technical challenges are purely caused by failure of technology. Therefore, it is always important to look if they are caused by any organisational issue. For example, stressed working environment, work overload, lack of resources and miscommunication. Any challenge caused by any of the above mentioned reasons comes under the category of organisational challenges. If we look into the list of all mentioned technical challenges in Chapter 5, Section 5.1, the root cause for each challenge is an organisational challenge.

6.1 Challenges

On the basis of information and findings from Chapter 5, all challenges have been presented in Table 6.1. It contains the information if these challenges have any impact on HSE, Working Environment and Cost. It also shows that if these challenges had the possibility of avoidance. The last column in Table 6.1 has some proposed solutions which were discussed with respondents during interviews.

Table 6.1: Challenges, their Impacts and Proposed Solutions

Challenges	Problems Caused	Impact				Possibility of Avoidance	Proposed Solution
		Issues	HSE	Working Environment	Cost		
Power from EG	Delay in operations	Extra resources, Loss of production, Down time	No	Yes	Yes	No	Extra Diesel Generator
	Insufficient power	Prioritise operations	No	Yes	Yes	No	-
Water Injection	Came up earlier than expected	Less water injection capacity	No	Yes	Yes	No-But could have been planned earlier	-
Material selection and design related issues	Corrosion	Loss of work, Time consuming, Additional CAPEX that increased OPEX	No	Yes	Yes	Yes	Selection of better quality material, Better communication between contractor and operator, More focused during the project/More resources/follow up
	Wrong specification		No	Yes	Yes	Yes	
	Chemical leakage		Possibly Yes	Yes	Yes	Yes	
	Transmitters		No	Yes	Yes	Yes	
	Positioners and valves		No	Yes	Yes	Yes	
	Insulations		No	Yes	Yes	Yes	
Multiple Locations	Hard to follow up all operations	Delayed operations, Complications, Different working environment	No	Yes	Yes	No	Better organisational structure and open communication
Feedback to suppliers/Vendors	Change of suppliers and contractors,	Uncertainty to project,	No	Yes	Yes	Yes	Chose suppliers and contractors wisely
	Mostly leave after project phase	Lost information					Collect information before they leave
Different ERP system	Confusion and complexity	Loss of information and specifications	No	Yes		Yes	Using only one ERP system
No change policy	More problems and increased cost of change of plans	Rigidness of system, No flexibility	No	Yes	Yes	Yes	Flexible and lean approach
Quality check	Changing a lot of equipment, Not suited to current situation	Maintenance, Loss of work	No	Yes	Yes	Yes	More follow up and less dependency on contractors

6.2 Elements for Lessons Learned

The main focus in this section is the basis for lessons learned which contain five main elements. These elements are:

- Identification
- Documentation
- Analysis
- Storage
- Retrieve

Then these elements are explained in connection to the lessons learned processes and procedures in AkerBP. The explanation is also in relation to the research questions mentioned in chapter 1.

6.2.1 Identification

This is the first step to capture lessons learned. The main idea here is to identify important comments, tasks, achievements or failures which can be helpful for future projects. Lessons learned session can be conducted in the form of workshops and meetings. People share their ideas and contribute in the identification of lessons learned for their respective disciplines and responsibilities.

6.2.2 Documentation

Once lessons learned are identified, the next step is to document them. This can be done in the form of different reports and audience. These reports are distributed among partners and stake holders who also take their part for the authentication of lessons learned. The feedback from them also added up to those reports to make the finalised report. This final report is then distributed among the whole project team.

6.2.3 Analysis

The documented lessons learned are analysed to see where they are most related and useful for application. These lessons leaned are shared with other project teams. On the basis of these lessons learned, special training sessions from professionals can be arranged to improve particular areas.

6.2.4 Storage

Lessons learned are usually stored in repository. It is very important to keep all lessons learned at one place. So, it will be easy for people involved in future project to find their respective lessons learned. Lessons learned should be stored in simplest possible way.

6.2.5 Retrieve

The stored lessons learned are retrieved as guidance for the future projects. If the storage repository system is simple, then it is easy to retrieve lessons learned. But making it complex can make the retrieving process hectic and people usually do not have much time to spend on lessons learned from past projects.

For Ivar Aasen, lessons learned practices were conducted only for project phase. It was done just before the operations and at the end of project phase. Project members were encouraged to have lessons learned session in the forms of workshops and meetings. People shared their experiences from their individual experiences and as teams as well. They shared their ideas in these sessions. These ideas were then documented and stored in lessons learned database for AkerBP. These lessons learned were also shared with other partners and stakeholders. Lessons learned for project phase can be retrieved from database for future projects.

The only issue here is that, it has been almost over two years of operations but no such lessons learned session have been conducted yet. This implies that nothing has been documented yet a lot of valuable information is floating in people's minds. This information can fade over time.

6.3 Challenges for Lessons Learned during Operation Phase

6.3.1 Dedicated Personnel

There were no dedicated responsibles for the management of lessons learned throughout this whole process. For knowledge management there should be some dedicated personnel within the organisation. I have mentioned about these roles and responsibilities of dedicated responsibles in Chapter 4, Section 4.4. These roles can be very helpful in managing lessons learned repositories, procedures and learning processes. They can also help in conducting lessons learned session, workshops and meetings. Their contribution could play a vital role in making an organisation into a learning organisation. It contains all three levels of learning; individual, group and organisational learning. If we look at the numbers in Table 5.3 from interviews and surveys, it clearly shows that employees were missing guidelines to capture, transfer and manage lessons learned.

Another reason is that people are moved to new projects when they are done with the previous one. They do not get enough time to record lessons learned and share with other colleagues. This can be improved by taking experience from leaving out expert as mentioned in Chapter 4, Section 4.3.6.

6.3.2 Transfer of Lessons Learned

Transfer of lessons learned at all levels; from individuals to groups, groups to organisation and then from organisation to both individuals and groups has been an issue for Ivar Aasen. This statement also justified by the numbers in Table 5.2 . People are not sure if they are

playing their role in transfer of lessons learned across all levels. That is why most of the people stayed neutral and rest of them disagreed about effective transfer of lessons learned.

6.3.3 Workload

There has been a lot of work load on individuals and teams working at that time. Some of the reasons mentioned were;

- Loss of competence due to down manning
- Unfinished tasks left by project for operations
- More maintenance work than expected

Down manning was due to merger with other companies. Many tasks were left unfinished by the project teams. So, they were transferred to operations causing work overload for them. Excessive maintenance work was mainly due to wrong selection of material and chemicals which could have been planned and decided in planning and execution phase. People have been busy in their daily routine work. They never felt like they have time for sharing their experiences with others and for future projects.

6.3.4 Multiple System Interfaces

Presence of multiple system interfaces has turned out to be a challenge for people to share their experiences. During interviews, it was mentioned that they have always been confused with so many systems. We have to write into many systems everyday. So, we do not know which system works for lessons learned and how do we manage lessons learned. Most of the respondents considered PIMS and Synergi as a lessons learned system but they are actually routinely work reporting systems. Lessons learned system should be distinguished and used only as lessons learned database or repository. To make a better system interface, user involvement can be considered. Suggestions from end users can be helpful to make a simple and easy system interface according to their requirements. User involvement has been beneficial in ways that it increases the users' acceptance of new system and provide satisfaction with the system (Hussein and Hafseld, 2016). So, a simple and user friendly system interface can be developed by user involvement.

6.3.5 Timing to Capture Lessons Learned

Timing to capture lessons learned is one of the most critical part in lessons learned practices and one of the research questions for this thesis. All projects are different from each other in some way. So, it is very hard to generalise the timing factor for all projects. I will explain this for similar projects and project and operation phases separately. Projects like Ivar Aasen, can capture lessons learned on regular basis. Projects are usually divided into small segments or sub projects and they all have different phases. For example, in Ivar Aasen, we had construction, building, execution, installation and commissioning phases. The best practise is to capture lessons learned at the end of each phase. The benefit of doing this exercise is that all the contractors and vendors will be there until the end of their

tasks. So, feedback and knowledge sharing with them could enhance learning process. Then these lesson learned can be stored in repository and transfer to the rest of the teams and other project teams especially to the operations.

Unlike project phase, operation phase is quite different. In operation phases, there is no further clear stages or phases. Operation phases are like rotating wheel. There is always something going on in operations and some of these things are unplanned or unforeseen. For example,

- In Ivar Aasen reservoir pressure dropped much earlier than expected
- A lot of maintenance work came up
- Organisational setup moved from small setup to a bigger setup
- Some of unfinished work left by project phase

In short, operation teams are always busy in fixing some extra tasks other than their routine work.

In such situations, the better approach is to fix a time for lessons learned practices and dedicate some people to capture lessons learned. Most of the respondents agreed during interviews that a six month period is good enough to capture, document and store lessons learned. It could be one year as well depending on the situation and workload. But, more than one year might not be a good approach. The reason is that the information in people's minds fades over time and they might miss some important lessons they have experienced.

6.3.6 Utilisation of Lessons Learned

The next important question is how to utilise or bring back captured lesson learned to other phases. For example, from project to operation, from operations to organisation and then from organisation to back to project and operations. It looks like a cyclic process that goes on during all the phases of any project or operations.

For projects, if lesson learned are captured and stored at each stage then they can be used a guideline for next phases. Then lessons learned form project phase can be shared with operations by conducting some lessons learned practices such as meetings and workshops and then storing in organisation's LL repository. Similar process can be applied for operations. Once lessons are stored in organisation's repository, the organisation can evaluate and use them for organisation's internal and external learning. External learning means to share with other organisations like bench-marking and learn from their success factors.

6.3.7 Evaluation of Lessons Learned

According to Rowe and Sikes (2006), evaluation of lessons learned is important to keep the check on validity and efficiency of captured and stored LL. This can be done when it becomes the part of organisation's culture. If organisations do not value and share LL, then there is no point in investing a lot of time in capturing and storing LL. It is also important to avoid re-occurrence of LL and most importantly to repeat most effective and valuable LL (Rowe and Sikes, 2006).

Chapter 7

Conclusion and Recommendations

The findings and discussion parts of thesis have some suggestions for the improvement of lessons learned practices within the company. I have observed that management has always been supportive and encouraging people for lessons learned practices in order to achieve high level of organisational learning. But, there are few more aspects where management should focus to achieve competitive advantage through organisational learning. Some of the the aspects are:

Improved systems and process: Company has some existing processes to capture lessons learned. But these processes are more focused only on capturing lessons learned and no efforts have been observed for transfer and implementation of those lessons learned. Therefore, management should replace or update the existing structure and processes to those which are more efficient and proactive. For example, hiring dedicated people for capturing, reviewing, storing and transferring lessons learned across all levels of organisation. The example of these dedicated people are Chief knowledge officer, knowledge manager or knowledge broker, as mentioned earlier in chapter 4. These people will only be focused on getting the maximum lessons learned from employees and maintaining the lessons learned database.

Training of employees: The management should explain the significance of lessons learned to all employees. It is important to educate them about the importance of how organisational learning can groom their professional careers. How lessons learned can help and guide them for future projects? Results in table 5.3 show that employees are clearly missing guidelines. Therefore, Periodic training sessions in the form of workshops, meeting and informal gatherings could be helpful.

Transfer of lessons learned: Results from table 5.2 shows that most of the respondents had issues with the transfer of lessons learned form individuals to groups or organisation and back from organisation to individuals and groups. A better approach to transfer lessons learned among different levels could be helpful in this matter. For example, in this case some of the people working in project phase, should have been moved in operation phase.

So that they could share their experiences with others in operations having advantage of knowing most of things already. The same way, operations people can be involved in project phase. So, they will have heads up of the challenges coming towards them. It is similar to job rotations description in chapter 4.

Resources and workload: One of the main challenges for respondents were lack of resources and workload. Due to this, they were not able to find time to record lessons learned. Management should make it sure that employees get enough time to record their lessons learned in time and probably make it as a requirement of their job description. Better resources will help to boost the learning process.

Timing for lessons learned: Timing for lessons learned system is very crucial. The lessons should be recorded or reported in the database as soon as you observe or learn them. If it takes too long to record, there is possibility of loosing some valuable information. It is also important to obtain information from leaving experienced people in time before they leave. In case of Ivar Aasen, the lessons learned sessions were conducted at the end of project phase. There was nothing recorded during the whole project phase. Most importantly, there has been no lessons learned session even after more than two years of operations. So, the chances of loosing some important information are high. Lessons learned sessions should be conducted on continuous basis. For project phase it can be done after completion of each stage like for example in this case after building, commissioning, hookup and installation. For operations, a time frame can be fixed for lessons learned session for example every three or six months. The reason is that the operations usually involve ongoing processes. So, it is hard to define the end of any particular stage.

Easy and simple interface: The lessons learned database should be very simple, easy and user friendly. Long written documents can be time consuming for people. So, a better approach is to write the name of an expert relevant to required topic. Then it will be quite easy for people to contact and discuss the issues with an expert.

Updating the knowledge repository: Validity of information in knowledge repositories is a big concern. Therefore, it is important to keep the repositories up to date and remove all the irrelevant and old information. This can be done through a dedicated person to maintain lessons learned database.

When all the systems and processes are in place, then it is employee's responsibility to follow the system and play their vital role in organisational learning. It starts from individual learning and adds up to organisational learning. In the case of Ivar Aasen, results in table 5.1 shows willingness and dedication of respondents towards lessons learned. This is a positive sign for the company.

Bibliography

Ahuja, G., Lampert, C., 06 2001. Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. Strategic Management Journal 22, 521–543.

AkerBP-ASA, 2016. History/Ivar Aasen. https://www.akerbp.com/en/production-started-at-the-ivar-aasen-field/, [Online; accessed 15-April-2019].

AkerBP-ASA, 2018. Annual statement of reserves 2017. https://www.akerbp.com/wp-content/uploads/2018/03/Annual-Statement-of-Reserves-2017-1.pdf, [Online; accessed 15-April-2019].

Alavi, M., Leidner, D. E., Feb. 1999. Knowledge management systems: Issues, challenges, and benefits. Commun. AIS 1 (2es).

Anbari, F. T., Carayannis, E. G., Voetsch, R. J., 2008. Post-project reviews as a key project management competence. Technovation 28 (10), 633–643.

Argyris, C., 1982. Reasoning, learning, and action : individual and organizational, 1st Edition. San Francisco, CA : Jossey-Bass, a joint publication in the Jossey-Bass series in social and behavioral science in management, training, and development.

Argyris, C., 1995. Action science and organizational learning. Journal of Managerial Psychology 10 (6), 20–26.

Argyris, C., Schön, D., 1996. Organizational Learning II: Theory, Method, and Practice. No. v. 2 in Addison-Wesley OD series. Addison-Wesley Publishing Company.

Ayas, K., 1996. Professional project management: a shift towards learning and a knowledge creating structure. International Journal of Project Management 14 (3), 131–136.

Bapuji, H., Crossan, M., 2004. From questions to answers: Reviewing organizational learning research. Management Learning 35 (4), 397–417.

Basten, D., Haamann, T., 2018. Approaches for organizational learning: A literature review. SAGE Open 8 (3), 2158244018794224.

Birk, A., Primarily, A., Sdm, A. B., Dingsyr, T., Telecom, S., 2002. Postmortem: Never leave a project without it.

Boreham, N., Morgan, C., 2004. A sociocultural analysis of organisational learning. Oxford Review of Education 30 (3), 307–325.

Bryman, A., 2016. Social research methods. Oxford university press.

Burns, R. B., 2000. Introduction to research methods . frenchs forest.

Busby, J. S., 1999. An assessment of post-project reviews. Project Management Journal 30 (3), 23–29.

Castronova, E., 01 2005. Synthetic worlds: The business and culture of online games. Bibliovault OAI Repository, the University of Chicago Press.

Cavaleri, S., Reed, F., 05 2019. Organizational inquiry: Organizational inquiry: The search for effective the search for effective knowledge knowledge.

Cheng, N., 12 2009. Knowledge sharing and knowledge broker of organizations. Future Information Technology and Management Engineering, International Seminar on 0, 195–198.

Chirumalla, K., 2016. Organizing lessons learned practice for productservice innovation. Journal of Business Research 69 (11), 4986 – 4991.

Chiva, R., Ghauri, P., Alegre, J., may 2013. Organizational learning, innovation and internationalization: A complex system model. British Journal of Management 25 (4), 687–705.

Cleland, D. I., 1985. A strategy for ongoing project evaluation. Project Management Institute.

Crossan, M. M., Lane, H. W., White, R. E., 1999. An organizational learning framework: From intuition to institution. Academy of management review 24 (3), 522–537.

Day, G. S., 1994. The capabilities of market-driven organizations. Journal of marketing 58 (4), 37–52.

Dixon, N., 1999. The organisational learning cycle: How we can learn collectively gower: Hampshire.

Dow, R. M., Pallaschke, S., 2010. Managing knowledge for spacecraft operations at esoc. Journal of Knowledge Management 14 (5), 659–677.

Easterby-Smith, M., 1997. Disciplines of organizational learning: Contributions and critiques. Human Relations 50 (9), 1085–1113.

Field, L., 1997. Impediments to empowerment and learning within organizations. The Learning Organization 4 (4), 149–158.

Fiol, C. M., Lyles, M. A., 1985. Organizational learning. Academy of management review 10 (4), 803–813.

Ford, W., 1991. The learning enterprise: Integrating total quality management and workplace reform and renewal. In: Proceedings of the TQMI Conference. pp. 59–62.

Garvin, D. A., 06 1993. Building a learning organization. Harvard Business Review 9.

Ghoshal, S., Bartlett, C. A., Moran, P., 1999. A new manifesto for management. MIT Sloan Management Review 40 (3), 9.

Hara, N., Schwen, T. M., 2006. Communities of practice in workplaces. Performance Improvement Quarterly 19 (2), 93–114.

Hill, C. E., Thompson, B. J., Williams, E. N., 1997. A guide to conducting consensual qualitative research. The counseling psychologist 25 (4), 517–572.

Hoegl, M., Schulze, A., 2005. How to support knowledge creation in new product development:: An investigation of knowledge management methods. European Management Journal 23 (3), 263 – 273.

Huang, J., Newell, S., 04 2003. Knowledge integration processes and dynamics within the context of cross-functional projects. International Journal of Project Management 21, 167–176.

Huber, G. P., 1991. Organizational learning: The contributing processes and the literatures. Organization science 2 (1), 88–115.

Hussein, B., 2018. he Road to Success: Narratives and Insights from Real-Life Projects. Fagbokforlaget.

Hussein, B. A., Hafseld, K. H., 2016. Organisational influences impacting user involvement in a major information system project: A case study in a governmental organisation. International Journal of Project Organisation and Management 8 (1), 24–43.

Jones, N., Herschel, R., Moesel, D., 03 2003. Using knowledge champions to facilitate knowledge management. J. Knowledge Management 7, 49–63.

Jones, S., 1996. Developing a learning culture: empowering people to deliver quality, innovation, and long-term success. McGraw-Hill Book Company.

Karim, N. S. A., Hussein, R., 2008. Managers' perception of information management and the role of information and knowledge managers: The malaysian perspectives. Int J. Information Management 28, 114–127.

Keegan, A., Turner, J. R., 2001. Quantity versus quality in project-based learning practices. Management learning 32 (1), 77–98.

KMT, 2019. Organisational Learning Theory. http://www.knowledge-management-tools.net/organizational-learning-theory.html, [Online; accessed 10-March-2019].

Kumar, R., 2011. Research methodology: A step-by-step guide for beginners. Sage Publications Limited.

Kumar, S., Terpstra, D., 2004. The post mortem of a complex product developmentlessons learned. Technovation 24 (10), 805–818.

Levinthal, D. A., March, J. G., 1993. The myopia of learning. Strategic management journal 14 (S2), 95–112.

Matlay, H., 1998. The learning small business-myth or reality. In: National Small Firms Policy and Research Conference. Vol. 2. Cranfield School of Management, pp. 984–1005.

Matlay, H., 2000. Organisational learning in small learning organisations: an empirical overview. Education+ Training 42 (4/5), 202–211.

Mayo, A., Lank, E., 1994. The Power of Learning: A guide to gaining competitive advantage. Institute of personnel and development.

Mueller-Seeger, J., Hutter, K., Fller, J., Matzler, K., 11 2011. Virtual worlds as knowledge management platform - a practice-perspective. Information Systems Journal 21, 479–501.

Nonaka, I., 1994. A dynamic theory of organizational knowledge creation. Organization Science 5 (1), 14–37.

Nonaka, I., Konno, N., 1998. The concept of ba: Building a foundation for knowledge creation. California Management Review 40 (3), 40–54.

Nonaka, I., Takeuchi, H., 01 1991. The knowledge creating company. New York 1, 995.

Nonaka, I., Takeuchi, H., 1995a. The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford university press.

Nonaka, I., Takeuchi, H., 01 1995b. The Knowledge Creating Company: How Japanese Companies Create The Dynamics Of Innovation. Vol. 29.

Odor, H., 2018. A literature review on organizational learning and learning organizations. Int J Econ Manag Sci 7 (494), 2.

Patton, M. Q., 2005. Qualitative Research. American Cancer Society.

Pavlin, S., 2006. Community of practice in a small research institute. Journal of Knowledge Management 10 (4), 136–144.

Pawlowski, S. D., Robey, D., 2004. Bridging user organizations: Knowledge brokering and the work of information technology professionals. MIS Quarterly 28 (4), 645–672.

Pedler, M., Burgoyne, J., Boydell, T., 1991. The learning company. maidenhead.

Revans, R., 2011. ABC of Action Learning. Gower Publishing.

Romme, G., Dillen, R., 1997. Mapping the landscape of organizational learning. European Management Journal 15 (1), 68–78.

Rose, K. H., 2013. A guide to the project management body of knowledge (pmbok® guide)fifth edition. Project management journal 44 (3), e1–e1.

Rowe, S., Sikes, S., 2006. Lessons learned: taking it to the next level. In: Originally published as part of 2006 PMI Global Congress Proceedings. Seattle, Washington.

Scarbrough, H., Swan, J., Preston, J., of Personnel, I., Development, 1999. Knowledge Management: A Literature Review. Issues in people management. Institute of Personnel and Development.

Scott, B. B., 2011. Organizational learning: a literature review. IRC Research Program 126.

Shrivastava, P., 1983. A typology of organizational learning systems. Journal of management studies 20 (1), 7–28.

Smircich, L., 1983. Concepts of culture and organizational analysis. Administrative science quarterly, 339–358.

Turner, J. R., Keegan, A., Crawford, L., 2000. Learning by experience in the project-bases organization.

Von Zedtwitz, M., 06 2002. Organizational learning through post-project reviews in rd. University of St.Gallen 32.

Wang, C. L., Ahmed, P. K., 2003. Organisational learning: a critical review. The learning organization 10 (1), 8–17.

Weber, R., Aha, D. W., Becerra-Fernandez, I., 2001. Intelligent lessons learned systems. Expert systems with applications 20 (1), 17–34.

Weick, K. E., 1991. The nontraditional quality of organizational learning. Organization science 2 (1), 116–124.

West, J., Iansiti, M., 2003. Experience, experimentation, and the accumulation of knowledge: the evolution of rd in the semiconductor industry. Research Policy 32 (5), 809 – 825.

White, M., Cohan, A., 2016. A guide to capturing lessons learned. The Nature Conservancy.

Williams, T., 2007. Post-project reviews to gain effective lessons learned. Project Management Institute.

Wu, H., Gordon, M. D., Fan, W., 2010. Collective taxonomizing: A collaborative approach to organizing document repositories. Decision Support Systems 50 (1), 292 – 303.

Zidane, Y. J., Hussein, B. A., Gudmundsson, J. Ø., Ekambaram, A., 2016. Categorization of organizational factors and their impact on project performance. Procedia-Social and Behavioral Sciences 226, 162–169.

Appendices

7.1 Appendix A - First Questionnaire

Lessons Learned for Ivar Aasen etter 2 r i drift

Purpose and objectives

The purpose of identifying the lessons learned for Ivar Aasen after 2 years in operation is to develop insights into significant challenges encountered that had an impact on among other things; health, safety, environment, operational costs (expenditure), production capacity, working environment, collaboration on site (one team), and on resource productivity.

The documentation of lessons learned will also covers the measures that had been used to respond to these challenges as well as an evaluation of the possible measures that should have been implemented earlier in order to avoid or eliminate these challenges or to reduce their impacts.

Through this Questionnaire we aim to; 1) provide the respondents with an opportunity to reflect on their tasks, problems encountered, experiences, and insights during the operation phase of Ivar Aasen. 2) The answers of the respondents will provide a framework for conducting interviews with some selected respondents in order to gain deeper insights into these challenges or solutions implemented.

Please read each question carefully, the expected time-frame for completing this open ended Questionnaire is estimated to 45-60 minutes.

Questions about this survey could be addressed to
Waqas Mushtaq, NTNU, waqasm@stud.ntnu.no
or to Associate professor Bassam Hussein, NTNU, bassam.hussein@ntnu.no
or to Bjrn Sundfr at Aker BP.

1. Name:*

2. Job Title:*

3. How long have you been working on Ivar Aasen platform?* Please enter the number of months

4. Roles and Responsibilities:* Please explain your assignments, responsibilities during the operation phase of Ivar Aasen

5. Significant Technical problems Please list and elaborate on any significant Technical problems that have been encountered during the operation phase.

6. Impact of technical problem encountered Please assess the impact of the Technical problem you have identified above on: HES (health, environment, safety), Operational costs (expenditure), Production capacity, Working environment, Collaboration on site (one team), Resource productivity, Or on any aspect you believe was critical

7. Measures applied Please identify measures that have been applied in order to address the above mentioned Technical problems. In a hindside, what could been done during project phase in order to avoide this type of technical problems?

8. Significant organizational challanges. Please list and elaborate on any significant Organisational challenges that have been encountered during the operation phase.

9. Impact of organizational challangtees. Please assess the impact of Organizational challenges on issues such as: HES (health, environment, safety), Operational costs (expenditure), Production capacity, Working environment, Collaboration on site (one team), Resource productivity, Or on any aspect you believe was critical.

10. Did the management respond to these organizational challanges? and how?

11. In your opininin, how these organizational challanges could have been avoided or reduced?

12. Learning / Experience transfer Please elaborate on systems or methods that were used to facilitet the exchange of knowledge and experience with other colleagues during operation phase.

13. Learning / Experience transfer How do you assess the contribution of these methods? What do you suggest to enhance the experience or knowledge sharing during the operation phase?

14. Overall assessment * Anything you want to share from your experiences during the operation phase such as: Positive experience/Moment of joy Negative experience/Moment of frustration Your overall assessment of your own experiences

7.2 Appendix B - Second Questionnaire

Part 2 – Lessons Learned

1. When we identify and collect lessons learned at Aker BP:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
we are willing to share learning about failure as well as success	-	-	-	-	-	-
we avoid issues of blame	-	-	-	-	-	-
we are open about problems and challenges encountered	-	-	-	-	-	-
we get to the root causes of problems / opportunities	-	-	-	-	-	-
we are encouraged by our nearest leader/ supervisor to share our experiences	-	-	-	-	-	-
we write useful lessons learned that could be generalised to other projects	-	-	-	-	-	-
we write truthful lessons learned	-	-	-	-	-	-

2. How well lessons are transferred through Aker BP?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
lessons learned move effectively from the individual to project team	-	-	-	-	-	-
lessons learned move effectively from the project teams to the organisation	-	-	-	-	-	-
lessons learned move effectively from the organisation to individuals and project teams	-	-	-	-	-	-
lessons learned are applied effectively by project teams and individuals in new projects	-	-	-	-	-	-

3. **What hinders people in Aker BP from putting more efforts into the learning process (capture and transfer)?**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
I believe we are doing enough to capture, and transfer lessons learned	-	-	-	-	-	-
I believe we lack clear guidelines on how to effectively capture and transfer lessons learned	-	-	-	-	-	-
Reporting lessons learned is a time-consuming task, we lack time	-	-	-	-	-	-
Reporting lessons learned is a resource consuming task, we lack resources	-	-	-	-	-	-
The management does not support the process	-	-	-	-	-	-
Lessons-learned repository in PIMS is not user friendly (not easy to record, search or retrieve)	-	-	-	-	-	-
I believe that the lessons collected do not have any impact on organisation's strategi or procedures	-	-	-	-	-	-