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Executive Summary

The scientific field of risk management (RM) is not older than 30-40 years, but today it is considered as a critical business function. In a society where large amounts of data are being processed at an ever-faster pace, such as in the oil and gas industry, there is a need for a well-functioning RM system. The system should enable companies to identify and manage risks, as well as support the decision in addressing risk when making decisions under uncertainty.

The purpose of this master thesis is to study how companies in the oil and gas industry manage risk during the whole project life cycle, using Offshore AS as an example. The thesis will investigate if Offshore AS's process manuals are adhered to and sufficient, and further look into how the risk is transferred between the departments and different stages of a project. In addition, it will also be considered whether it is possible to optimize the RM in Offshore AS. To answer these questions, a review of the company's internal documents, qualitative case studies of eight previous projects and six semi-structured interviews with key personnel has been carried out.

The document review of the internal process manuals provides an understanding of how Offshore AS manage risk in their organization. The document review is also the basis for the evaluating in the case studies, where previous projects are evaluated against the process manuals. The results from the case studies further provided the foundation for the interview questions, which were intended to verify the findings in the case study.

The evaluation of Offshore AS shows that they satisfy the processes to a large extent, and many of the principles for good RM are implemented. At the same time, the processes are not always adhered to, they are not sufficiently described and there exist signs of errors and weaknesses, which convey that the processes are not optimal and needs improvements. The results indicate that the risk transfer between the various departments is somewhat discontinuous.

In order to improve the risk transfer between the departments, it is important that the processes that have been set are followed and described in more detail, and that they are prioritized independently of available resources.

During the discussion, there were several suggestions on how Offshore AS can optimize its RM. The measures listed below are among the most important measures the authors recommend the company to implement:

- Examine the possibilities of either improving one of their current systems or look for a better system for managing and storing data, which includes a sorting and filtering function, opportunities, document control, registration of actual events and a notification function that clarifies when someone has updated or changed documents.
- Revise and update the process manuals in addition to carry out a comprehensive training program to achieve a unified understanding of the processes, responsibilities, and content.
- Apply and include a detailed description of the Lessons Learned process on how to capture important lessons learned and make efficient use of these.
- Last but not least, Offshore AS should improve and update the RA templates.

If Offshore AS implements the measures above, it can help them to improve their RM and the risk transfer between the various departments in the organization. The risk transfer circle will then be more coherent and continuous than it is today.

Contents

Preface

This master's thesis is the concluding work of our Master of Science at the University of Stavanger (UiS) at the Department of Industrial Economics, Risk Management and Planning. The thesis is written within the specialization of risk management, contract administration and project management, and was performed from January 2019 to June 2019. The thesis was conducted in collaboration with Offshore AS and study the risk management in Offshore AS. The study is intriguing as it provides insight to a real example on how an oil and gas company manage risk throughout the life cycle of a project.

The master's thesis has been written anonymously due to strategical reasons, which makes it difficult to honor and show our gratitude to out two external supervisors. You know whom you are, and we are very thankful for making the time and effort to help and advise us through this thesis.
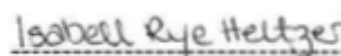
We would also like to thank the employees in Offshore AS for showing interest and goodwill throughout this period. Without the help of the interview candidates, this thesis could not be achieved. We appreciate you taking the time to be interviewed and sharing valuable inputs for the master's thesis.

Last but not least, we would like to thank our supervisor, Sindre Lorentzen, at UiS for his valuable guidance, presence and feedbacks throughout the master's thesis.

Stavanger, June 11th, 2019.

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Abbreviations

ALARP	As Low As Reasonable Practicable
BA	Business Acquisition
BMS	Business Management System
CR	Change Request
CRM	Customer Relationship Management
DMS	Document Management System
EPIC	Engineering Procurement Installation Commissioning
FMEA	Failure Mode Effect Analysis
FTT	Feedback to tendering
HAZID	Hazard Identification
HAZOP	Hazard and Operability Analysis
HIRA	Hazard Identification and Risk Assessment
IMR	Inspection Maintenance and Repair
ITT	Invitation To Tender
LL	Lessons Learned
MDDR	Master Document and Deliverables Register
MoC	Management of Change
PSA	Petroleum Safety Authority Norway
PEP	Project Execution Plan
PM	Project Management
PM&E	Project Management & Engineering
RA	Risk Assessment
RFQ	Request for Quotation
RMT	Risk Management Tool
SJA	Safe Job Analysis

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Concepts

Risk analysis   Risk analysis is the process of evaluating the probability of an unfavorable event occurring within the company (Rausand & Utne, 2014).

Risk assessment   Risk assessment (RA) is a systematic process of assessing the potential risks that can occur in a planned activity or company (Rausand & Utne, 2014).

HAZOP   Hazard and Operability Analysis is a structured method to identify and document hazardous events and operative relations for a system or a process. The method is often carried out in the design phase to verify the integrity of a system or a process and has become a for verification of the design of process systems in the offshore industry (Rausand & Utne, 2014).

HAZID   Hazard identification is a structured method to identify and document risk and dangerous relations connected to an operation, such as installation, modification, replacement of equipment's etc. It is a well-recognized and documented method that ensures that the analysis object is analyzed in a thorough and structured manner (Rausand & Utne, 2014).

HIRA   Hazard Identification and Risk Analysis (HIRA) is a mutual expression that cover the activities concerned to identify hazards and assess risk at facilities and throughout their life cycle. This to secure that the risk to employees, the public, or the environment are constantly coordinated with the company's risk acceptance (Chola Risk Services, n.d).

Accept criteria   The risk acceptance criteria are used as a base when making decision about what is acceptable risk. Acceptable risk is the risk that is accepted in a specified situation based on present standards of the society and within the company (Rausand & Utne, 2014).

ALARP   ALARP (As Low As Reasonably Practicable) involves reducing the risk further than currents requirements in regulations. Identified risk-reducing measures shall be implemented unless they are grossly disproportion to costs and other disadvantages (Rausand & Utne, 2014) .

Toolbox talk   Toolbox Talk is an everyday dialogue among the employees, that emphases on specific safety concerns. These tools can be used regularly to support the safety culture along with promotion of the health and safety dialogue on job sites (SafetyCulture, n.d).

SJA   Safe Job Analysis (SJA) is a systematic analysis of risk elements that is connected to the work task that is being performed. The analysis is carried out in advance of the job to secure that all risk factors are taken into account and to make the employees, who are to do the work task, more aware of possible hazards (Cholar Risk Services, n.d).

Chapter 1 Introduction

Even though the history of risk has stretched over millennia, the scientific field is quite young. The phenomenon of risk extends far back in time; however, it does not exist a widely agreed definition of the concept of risk yet. As it was more usual to think of risk as the expected value of loss in the 70s, the concept of risk has developed to include environment, safety and health.

There are several definitions of the term risk within the various disciplines. It is common practice in the oil and gas industry to practice a probability-focused definition of risk, but in recent times there has been expressed a need for seeing beyond expected values and probabilities. In order to see beyond expected values and probabilities, it is critical to take the knowledge that risk, and probability judgement are based on into account and further describe the risk in terms of uncertainties. Professionals from all over the world with great interest and commitment has gathered to be able to reach a much-needed consensus in the scientific field of risk-related terms (SRA, n.d) which can be justified for different disciplines, such as the oil and gas industry.

As the oil and gas industry faces a number of risks and uncertainties, it is important that companies focus on risk management (RM) to handle the amount of uncertainty they are exposed to. The scientific field of RM is not older than 30-40 years, but today it is considered as a critical business function and many recognize the need for a well-function risk architecture. It is no longer seen as acceptable for a company to cause damage to people, environment or material values, in addition to the company's reputation. Therefore, clients and stakeholders place higher demands and expectations on the company to take RM seriously. In a society where large amounts of data are being processed at an ever-faster pace, such as the oil and gas industry, there is a need for a well-function RM system that enables companies to identify and manage risks, in addition to support the decision in addressing risk when making decisions under uncertainty.

Although the overall trend is that RM has improved on the Norwegian shelf, Petroleum Safety Authority Norway's (PSA) indicator for 2015 shows that the risk level is increasing compared with previous years (Tollaksen, 2016). Therefore, it is particularly intriguing to study a real example that provides insight on how an oil and gas company manage risk throughout the life cycle of a project and if there are any areas that needs to improve.

1.1 Offshore AS

The report is written in cooperation with Offshore AS, which is a global oil and gas company that delivers a high range of services to the offshore industries. Due to the anonymity of the report, the company's name is anonymized by using the fictitious name "Offshore AS". This chapter provide readers a brief introduction about the company and their work areas. All the information is retrieved from Offshore AS's website and annual report.

The Company's business

The company's business consists of vessel management, including contracting, purchasing, selling, processing and rental of ships. Furthermore, they provide Remotely Operated Vehicle (ROV) services, subsea constructions, inspection, maintenance and repair, engineering and project management.

The Company is currently operating a large fleet with vessels ranging from Platform Supply vessels, Anchor Handling Vessels, Subsea Construction Vessels to Light Well Intervention Vessels (Anonymous, 2018).

Business segments

Offshore AS' business is divided into two segments which allows for higher income opportunities and gives the opportunity to provide integrated subsea projects.

The first segment consists of vessels operations and project management within the subsea projects. Offshore AS has is positioned as a worldwide IMR partner as they possess all necessary assets and disciplines regarding IMR projects to offer unified, available, subsea solution from a total supplier (Anonymous, 2018).

The second segment consist of long-term vessel chartering to third party companies, which gives Offshore AS solid contract insurance and strong income. This includes modern subsea vessels and ship management services to oil companies and leading subsea contractors (Anonymous, 2018).

1.2 Objectives and Limitations

The purpose of this thesis is to study if Offshore AS's process manuals are adhered to and sufficient to manage risk throughout the project's life cycle with the associated research questions:

- *How does* Offshore AS *manage to transfer the risk from the tender process to completion of the project?*
- *How can* Offshore AS *optimize the risk management from tender process to completion of the project?*

The purpose of the research questions is to investigate whether the processes, that all personnel in Offshore AS shall comply to, have a sufficient approach to risk in this type of industry and whether these are followed. By examining this, it will provide an insight into whether there is a need for changes to get a more well-functioning system and work methodology.

The research questions will be answered by performing a case study and semi-structured qualitative interviews. As the classic case study approach requires the development of theory before collecting the data in order to deduce propositions and guidance of the data collection and evolution, the authors will be reviewing Offshore AS's three of the main process manuals used in the project lifecycle with emphasize on risk. This includes the Business Acquisition (BA) manual, the Project Management (PM) manual and the Risk Management (RM) manual, to get an overview of the activities and the controls performed by Offshore AS operations. Eight previous projects with associated documents will be analyzed in relation to the above process manuals to investigate whether they were according to the processes or in which areas they differ. To verify the results of the case study and to achieve a picture of the current situation in the company, interviews across the departments will be conducted based on the information obtained from previous projects and the company's internal documents. Results will further present an insight about what Offshore AS should emphasize on to be able to improve their RM in the future.

When mentioning the departments within Offshore AS, it is delimited to the departments within BA, PM, HSEQ and operational. It is worth mentioning that HSEQ is a support function. Due to limited access to documentation of the risk transfer from PM to operation, the thesis does not focus as much on this. The report is limited to focusing on Offshore AS's head office, and

therefore the results may not apply for other offices located in different parts of the world. Because the thesis consists of semi-structured qualitative interviews that require a large amount of processing work, it was definite to interview few, but representative, candidates. As both time and representative completed projects was limiting, it was decided to only focus on IRM projects of level 3 and level 4 which will be described later. As the thesis focuses on the entire project's life cycle, it was decided to only consider completed projects which includes older projects. This, together with the fact that the authors were new to the company's system, may cause the results to differ slightly from the current situation as things might have changed. Time also limits literature review and as the thesis has a wide scope, it has been chosen to focus on the most important parts in RM within the project.

1.3 Content

The thesis is divided into seven chapters. Chapter one contains an introduction to the topic of the thesis, in addition to a short presentation of the company that has been studied, as well as the thesis goals and limitations. In chapter two, literature relevant to the topic's theme and research questions is presented, which includes the concept of risk, risk description, RM and finally how to optimize RM. Chapter three is concerned to outline the three process manuals which provides a single global standard for BA, PM and RM on how Offshore AS should perform the processes. The next chapter takes you through the relevant methods used to answer the research questions. This involves a qualitative research strategy with a case study research design involving multiple former projects, in addition to various interviews of participants from the disciplines of BA, HSEQ and PM. Furthermore, in chapter five the results from the case study and the semi-structured interviews will be presented. In chapter six, the results from the methods mentioned above will be discussed against the documents reviews of the manuals and relevant theory. In addition, appropriate improvement measures will be considered and discussed. Chapter seven will present the conclusion, along with recommended improvement measures, to improve and optimize RM from the tender process to project completion.

Chapter 2 Theory

In this chapter, literature relevant to the topic's theme and research questions is presented, which includes central concerns about how to define, describe and manage risk, in addition to optimize RM.

While the history of risk has stretched over millennia, the risk analysis has been developed as a field since the middle of the last century. The first standard within risk and reliability analysis came in 1949 with the purpose of integrating safety and reliability thinking while developing products (Rausand & Utne, 2014). Since then, a number of new standards and suggestions have been made to define, understand and propose ways to deal with the risks. In the 1970s and 80s, the offshore industry's perspective on risk developed along with various methods, which is still the basis for the field today. The Norwegian offshore industry gained an increased focus on safety, in the same time period as mentioned above, as a result of near accidents or accidents in the Norwegian shelf. A decade later, requirements for risk analyzes were introduced, yet there is still challenges in the industry how the risk should be defined and understood (Rausand & Utne, 2014).

2.1 The concept of risk

Since the phenomenon of risk extends far back in time, there are several definitions of the term risk. Abraham de Moivre defined risk in 1711 as: *"The risk of losing any sum to be the sum adventured multiplied by the probability of the loss"* (Aven, Risk, surprices and black swans, 2014, s. 23), in modern terms, the expected value of loss. As stated by Aven (2014), there do not exist a widely agreed definition of the concept of risk. Many attempts have been made to provide a broadly accepted definition, nonetheless, one unified set of definition have not been established (Aven, 2015a).

Some examples of probability-based risk definition are:
- Risk is the product of probability of an event and the consequences of the event (DNVGL, 2017).
- Risk = Probability x Consequence (Rausand & Utne, 2014).

Many oil and gas companies, including Offshore AS uses probability-focused definitions. However, Aven (2015b) expresses the need for seeing beyond expected values and

probabilities, and underlines the need to focus on the critical link to knowledge, and the lack of knowledge, which risk and probability judgements are based on. In recent times, the scientific fields have switched from describing risk in regard to probability to describing the risk in regard to uncertainties (Rosa, 2011). The Society of Risk Analysis (SRA), a multidisciplinary, scholarly, international society that enables an open forum for discussions related to risk assessment (RA) (SRA, n.d), has contributed with an authoritative glossary of risk-related terms which brings the scientific field on step further to a much-needed consensus. This glossary gives some definitions of risks, which can be justified for various contexts:

a) Risk is the possibility of an unfortunate occurrence.
b) Risk is the potential for realization of unwanted, negative consequences of an event.
c) Risk is exposure to a proposition (e.g. the occurrence of a loss) of which one is uncertain.
d) Risk is the consequences of the activity and associated uncertainties.
e) Risk is uncertainty about and severity of the consequences of an activity with respect to something that humans' value.
f) Risk is the occurrence of some specified consequences of the activity and associated uncertainties.
g) Risk is the deviation from a reference value and associated uncertainties (Aven, 2015a)

In supplement to the risk described by uncertainty, the common factors are that an activity is assessed, and risk is defined in connection to the consequences of this activity considering something that people value. To explain the term risk concept, Aven (2015b) describe that an activity leads to some consequences (C) and that these are unknown - they are uncertain (U). These two components constitute risk: *"The risk concept (C, U) covers (i) that the activity leads to some consequences C, and (ii) that these consequences are not known (U)"* (Aven, 2015b, s. 13). Sometimes consequences are split into events A and their associated consequences C. Risk is then written as (A, C, U) (Aven, 2015a).

2.2 Risk description

The risk concept does not provide a tool for assessing and managing risk; therefore, we have to describe or measure the risk. As for the risk concept, there are also many different definitions of risk description. The SRA glossary gives some definitions of the risk description, which can be justified for various contexts:

1. The combination of probability and magnitude/severity of consequences.
2. The triplet (s_i, p_i, c_i) where s_i is the i-th scenario, p_i is the probability of that scenario, and c_i is the consequence of the i-th scenario, $i = 1,2, ..., N$.
3. The triplet (C', Q, K), where C' is some specified consequences, Q a measure of uncertainty associated with C' (typically probability) and K the background knowledge that supports C' and Q (which includes a judgement of the strength of this knowledge).
4. Expected consequences (damage, loss), for example computed by:
    i. Expected number of fatalities in a specific period of time or the expected number of fatalities in a specific period of time or the expected number of fatalities per unit of exposure time.
    ii. The product of the probability of the hazard occurring and the probability that expected damage given that the hazard occurs, and the object is exposed to it.
    iii. Expected disutility.
5. A possibility distribution for the damage (for example a triangular possibility distribution) (Aven, 2015a).

In Aven's book called "Risk Analysis", he defines risk description as point three above. In accordance with Aven's risk concept, *(C, U)*, a risk description is obtained by describing the consequences and utilize a description of uncertainty, Q (Aven, 2015b). The risk description then becomes: (C', Q, K) or (A', C', Q, K), where A' is some specified events (Aven, 2015b).

For this, a common approach to express the uncertainties is by the means of probabilities. It is common to distinguish between two probabilities; knowledge-based probability and frequentist probability. We refer to knowledge-based probability when the uncertainty is expressed based on the assessors degree of belief in terms of the assessors background knowledge, while frequentist probability is the fraction of times the event occurs when the situation considered were hypothetically repeated over and over again under similar conditions (Aven, 2015b).

2.3 Risk management

RM is a continuous management process with the objective to identify, analyze and assess possible risk factors in a company, as well as to find and implement measures that can minimize the possible outcomes (Rausand & Utne, 2014). A good company management has risk as integrated part of their daily operations and relates to all activities, situations and happenings that may affect the company and its capability to reach the company's objectives and vision (Aven, 2015b). As there is risk related to all activities managed by people, RM applies to all industries and businesses and is often split into three main categories: strategic-, financial- and operational risk. The strategic risk entails the consequences that are affected by acquisitions, technology, laws and regulations and the labor market. The financial risk entails the consequences that are affected by the market, credit and liquidity issues. Finally, the operational risk that may cause consequence on the company as a result of safety- or security-related matters. For a company to successfully implement RM, Aven (2015b) elaborates that it is very important that the top management is involved and assure that:

- A strategy for RM is established.
- A formal RM process is established along with routines the company has to follow.
- A management structure with roles and responsibilities, to assure the risk analysis process is being an integrated part of the company.
- Analysis and support systems is implemented.
- Communication, training and development of RM culture to achieve that the company is improving.

The risk analysis process is a central part of the RM and contains three main phases: planning, RA and risk treatment (Aven, 2015b). Risk analysis is important as it will form the basis for a decision which the decision-makers will evaluate in a decision situation. There are a number of definitions about RM, but a joint factor is that various concerns has to be measured when evaluating and managing risk in an environment of uncertainty and to keep a balance among the economic aspects and safety aspects.

2.3.1 Decision making under uncertainty

RM involves making big decisions for the company, and these decisions can be made when there are considerable risk and high uncertainty as to what the consequence the provision may entail (Aven, 2015b). The outcome of the decision is difficult to predict, and the objective of RM is to support the decision in addressing risk when making decisions under uncertainty. A method to deal with uncertainty is the cautionary principle.

Cautionary principle

A decision-making strategy consider the effect on risk and the uncertainty that cannot be identified in the analysis. The result is a decision which is based on calculation of risk and application of cautionary principle or precautionary principle. By applying the cautionary principle in RM, means that caution is taken by not starting an operation or by implementing measures to minimize the risk and uncertainties, where the level of caution is balanced against other concerns like cost etc. (Aven, 2015b). In the offshore industry, the consequences are often known, and therefore minimum requirements are set in order to protect people and environment, and these requirements can be considered justified by referring to the cautionary principle.

Risk analysis are tools that provide insight into risk and the trade-offs involved but consist of strong limitations as they are built upon assumptions and suppositions. The analysis does not express objective results and by being caution, Aven (2015b) means reflecting on this fact and emphasize on robust design solutions, design for flexibility, implementation and improvement of safety barriers, quality control, precautionary principle and the ALARP (As Low As Reasonably Practicable) principle. With experience, gained information through experience transfer and by investing incidents, the company can use this information to form the basis for further work to prepare a nuances and improved RM offshore. Therefore, the essential idea behind a cautionary principle is to be up to date on development and have knowledge of what a solid RM is, to prevent accidents and unwanted incidents.

2.3.2 Framework and guidelines for risk management

RM approaches constitute the foundation for RM. This also include activities like establishing roles and responsibilities, communication, training and the development of a good risk culture. As rules and regulations require that RM is carried out in the offshore industry, many companies choose to adopt comprehensive tools such as guides, frames and standards to get guidance on how they can fulfill the requirements. Two examples on such tools is DNV guidelines and the

ISO 31000 standard. DNV guidelines provide RM and quality assurance services to the maritime, oil and gas industry. DNV GL – Maritime is seen as the world's leading classification society and is a recognized advisor within the maritime industry (DNV GL, n.d). The ISO 31000 standard provides guidance on how organizations can integrate risk-based decision-making processes into the organization's activities (ISO, 2018).

DNV Guidelines – Risk Management in marine and subsea operations

DNV has prepared a recommended practice with a goal to *"establish guidelines and recommendations for the process required to reach an acceptable and controlled exposure to risk during marine operations, for personnel, environment, assets and reputation"* (DNVGL, 2017). All activities of an organization may involve risks which can have a negative impact on the environment, safety and societal areas, in addition to cause damage to the company's economic performance and corporate reputation (DNV GL, n.d). DNV outlines that to manage risk effectively will help the company to perform better in an environment with uncertainty and build sustainable business performance over time. Their RM service portfolio is primarily based on the international standard for RM – ISO 31000, and their goal is to help the companies understand the core principles of RM and implement it as a part of the company's management systems. If the company implement a solid RM platform and start using a risk-based thinking, the company will be more equipped for the shift to the ISO standards where it is required to apply a systematic approach for managing risk.

The ISO 31000 standard

As the world we live in today is constantly changing, it is important that the companies manage the amount of uncertainty they are exposed to. How companies manage uncertainty can be crucial for whether the company manages to succeed in achieving its goals (ISO, 2018). The ISO 31000 standard is newly revised where potential positive effects in the perception of risk is also integrated. It can then be said that the risk is about uncertainty about goal achievement in general. The uncertainty can be affected by both hazards and opportunities, and thus gives both negative and positive results in relation to the goal (Difi, n.d.a). By conducting an uncertainty analysis, it will be possible to identify the projects potential uncertainties (Difi, n.d.b). ISO 31000 gives a guidance for how the companies can implement risk in every decision in management, planning, reporting, policy, values and culture. As the standard is newly revised, it allows the standard to be more strategic with more emphasize on the involvement from top management and implementation of RM in the company's organization. The new

standard points out that RM should be a part of the company's structure, processes, goals, strategy and activities. The system can be applied by every organizations and is further open and principle-based letting the company apply the principles in the standard in relation to their own context. If oil and gas companies apply the ISO 31000 tool, they can develop a strategy for RM to identify and minimize risk, and on behalf of that they can increase their probability of achieving their goals and a better protection of their values. The ISO 31000 main goal is to develop a RM culture where the employees and clients are aware of the importance of monitoring and manage the risk. In the offshore industry, it is especially important that companies implement such a type of RM as many clients have a very strict policy and demands towards the company they are cooperating with. Figure 1 show ISO 31000:2018 suggest hos risk is manages based on principles, framework and processes.
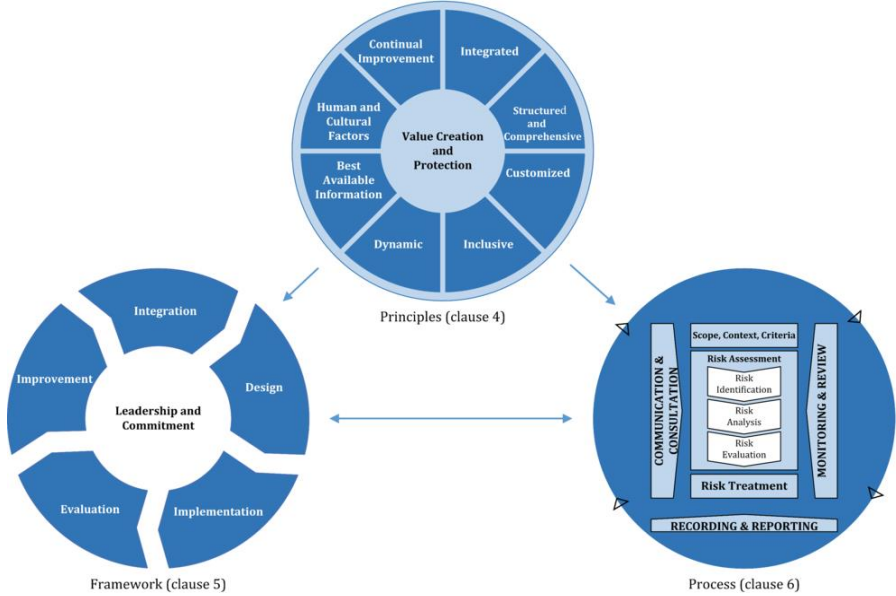
Figure 1: The ISO 31000 model (ISO, 2018)

The standards (ISO, 2009) definition of the objective with the RM process is that it is a *"systematic application of management policies, procedures and practices to the activity of communicating, consulting, establishing the context, and identifying, analyzing, evaluating, treating, monitoring and reviewing risk"* . The process begins by getting a common view of the context, establishment of the scope and goals which also include activities like problem definition, gather information, organize the work and select an analyze method (Aven, 2012). It is important that the context is described and understood as it may minimize the total risk and avoid the decision-makers from overlooking matters that can turn to unwanted events.

The central part of the RM process is RA, and a general approach is first to identify the risks that can cause an effect on the company's goals (ISO, 2018). Conducting a RA may expose risks that can emerge, where there is weak background knowledge, which can further imply a new sort of event that may lead to serious consequences if it occurs (Aven, 2014). The risks that are identified will then be assessed using cause and consequence tools, for so to be evaluated what that is required for the initiating event to take place and the potential outcome (Aven, 2012). To evaluate and present the cause and consequence, tools can be used such as probability, expected value, prediction interval, uncertainty factor, evaluate the strength-of knowledge and so on. When the risk has been evaluated, some risk treatment proposals can be given to the decision-makers (ISO, 2018).

2.3.3 Process

A general definition of a process is the movement from one state to another, for example getting from A to B. A process is also stated as a systematic order of activities that together create a required result (Difi, 2018). A project contains many processes and it is therefore important that the processes are a planned movement from A to B, with a clear purpose of development or change. In other words, how the processes are managed and lead in Offshore AS to get from the current situation (tender phase) to the wanted situation (project completion). The project manager is responsible for making sure that the project is going according to plan, but it is the interaction between those who participate in the actual process that create the results. How long a process lasts is varying, some may last from weeks to months, while others last for years. Regardless of the time of the process, good project and RM are equally important with each process to reduce the likelihood of an unwanted event occurring. Offshore AS has prepared three process manuals that show all the activities that belong to each process in the project, which will be further explained in Chapter 3.

2.4 Optimization of Risk Management

According to SNL (2018), the term optimizing is about making something as good as possible, bringing a system or process to an optimum under the conditions given. Although there are many definitions of optimization, they have one thing in common; to make changes that deliver better results. Optimization is a word with broad terms and this report focus on RM and risk process optimization in the oil and gas industry. ISO 31000 define RM process as: "A

systematic application of management policies, procedures and practices to the activities of communicating, consulting, establishing the context, and identifying, analyzing, evaluating, treating, monitoring and reviewing risk" (ISO, 2009).

Despite the fact that RM has a long history, RM as a scientific field is quite young - not more than 30-40 years (Aven, 2015a). Today it is seen as one critical business function that underpin the operational, accounting, financial and strategic health of a firm and many now recognize the need for a well-function risk architecture to both help them to reduce and mitigate risk and to improve and optimize performance (Marsh, n.d). RM is an important tool when used properly, provide a global view to identify the "big picture" risks, in addition to opportunities to apply RM methods across departments to optimize and improve performance.

As all operational activities occur inside of specified business processes, so too do all risks, mitigation activities, and monitoring processes. Improvement of RM processes permits an organization to identify these risks and form appropriate and suitable controls in a more consistently manner. On one side you have risk identification and form a process for risk mitigation and on the other, to make sure the process is truly executed. For this, transparency through the organization is needed, along with communication between departments and a method to assign accountabilities. To achieve these, RM process improvement is important (LogicManager, n.d.).

Business objectives and surrounding environment changes, thus there is a need for continuous improvement of the RM processes and by monitoring the RM processes, possibilities for carrying out improvements and optimization of the processes will emerge.

2.4.1 Single loop-, double loop- and deutero learning
In conjunction with optimization, Chris Argyris and Donald Schön have developed the concepts of single and double loop learning. People tend to look at changes as something negative, don't always understand the need for changes and are resistant when changes require them to deviate from old routines. Therefore, single loop and double loop learning is important for all organizations, including oil and gas firms, so that both the organization and its workers develop an understanding of the cause of the problem and a productive way to solve them. Argyris describes that single loop learning occurs when: *"a mismatch is detected and corrected without changing the underlying values and status quo that govern the behaviors"* (Argyris, 2003, s.

1). That is, single loop learning debris within the approved routines and is fixing an action to find a solution to or prevent a mistake. However, this avoids the root cause of the problem which results in only making small fixes and adaptions (Argyris, 2003). Therefore, in addition to single loop learning, we also need double loop learning.

Argyris describes further that double loop learning occurs when: *"a mismatch is detected and corrected by first changing the underlying value and other features of the status quo"* (Argyris, 2003, s. 2). That is, double loop learning is correcting and goes deeper and more into the underlying cause of the problem which might be norms and policies, motives and assumptions etc. (Argyris, 2003). It is about self-awareness and be willing to candidly inquire why it went wrong without going to self-defense mode that prevent truthful feedback and learning. As oil and gas companies face decisions that have an element of risk and uncertainty every day, double loop learning can help oil and gas companies to improve decision-making in their operations and learn from incidents by changing the rules.

A third concept, which is developed by Gregory Bateson but introduced by Argyris and Schön, is deutero learning, which includes and exceeds both single and double loop learning. According to Argyris and Schön it is to be understood as second order learning, reflecting on the first order actions, which they describe occurs by "*going meta on single and double loop learning* (Argyris, 2003, s. 2). Employees learn from mistakes of both the present and the past, and they must be able to admit this as the goal of deutero learning is to improve awareness and learning. With other words, deutero learning involves "learning how to learn" by searching to improve both single loop and double loop learning (Argyris, 2003).

As oil and gas companies are concerned with delivering reduced project risk, together with increased efficiency and optimized safety performance, it is important to address both single loop and double loop learning in addition to deutero learning in the originations. While it is important for oil and gas companies to correct errors, it is also important to detect errors by taking underlying assumptions into account and learn from mistakes. In addition, it is important that oil and gas companies develop the ability to learn about learning.

2.4.2 Tacit and Explicit Knowledge

It is common to distinguish between tacit and explicit knowledge. Schindler & Eppler (2003) explains that tacit knowledge refers to "know-how" and "know-why" questions which is hard to obtain and challenging to transfer and communicate to others by verbalizing it or writing it down. Michael Polanyi (2015) expresses tacit knowledge as "knowing more than we can tell", and further explained that one of the most convincing examples is facial recognition: "*We know a person's face, and can recognize it among a thousand, indeed a million. Yet we usually cannot tell how we recognize a face we know, so most of this cannot be put into words*" (Polanyi, 1966, s. 4). Other examples include cycling or driving a car, which can only be taught and acquired through personal experience. Michael Polanyi (2015) further explains that personal contact, regular interaction and trust are needed to be able to transfer tacit knowledge.

One the other hand, explicit knowledge refers to "what", "where" and "how many" questions, which is knowledge that is articulable, modifiable, storable and accessible, such as process manuals, textbooks, documents and procedures (Schindler & Eppler, 2003). Explicit knowledge can without difficulties be transmitted to others, and therefore explicit knowledge has mainly been captured in former projects, as it is not easy to express tacit knowledge.

Newell et al. (2006) points out that capturing lessons learned (LL) is a frequent strategy to transfer knowledge between projects. Williams (2004) outlines that tacit lessons are important lessons that are unfortunate, often overlooked, and emphasize the importance of converting tacit knowledge to explicit knowledge which requires commitment and motivation of employees (2004). A Lessons Learned Processes is important to convert tacit knowledge into explicit knowledge to make the knowledge available for future reference and useful when necessary (Trevino, 2018).

Chapter 3 Document Review

In order to answer the research questions whether if Offshore AS manages to transfer the risk from the invitation to tender to project completion, hereunder if the employees follow the company's process manuals, it is essential to give an insight into three of the company's process manuals. These process manuals provide a single global standard for BA, PM and RM on how Offshore AS should perform the processes. This chapter will only include and incorporate relevant information for the research questions that empathize on the focus areas.

The chapter will first present the BA process manual which will give an introduction on how projects are classified in accordance with pre-defined criteria, and then outline the BA life cycle that present the process. The chapter will then present the PM process manual which outlines the project life cycle that takes you through the eleven phases that present the process. Finally, the chapter covers the RM process manual that outlines the implementation and monitoring and RM in Offshore AS.

3.1 Business Acquisition Manual

The BA manual, which all employees within the BA department is committed to comply, is designed to give the company an overview of all the BA activities and the controls performed by Offshore AS. The core of the BA manual is to provide a set of management and system processes, tools and abilities to handle all BA activities, where the result is a cost-efficient and consistent deliverable in agreement with the client and Offshore AS's requirements.

It is important that the risk evaluation and management process is considered and applied throughout the entire BA process. This will be given more consideration in chapter 3.3 Risk Management Manual.

Since Offshore AS has a various range of project types and contract values, it is not suitable to use the same processes to all opportunities and tenders. To allow flexibility, Offshore AS has developed five levels which is chosen based on the project's scope and level of risk. The five levels will be further elaborated later in this section.

3.1.1 Project Levels

Projects are classified in accordance with pre-defined criteria based on the scope of work related with the project. The projects are classified into five separate levels through an increasing scale of: Commercial Risk, Technical Risk/Complexity, Country Risk. Level 1 denotes low risk and Level 5 project attracts significant risk.

When an ITT is received, a level is established using a form that establishes necessary internal deliverables and the reviews required. The deliverables and review needed increases proportional with the level of risk, as shown in Figure 2.
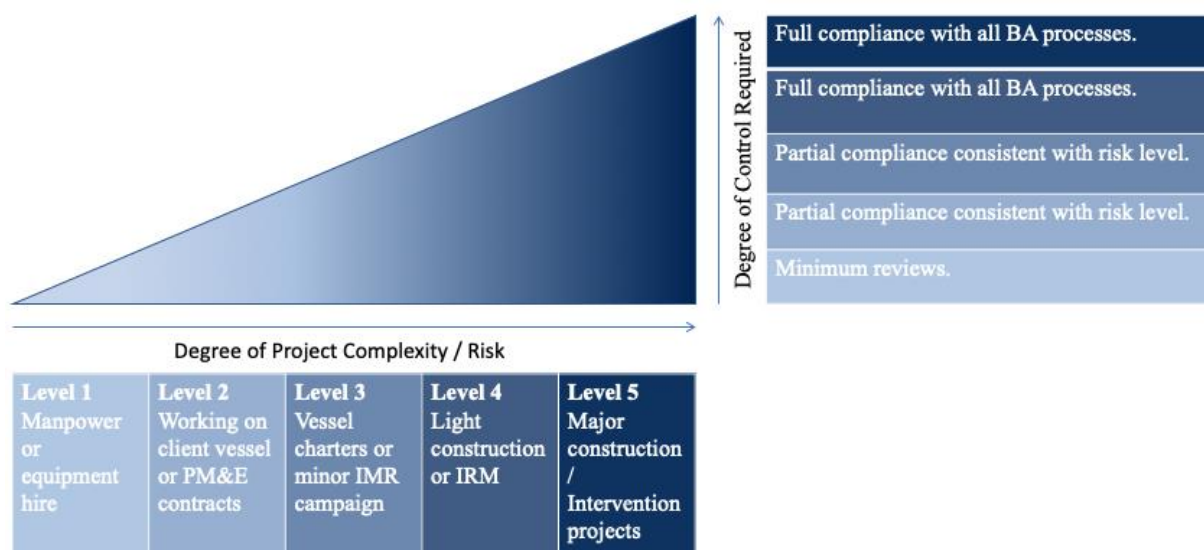
Figure 2: Project Level Model (Anonymous BA, 2018)

Project Level 1 – Manpower or Equipment Hire

Offshore AS is working under the direct command from the clients. The scope is to supply competent employees and/or proper equipment in according with the scope of work to be completed. The projects requirement is assessed to be of low commercial/low technical risk and low country risk, and also generally be at low value.

Project Level 2 – Working on Client Vessel or Engineering Contracts

Offshore AS employees would be carrying out their obligations and activities on supplied 3rd party vessel, and not an Offshore AS owned vessel. The scope of work would be described and completed under instructions from either the client or Offshore AS project employees.

Offshore AS Engineering department may be asked to develop plans, solutions, and supply with equipment etc. on behalf of a client. The projects requirement is assessed to be of low commercial/low technical risk and low country risk.

Project Level 3 – Vessel Charters or Minor IMR Campaign

Offshore AS simply provide the vessel to its client. If there is any work it will be of minimum engagement for Offshore AS, and the obligation for providing employees and/or equipment in accordance with the scope of the work to be completed would be with the client. The scope could extend to minimal IMR job or surveys. The projects requirement is assessed to be of medium commercial risk, and/or medium technical risk and/or medium country risk.

Project Level 4 – Light Construction or IMR

Offshore AS is responsible for most, if not all, activities related with the project and is to supply and manage all resources needed to complete the project. There may be significant subcontractors required and handling valuable client free issued resources. The projects requirement is assessed to be of high commercial risk, and/or high technical risk, and/or high-country risk.

Project Level 5 – Major Construction/Intervention Projects

Offshore AS is answerable for all the activities related with the project and supplying and managing all resources needed to execute the project in consistent with both client expectations and contractual commitments. Level 5 projects will be high value and might have EPIC (Engineering Procurement Installation Commissioning) answerability with several momentous subcontractors. The projects requirements are assessed to be very high commercial risk, and/or very high technical risk, and/or very high-country risk.

3.1.2 Business Acquisition Life Cycle

The BA life cycle is split into thirteen phases that present the process which all BA personnel shall comply to. The Process Map, see Table 1, gives an overview of the thirteen phases and provides a clear and precise sequence of activities. These activities have to be in accordance with the prescribed deliverables, see Appendix 1.1, which is fundamental to secure and verify that full compliance with the BA management process has been accomplished.

Table 1: The Process map, Business Acquisition (Anonymous BA, 2018)

The Business Development Stage	
Phase 1	Identify Business Opportunities and Prospects
The Business Acquisition/Tender Management Stage	
Phase 2	Receipt of ITT/RFQ
Phase 3	Tender and Pre-Kick Off Administration
Phase 4	Kick-Off Meeting
Phase 5	Tender Documentation Preparation
Phase 6	Tender Review/Provisional Approval
Phase 7	Tender Approval
Phase 8	Tender Submission
Phase 9	Tender Clarifications & Negotiations
Phase 10	Tender Commitments
Phase 11	Handover to Projects
Phase 12	Lessons Learnt – Unsuccessful Tender
The Business Acquisition Support Stage	
Phase 13	Business Acquisition Support

The phases will furthermore be presented in the following sections with emphasis on risk.

Phase 1 - Identify Business Opportunities and Prospects

This phase includes the activities: identify potential clients and/or opportunities, internal assessment of client/opportunities, develop qualified client and/or opportunities, develop strategy/pursuit plan and maintain client relationships.

Subcontractor risk is a central challenge and therefor Offshore AS needs to assess such risk and create proper strategies to deal with it. Hence, developing a strategy plan involves creating agreements with subcontractors and applicable partners.

Every change involves inherent risk, and therefore it's essential to maintain client relationship and report changes in Offshore AS's Customer Relationship Management (CRM) system.

Phase 2 – Receipt of Invitation to Tender / Request for Quotation (ITT / RFQ)

When Offshore AS gets an ITT from a client, a series of actions are commenced by Offshore AS to assure that the invitation is handled and supervised in agreement to the corporate goals and/or operational capabilities. Further actions and supervisions are aimed to secure that all requests for services are handled in a controlled and qualified approach to validate the data used to formulate a response to the client. This phase will give guidelines for the following activities:

- Receive and record ITT/RFQ
- Bid/No Bid Decision
- Establish Project Criteria Level (Anonymous BA, 2018).

Making a bid is not a decision that should be taken carelessly, as the effort that goes to responding to tenders is a significant investment. The decision has to be based on Offshore AS's capability, equipment availability, competitive position and availability of resources to assemble tender. The finished Bid/No Bid form confirms the Project Level and establish the tender deliverable and the reviews that are required which is then used for control of the tender development.

Phase 3 – Pre-Kick Off Administration

This phase includes the activities: Preliminary Review of Lessons Learnt, Formalize Tender Team & responsibilities, Access to Tender Documentation, Prepare Presentation for Kick Off Meeting, Prepare Tender Responsibility Matrix and Establish all necessary registers.

Offshore AS shall assure that LL from former tenders is applied and Feedback to Tendering is reviewed. Problems identified must be listed in the Tender Kick Off Meeting and included in the Tender Kick Off Presentation. Furthermore, all required registers must be established to assist the tender process, usually: Contractual, Technical, Commercial and Risk Register.

Phase 4 – Kick-Off Meeting

In this phase all relevant departments should attend to clarify responsibilities and timelines for the tender. In the Kick-Off meeting the tender budget is established and are based on the approved amount in the Bid/No bid which will be monitored and reported throughout the tender phase. The activities and results of the Kick-Off meeting shall be documented in the minutes of meeting.

Phase 5 – Tender Documentation Preparation

The Tender Deliverables and Review Form are to be stored in Document Management System (DMS) and shall be accessible from CRM.

Phase 5 includes the activities: Commence Tender Readiness Review Checklist, Strategic Review, Lessons Learned Review, Constructability Review, Risk Assessments, Subcontractor Scope of Work, Equipment & Consumable Lists, Third Party Costing's, Prepare Tender Proposal Documents, Prepare Qualifications to Tender and Prepare Cost Estimate.

The Tender Readiness Review Checklist is a living document which the department of BA is responsible to maintain. The intention of the checklist is that it should work like a memory jogger with LL from previous tenders to ensure that the mistakes are not repeated. Furthermore, it is expected that each region maintains their own checklist.

The Pre-Kick Off Administration Stage demands a LL review, which shall be recorded in MOM, that entails:

● Review of Lessons Learnt Database
● Review of Close out reports of applicable projects
● Consultation with personnel involved in former (or current) applicable projects (Anonymous BA, 2018).

To determine the level of risk related to the tender terms, conditions and scope of work, a number of RA must be performed. The output shall be recorded in the following RA documents: Legal Contractual-, Commercial- and Technical RA, which needs to be assessed and signed prior submitting the tender. They shall be updated throughout the tender clarification process, and should be revalidated before contract award, as a minimum. Qualifications occurs when

Offshore AS is taking exceptions to something from the client's documents. These are to be assembled, reviewed and approved before submitting to the client.

Phase 6 Tender Review/Provisional Approval

This phase is to assure that suitable level of checking is performed before the final review and agreement by the senior management. The amount of reviews is decided in Phase 2 and documented in the Tender Deliverables and Review document, it is not necessary to complete these reviews unless previously identified. The various reviews are outlined below:

● Schedule Review
● Project Management & Engineering (PM&E) Review
● Method Statement Review
● Qualifications Review (Anonymous BA, 2018).

Dependent on numbers and details, the qualifications can have an instant effect on the client's response to the tender. The qualifications need to assure that the offer is clear, but too many may eliminate Offshore AS in an early stage. The qualifications have to be reviewed to assure it is a differentiation between relevant qualification and clarifications and that unacceptable risk issues at the ending of RA are closed.

Phase 7 – Tender Approval

This phase includes the activities: Prepare Tender Approval Information, Regional Review, CEO Review, Board Review and Obtain signature approval to submit tender to client.

Relying upon the Authority level, numerous of senior management reviews are required which is, along with the deliverables required, defined in the Tender Deliverables and Review document. Normally the deliverables are the same:

● Tender Board Review Presentation.
● Tender Approval Form.
● Board Review Memo (Anonymous BA, 2018).

Prior to the Tender Board, all tender deliverables and reviews shall be archived in DMS. Furthermore, the results of the reviews shall be recorded in minutes of the meeting. Acceptance for submitting the tender is given by a signed Tender Approval form. If substantial changes

related to the submission are identified after original approval has been received, then the Tender Approval Form must be revised and re-approved.

Phase 8 Tender Submission

Before Offshore AS submit the tender submission package they have to ensure that all information and documentation used in the submission is appropriate, precise and current. Preparation of the final submission package has to include a suitable cover letter and executive summary which will further forwarded to the client in agreement with the delivery guidelines accommodated in the original ITT/RFQ. While the client is reviewing the submission, personnel from the tender team has to preserve the regular contract with the client to assure compliance with the submission and the client's guidelines. Through their communication channel they will also be able to discuss or clarify the client's needs.

Phase 9 Tender Clarifications & Negotiations

The phases before leads to activities aimed to assure quality, competitive, risk managed proposal is submitted, and it is important in this phase that the integrity of the BA process is maintained.

If there are any commentaries from the client that involve variations to the proposal, the process has to return to Phase 5. During the tender clarification process, it is also important that the RA's are kept up-to-date. With substantial changes in the risk profile, the form should be revalidated by the person specified on the form. As a minimum the form should be revalidated before the contract is awarded, and The Tender Approval Form should be updated and re-signed for substantial changes.

Phase 10 Tender Commitment

The tender commitment phase is the last chance to examine and confirm that all risk and cost is sufficiently defined. Before acceptance of the contract they have to complete:

- RA is up to date and signed.
- Tender Approval Form is up to date and signed (Anonymous BA, 2018).

Phase 11 – Handover to Projects

Phase 11 includes the activities: Prepare Documentation/Presentation for Tendering Department, Handover to Projects and Tender Outcome. The former is about collecting final

documentation for handover to applicable project manager, while Tender Outcome is about updating the CRM database with award status.

Phase 12 – Lessons Learnt – Unsuccessful Tender

As defined earlier, the investment of tendering is significant. When Offshore AS has an unsuccessful tender, it is important to assure that they learn and can improve until next time they submit a tender. Offshore AS is using a The Tender Debrief Report to get feedback from the clients, but it may also be used as a debriefing process and where necessary changes were made.

Phase 13 – Business Acquisition Support

When the contract is handed over to Project Management, the tender team still has to be involved in some further phases, such as feedback to tendering (FFT). FTT process initiated by projects may be important for the next tendering. The PM can advise the BA department about point of note, such as cost omissions or overestimates, contractual inconsistencies or misrepresented information.

Implementation and Monitoring

To implement and monitor the various BA management processes and tools, it is fundamental to establish and promote an effective process management. Offshore AS Business Units will be capable to assure the completion of the goals and implementation of important improvements to the BA management process.

Auditing and Improvement

To achieve continual improvement, it is important that Offshore AS monitor, measure and analyze processes and based on reliable results they are able to assure completion of the process goals and continuously improve within the BA system.

3.2 Project Management Manual

The Project Management (PM) manual, which all project staff is committed to comply, is a discipline where projects are planned, executed and finished by applying a systematic, repeatable, and adaptable process. According to Offshore AS, a project is defined as:

"A unique set of activities that are meant to produce a defined outcome, with a specific start and finish date, and a specific allocation of resources" (Anonymous PM, 2018).

The core of PM is to provide a set of management system processes, tools and abilities to successfully handle a project where the results is a cost-efficient and operationally consistent deliverable in agreement with the client and Offshore AS's requirements.

The manual includes the sequential phases that are necessary to give the topmost level of project control. Nevertheless, the actual level of PM control is decided by the designated level. The project level, as described in 3.1.1, is decided at the tender stage, but the General Manager can modify at the project kick-off stage if necessary. Furthermore, Appendix 1.2 – Project Execution Deliverables & Review Template, gives an overview of specific project control requirements. It is important that risk evaluation and management process is considered and applied throughout the entire PM process. This will be given more consideration in chapter 3.3 Risk Management Manual.

3.2.1 Project Life Cycle
The Project Life Cycle includes five different stages as demonstrated in Figure 3, which is further split into eleven phases that present the process which all PM personnel shall comply to.
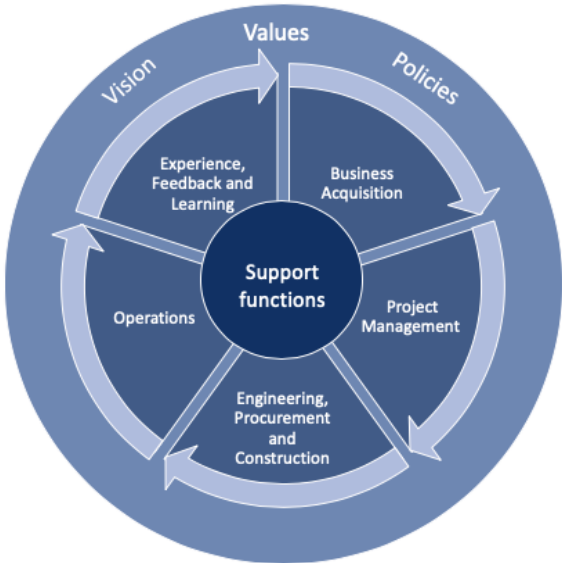
Figure 3: Project Life Cycle (Anonymous PM, 2018)

The Process Map, see Table 2, gives an overview of the phases provide a clear and precise sequence of activities which have to be in accordance with the prescribed deliverables that is fundamental to secure and verify that full compliance with the project management process has been accomplished.

Table 2: The Process Map, Project Management (Anonymous PM, 2018)

The Business Acquisition Stage	
Phase 1	Commercial Handover
The Project Management Stage	
Phase 2	Project Kick-Off
Phase 3	Project Preliminaries
The Engineering, Procurement and Construction Stage	
Phase 4	Project Constructability Review
Phase 5	Project Preparation
The Operations Stage	
Phase 6	Project Readiness
Phase 7	Project Mobilization
Phase 8	Project Offshore Execution
Phase 9	Project De-Mobilization
Phase 10	Project Completion
The Experience, Feedback and Learning Stage	
Phase 11	Project Close-Out

The phases will furthermore be presented in the following sections with emphasis on risk.

Phase 1 - Commercial Handover

Even though the PM manual begins at the commercial handover point, the PM team should be included to support the BA process and activities. The BA department are answerable for planning and leading a Project Handover meeting, which includes that all relevant departments are represented. Before the contract for the project is signed, a contract review meeting is recommended, where Legal, Tendering, Commercial and Financial departments have a meeting with the suggested project manager to go through the contract and make sure that it is consistent with documentation and obligations in the offer.

Phase 2 – Project Kick-Off

The goal of phase 2 is to assure that everybody, including key designated subcontractors when applicable, is familiar with:

- The project goals and objectives
- Contract requirements and client expectations
- Roles and responsibilities
- The relation with other projects and resources (Anonymous PM, 2018).

Phase 3 – Project Preliminaries

This phase includes identification and establishment of draft documentation and activities that are necessary for the project to assure that all required deliverables are identified. Furthermore, it includes that the control budgets, plans, schedules and correlated documentation are settled and approved by both Offshore AS and the client.

Phase 4 – Project Constructability Review

In phase 4 conceptual designs are developed showing ideas and suggestions to find operational solutions essential to execute project requirements. The aim of this phase is to ensure that the methods are attainable without any considerable changes expected, to determine issues or risks and allowing improvement of solutions or measures regarding design, HSE, quality, assets etc.

Phase 5 – Project Preparation

This phase consists of preparing exhaustive project documentation, engage subcontractors and carry out procurement and fabrication activities. Documentation shall be finished by applying accepted forms and templates. The phase also includes management of control budgets, plans and schedules, where any changes has to be inspected, reported and endorsed in conformity with authorization matrices. The most important topics under this phase with emphasize on risk is:

- Master Document and Deliverables Register (MDDR)
- Management of Change (MoC)
- Lessons Learned
- Hazard Identification and Risk Assessment (HIRA) (Anonymous PM, 2018).

Phase 6 – Project Readiness

A Project, Vessel and Subcontractor Readiness Review meeting shall be held with key personnel to review all relevant concerns related to the project, vessels and subcontractor respectively. A Project Readiness Review checklist must be constructed to provide a short report of the business readiness. In supplemental to/or as a substitute to the checklist, the readiness status can be evaluated by:

- Pre-execution HAZID/RA;
- Meeting minutes;
- Process checklists (Anonymous PM, 2018).

Phase 7 – Project Mobilization

The mobilization activities shall be conducted in agreement with the project specific Mobilization Procedures/Plans which is helpful to coordinate activities like mobilize equipment and staff, test equipment and verify vessels readiness.

Phase 8 – Project Execution

All project execution activities have to be conducted in conformity with the specific plans, procedures and Operations Manuals. Other activities that will also be performed, but not limited to, are:

- Perform operations in line with procedures.
- Administer changes in conformity with the MoC Process and the Variation process, where applicable.
- Register data to generate documentation (Anonymous PM, 2018).

Phase 9 – Project Demobilization

When the project personnel's assignments and obligations related to the project are finished, they shall be demobilized in line with the specific Demobilization Procedures/Plans.

Phase 10 – Project Completion

At the practical completion, the close-out activities will start. It's the project manager who are accountable for determining all elements that remains to be finished, in conformity with the Close-Out-Checklist, such as LL Workshop and Completion Report. Furthermore, he is responsible for producing a report which describes the problems that occurred throughout the project and the achievements of the specified objectives and deliverables.

Phase 11 – Project Close-Out

This phase is mainly administrative, where the General Manager Projects Delivery is accountable for assuring that the project is adequately closed and that all residual assignments are executed.

3.3 Risk Management Manual

The RM manual, which all project staff is committed to comply, illustrates the RM process for the company's business activities. According to Offshore AS, the RM manual purpose is:

"To identify threats and opportunities associated with the Offshore AS business and operational activities and establish efficient means of barriers and controls in all phases of the business life cycle." (Anonymous RM, 2017).

The RM process implies assessing of impacts on individuals, the environments and material values. Offshore AS's RM principles and techniques are in accordance with:

- ISO 31000: Risk management – Principles and guidelines
- ISO 31010: Risk management – Risk assessment techniques
- ISO 17776: Guidelines on tools and techniques for hazard identification and risk assessment
- DNV RP-H101: DNV Recommended Practice – RISK management in marine operations (Anonymous RM, 2017).

3.3.1 Implementation and Monitoring

Risk and Opportunity Register

Offshore AS is using a global RA Worksheet which all results from RA's shall be recorded in the appropriate Risk Register as described in the appropriate Process and guideline. All results from the RA's shall be available to the appropriate project team through the suited Electronic Risk Management Tool (i.e. RMT). This tool makes Offshore AS able to identify, evaluate and manage the risk from the early phases in BA throughout the project life cycle, and by include LL, Offshore AS is skilled to continuously improve the mitigation and management of risk.

The findings and mitigations from the RA's are recorded into the Risk Register with responsibility and deadlines ascribed.

Risk Management Principles

By implementing RM principles and processes Offshore AS can detect risks related with their business and operational activities. The RM process is in accordance with relevant aspects of *ISO 31000:2009; Risk Management – Principles and Guidelines,* which is presented by Figure 4.

1	• Establish the context of Risk Management within the Organization.
2	• Identification of all risks including those induced by a change.
3	• Analysis of the probability and consequence of the identified risks.
4	• Evaluation of the identified risks against group risk acceptance criteria.
5	• Determine the suitable measures required to mitigate/control risk.
6	• Monitor and review risk information, effectiveness of controls and efficiency of overall Risk Framework

Figure 4: Risk Management, Principles and Guidelines (Anonymous RM, 2017)

RM has to be regarded as a continuously process that supports evolution and implementation of Offshore AS's strategy. To assure that all risks are taken into account while identifying, the external and internal context has to be established before proceeding to risk process and other related activities. When Offshore AS are establishing the context, they have to determine the external and internal parameters that will be assessed when handling risk. ISO 31000 demands that the external and internal context are taken into consideration when defining the scope of Offshore AS's RM process, formulating the RM policy, and establishment of the risk criteria.

Risk Identification

Offshore AS has to identify possible risk source, their root and potential effects. The mainly goal of this is to produce a complete list of risks on the basis of those events which can create, improve, degrade, avoid, increase or postpone the achievement of the objectives. The risk identification tools and techniques that shall be used has to be suitable for Offshore AS's objectives and capabilities, and to the risk that has been identified.

Risk Analysis

A risk analysis considers the roots and sources of risk, their positive and negative effects and the probability that those effects will take place. Present controls and their effectiveness shall be considered when conducting risk analysis as this will lead to which further activities it will be necessary to suitably handle the risk.

The level of detail that is necessary to perform a risk analysis is reliant on numerous factors. The nature of the risk, the meaning of the analyze, the accessible information and means will affect what kind of assessment that is executed. Where there is a significant degree of certainty quantitative analysis will be performed, otherwise qualitative analysis.

Risk Evaluation

Risk evaluation includes relating the level of risk discovered throughout the analysis process with Offshore AS's risk acceptance criteria. Succeeding from identification and analysis, all risks will be evaluated in conformity with predetermined acceptance criteria. An assessment will be performed on likelihood and severity which will help to categorize and prioritize correctly.

Risk = Consequence x Probability

The severity criteria are described in Table 3, and the highest severity for any of these three criteria must be used to decide the Risk Rating. The liability criteria are denoted in terms of team knowledge, LL and experience.

Table 3: The severity criteria (Anonymous RM, 2017)

High	Where Risk Rating is designated as High further risk reduction measures (controls) must be introduced to lower the risk to an acceptable level before operations can proceed.
Medium	Where Risk Rating is designated as Medium further risk reduction measures (controls) should be considered, where practicable, but operations may proceed.
Low	Where the Risk rating is designated as Low no further action is generally required

On behalf of the risk level and the acceptance criteria, prioritization of risk processing can be contemplated. Conclusions should also include considerations of legal, regulatory and other requirements. The system should be used for all procedures to assure that suitable attention is given to the risks and opportunities that pose the greatest threat or benefit.

ALARP Principles and Risk Management Concept

The risk will be restricted in alignment with national legislation, internal requirements and acceptance/client criteria, and the risk will be further diminished to the degree reasonably practicable. By this it means that the risk will be diminished beyond the lowest level or internal acceptance criteria if it is attainable to do this without unreasonably expenditures or disadvantages, as Figure 5 shows.
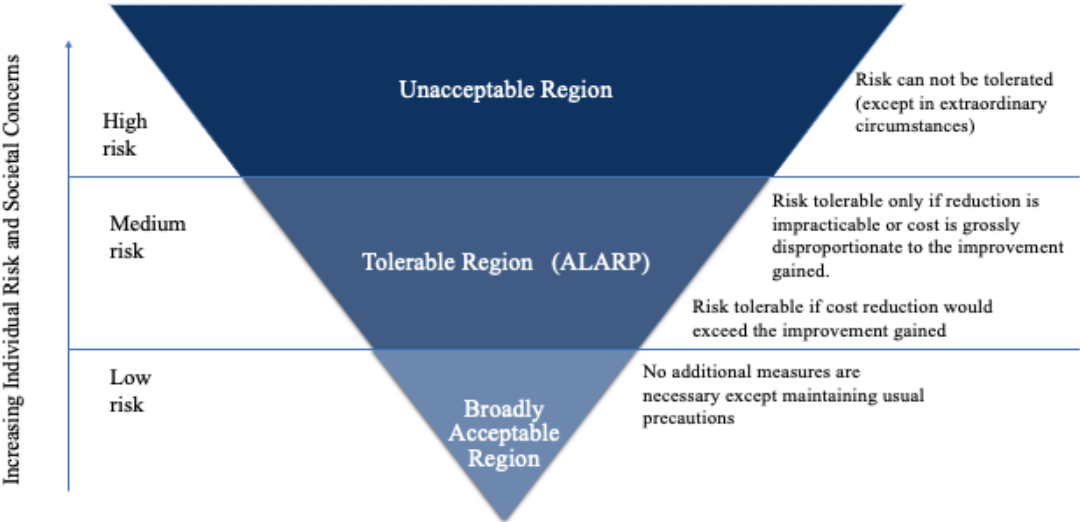
Figure 5: The ALARP principle (Anonymous RM, 2017)

Risk Control Measures

All risk effects need to mitigate to ALARP, various of control and reduction measures shall be applied that are suitable to that type of risk. Determined by what kind of risk, one or a combining of various management strategies may be suitable. In ISO 31000:2009 the hierarchy of RM strategies is summarized in order to prioritize; terminate, treat, transfer or tolerate.

A long with the control strategies in ISO 31000;2009, the application of the succeeding hazard control hierarchy shall be handled for risks/hazard exclusively related with the security of

employees. The hazard control strategies are presented in order, as Figure 6 illustrates, of the prime concern with Personal Protective Equipment (PPE) being evaluated as a final solution.
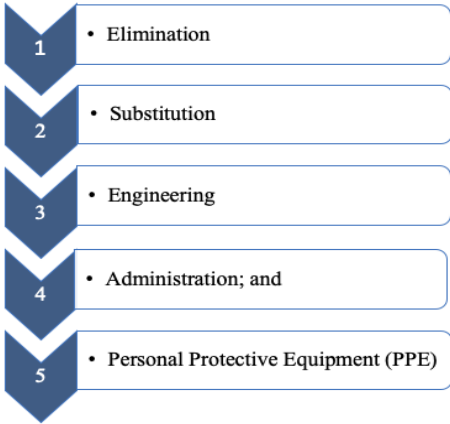
Figure 6: The hazard control strategies (Anonymous RM, 2017)

When a certain risk has been identified an appropriate and adequate control measure should be implemented. The measurement itself should be evaluated by applying one of the risk evaluation techniques to assure there is no further exposures.

Risk Closure

In the monitor and review process, risk will be evaluated regularly to evaluate the present exposure to Offshore AS. Risk that is no further regarded as a viable exposure will be evaluated and terminated applying a suitable status in the Risk Register, as the Table 4 presents.

Table 4: Risk closure table (Anonymous RM, 2017)

Status	Description
Closed – Mitigated	Mitigation actions(s) have been successfully completed and the risk is no longer considered a threat.
Closed – Impacted	The risk has now impacted and is no longer considered a 'risk' but an 'issue' and should be reflected in the actuals.
Closed - Expired	The period during which the risk may impact the project has passed. The probability can now be reduced to 0% and any outstanding actions can be cancelled.
Not Valid	Risk is no longer considered a viable exposure on the project (e.g. duplication of existing risk, scope changes etc.)

3.3.2 Risk Management in Offshore AS

RM in Offshore AS is considered and anchored in the various business levels and activities, from Management to Operations, from Strategy to Execution.

Risk Management within BA

Within the BA phase, the RA focus first and foremost on the identified risks that affects the business and usually involves Legal, Commercial and Technical, whilst also consider HSEQ aspects related to the business. BA is answerable for preparing a Risk Register, which is transferred to Project Execution if necessary. Identified risks shall be considered with regard on probabilities and consequences with associated mitigation measures. Furthermore, at this point in time, a copy of the Risk Register shall be filed for future reference and to permit a precise LL Exercise upon completion of the project.

Risk Management during Contracts

Clients assigns operational activities to Offshore AS which the company's business activities are based on, where RM techniques shall be undertaken throughout different phases of the contract. Examples of appropriate risk identification activities, where different sources of information shall be considered are:

- Risk Identification Workshop
- Project Team Meetings
- Client/Supplier Risk Register
- Lessons Learned (Anonymous RM, 2017).

Risk Management within Engineering

Offshore AS's tools for RM within engineering might involve, but are not limited to, the following: Hazard Identification & Risk Assessment, Generic hazards check lists and Qualitative Risk Analysis. Both procedures and documentation for conducting the aforementioned activities, exists in the Business Management System.

- *Failure Mode Effect Analysis (FMEA)*

  According to Offshore AS, FMEA can be defined as: *"A systematic analysis of the systems to whatever level of detail is required to demonstrate that no single failure will cause an undesired event"* (Anonymous RM, 2017). FMEA shall be commenced, mainly by external consultants, as early as the design and development programme will permit.

- *Hazard Identification and RA Studies*

  Each project or main operation shall be subjected to a RA study (HAZOP, HAZID or HIRA) before start-up of operations. The aim is to identify potential hazards and risks, control these sufficiently and to decrease the related risk to ALARP.

Qualification of risk throughout each study shall be undertaking using the Offshore AS Group Risk Matrix.

Risk Management Operations

Offshore AS shall, during all operational activities, use one primary means of risk identification, evaluation and management process to assure that risks and hazards are identified, evaluated and managed to ALARP through the whole operational lifecycle. Offshore AS's activities for RM regarding operations involves:

- Project RA
- RA on site
- Observation
- Toolbox/Pre-start Meetings
- Management of Change Process
- Operational HAZOP reviews and assessment (Anonymous RM, 2017).

Risk Assessment on site

The RA on site, usually referred to as Job Hazard analysis, is required at all workplaces before a task is commenced.

Observations

By Offshore AS, a hazard is defined as: *"An unsafe act or condition, if identified or left uncorrected, has the potential to cause an accident or imposes an unacceptable level of risk to personnel, the environment or property"* (Anonymous RM, 2017). Offshore AS has implemented a hazard and risk report system where the staff has easy access to so-called "Observation"-cards, which makes it easy to report hazards at all worksites.

Pre-Start Meetings and Toolbox Talks

Prior a shift, the accountable supervisor is obliged to commence a Pre-Start Meeting, where all employees involved on that shift shall participate. The objectives of these meetings are to

discuss activities related to the shift and the associated hazards and risks, as well as necessary precautions to be followed.

The supervisor in charge may initiate Toolbox meetings to talk through forthcoming operational activities, equipment being utilized, safety precautions to be complied and any applicable PPE requirements. These meetings also have HSE information and informal training on the agenda. Toolbox talks performed and documented according to Offshore AS standards and guidelines.

Management of Change (MoC)

Offshore AS has developed and implemented a MoC process, which defines how a change to established routines, procedures, statutory requirements etc., should be handled in a secure and cost-efficient manner to reduce or prevent any unfavorable impacts as a result of the change.

Any identified needs for changes must be communicated to the applicable manager. A Change Request (CR) shall be formulated, which must contain a complete description and justification of the change. In addition to the CR, a comprehensive RA shall be implemented and accompany the CR.

Chapter 4 Methodology

This chapter is concerned to outline the methodology which Smith describes as *"the explanation of the approach, methods and procedures with some justification for their selection"* (2002). To increase the validity of the thesis' discoveries, it is essential to assure transparency concerning the methodology applied to answer the research questions. The research methodology applied in this master thesis is widely based on Yin's (2009) and Bryman's (2012) principles and strategies which include selecting a research strategy, a research design, an approach for collecting data and a framework to analyze it. The chapter will first present the research strategy before the research design is outlined. Furthermore, the chapter covers the research method followed by data analysis, before quality in research concludes the chapter.

The purpose of this thesis is to study if Offshore AS's process manuals are adhered to and sufficient to manage risk throughout the project's life cycle with the associated research questions:

- *How does Offshore AS manage to transfer the risk from the tender process to completion of the project?*
- *How can Offshore AS optimize the risk management from tender process to completion of the project?*

The method that was most appropriate to answer the research questions was a qualitative research strategy with a case study research design involving reviewing multiple former projects. The data collection was carried out by applying a case study method, and by conducting multiple interviews of participants from the disciplines of BA, PM and HSEQ, as the main proof source. A summary of the methods used is listed in Table 5.

Table 5: Research methods

Research methods

Research strategy	Qualitative
Research design	Case Study
Data collection procedure	Literature collection and interviews
Framework for analysis	Case descriptions and collected literature

4.1 Research Strategy

This subchapter presents the main steps of the research process, selection of literature, research strategy and the connection between theory and research.

4.1.1 Research Process

Initially, literature related to the research topic was reviewed which will be elaborated in 4.1.2. After reviewing all relevant literature, a discussion with Offshore AS took place which made it possible to formulate the research questions. Additionally, the research design and research methods were determined in collaboration with Offshore AS. This allowed to start the process of reviewing the company's three process manuals which was necessary to conduct the case studies of former projects. Prior to collecting data from the case studies, an easily comparable overview of the processes related to BA, PM and RM was created to allow for heightened measurability, which is presented in Appendix 1.

To support the evidence from the case studies and gather other relevant information and opinions, the process for booking interviewees started after the case study was completed. However, the preparation of the interview questions started in parallel with the execution of the case studies and was completed after reviewing the previous projects. The interviews were performed in alignment with the interview guides and furthermore transcribed from sound recordings, approved by the participants, and analyzed. Figures 7 illustrate the research process.

Conduct Literature Review

A literature review were conducted which is presented in 4.1.2

Define research questions

Based on the literature review and conversations with Offshore AS,

the research questions were defined which is presented in 1.2

Choose research design

A case study was chosen. The procedure that was used during the analysis is presented in Appendix 1. A document review of the compnay's three process manuals was performed beforehand, which is presented in chapter 3.

Conduct case study

Eight previous projects were reviewed at the company's office.

Results presented in subchapter 5.1.

Select interview subjects

A purposive samling of interviewees was conducted, which is presented in sub 4.1.2

Create interview guides

Semi structure interview guides for the department of BA, HSEQ and PM were created.

Presented in Appendix 2.

Coduct and transcrive interviews

Six interviews were conducted at the company's office and transcribed.

Results is presented in subchapter 5.2.

Discuss analysis results in relation to theory

The results from the case studies and the interviews were discussed in relation to theory and the document review. Presented in chapter 6.

Conclude the research question

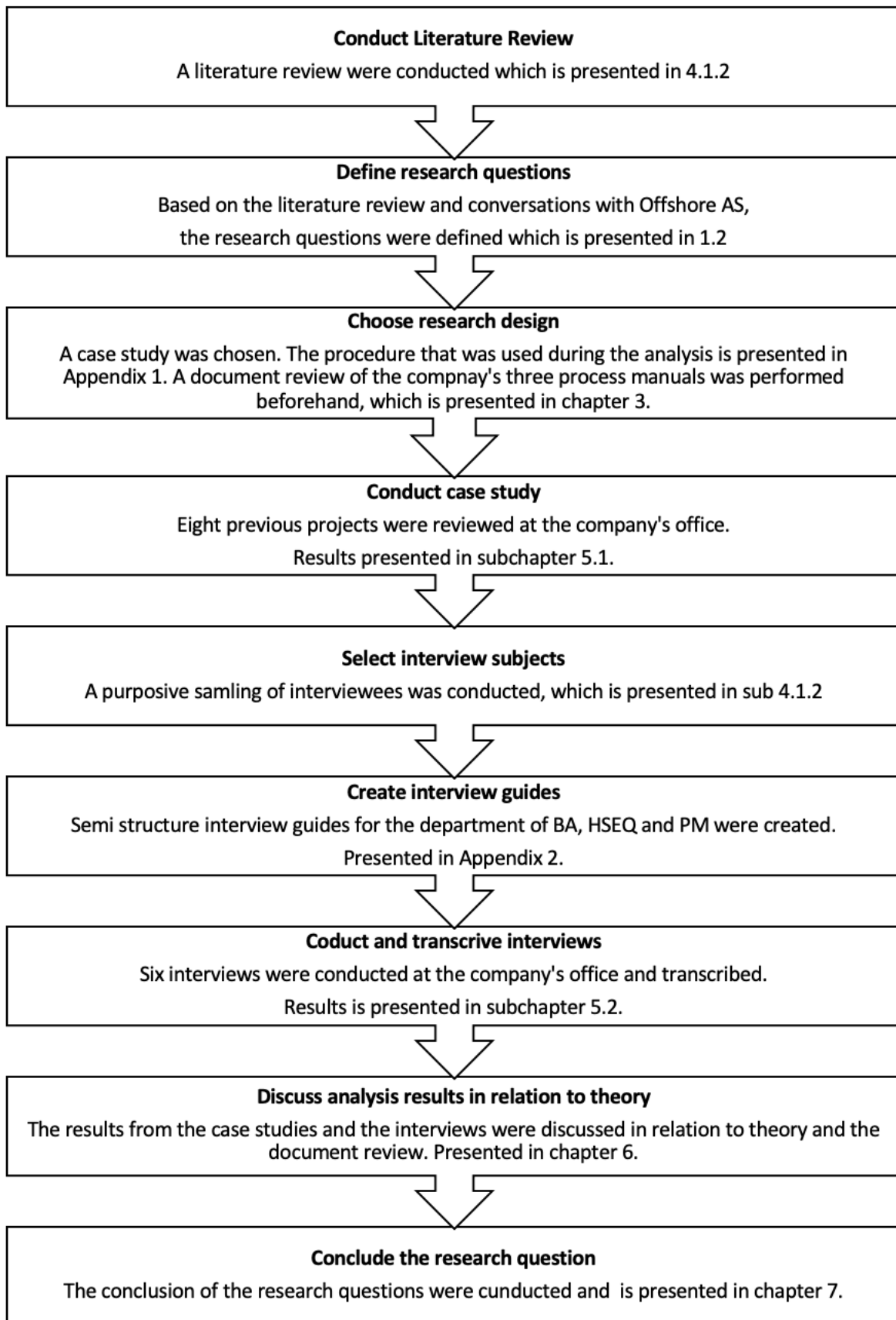The conclusion of the research questions were cunducted and is presented in chapter 7.

Figure 7: Research Process

4.1.2 Review and Selection of Literature

In this thesis, literature review and data collection have been carried out in parallel to guide the process of identifying relevant literature, which makes it possible to focus on the topics that are most important. The classic case study approach requires the development of theory before collecting the data in order to deduce propositions and guidance of the data collection and evaluation (Yin, 2009).

The initial phase of the literature review included to identify relevant topics and gather information that was related to RM during the project's life cycle. Collecting the right information, made it easier to answer the research questions in the best possible way. While reviewing the existing literature about the subject, using keywords, it was located various guidelines that recommends how risk can be managed in companies and throughout their projects. It is worth noting that reports on this topic are likely to have been conducted earlier, however, they are presumably confidential as they contain sensitive business information.

The literature acquired and employed in this thesis is largely obtained from Offshore AS's website, database and internal documents. The library at University in Stavanger and Google Scholar was helpful during the search for literature to get additional information with high quality and to gain insight into the subject's current theory. In addition to what has been mentioned earlier, it has been useful to get inputs and suggestions on relevant topics, articles and books from fellow students. The online database BIBSYS has also given inspiration and ideas for where to find relevant literature.

4.1.3 Choosing a Qualitative Research Strategy

The research strategy is defined as a general orientation to the performance of social research and is commonly distinction between quantitative and qualitative research (Bryman, 2012). Because of the report's research questions, a qualitative research approach was an appropriate choice as qualitative research emphasizes words rather than quantification and aims to discover instead of testing variables (Bryman, 2012).

4.1.4 The Relationship Between Theory and Research

There are two ways to think logically, inductive and deductive (Jacobsen, 2000). In a deductive approach you go from theory to empirical, with an expectation of how the world looks before

empirical data is collected to see if the expectations match reality. In the inductive approach you go the opposite way, from empirical to theory. The abductive approach derives from the insight that most major scientific advances neither followed the method of pure deduction nor pure induction, and it is stated that most research processes are characterized by a shift between the inductive and the deductive (Thagaard, 2002).

Qualitative study tends to have a deductive approach and this thesis is no exception as observations are based on theory. However, because reports on this topic have a tendency to be confidential, the existing knowledge of the thesis topic was poor, and hence the data collection can be seen as an inductive approach. Therefore, the research processes can be characterized as an abductive approach. The abductive approach is nevertheless a subordinate process because it will not comply or provide an analysis of the existing process descriptions.

4.2 Research Design

According to Bryman, research design represents "*a structure, or framework, that guides the execution of a research method and the analysis of the subsequent data*" (Bryman, 2012, s. 45). The most common distinction is between experimental design, cross-sectional or survey design, longitudinal design, case study design and comparative design (Bryman, 2012). Given that the authors are seeking to comprehend how things work and emphasizes on contemporary events, a case study design approach is a natural and appropriate choice. Yin defines a case study as "*an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin, 2009, s. 18).

To answer the research questions as accurately as possible, the authors incorporated and assessed different former projects. To increase the validity, which is defined as "*the extent to which the scores from a measure represent the variable they are intended to*" (BAcampus, n.d.), the authors desired to assess a wide variety of former projects such as critical cases and some representative or typical cases.

The purpose of this research is to study how RM are applied in practice in Offshore AS and how Offshore AS can optimize their RM throughout the project's life cycle. The units of analysis, the main entity that is being analyzed (Yin, 2009) is the "case" and the employees in

Offshore AS that participated in the interviews. The term "case" associates the case study with a location, like an organization or a community (Bryman, 2012). The case in this thesis is defined as "the RM in Offshore AS".

When a case has been selected, one or more research methods are necessary to collect data, and are interrelated with various types of research designs. The latter gives a framework of the collection and analysis of the data, whilst a research method is a technique for collecting data (Bryman, 2012).

4.3 Research method

Choosing a case study approach will not in itself provide the thesis with data, therefore a method is necessary to collect data. This section will describe how the internal documents have been reviewed, how the interview objects was selected and how the data was collected.

4.3.1 Examine previous projects and internal documents

Selection of internal documents

Review of documents, along with interviews, is a commonly used method in case study research and provides important information from multiple data sources that can be summarized and interpreted in order to answer the research questions (Hancock & Algozzine, 2011). When selecting documents, it is important to be critical and choose those with most relevance and credibility.

In this thesis, the RM will be evaluated throughout the project's life cycle. It is therefore crucial for the thesis that the company gives access to the archive, to gain more information than what articles and textbooks can provide. The documents in the public domain are available to everyone, but the company have provided access to all the internal documents needed in this thesis. Some of the internal documents contain sensitive information, therefore they will not be reproduced in the thesis. The findings made during the document survey are used to complement the interviews which makes it possible to critically interpret the relation to the documents and increase the validity of the findings (Hancock & Algozzine, 2011).

Data collection

Document review

The documents that will be reviewed and evaluated are the company's process manuals (within BA, RM and PM). It is important when evaluating the projects, at a later stage, that one is well acquainted with the process manuals and processes they are going through. To get the competence needed, the process manuals from three departments were studied along with a review with the external supervisors. The review with the external supervisor gave a deeper understanding of which phases of the project it was important to focus on considering the research questions. The most important findings in the various phases was written down and filed in Chapter 3. Based on the processes and the theory, a plan was prepared for how the projects were to be evaluated and how the results should be presented, see Appendix 1.

Previous Projects

It has been conducted eight reviews of previous projects, as shown in table 10 and 11, where the names of the projects are not displayed due to the anonymity of the thesis. In order to review the various projects, a guidance in the business management system was required to be able to navigate in the system. The system provided all documentation from the deliverables, whereas the documentation from BA had to be sent. By having all necessary documentations of the projects available one could investigate whether they were according to procedures or in which areas they differ. When gather information, Hancock & Algozzine (2011) says it is important to consider:

- What guarantee exists that the document is accurate?
- Is the document representative under the conditions and for the purpose it was produced?
- Are there other documents that can confirm the information in the document?

The review was structured using a premade form by going through one project at a time, where the findings were listed in the table that was prepared. The researchers sat at one of the company's offices, and the review of the previous projects took place over a period of five days. The final results were submitted for approval and reviewed by the external supervisor.

4.3.2 Interviews

Selection of interview objectives

To accomplish the most correct results, a purposive sampling of interviewees was conducted. The researchers' goal was to sample participants in a strategic way, not on a random basis, that are relevant to the research questions and to ensure variety in the resulting sample (Bryman, 2012, s. 418). As the research questions needs sample members to illuminate different aspects in the projects, it is important that the sample members differ from each other in terms of key characteristics. The sampling of interviewees was made in accordance with purposive sampling, however some parts can be described as a convenient sample. A convenient sample is choosing the participants that are available for the researcher (Bryman, 2012). Due to the fact that some projects were carried out many years ago and some of the employees who worked on the projects were no longer employed by the company, criteria were set for the participants that were available to be interviewed.

The criteria for sampling was that the interviewees should be from different departments within Offshore AS and have relevant insight, qualifications and experience within the areas of importance for the research questions. In order to evaluate which participants that had the competence that was necessary, the external supervisor was consulted, and it was decided which ones who would be invited to participate in the interviews.

Data collection

The interviews that have been conducted was semi-structured interviews which gave the researchers the possibility to ask further questions in response to what are seen as significant replies. The interview has been prepared based on the information obtained from previous projects and the company's internal documents.

Interviews

It has been conducted six interviews, as shown in table 6 and the names of the interviewees are not presented due to the anonymity of the thesis. In addition, letting the interviewees stay anonymous can encourage them to speak more freely and be more open towards the interviewer. The interview had a semi-structured form that allows the interviewees to reveal concerns or their view on important aspects as the sequence of questions are not locked in order and can be tailored to the situation or to the interviewee (Bryman, 2012). It also gives an opportunity to

elucidate and elaborate on other important topics and concerns that should be considered in relation to the research questions. The interviewees chosen is from three different departments (BA, PM and HSEQ) with varying responsibilities in a project, to gain important and valuable information.

Prior to the interviews, the participants were informed and approved that the interviewers used admissions during the interviews, as Bryman (2012) recommends to ensure validity. The record of the interview also gave the interviewers the opportunity to be more present in the interview and really listen to *what* they are telling, instead of taking notes. After the interviews, the recordings were transcribed. Table 6 illustrates which department the interview objects belong to, along with the duration of the interview and the number of words for each transcript.

Table 6:Overview of the sampled interviewees

Interviewee number	Place and date	Department	Duration (min)	Number of words
1	Norway 25.04.19	The department of Project Management	1h 5 min	5233
2	Norway 25.04.19	The department of HSEQ	1h	4950
3	Norway 25.04.19	The department of Business Acquisition	1h 10 min	5087
4	Norway 26.04.19	The department of Project Management	59 min	5403
5	Norway 26.04.19	The department of Business Acquisition	1t 15 min	6012
6	Norway 26.04.19	The department of HSEQ	50min	4020
	Sum		5 t 45 min	30 705 words

Interview Guide

The interviews were conducted along with an interview guide, which can function as a list of memory prompts to assure that all relevant topics are covered (Bryman, 2012). The interview guide created was split in two parts, one for the department of BA and one for the department of PM and HSEQ with specific questions for each department. The interview guide from BA is

divided into six keywords, while PM and HSEQ has five, that are considered as focus areas as shown in Table 7. The specific questions for each department will provide a deeper understanding and steer the interview in a direction were the interviewees has the most knowledge. Some of the questions were more open than others which allowed the interviewees to reflect freely without being steered in one direction.

Table 7: Focus areas

Focus areas	
BA	**PM and HSEQ**
- Risk Assessment - Level - Qualification Review - Lesson Learnt Review - Tender Readiness Review & Tender Board Review - Risk Transfer	- Handover - Level - Management of Change (MoC) - Lessons Learned Process - Process Risk

4.5 Data analysis

Data analysis is about the management, analysis, and interpretation of the data (Bryman, 2012). Prior to reviewing the former projects, it was necessary to go through the company's process manuals where focus fields were identified and coded. Bryman (2012) explains that coding within analysis of qualitative data, is a process in which data are categorized to facilitate the analysis. Bryman (2012) also emphasized that one should code along the way to avoid being overwhelmed with data at the final phase of the data collection. The data obtained from reviewing the previous projects was documented in a table developed in advance which emphasized these coding's. The raw data must be managed which involves checking the data to determine if there are any apparent errors (Bryman, 2012). The table was sent to the external supervisor afterwards to double check if there were any flaws. When approved, the authors began to systematize the themes to make it more manageable and made a checklist table to clearly demonstrate whether Offshore AS followed their processes.

The interviews were audio-recorded, and Bryman (2012) explains the importance of being alert to possible hearing mistakes which can lead to misinterpretation of the respondents' answers.

The transcribing from these recordings were commenced early to secure good results as the interviews was fresh in memory. While transcribing the interviews, the authors went through the audio recordings together and sent them to the interview objects afterwards for approval. During the interviews, memos was used to secure that significant nuances were taken into account later in the process. Thereafter, the authors examined the data to extract core themes by coding each transcript into categories, which allowed the authors to interpret and make sense of the data. This also helped link it to the research questions, the literature and the theoretical ideas used to elucidate the problem. Normally the coding utilizes single words rather than sentences, but this case uses the latter to describe the situation.

Bryman (2012) outlines that data analysis is fundamentally about data reduction which makes it is easier to make sense of the information gathered and to interpret the material. The authors grouped the textual material from each interview into categories. At first the authors coded a good number of categories, but these were refined, as Bryman (2012) recommends, by examining the most repeating findings and how relevant they were to the research questions.

4.6 Quality in Research

Reliability and validity are two of the most prominent criteria for assessing the quality in research (Bryman, 2012). This subchapter will evaluate the quality of the research design, by addressing these criteria. The research presented should be seen in the context of the limitations of the methodologies which will be highlighted at the end of the sub-chapter.

Reliability

Reliability refers to "*the consistency of a measure of a concept*" (BAcampus, n.d.) and is concerned with whether the data elicited and presented in the study can be reproduced in a later study (Bryman, 2012). One usually distinguishes between external and internal reliability.

Bryman (2012) outlines that external reliability deals with the question of whether the findings of the study are repeatable by other researchers, which is a challenging criterion to meet in qualitative work when the research is based on a case study. Bryman (2012) also outlines that a good way to replicate such work is adapting the initial researcher's social role. The study is performed by two master students which has signed a confidential information and confidentiality agreement, where internal documents is subject of a non-disclosure agreement

and for that reason cannot be published. On the basis of the report's confidentially, the project names are anonymized and allocated numbers from 1 through 8, making it hard for other researchers to replicate the study exact. Furthermore, the interviews are anonymous which can cause difficulties locating the same interview objects, unless Offshore AS and the interviewees allows to make such information available. These factors will prevent identical replication. However, the authors have used purposive sampling making it reasonable to think that other researchers can achieve similar findings with different interviewees that meets the same criteria. In addition, semi-structured interviews along with transcription of these is used which increases the reliability.

Yin (2009) describes that the aim of reliability is to limit errors and biases in the study. Both maintaining a chain of evidence and documenting the research process accurate will secure reliability. A case study database was constructed and stored electronically which consisted, among other things, of interview guides, audio files, transcripts, manuals, figures etc.

Internal reliability is concerned with whether group members of the research agree on interpretations (Bryman, 2012). This applies when there is more than one member of the research, and since the thesis consists of two authors, the challenge of consistency has been considered throughout the thesis. Any disagreements have been discussed until both parties have agreed upon the outcome. To improve the internal reliability, the authors have collaborated closely throughout the thesis on every applicable aspect of categorization and results and has led to disagreements being limited.

Validity

According to Bryman, validity is the most important criterion of research and is "*concerned with the integrity of the conclusions that are generated from a piece of research*" (2012, s. 47). One usually distinguishes between external and internal validity.

Bryman (2012) explains that internal validity is primarily related to the issue of causality and is concerned with whether the researchers' findings is in alignment with the theoretical ideas developed. According to Bryman (2012), triangulation is an excellent tool to secure internal validity. He refers to it as an approach that entails utilizing multiple sources of data, methods and researchers in the study. Triangulation has been employed wider by Denzin which distinguishes between data triangulation, investigator triangulation and method triangulation

that can increase the validity and reliability of the results. Data triangulation was used in the thesis which refers to when data or findings can be verified with various research sources, accumulating credibility to the discoveries (Denzin, n.d.). The authors have used internal documents from Offshore AS and only reliable sources through the thesis which the readers can track down by using the reference list. Methods triangulation refers to when several methods is used in a study to minimize biases and deficiencies arisen from any single method (Denzin, n.d.). The authors have used interview to enhance and clarify the results from the case study adding validity to the findings. Furthermore, investigator triangulation is used as both authors attended the case study and all interviews together which minimizes bias in gathering, reporting and analyzing data.

Furthermore, Yin (2009) emphasizes interview validation as a tool to secure internal validity. The authors have listened to and reviewed the audio recordings several times in addition to sending a summary to the interviewees for confirmation and validation. However, the authors cannot guarantee that interviewees are not affected by subjectivity.

As explained by Bryman, "*the external validity is concerned with the extent to which the results can be generalized and hold for others*" (2012, s. 47). The research question is aimed at Offshore AS; hence the results are specific to Offshore AS and not generalizable to all companies but may be interesting for some oil and gas companies. The authors desired and conducted interviews with employees from the different departments to achieve a more realistic picture. Due to time constraints and lack of available interviewees, it can be discussed whether six interviewees were adequate to achieve relevant findings. However, the authors prepared both closed and open questions that allowed the respondents to disclose their understanding and thoughts. The results were repetitive and by comparing this with the case study and the internal documents, the authors are confident that the findings are current and relevant across the firm.

Limitations of the Methodology

Qualitative research has a reputation for being highly subjective and depends heavily on the researcher's ability to distinguish between what is important and insignificant (Ayres, 2018). Such research is also criticized to be hard to replicate, which also yields for this study, due to the variability of researcher bias and the informational bias in addition to being unique in itself. Bryman (2012) also argues that it is very hard to conduct a true replication as there are barely any standard procedure. The authors have tried to document the procedures thoroughly.

Nevertheless, on the basis of the report's confidentially, some internal documents and matters cannot be published, hence it is difficult to replicate.

Lack of statistical representation is one limitation which is always present within qualitative research (Ayres, 2018). The authors have tried to look for trends in the data by looking for identical statements across various interview objects. As these trends cannot be validated by calculations, the authors have tried to employ them with care and verified them continually throughout the research period.

A further criticism that Bryman (2012) emphasizes is the problem of generalization where the scope of the findings is suggested restricted, which yields for this study as the interviews are conducted with a small number of interview objects and encompasses one case.

Another issue with qualitative research is lack of transparency in how the research was performed. More specifically, what the researcher did and how he landed at the study's conclusion (Bryman, 2012). The authors have described the research process as accurate as possible and included a figure of the research process, as well as describing how and why the various previous projects and the selected interview objects was chosen. This enables researchers to obtain insights into how the research was conducted.

To summarize, extensive work has been carried out to ensure that the collected data is valid and reliable, while it has a sufficient quality level.

Chapter 5 Results

This chapter presents relevant results from the case study and semi-structured interviews which forms the basis for answering the research questions. The chapter is split into two sub chapters: Case Study results and Interview results which will be presented respectively.

5.1 Case Study results

This sub chapter is concerned to outline the results from the case study. The results will first be presented as a checklist, table 10 and 11, to demonstrate whether Offshore AS follows its processes, and furthermore provide a more detailed review of the most important findings. The results from BA department will be presented first. On behalf of the thesis research question along with the external supervisor's desire, it was decided to emphasize on the following shown in Table 8:

Table 8: Case study layout, Business Acquisition

Deliverable Requirements	Risk Assessment – Legal, Commercial & Technical
	Tender Readiness Review
	Tender Board Review Presentation
	Handover to Projects
Preliminary Review	Lessons Learnt Review
Tender Submission Review	Qualifications Review

Furthermore, the findings from the project department will be introduced. Due to the same argument as above, it was decided to emphasize on the following shown in Table 9:

Table 9: Case study layout, Project Management

Project Life Cycle	Risk Register
Stage 1 - Business Acquisition	Handover Documentation
	Record of Handover Meeting
Stage 2 - Project Management	Internal Project Kick-Off Meeting
Stage 3 - Engineering, Procurement & Construction	Management of Change Process (MoC)
	Lessons Learned Process
	Hazard Identification and Risk Assessment (HIRA)
Stage 4 - Operations	Project Readiness
	Lessons Learned

On the basis of the report's confidentially, the project names are anonymized and allocated number from 1 through 8. It will not be a review of the results of each project, but a summary of all the projects will be presented.

5.1.1 BA department

Table 10 gives an overview of the results found from the department of BA, and to what extent they have fulfilled the process manuals they should comply to, this will be further elaborated in the next sections.

Table 10: Results from case study, Business Acquisition

Business Acquisition									
	Project	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Deliverable Requirements	Risk Assessment – Legal Contractual	-	-	-*	-*	√*	-	√*	√*
	Risk Assessment – Commercial Contractual	-	-	√	√	√	-	√	√
	Risk Assessment – Technical Contractual	-	-	√	√	-	√	√	√
	Tender Readiness Review	-	-	-*	√	√	-	-	-
	Tender Board Review Presentation	√*	√	√	√*	√*	√	√*	√*
	Handover to Projects	√*	√	√	√*	√*	√*	√*	√*
Preliminary Review	Lessons Learnt Review	√	-	-	-*	-	√	-	-
Tender Submission Review	Qualifications Review	-	-	√*	√*	-	√*	-	√*

*The results marked with a * will represents those activities that are partially fulfilled.*

Deliverable Requirements

Risk Assessment - Legal, Commercial & Technical

In all of the projects, the tender team did not prepare a Risk Register which shall be transferred to Project Execution, where all findings from the RA's are supposed to be stored.

In many projects one or more of the RA's was not performed. Regarding Legal RA's, only project 5, 7 and 8 had conducted it, but in project 5, the intended template was not used, only a self-made document. The Legal RA document number in project 7 and 8, did not match the predetermined document number, while they had commented that the Legal RA was not applicable in project 3 and 4.

With regard to Commercial RA's, project 3,4,5, 7 and 8 had conducted the RA's in the intended template and stored it in DMS. The documentation that Commercial RA's had been carried out in project 1,2 and 6 could not be located. Five out of eight projects had performed Technical RA's.

There is no sign that the RA is reviewed and signed off by the person indicated on the form before the tender is submitted. In most cases, there were no evidence that these RA's were updated throughout the tender clarification process and revalidated before contract award.

Tender Readiness Review & Tender Board Review Presentation

In many of the projects, BA did not create and maintain the Tender Readiness Review Checklist and in those projects it were created, it was little used. Tender Readiness Reviews are to be archived in DMS and shall be accessible from CRM, but this is not done in any of the cases. The tender readiness review template for project 4 and 5 was located at Offshore AS's server. A comment stated that the tender readiness review in project 3 was completed and in file, but in spite of this comment, no evidence was found.

In all projects, Tender Board Review presentation had been created and most of them, except project 1, included risks to varying degrees. The presentation in project 2 included some risks regarding legal, commercial and technical matters. The presentation in project 3 and 8 included some risks, while project 6 included LL in addition. In project 4, the presentation included some technical and commercial risks with corresponding mitigation options, while the presentation

in project 7 included legal and commercial risks. Project 5 included significant risks along with a legal contractual risk summary. The results of the Tender Board Reviews shall be recording in minutes of the meeting, but this is only included in project 5, 6, and 7, while the MOM for project 1,2,3,4 and 8, could not be found in the company's management system.

Handover to Project

In all projects, the Handover to Project sheet was created in accordance with the intended template to verify the handover process. The Handover to Project sheet in project 8 commented "No Risk Register - Standard Op.". All projects, except 1 and 7 had made a Handover to Project presentation which presented risks to varying degrees. In project 2, the handover presentation included some elements regarding legal, commercial and technical risks, while in project 3 it was included some elements regarding commercial and technical risks. The presentation in project 6 included some risk but not LL, while the presentation from project 4 did not include Technical, Commercial and Legal RA, but it contained main risks and mitigation options. In project 5, the presentation presented Commercial and Contractual RA's but no formal Technical RA. A comment was located saying that technical questionnaire was prepared by the various technical stakeholders and close dialogue with Offshore AS Management input to technical qualification log.

The results show that it was very little emphasize on LL in the handovers.

Preliminary Review & Tender Submission Review

Lessons Learnt Review

Preliminary Review of LL was generally inadequate in all of the projects. Only project 1 and 6 had included LL from previous projects where project 1 included LL in the Tender Board Review presentation of a previous project. The Tender Board Meeting presentation in Project 6 included a comprehensive list of main risks and LL in addition to a single document about lessons learnt was found. However, Preliminary LL from former projects/tenders could not be located in projects 2, 3, 4, 5, 7 and 8. In fact, in project 7, they commented "Note done as a specific meeting". In both projects 3 and 4 they commented that the review was addressed within the Technical RA and the Project Execution Plan (PEP). In spite of these comments, no evidence was found.

In project 2 and 8 there was no identified findings or lessons included in the associated Tender Kick off Meeting presentations. The Tender Kick Off Meeting presentation in projects 6 and 7 did include noteworthy issues. For project 6, two Tender Kick Off Presentations were found. The first included a comprehensive list of main risks, but no LL from previous projects, whilst the second included one main risk and noteworthy issues regarding subcontractors, compliance to local rules and regulations, local taxes, local bases and interfaces. The latter presentation, however, did not go into the depth of the noteworthy issues.

It appears that the LL Database does not actually exists as there is no evidence of it. In projects 1, 2, 3, 7 and 8 there was no sign of MOM which the outcome of the review is supposed to be recorded, and therefore one can assume that review of close out reports of relevant projects and consultation with personnel involved in previous relevant projects has not been done.

A copy of the Risk Register, which BA is responsible for establish, was not filed to permit a precise LL Exercise upon completion of the project. This applies to all tenders.

Qualifications Review

In projects 1, 2, 5 and 7, there were no evidence that qualifications review was conducted. In the remaining four projects qualifications reviews was located. In project 4, qualifications review regarding technical, commercial and contractual risks was found, while in project 6 commercial and contractual qualifications description found but without response, cost impact, schedule impact and status. Project 3 and 8 included qualifications reviews, but here were no signs that the RA's had been updated.

5.1.2 Project department

Table 11 gives an overview of the results found from the department of PM and to what extent they have fulfilled the process manuals they should comply to. This will be further elaborated in the next sections.

Table 11: Results from case study, Project Management

Project Management									
	Project	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Project Life Cycle	Risk Register	√	√	√	√	√	√	√	√*
Stage 1 - Business Acquisition	Handover Documentation	√*	-	√	√	√	-	√	√
	Record of Handover Meeting	√	√	√	√	√	√	√	√
Stage 2 - Project Management	Internal Project Kick-Off Meeting	√	√	√	√	√	√	√	√
Stage 3 - Engineering, Procurement & Construction	Management of Change Process (MoC)	√*	√*	√*	√	√	√*	√*	√
	Lessons Learned Process	-	-	-	-	-	-	-	-
	Hazard Identification and Risk Assessment (HIRA)	√	√	√	√	√	√	√	√
Stage 4 - Operations	Project Readiness	-	√	√	√	√	√	√	√
	Lessons Learned	-	√	-	√	√	√	-	-

*The results marked with a * will represents those activities that are partially fulfilled.*

Project Life Cycle

Risk Register

In project 8, the Tender Handover to Project sheet included a comment that stated that a Risk Register was not established. Furthermore, there was no evidence that the BA department prepared a Risk Register in any of the projects although they are responsible to establish it.

In all of the projects, the project department had established a Risk Register and the global RA worksheet was created for every project and stored in Risk Register, which was filed in DMS.

In project 5, the Risk Register contained several documents instead of including all the risks in one. In project 8, the global RA worksheet was created but was poorly fulfilled as it only contained three potential risks. These were marked as not closed, and the register is clearly not updated during the project. These results were not available through RMT, as this tool was nowhere to be found. This applies to all of the tenders.

Stage 1 - Business Acquisition

Handover Documentation

The handover documentation sheet could not be located in project 2 and 6. However, in project 2, a handover presentation was found along with the minutes handover sheet. In project 6, a handover meeting took place and the intended minutes handover sheet was created and signed. Nevertheless, there is no evidence that the RA's from BA department was transferred to the project department in this project.

Record of Handover Meeting

In all of the other six projects, the handover documentation sheet was found along with minutes handover sheet to record the handover meeting. Project 1 included a review of elements from legal RA, but nothing regarding commercial and technical RA. In project 3, a handover presentation was included. Project 4 also included a handover presentation, but it did not include technical, Commercial and Legal RA from BA, nor any LL. However, it contained main risks and mitigation options. In project 5, the handover documentation included Commercial and Legal RA form the tender process, but the Technical RA was not completed. In project 7, the handover documentation sheet stated that the RA's from BA department was enclosed, but these documents was not found. Project 7 included a commercial handover sheet which included a few potential risks, but none of the Technical and Legal RA's were included.

Stage 2 - Project Management

Internal Project Kick-Off Meeting

The documentation found in mostly all of the projects was a Project Kick-Off meeting in form of a presentation, except in Project 8 where the use of a sheet was created in addition. To document the meeting, it was created a MOM – Project Kick-Off Meeting Minutes. This document included HSEQ introduction and occasionally some general risks towards the type of work or project. The common denominator in six of the projects Kick-Off meetings was the

lack of LL and the RA's performed by BA department in the presentation. Project 4 and 5 had some attention on previous LL and risks towards the projects.

Stage 3 - Engineering, Procurement & Construction

Management of Change Process (MoC)

There were deviations from the MoC process that states that after each change, a new RA must be carried out. The projects that followed the process is carried out in project 4, 5 and 8, but that is not nearly all. Some changes had a comment that implied that performing a new RA was "Not applicable", this contradicts what the process require. In project 1 and 2 it was documented changes regarding starting work prior signing the contract without performing a RA, this is a remarkable finding.

Lessons Learned Process

The RMT, where documents of the LL Process shall be recorded, was not found in the management system, and therefore it is not in alignment with the process. The findings indicated that there is no process for how to manage LL.

Hazard Identification and Risk Assessment (HIRA)

All of the projects had conducted either one or more RA's before start-up of operations. In project 3, 5, 6 and 7, detailed HAZOP and HAZID reports were carried out and updated throughout the project, with some measures that is implemented and closed. In project 1, 2 and 8 it was only performed a HAZOP analysis, where project 2 was without a corresponding report. Project 4 was the only project that has a HIRA risk assessment. Along with the RA's, it has at some occasions been prepared a short presentation of the risk with a Minutes Meeting. The reports and RA's were filed in DMS and was often included in the Risk Register.

Stage 4 - Operations

Project Readiness

In most of the projects, a Readiness Review meeting had been held to go through the Project Readiness Review checklist. The checklist was found in the management system and provided a short report of the business readiness, and some of the checklists had also been updated with implemented measures. Regarding project 1, the Project Readiness Review checklist could not be found, while the Project Readiness Review in project 2 was not completed sufficiently.

In those projects where it had not been conducted a checklist or a sufficient checklist, it should have been supplemented with a pre-execution HAZID/risk assessment along with meeting minutes and a process checklist.

Lessons Learned

LL exercise upon completion of the projects, was carried out to varying degrees. Project 1, 3, 7 and 8 did not performed a LL exercise upon completion of the project and is therefore not in agreement with the process. The workshops that was performed, were filed in DMS as the process implies. The common denominator for all the projects is that none of the LL exercise of the projects was stored in the RM database RMT as it should.

5.2 Interview results

This chapter is concerned to outline the results from the semi-structured interviews. The questions in the interview is based on the results from the case-study formerly conducted, with emphasize on the areas that has some improvement potential. The results will be listed in accordance with the keywords in the interview guide and will provide a summarized review of Offshore AS's employees thoughts around these areas. First section will provide the results from the department of BA with the following results from the department of PM.

5.2.1 Results Interview Business Acquisition

In this section each keyword from the interview guideline will be thoroughly analyzed and a summary of the results will be presented in the following sub-sections.

Risk Assessment

Are the RA's (templates) optimal and suitable for all types of tenders? If no, why?

Both candidates from the BA department stated *"No, the RA's are not optimal or suitable for all types of tenders"*. The first candidate argued that the project department do not use the same templates, making it impossible to easy transfer into what they use. He explained that the contract legal RA is completely different and in a separate format, developed by the lawyers, while the technical and commercial RA's has the same format with 10-15 predefined questions which you must go through; *"Hence, you have not taken everything into account"*. He further explained that when identifying risks in tender, you can go through each and every risk, but

there is no quantification function in those sheets. We have tried to create such sheets, so that we can say that the probability and the risk leads to an actual sum we can put into the budget. Because that's what it eventually comes down to.

By contrast, the second candidate states that both Contractual and Commercial RA have good questions which are relevant to ask for most types of contracts. The issue with these is rather that there is not a good culture for the controlled/combined preparation of these, as it does not feel as formal as in requiring a meeting with multiple attendants as for the Technical one. The issue with the Technical one is that there are a lot of pre-determined questions which are suited for complex Construction/Fabrication Tenders. The questions are somewhat ambivalent, and the issue becomes that we try to find responses to all questions in it rather than responding to those which are really relevant to the scope. This makes the Template less "respected" and less used. The candidate also stated: *"There is no aligned training for how we are using the RA's nor how we use the "product" of the actual RA"*.

When performing a RA is BA collaborating with the HSEQ department?

Both candidates answered that they collaborate with the HSEQ department, but predominantly on the Technical RA. The first candidate further explains that they do not invite HSEQ on Contractual RA because the lawyers does it themselves. They tend to invite HSEQ on the Technical RA and occasionally on the Commercial RA when the bid gets bigger. The second candidate said that he would normally ask HSEQ to invite and facilitate the meeting, and that he on recent tenders liaised with the HSEQ department regarding how he have dealt with the RA's.

How is the RA's documented and filed?

The first candidate explains that the workplace is SharePoint, which is where it is stored in word documents, while the PDF must be stored in DMS. The documents should not be stored in the folders anymore. In accordance with former candidate, the second candidate point out that the RA's shall be filed on the relevant folder. In addition, the RA's are to be uploaded to DMS as showing the completion of the Tender Process.

Who is responsible for identifying risks in tender?

The first candidate replied that the flow chart might define the responsible person for identifying the risks in tender, before he added that he guessed it was him. The other candidate

pointed out that all members of the tender team is responsible. The latter candidate further explained that the expectation is that those responsible for a section is to identify risks. A Tender Lead is not expected to identify complex technical risks linked to the method proposed (although he might), that is for the Engineering team to do. Likewise, the Engineering team is not expected to identify risks associated with payment-plan or taxes. That is for the Tender Lead in cooperation with Legal, financial and tax manager.

Level

Can you explain on what basis the level is chosen?

The first candidate pointed out that they use the 1-5 level matrix. He further explained that you might have a chartering project in the North Sea that has very low risk, but which becomes a level 5 because you have a long duration and a lot of money involved. Otherwise, you can have a week in Nigeria with incredibly easy scope, but you end up with a level 5, even if it involves a smaller amount of money, because Nigeria has a high-country risk. The contract often sets the types of risks you get. The candidate also explained that they sometimes choose a level 0 because of short deadlines, as it takes at least 4-5 weeks to go through the whole process for a level 5 bid. How it is defined is probably not written anywhere. Also, for example in Nigeria, the bids are very disreputable and often a wasted resource. We often spend 1000-1250 hours on a level 5 bid vs. a level 0 bid where we spent 13.5 hours, and we end up with the same results.

Is the process clear on how to choose level?

The first candidate underlined that the level changes frequently. We can start at level 3 and go to level 5 because we find a document that tells us to do something, which involves greater risk, and the level goes up, or vice versa. The other candidate emphasized that the level is understood as a guideline, which he finds illustrative and quite good, but not absolute nor clear. The candidate further explained that people tend to prefer to have a high level, which is good from a review point of view, but poor in terms of times and resources.

If any changes occur, will the level be reevaluated and updated? Or if the level chosen turns out to be too low/high, what do you do then? And how is it documented?

The first candidate explained that if a change occurred, then the level is reviewed and updated in the CRM system, but that there unfortunately is no process for how to do it. The candidate further explained that if they make a mistake in the beginning, then they just change it in the

system. There is a very small margin between the levels. The second candidate answered that it depends, and that they recently had a bid which was set to Level 4, but as the bid was progressing it was more appropriate to call the bid a level 5. For that, we report it to our managers, and it gets filed up the chain.

The former candidate also explained that they frequently do a level 5 process, including the RA's, even though they have a level 3 bid, in case the board require that they have to present something to them. If they say that this will be a level 5 if we bid, we must have everything ready.

The candidate explained that the only documents is the tender board presentation and the TAF (Tender Approval Form). He also explained that if the bid of level 0 becomes a level 5, then they often have that revision A has level 0 and B has level 5, but not necessarily reasons why.

Qualifications Review

When recording qualifications throughout the tender phase – are the risk assessments reevaluated and updated to show the actual risk in the project? If no, why?

The first candidate explained that they often write in the RA's that they have added a qualification and that they do not accept it, but then in the negotiation it might get accepted. If you win the job and hand over to project, then it is usually documented in that RA but the candidate states: *"But they will not necessarily be updated"*. The second candidate answered that they sort of reevaluate and update the RA's and explained that he tries to close out the risk identified with qualifications or other mitigating actions. The candidate explained further that the risks do obviously not change, they are just mitigated with, for example as described above, a qualification.

The former candidate pointed out that one reason could be that it might be another person sitting in the negotiation than the person who wrote these papers. Another reason the candidate outlined was lack of time as it usually goes very fast at the end. The candidate explained that they always try, but not always do, to go through and update and write what has been done in the handover before they hand over the project.

Which consequences can this lead to?

The first candidate stated: *"To be honest, very few read the RA's because they are in a different format and they re-create it anyways"*. The candidate defended his claim by explaining that they very often identify risks that has actually happened. However, the project team state that "this has not been taken into account", while, for example, in the risk sheet it is marked that fifty thousand is set of in case it happens. The candidate further outlined embarrassment as another consequence since the project department has attempted to bill for something they do not have the right to invoice, and often thought that something would be paid for by the client. This might happen if, for example, someone has given something away in negotiations, and the project department has not perceived this information. A third consequence the candidate pointed out was money and described an example where they had a day-rate job that become a fixed-price job during negotiations, where the project did not notice before start-up. He further explained that there is a different planning level if you have a fixed price job. You would want to spend quite a few 100 hours extra to make sure that it goes right, because it is the client who has more responsibility for whether it goes fast or not.

If there is a significant change in risk profile during the clarification process, how do you review and update the risks identified in the assessments?

The first candidate explained that they have now entered into an agreement where they will have a new tender board each time they make a major change, involving all relevant personnel to confirm whether or not the change is acceptable. He further stated that he does this if he is the one who negotiates, but that he cannot invite if other negotiate. The candidate also pointed out that this often happens very quickly, and that he sometimes speaks on the phone or sends an email asking for confirmation. Then they have accepted something that is not necessarily taken through a tender board.

The second candidate stated, *"We don't really do that. When a clarification/negotiation process commence, I have seldom/never experienced a re-do of a sit-down risk assessment"*. He further explained that at this stage management and various stakeholder are much more interested in the bid and there are vivid and extensive discussions prior to any response to a clarification. He also pointed out time constraints, saying: *"But in all fairness, it would be un-likely, unpractical and unrealistic to expect this as time allowed for a clarification response is often very limited"*.

<u>Lessons Learnt Review</u>

How are previous lessons learned from tenders applied in a new tender?

The fist candidate explained that if they bid and do not win, they put a so called "why didn't we win" note in the CRM system. An example the candidate pointed out was that one of their clients does not like a specific boat, which they have noted. He further explained that if they were to carry out a similar project that they had done earlier that went wrong, they would have to talk to other people if they would like feedback because their system is not optimal. He quoted: *"The only way to know about similar projects, is to remember it"* and described that he can look for the project number by searching for example on a specific client in the CRM system. The candidate further acknowledged that it is not very user friendly or systematic to go through the LL in the different formats they have. Finally, he highlighted: *"It is impossible to get information out of the system. If I want data, then I have to know exactly what happened"*. The candidate explained that they invite people that they know were involved in similar project on the kick-off, and also sometimes on the RA's. They are also involved when we develop the methods allowing them to inform us what went wrong last time and their own suggestions for improvement. Eventually the candidate stated: *"But this is only based on personal memory in the organization"*.

The other candidate stated that: *"Doing lessons learned is something we are all very eager to do more of, but something which is unfortunately seldom prioritized"*. He further explained that their team in Norway is quite small and that he doesn't think it is a huge problem within Offshore AS Norway. The candidate also explained that it is very unfortunate that they cannot learn efficiently from the errors or successes of other parts of the Offshore AS group.

Is it easy to access previous lessons learned documents?

The first candidate pointed out that it is easy access to previous LL documents if you know exactly where they are and what they are called. He also acknowledged that it would been hard for new employees to find this information. The second candidate quoted that *"I do not know where any may be"*.

How are the lessons learned communicated to all relevant departments?

The first candidate answered that LL are communicated to all relevant departments through the kick-off, where the kick-off presentation includes a point called "previously lessons learned".

This point is also included in the tender board and the handover presentation. As an example, he pointed to a job that they won last year where the client complained about unsuitable offshore personnel, which they brought up in the kick-off presentation when they won again this year. He further informed that this was a very nearby project that he remembered well and acknowledged that he probably wouldn't have remembered it if it was 10 years ago, and added: *"It depends if you can find it, and based on what you remember and who you think knows"*. The other candidate explained that it is usually communicated during the Kick-Off and through RA's, as well as the strategy discussions along the way.

How is a lesson learned supposed to be documented and stored?

The first candidate explained that LL where they do not win, only are documented and stored in the CRM system, while the project department store their LL reports in DMS. He further pointed out that they have no responsibility for LL from the project, as far as he knew, but that he frequently asks them for feedback which he will get in the PMS system and on mail. The candidate then outlined that as soon as project discover something, that does not match with what they have bid, he wants them to send feedback to tender immediately. The second candidate replied that he did not know where the LL should be documented and stored.

Tender Readiness Review

When reviewing previous projects, we could only find two readiness reviews. Is there any particular reason that this is not conducted?

The first candidate explained that they do conduct them in these days and that they now and then conduct compliant reviews to check which projects are compliant. He further said that their biggest source of error might be that they are stored in SharePoint and not in DMS where they are supposed to be stored.

The candidate outlined that the Readiness Review, in their eyes, is only a tick-box exercise that has no practical significance for the bid you make, and that the Readiness Review sheet needs a major rebuild. Furthermore, he stated: *"No one reads them, and they end up nowhere. It is a sheet we are trying to remove"*. He then described that the only thing he do is to go in the BMS system where they have a link to DMS and look at the profiles. If there are supposed to be ten profiles, but the system only finds nine, then it might be the Project Readiness sheet that has gone through the system. He explained that one of the reasons is because they have filled out

the wrong tender number, which shall be entered in a separate box in DMS, and it ends up on another CRM code.

In conjunction with readiness review, the candidate pointed out that the project department has more off-shore readiness but acknowledged that: *"The questions they ask there is dragged out of no-where and a lot of them don't have any importance or meaning to our projects. So that template is also very poorly"*.

The other candidate explained that he has only done it once and think it is more of a "process step" rather than something which actually improve the tender or the process. He described that that the document is something which is to be prepared very late in the tender process, at a time when you are working all days of the week and long days. In reality, it just does not get a priority. The candidate further stated: *"Unless we are trained to really appreciate the aid/support of the Readiness Review it is unfortunately unlikely that it will be considered more than a paper-exercise"*.

Handover

How is the risk communicated from BA to project and operation?
The first candidate replied that when getting a tender, the risk communication is joint work. We send the scope and invite employees from different departments, depending on what the job is and where we see the risk, and fill out the technical risk. If we win the contract, it goes on to project and we arrange a handover along with a handover presentation. The candidate points out that the problem is that the handover includes a lot of documents. The candidate quoted in the end: *"But they do not go through the risk register or the risk assessments again"*.

The other candidate explained that during kick-off, the risks of significance will be included in the kick-off presentation. In the Regional Tender Board, a relatively exhaustive list is included, alongside proposed mitigations, if any, for approval. A condensed, top-item list is included for potential corporate Tender Board (if tender of sufficient size).

The second candidate also replied it is communicated relatively well for Technical and Contractual RA's. It is further elaborated that the Technical RA includes all the relevant stakeholder departments, while contractually is dealt with by Legal, which is the same persons

who would be dealing with the contract if any issue arises during execution. The one area where improvements can be made is for the Commercial RA.

In general, how easy is it to access and find the data/information you need within BA? What about data/information from the other departments?

Both candidates answered that they have been with the company for a while, so they find it relatively easy to find information as they know who to ask to get data and information. The first candidate added that if it is a relatively small project, then you can just search on the project number and browse a page and you will find it. For larger projects, there are thousands of documents. He also stated that it is not possible to sort and filter in DMS, so you have to know what you are looking for. Eventually, the candidate stated: *"For new people it is hard and requires a lot of follow-up to find information"*.

The second candidate pointed out that that there is a lot which is saved within the minds of people in the company which is not readily available. The candidate also outlined that: *"It is a huge problem that there are so many places to store information"*. As an example, the candidate explained that in his most recent tender, he had four folder structures for the same bid, which did not include all the other databases, CRM/DMS etc. He also explained that an issue is getting data from Offshore AS Management. He described that a lot of the information is available to them through for instance UNISEA, but it is not used regularly enough for them to build up the expertise in how to use if effectively.

The former candidate explained that other departments generally have very little information that is shared, if you disregard BA as he claimed that they are trying to share with others. The candidate explained that there is very little stored in the different department folders. He further explained that Engineering has something stored in it, just to make it easier to access and that Survey have some generic general procedures in the department. He also stated that he believes that everything is in the BMS now, which is that place they store their templates. The candidate also pointed out that they, between project, store things differently in the folders, and that it should be stored in DMS where they have a document registration system. However, the candidate explained that they do not have document controls, so it can be misused. Also, the naming can also be wrong, so it can be difficult to find.

How is data/information stored?

The first candidate pointed out that the data is stored many places, such as in the folder structure, SharePoint, DMS and in the BMS system. The candidate also pointed out that he thinks that DMS and the BMS system does the exact same thing and don't understand why they have two systems. He further explained that someone has decided that they should have one place for projects and working documents, and one for generic documents, and that BA shall work in SharePoint while everyone else in the folder structure. Furthermore, he acknowledged that due to some difficulties, he does not believe that everything ends up in one system in the nearest future. The candidate pointed out that Brazil has started to look at some sort of SharePoint based storage system because they found DMS so difficult to use.

The second candidate answered that they are moving to the cloud, so the data is supposed to be stored there, but he believes some old gems are still in the old network. He also pointed out: *"There is unfortunately, a lot on personal drivers"*.

Are there any current challenges in transferring data regarding risk between the different departments?

The first candidate quoted: *"We are not good at naming documents"*. To defend his statement, he explained that if he searched for "Risk Register" in DMS, but somebody named it "RR", he would not find it. He further described that they have numbering and that he could search by number and look until he got some hits. The candidate further elaborated that they do have a folder structure in project which is relatively similar, and as long as it is stored there, then he will find it. Where people store documents is usually a little different, and it is not necessarily an instruction for logistics. The candidate also outlined that the process manuals does not match reality because they are not updated. An example he outlined was that the processes do not say anything about SharePoint or the BMS system, in fact it is not mentioned at all. Furthermore, the process say that we should use RMT, but that does not exist in the system.

Another challenge the candidate outlined was that BA and project do not have the same RA templates, which makes the transfer more difficult. The candidate explained that the transfer is not impossible, but you have to read through the documents and carry it over. People do not do it because it does not create much value. He also pointed out that everybody can change data in the formats, which can be challenging as people can simply edit and past in incorrect information.

The candidate also described that they have created a Risk Register they use in tenders, which they pass over to project when they win. He explained that they have done it a few times, but that it is beyond the process, so you double the workload. He also explained that they now have an open Risk Register and every time there is a problem, they must write it in there, but some people do not bother doing it. The candidate also outlined challenges with the risk budget and explained that there is no template for it. He describes that they have added an extra column in the Risk Register called "consequence, probability and sum" - and that becomes their "risk budget". He argued that it does not help to say that the risk is for example 16, you have to convert it to money to mitigate it.

5.2.2 Interview results from Project Management

In this section, each keyword from the interview guideline will be thoroughly analyzed and a summary of the results will be presented in the following subsections.

Handover

Can you describe how handover from BA to Project is performed?

From the HSEQ and PM department's point of view, the candidates had the same arguments about the handover from BA to project. The candidates explained that BA is sending out an invitation to a formal meeting with key personnel, where all the top risks that BA has identified is introduced and added in the handover package. One of the candidates said that if resources are available, parts of the project team will be a part of the tender phase and also explained that to be able to understand the risk properly, it is important to be involved before submitting the bid. The candidates also pointed out that there is no focus on these risks when the PM initiates its own risk identification in the project. The project manager candidates, however, stated that the operational risks are transferred to the Risk Register, and the process allows them to communicate with the department of BA after BA has delivered the handover package.

When reviewing previous projects, there was lack of documents of the handover from project to operations. How does the project management transfer documents regarding risk to operation, and how is this documented?

All the candidates described that there is no formal "handover" document, as the stab from operation are involved from the beginning when PM is handed the project documentation from BA. Further, it was explained that when RA is performed on the procedures, the operational

workers are included, and at a later stage all project documentation, normally a HAZOP report, will be sent via mail along with the procedures adapted to the project.

It was also stated that there is always a Kick-Off on Mobilization to present an overview of the work to be carried out. When this is done, RA is performed on each part of the work and a toolbox talk is performed, which allows the information to reach out to everyone involved. One of the candidates explained that there are some differences between long-term and short-term contracts, and further elaborated that on short-term contracts, an HAZOP report will be sent or filed in DMS so the operational can access it. On longer projects there will be weekly rapports, meetings etc.

Can you describe how Kick-Off Meeting is performed?

One candidate stated that: *"We have a Kick-Off meeting and keep the focus on the most important issues in the project, (…). We make our own procedures, get a good overview of the project and establish a presentation where the Risk Register is established."* Another candidate pointed out that the Kick-Off meetings are not always performed in a satisfactory way. When going through the scope of the project, it is just sometimes that risks from BA is presented in the Kick-Off. Also, all risks identified by BA are not necessarily important to the project teams, and thus some are excluded. Another candidate emphasized that one of the problems with the transfer is that BA has their own methods, while PM other methods. Therefore, the findings or results BA deliver to PM cannot be transferred directly, meaning it becomes cumbersome to share information between the two departments.

In general, how easy is it to access and find the data/information you need?

There were mixed answers from the candidates regarding how easy it is to access and finding data and information in Offshore AS. Some of the candidates are satisfied with the situation as it is today, despite the fact that they do not have direct access to the data from other departments, because they have an open culture where it is easy to ask the different departments for data. Further, the candidates elaborated that a problem with finding information, is that the data is stored in different places, such as DMS, Business Management System (BMS) and on the server. This is a problem as it is unsystematically stored, and you have to search within these platforms to find the document you need. It is time consuming. It also requires good knowledge and experience to be able to use and search in the systems. In addition, one candidate explained

that they have implemented a new challenging program, that leads to yet another program to store information in, and there is also no procedures on which one to use and when.

Furthermore, a candidate explained that another challenge when transferring data regarding risk between the different departments, is that there is not a comparable method from BA to Project, in departments and offshore. He further elaborated that this makes traceability and transmission difficult and unmanageable.

Level

When the candidates were asked to explain how the project level is confirmed, the candidates had some various descriptions. One candidate explained that it is confirmed by the type of work. While other candidates explained that PM uses criteria's or a checklist and project deliverables (PEDR) to confirm the level, along with all necessary documents that have to be signed by the department manager. If the level set by BA is not consistent with the level PM decides, the project team will give a feedback to BA, because the more comprehensive the project is, the more risk, and the require for more risk reducing measures.

Management of Change (MoC)

Can you elaborate how changes are managed?
One of the candidates explained that: *"Changes occurs all the time (…). In principle are all changes treated equally. You identify the change, assess a RA to see what the change may bring and if you can reduce the risk. If the risk can be reduced the change is OK, if not the change will not come through."* This was stated by most of the candidates, but two candidates also made it clear that there is not always conducted an RA, as it should according to the process. The explanation of why the RA was not always conducted, was that it is not always suitable, and in some cases, it is enough to clarify the change with the client and get the client to sign for the new change. Furthermore, one candidate explained that the changes are rarely added to the projects Risk Register, unless it is a bigger change, because usually a RA is conducted and handled before it gets closed, and therefore there is no need to add it in the Risk Register.

How is the change(s) communicated to all relevant personnel?

One candidate pointed out that there is some inconsistency in the process regarding who is responsible for signing the document when a change has occurred, and this may lead to confusion. If there is a change in a procedure, a candidate explained that the operational workers who will conduct the procedure will also contribute during the RA and conduct a toolbox talk. The candidate further explained that before the job is conducted, all hazards are evaluated and communicated to the operational workers to assure that they are fully informed. The changes will be stored in the project documentation, and sometimes sent onshore, except the tool-box talks.

Are there any challenges with the MoC process? If yes, in which way could it be improved?

A candidate pointed out that a challenge is that there is not enough traceability, and it is difficult to determine which changes have actually been made since it is not defined where these are stored. Another candidate said that the MoC process has just been improved, but it could be used more often and there is always room for improvement. The offshore workers has become better at using it as a tool. Further, the candidate stated that if they want the MoC process to be an integrated process, all workers should use it more often and as a tool.

The third candidate stated that the MoC process itself is straightforward and relevant, but the main issue is the management system that has some errors. In addition, there are challenges to see the process and the organization is not properly set, as stated earlier. This means that some managers are missing, and it is not defined who is responsible for approvals that needs to be signed.

The fourth candidate underlined that most is done according to the process when there is enough time, but there is a lot of papers and the impression is that most of the employees do not read them. Furthermore, he emphasized that the operational workers may not have much time to read and understand the documentation sent to them as they are sent straight to mobilization. The candidate has over the last couple of years tried to define good role descriptions and responsibilities in the project to assure that key personnel in the project know what is expected from them.

Lessons Learned

Are you familiar with and can you elaborate the Lessons learned process?

The elaboration of the LL Process has some various answers. Two of the candidates stated that there is no formal or specific procedure for how to carry out and fulfil the process. The candidates implied that the HSEQ department has discussed that this can be a disadvantage in the process as each project manager can decide how to implement it and how it will be documented.

One of the candidates explained that: *"The storage of the documents is not clear, and it is not a register that allows you to search for information related to various types of work tasks. It is a manual work and one must be familiar with previous projects in order to find lessons learned documents related to the same type of work. In other words, not any functional lessons learned process."*

Another candidate replied that the process is not very well known and for that reason it should be improved, which requires a very disciplined organization and a good system to make it happen. The last candidate elaborated that LL will contribute to continuous improvement, which means that they have to identify former faults and figure out what to do to avoid them from happening again. The routines for feedback from the offshore workers are good, and the degree of formality is varying. In addition, the candidate added that at this point, the company is facing pressure on time and resources, and therefore less time is spent on LL, along with the fact that it varies what the client requires.

He further explained that when a LL is not performed, it should in principle be performed a MoC, but as a cause of time limitation this is not done. The requirements for documentation are still the same whether the project is small or big, which can be a big problem.

Is there any register where lessons learned documents can be archived and is it easy to access and find lessons learned from similar projects?

Regarding the question if there is any register for LL documents, the candidates were unanimous in their answers. There is no good procedure for LL and where the documents are to be stored, although RMT was an attempt that failed. RMT was a system used for a very short period of time, and two of the candidates outlined that the system was not functional and therefore it was not used by the employees.

One candidate explained that BMS contains LL rapports from previous projects. To find an appropriate LL for an ongoing project, you either have to have good knowledge about the previous projects, or the opportunity to ask a coworker if they can recall any similar projects. A candidate also mentioned that to be able to find these documents you either have to remember the project number, the time period for the project or the vessel that was used in the project. It is cumbersome and not a consistent way to search and store the documents, as also mentioned in the previous subsection.

Another issue described by one of the candidates is that the documents are prepared and stored in different systems that causes confusion when searching for documents. This means that the LL do not have the same template and are stored as an appendix in DMS which makes them unavailable. Another candidate explained that the system is too heavy on small projects that makes it hard to locate the documents.

One of the candidates pointed out that there are several other types of tools that could have been used to make the search and work more efficient, for instance: PIMS, Synergi and UXRisk.

At the completion of a project one activity that should commence is Lessons Learned Workshop. Can you describe how this is conducted and documented?
The candidates in this subsection were unanimous in their answers. A candidate in the HSEQ department explained that last year they started to push the workers a little extra to conduct the workshop after each project, no matter the size of the project. And because of that, there has been an improvement, but there is still room for further improvement.

Another candidate pointed out that sometimes the meeting is very formal, especially on big projects. Every department has their own presentations to get feedback from clients and discuss their experience with the project before they finish the workshop with a dinner. The candidate further elaborated that: *"for larger projects, clients often arrange lessons learned, where we write long reports. We are quite good at workshops, even on smaller projects. The problem is not to register what we learned but to find out how and when to pick it up again. I experience that we have trouble getting something out of it, unless the same people are involved."*

Another candidate explained that as the situation is right now, the workshop is not performed in that big scale due to high costs. When the time or resources are limited, they can perform

other less formal options for the workshop, as brainstorming internally. The process does not indicate how to perform the workshop, so the manager is free to choose the procedure.

Further, it was explained that the workshop is documented with a MOM and is stored in BMS. One challenge is that it is documented in various ways as the project team decide, when it should have been one single system for how the LL documents should be prepared and stored.

Process Risk

How do you ensure project readiness prior to operations?

The candidates answered the same on this question that, according to the process, the readiness prior to operations is performed by going through a readiness review checklist and signing off. There were also some shared feelings about this checklist. The candidates elaborated that the checklist is not appropriate for all projects and is somewhat outdated and not relevant, and further elaborated that it is not the list that determines if the project is actually ready. The checklist, however, gives an indication of the important tasks in the project that should be checked, which can be useful according to the candidates.

One candidate pointed out that despite the fact that the management system says how to do it, the signed contract consists of requirements from the client. They should usually be completely overlapping, but it is often the contract that is emphasized instead of the checklist.

Further, a candidate explained that the checklist takes the user through critical things that must be in place before the operation starts. If there are any outstanding items, these should be actioned or mitigated. It is all about the timing in the project and ensure progress in the project. In large projects, there may be several crossings in the checklist, usually demanded by the client. RA is performed on mobilization before the operation by the offshore manager and the crew (relevant marine and project) on the boat and deals entirely with project specific elements. A candidate said that the routines for closing before mobilization is perceived as good. Before mobilization, the candidate uses Excel to keep track of the project, and the people who are responsible for each task is listed in the file. The candidate also highlighted that how thorough the review is conducted is depending on how much available time there is.

The Project Management Manual states that a project readiness review shall be held in form of a project readiness review sheet and/or a pre-execution risk assessment. How is this performed and documented?

The candidates had not much knowledge about this option in the process, but an overall understanding is that the checklist is just one way to make sure that everything is ready before mobilization. And by going through the Risk Register, they can also make sure that all actions and risks are closed or mitigated before going through to the next stage.

If the readiness review is not completed or insufficiently done, how is it then decided to move on with the project?

It was explained that if the readiness review is not completed or adequately done, the project starts when it has to start, as long as it is not completely safety-critical tasks that remain. These must be closed before starting, or there must be a plan for how to close it. Another candidate stated that this depends on the client and if the client will allow the project to move forward without conducting the readiness review. This is especially true when it comes to bigger projects, while on smaller and standardized projects, the readiness review is rarely performed as the risk is much less on smaller projects. It was pointed out that if the review is not conducted, it should according to procedure be performed a MoC and stored in DMS.

Offshore AS has a variety of selected methods for risk management (HAZOP, HAZID, HIRA) within project management and On-Site RA within operations. Is there any process for which risk assessment to conduct when? If not, should it?

One candidate explained that the process does not say which risk analysis should be performed when. This often depends on the client's requirements as the client has their specific RM procedures that Offshore AS is subject to when entering into contracts.

Another candidate stated that DNV Guideline describes best which risk methods (HAZOP, HAZID) to use for the office in Norway, while other offices has a similar process (HIRA). DNV is very clear how to proceed and the clients are well acquainted with it which makes it easy when communicating with the clients. It is documented in form of rapports and sent to client with the main point being to produce the risk and make it acceptable.

It is further stated that HAZID, HAZOP and HIRA are documented through risk reports and stored in DMS, before it is transferred to the project Risk Register where they are "managed".

One of the candidates described that to get a hold of On-Site RA you have to ask for them, as they are not sent onshore to the office. Further it said that an optimal solution would be to have a system where all of them was gathered to be able to get back and look at them.

Finishing

In the last interview question, the candidates were given the opportunity to elaborate on other related problems they experience with regard to RM. One of the candidates stated that the main problem is that not everyone is working according to the system, and employees has different view of how the system is working. As mentioned above, different offices have totally different systems and procedures, creating problems when sharing documents. Another candidate elaborated a desire for a system that focuses on continuous improvement, with particular regard to risk. At the end, the last candidate stated that he wishes for a project controller and a system that captures the correct data and measurements to reduce the risk, such as the duration of different tasks and the associated costs are calculated.

Chapter 6 Discussion

In this chapter, the results of the case study and the semi-structured interviews will be compared and discussed against theory and the document reviews of the manuals, to be able to answer the thesis research questions. For the sake of order, the discussion is divided into BA and PM/HSEQ with their associated sub-chapters based on the focus areas of the thesis. Since it is focused on similar areas within BA and PM/HSEQ, and as the questions posed during the interviews are resembling, the discussion will be marked by some repetition. This can, however, emphasize important factors that are necessary to highlight. Based on the results, appropriate improvement measures will be discussed which can help the company optimize their RM from the tender process to project completion.

6.1 Business Acquisition

This subchapter is divided into BA's six focus areas in alignment with the BA interview guide, Appendix 2.1, where the results from the BA department are discussed against theory and the document reviews of the BA and RM manuals, as well as the PM manual when appropriate. Improvement measures will be discussed along the way.

6.1.1 Risk Assessment

When reviewing previous projects, one or more of the RA's could not be found in many of the projects. Based on this, it can give an indication that the process regarding RA's is generally not sufficiently fulfilled and done according to the process. One reason for this, that both of the BA candidates pointed out, is that "*the RA's are not optimal or suitable for all types of tenders*", which might make it difficult to use the intended templates.

Furthermore, both candidates outlined that the Technical and Commercial RA's has the same format with 10-15 predefined questions, and that the Technical RA is more suited for complex construction/fabrication tenders and are somewhat ambivalent. The first candidate further elaborated and stated: "*Hence, you have not taken everything into account*". The consequence may be that the focus is on finding responses to all questions rather than responding to those which are really relevant to the scope, which again makes the template less "respected" and less used. By contrast, the second candidate stated that both Contractual and Commercial RA's have good questions which are relevant to ask for most types of contracts. The issue with these is

rather that there is not a good culture for the controlled/combined preparation of these, as it does not feel as formal as in requiring a meeting with multiple attendants as for the Technical.

Based on this, it seems like the RA templates are not optimal or suitable for all types of tenders, which makes the risk transfer through the project's life cycle harder. On one hand, the entire set up should not be based only on predefined questions, as this can cause the analyst to be "locked in a booth". On the other hand, it may be wise to have a guide sheet in addition, both for inspiration and in case somebody gets stuck. Furthermore, in addition to the guide sheet, perhaps a pre-set RA document for different types of tenders would improve this step.

The candidate also stated: *"There is no aligned training for how we are using the RA's nor how we use the "product" of the actual RA"*, which can cause the filling of the RA's to be incorrectly and insufficient, precisely because of lack of training. In addition, the format is such that anyone can do changes, and a common challenge is that people put in misinformation. Furthermore, the first candidate pointed out that the project department do not use the same templates, which can make the risk transfer more difficult. One consequence of this might be that the project department starts from scratch when they carry out their RA's and takes little account of the risks identified by the BA department. The transfer is not impossible, but it is time consuming to go through all the documents and transfer it manually. This leads to that employees do not usually do it because it does not create much value.

The above measures are useless if the personnel do not know how to use the RA's nor how they use the "product" of the actual RA. Therefore, all relevant personnel should undergo a course that focuses on the use and importance of carrying out RA's, which can help the staff to perform RA's more coordinated and equally. Furthermore, to facilitate and ease the transfers, both departments should use the same templates. To make sure everything is taken into account, an improvement measure could be that the PM department do their RA first and then go through the RA's created by the BA department and transfer the risks that they did not identify. In this way, the project department can mark of what is actually transferred and give feedback to the BA department on those they have not identified. Same formats will facilitate this. In addition, it could be wise that HSEQ is the owner of the formats, to make sure that the content in the RA's is accurate and faultless. If the company pointed out one or more superior owners, it may be easier to align and adjust.

When reviewing previous projects, there was no evidence that BA had prepared a Risk Register in any on the projects, and therefore it appears that BA does not comply with the process regarding Risk Register. However, the first candidate quoted *"We are not good at naming documents"* and therefore people could have named e.g. Risk Register as "RR" which makes it difficult to find data. Therefore, the results from the case study may differ from reality. An improvement measure might be to introduce a naming standard, as there is not necessarily an instruction for logistics.

Despite the results from the case study, the results from the interview had some conflicting findings. On one side, one of the HSEQ candidates stated that BA do not prepare any Risk Register, while the BA candidate described that they sometimes have created it. What is interesting is that the candidate further elaborated that *"this is beyond the process, so you double the workload"*, even though the process manual clearly states that BA is responsible for preparing a Risk Register. This may indicate that the manuals are not consistently adhered to or that some personnel have not familiarized themselves well enough with the manuals.

The first candidate also pointed out that the sheets don't have a quantification function, and that it does not exist a template for the risk budget. Furthermore, he argued that it does not help to say that the risk is 16, you have to convert it to money to mitigate it. To improve this step, it may be appropriate to investigate if there exist a useful tool that convert risk into money. Also, as the scientific field have switched from describing risk in regard to probability to describing the risk in regard to uncertainties, the authors recommends Offshore AS to see beyond expected values and probability and focus on the critical link to knowledge, and the lack of knowledge, that risk and probability judgements are based on. It is important to address the uncertainty on which risks and decisions are based on. For this, a common approach to express the uncertainties is knowledge-based probability and frequentist probability, which the authors recommend Offshore AS to facilitate.

Despite the fact that the process manual outline that all RA's shall be available through RMT, there was no evidence of this tool when reviewing previous projects. In the interview it emerged that RMT exists, but that they neither have it nor use it. Based on this, it can be claimed that there exist some inconsistencies between governing documents. This may indicate the need for both updating and revising the process manuals, so they correspond to reality. A consequence of this might be that the risk transfer is weakened as RMT is a tool that makes Offshore AS

able to identify, evaluate and manage the risk from the early phases of BA throughout the project life cycle.

As there was no sign of RMT, the authors asked the candidates where the RA's are documented and field. The first candidate explained that the workplace is SharePoint, which is where it is stored in word documents, while both BA candidates outlined that the PDF must be filed in DMS in the relevant folder. Firstly, the process does not say anytime about SharePoint, in fact it does not mentioning it at all. This is another evidence that there are inconsistencies between governing documents and clearly underlines a need for updating and revising the process manuals.

6.1.2 Level

When asking the candidates on what basis the level is chosen, the first candidate pointed out that they use the 1-5 level matrix, which is consistent with the process. The candidate elaborated the answer with two examples described in 5.2.1, which seems to be in alignment with the level description in sub-section 2.1.1.

Further, the candidate explained that they sometimes choose a level 0 because of short deadlines and/or because of disreputable bids. What is interesting is that none of the manuals says anything about a level 0, in fact they don't even mentioning level 0. Based on this, there is reasons to believe that there exist some inconsistencies regarding levels, which supports the argument that the process manuals should be revised and updated. On one side, in view of disreputable bids, it may be appropriate to choose a level 0, due to the fact that it takes approximately 1000-1250 hours to prepare a level 5 bid compared to a level 0 bid which takes around 13-14 hours, and they might end up with the same results anyways. Besides, if they bid a level 0 and it turns out to be a frivolous bid, then they don't waste resources. On the other hand, if they win the bid and it turns out to be a level 5 bid, it takes at least 4-5 weeks to go through the whole process for a level 5 bid. This might lead to shortcuts due to lack of time which can affect the risk transfer in a negative matter.

The other candidate, when asked if the process is clear on how to choose level, emphasized that the level is understood as a guideline, which he finds illustrative and quite good, but not absolute nor clear. This might be a cause to the first candidate's claim that the level changes frequently.

This underlines a need for a clearer process on how to choose level, in addition to training the personnel to a greater extent.

When asking the candidates whether the level will be reevaluated and updated if any changes occur and what they do if the level chosen turns out to be too low or too high, the authors received some contradictory answers on the first question. The first candidate explained that if a change occurred, the level is assessed and updated in the CRM system, unlike the second candidate who responded that it depends, which may indicate that they do not always do so. Despite the first candidate outlined that the level will be reevaluated and updated, there is no process for how to do it. If they make a mistake in the beginning, they just change it in the system. The second candidate also explained that if the bid of level 0 becomes a level 5, then they often have that revision A has level 0 and B has level 5, but not necessarily reasons why, which is unfortunate.

Regarding the latter question, the second candidate said that they report wrong choice of levels to their managers and outlined that changes of levels occurs frequently. One reason might be that they find a document that tells them to do something, which involves greater risk, and the level goes up, or vice versa. Both candidates pointed out that people tend to prefer to have a high level and that they frequently do a level 5 process, including the RA's, even though they have a level 3 bid, in case the board suddenly say that this will be a level 5. On one side this is good from a review point of view, but on the other hand poor in terms of time and resources.

6.1.3 Qualifications Review

When reviewing previous projects, only four out of eight projects had carried out qualification reviews. Based on this, it cannot be confirmed or denied that the process has been fulfilled, as there was evidence that qualification review was conducted in half of the projects. Despite this fact, the documentation of the reviews was relatively brief and there were no signs that the RA's had been reevaluated and updated to show the actual risk when recording qualifications, which is contradictory to the process. This was confirmed in the interviews as the first candidate stated that: *"They will not necessarily be updated"*. Moreover, the candidate stated: *"To be honest, very few read the RA's because they are in a different format and they recreate it anyways"*. A consequence of this may be that risks identified by BA are not taken into consideration. If the incident actually occurs, PM often claims that it was not taken into account, despite the fact that

BA has noted it in the risk sheet. This underlines a need for improvement of the RA templates in addition to the departments using the same templates.

Furthermore, the candidate explained that they often write in the RA's that they have added a qualification and that they do not accept it. But in the negotiation, it might get accepted. One reason for this could be that it might be another person sitting in the negotiation than the person who wrote these papers. If someone has given something away in negotiations and PM do not perceive this information, which may be due to the fact that they have not read the RA's, a consequence might be that PM attempts to bill for something that they do not have the right to bill for.

The other candidate had a fairly coinciding answer, as he explained that they sort of reevaluate and update the RA's and defended his respond by explaining that he tries to close out the risk identified with qualifications or other mitigating actions. One reason why they do not get updated might be because of lack of time as it often goes very fast at the end. If time is limit together with the fact that the PM department do not review the RA's, a consequence may be increased costs. One of the HSEQ candidate said that the RA's is not always reevaluated after a qualification and further elaborated that if BA have a risk they mitigate with a qualification, then they say the risk is low. If the qualification is not accepted, the risk analysis still say that the risk is low, as they do not update the RA. This is unfortunate as the risk presented is "lower" than what it actually is.

6.1.4 Lessons Learnt Review

When reviewing previous projects, Preliminary Review of LL was generally inadequate in all the projects. In fact, only two out of eight projects included LL from previous projects in the Tender Board Review presentation. When asking the candidates how previous LL from tenders are applied in a new tender, the second candidate stated: *"Doing lessons learned is something we are all very eager to do more of, but something which is unfortunately seldom prioritized"*. This is unfortunate because capturing LL should be on-going throughout the project life cycle. Furthermore, he outlined that he does not know where LL are to be documented and stored, or where to access them. One reason for this might be that it is not very user friendly or systematic to go through the LL in the different formats they have. This is unfortunate as LL is among one of the various sources of information which should be considered to identify risk. A

consequence of this may be the fact that it weakens continuous improvement of RM because the system limits the staff to learn and improve until next time they submit a tender.

To be able to learn, organizations need both single loop and double loop learning to develop an understanding of the cause of the problem and a productive way to solve them. Offshore AS should search to improve both single loop and double loop, in order to improve decision-making in their operations and learn from incidents. In addition, as the goal of deutero learning is to improve awareness and learning, Offshore AS should focus on deutero learning and to a greater extent on "learning how to learn". What is interesting is that one of the HSEQ candidate outlined that they do not have a LL Process, which is another evidence that there are inconsistencies between governing documents and clearly underlines a need for updating and revising the process manuals. This is unfortunate because a LL Process lays the foundation for being able to focus on single loop, double loop and deutero learning. An improvement measure may therefore be to apply and include a detailed description of the LL Process and elaborate on, among other things, how to identify, document, analyze, store and retrieve LL.

The second candidate agrees with the other candidate that the system is not optimal and quoted: *"The only way to know about similar projects, is to remember it",* before he highlighted: *"It is impossible to get information out of the system. If I want data, then I have to know exactly what happened".* Based on this and the fact that they either have to know exactly where they are located, what they are called and exactly what happened, it can be claimed that there is not easy to access LL documents, which makes it hard to learn efficiently from the errors or successes of previous tenders/projects. The fact that the only way to know about similar projects is to remember it, makes it difficult, if not impossible, for new employees to find this information. This may be one reason why the results of the case study on LL suggested that the use of LL overall was inadequate, as the authors was new to the systems. Therefore, the results may differ from reality, but on the other side, the argument that LL is not readily available and difficult to find reinforces. On one side, a new employee could talk to others for feedback. However, they would have to know who to ask, which is not a matter of course when you are new to the job, as opposed to people who have been working there for years. On the other hand, it is time consuming. As capturing LL helps to ease the risk transfer, one improvement measure could be a better storing and searching system for LL. Furthermore, Offshore AS should have basic training of all participants on how to use it, as well as creating a group that is further educated and allow them to hold annual training sessions.

The results from the case study suggested that the Tender Kick Off Presentation included LL to varying degrees, as not all problems identified was summarized in the Tender Kick Off Meeting and incorporated into the Tender Kick Off presentation. When asking the candidates how LL are communicated to all relevant departments, the authors got coinciding answers as both candidates highlighted the kick-off presentation which includes a point called "previously lessons learned". The second candidate also pointed out that LL are communicated through the RA's, as well as the strategy discussion along the way. This is contrary to the results of the case study that showed that LL is not much emphasized in the Tender Kick Off Presentation or in the RA's. One of the candidates commented, in addition, that they invite people that they know were involved in similar projects on the kick-off, however, this is only based on personal memory in the organization.

Furthermore, the BA process manual states that the Pre-Kick Off Administration Stage demands a LL Review, which shall be recorded in a MOM. First and foremost, the authors could not find any evidence that LL Database exists, which one of the HSEQ candidates confirmed. Based on this, it can be claimed that there exist some inconsistencies between governing documents. Furthermore, in most of the projects there was no sign of MOM which the outcome of the review is supposed to be recorded. Therefore, one can assume that review of close out reports of relevant projects and consultation with personnel involved in previous relevant projects has not been done.

Moreover, the BA manual states that when the contract is handed over to PM, BA still has to be involved in some further phases, such as Feedback to Tendering which may be important for the next tendering. The first candidate underlined that he frequently asks PM for feedback which he will receive in the PM system and on mail. One consequence of this may be that the feedback only remains in the mail and might be forgotten, which underline a need for a unified LL database where LL is stored and available to everyone. Furthermore, as soon as PM discover something, that does not match with what BA have bid, PM should send feedback and advise BA about point of notes immediately. This will help BA to improve until next time they submit a tender.

6.1.5 Tender Readiness Review & Tender Board Review
When reviewing previous projects, there was no evidence that BA had created and maintained the Tender Readiness Review Checklist in many of the projects. Nor was there any evidence

that the Tender Readiness Review form was filed in DMS and available from CRM. However, Tender Readiness Review form for two projects was located at the company's server.

The first interview candidate explained that they do perform them these days and that they occasionally carry out compliant reviews to check if the projects are compatible. The candidate outlined that one of the biggest sources of error might be that they are stored in SharePoint and not in DMS, where they should be stored. Another cause might be that they have filled out the wrong tender number, which shall be entered in a separate box in DMS, and then ends up on another CRM code. This may be one reason why the results of the case study on Tender Readiness Review suggested that the use of Tender Readiness Review form overall was inadequate. Therefore, the results may differ from reality, but on the other side, the results clarify and reinforce the claim that the Tender Readiness Review Checklist is not readily available and difficult to find. The other candidate, however, acknowledge that he had only done Tender Readiness Review once, which is contradictory to the statement of the first candidate.

The second candidate described that that the document is something which is to be prepared very late in the tender process, at a time where you are working long days, and therefore is not prioritized. The first candidate seems to agree and stated: *"No one reads them, and they end up nowhere. It is a sheet we are trying to remove"*. Based on this, it can be argued that the Tender Readiness Review don't get a priority and is only carried out if there is time left. This is unfortunate as the aim of the review is to make sure that all aspects of the proposal are complete and accurate. An improvement measure could be to conduct the Tender Readiness Review more than once. This measure contributes to determining whether there is adequate progress to assure readiness and that the process is carried out in an organized manner, without items being remaining at the last minute or forgotten completely. Having regular progress reviews can help Offshore AS to ensure that the critical time before submitting the tender is not wasted.

Further, both candidates seem to agree that the Tender Readiness Review has no practical significance for the bid. Furthermore, the first candidate outlined that the template is very poorly as the questions seems to be dragged out of nowhere and that some of them don't have any importance or meaning to the projects. An improvement measure may therefore be to do a major rebuild of the Tender Readiness Review Checklist and include meaningful questions that are relevant for the bid. Furthermore, the first candidate outlined that the Tender Readiness

Review is, in his view, only a tick-box exercise, while the second candidate said that he believes that it is more of a "process step" rather than something which actually improve the tender or the process. This highlights a need for, not only update the checklist, but also train the employees to really appreciate the aid and support of the Readiness Review.

6.1.6 Risk Transfer

When reviewing previous projects, the "Handover to Project" sheet was created in all the projects and was in accordance with the intended template to verify the handover process. All except two projects had made a "Handover to Project" presentation that presented risks to varying degrees as well as there was very little emphasis on LL. When asking the candidates how risk is communicated from BA to PM and operation, the first candidate answered that that they arrange a handover along with a handover presentation, which coincides with the case study results. The second candidate replied that the risk is communicated relatively well for Technical and Legal RA's, but that the one area where improvement can be made is for the Commercial RA. Based on both the case study and the interviews, it can be claimed that they fulfill the requirements for handover to projects in the process manuals, but the question is rather whether the review of identified risk is sufficient. Despite that the Handover presentations reviewed in the case study included risks to varying degrees, the candidate stated: *"They do not go through the Risk Register or the RA's again"*, which indicates that they do not fully follow the process.

When asking the candidates how easy it is to access and find data within BA, both candidates answered that it is relatively easy for them, as they have been with the company for a while. However, for large projects, there are thousands of documents and there is not possible to sort and filter in DMS, so you have to know what you are looking for. This is unfortunate, especially with regard to new employees, as it is initially difficult to find data which highlights the need for a better system that provides easy access to information.

Furthermore, the second candidate pointed out that there is a lot which is saved within the minds of people in the company and on personal drivers, which is not readily available. In those cases where employees quit, important data may disappear with them and will never see daylight again, which is unfortunate. The candidate also outlined: *"It is a huge problem that there are so many places to store information"*. The first candidate added that, between project, they store things differently in the folders, and that it should be stored in DMS where they have a

document registration system. An improvement measure might be to implement document controls, which will improve this step. In addition, the data is generally stored many places, such as in the folder structure, SharePoint, the BMS system etc. The processes do not say anything about the BMS system, in fact it is not mentioned at all, which indicated that there exist some inconsistencies between governing documents and a need for a revision of the process manuals.

The fact that there are so many places where data can be stored, might prevent people from finding the data they need. The fewer places one can store things, the less likely it is for people to store it in the wrong place. Optimally, everything should be stored in one system, but this is time consuming and one cannot expect this to happen any time soon. As it seems like DMS and the BMS system does the exact same thing, it could be wise to get rid of one of them. The fact that Offshore AS has one place for projects and working documents, and one for generic documents, and that BA work in SharePoint while everyone else in the folder structure, might make it more difficult to access data. The system must facilitate efficient handling of documents so that RM can be effective.

6.2 Project Management and HSEQ

In this subchapter, the results of the Case Study and the interviews of the PM and HSEQ personnel are discussed against the document review of PM and RM manuals, and relevant theory. This subchapter is further divided in alignment with the PM and HSEQ interview guide, Appendix 2.2, where possible improvement measures will be discussed.

6.2.1 Handover

According to the process manual, the PM team should be included to support the BA process and activities. While going through the case studies, there was no evidence that the project team is a part of the BA process, it can therefore not be confirmed that the process has been fulfilled. Despite the results from the case study, the results from the interview had some mixed findings. It was stated that if resources were available, parts of the projects team would be included in the tender phase to assure that the risk was properly understood at an early stage in the project. Even though this is stated, there is no such evidence that this has been done, and even though it has, it is still not according to the process. The process clearly points out that the project team should be included in the tender phase and it is therefore not sufficient if it only occurs when the resources are available. Some of the projects that were investigated in the case study showed

that the projects were not in accordance with the budget or schedule, and this could might have been avoided if the project team had been involved in the BA process.

The process manual states that the BA department are answerable for planning and leading a project handover meeting with all relevant departments, and that all documentation is delivered to the PM team. From the case study the findings show that the handover meeting in all eight projects was carried out, but it is difficult to know if all relevant departments and personnel were present. It is challenging to confirm, as some of the projects lacked the handover sheet and/or MoM which is usually signed by those present during the meeting and is a part of the process. The handover meeting also shows that what BA present vary, and to what extent the various documents or presentations contained risk from the three different risk analyses BA had carried out. This may indicate that there is no procedure for what to be presented at the meeting or that it is considered to be insignificant to include. To transfer the risk throughout the life cycle of the project, it is important that all risks are considered important and that they are sufficiently documented.

The findings of the interviews indicate that most of the employees know the procedure for the handover meeting. It was also stated that top risks that BA has identified is introduced and added in the handover package. This contradicts some of the findings from the case study where there were few or no risks introduced in these meetings. One reason why the results are contradictory may be because there is different perception of what the project team feel is important and relevant to include in the project phase from BA. In the handover package submitted to the project team, the process manual states that there should also be a Risk Register in RMT, containing all the results of RA's identified by BA. However, it was stated that the project team initiates its own risk identification and includes some of the operational risks, and therefore it is not according to the process. During the case study, the RMT system was not found and the interview candidates confirmed that this tool does not exist and explained that the system was an attempt to create a common platform for Risk Register, LL etc. Since the RMT do not exist, it would be recommended to have a review of the process manuals to get them up to date.

The mobilization activities shall be conducted in agreement with the project-specific Mobilization Procedures. During the case study, no formal handover documentation from PM to operational was found, which the candidates confirms by pointing out that there is no

"formal" handover document. The document that is sent to the operation is normally a HAZOP report with procedures that are custom for each project. In the preparations of these documents, operations have been included all the way so that they are well acquainted with all the risks associated with the project. This shows that the process is facilitated to ensure that all employees have sufficient knowledge of the project. With this in mind, there is reasons to believe that the risk transfer between PM and operations works quite well, but there is always room for improvement.

The kick-off meeting should be performed in every project, and the study show that this is carried out in each project where most of them had a presentation which included HSEQ introduction and were documented with a MoM. However, the common denominator in the presentation is lack of LL and RA's performed by BA department, which may indicate that the process is not sufficiently followed and that important elements of the project are omitted. This may further indicate that the previous experiences and risks are not transmitted in a satisfactory manner, although it has previously been mentioned that all risks are not seen as relevant to transfer from BM to PM. The finding from the interview verify the results from the case study as it is stated that the kick-off meeting is not always done in a satisfactory manner. Another issue with transferring and including risks from BA may be that the two departments use different templates, which makes it difficult to easily adopt the risk into the PM Risk Register. In order to make this transfer more efficient and more integrated, the departments should utilize the same templates, which can lead to better utilization of the risks already identified by BA.

The kick-off meeting on Mobilization provides an overview of the work to be carried out, where an RA (SJA) is performed on each part of the work, and tool-box talk is performed and in this way the information reaches out to everyone involved. Findings from the case study show no evidence that any RA's or tool-box has been performed before work offshore, which may be because it is not sent to the office onshore. The problems this can cause is that it makes continuous improvement difficult and no opportunity to look back at former projects and see what kind of challenges they faced. As the tool-box talks tends to be written, it would mean that there would be a lot of paperwork for the onshore employees to handle, so a digital system where the various RA's could be stored might be a good solution.

In order to transfer the risk between the various departments and maintain a good risk culture, it is also important with a system that allows it. With that said, it should be a well-functioning

system that ensures that the documents are easy to access and easy to find in order to carry out the work required effectively. During the interviews, the candidates was asked how they felt the current system worked and the answers were quite mixed. Overall, the candidates said that they do not have access to documents from different departments, but accessing is not a problem, although it may lead to additional waiting time. Furthermore, the candidates elaborate that the documents are not stored in one platform which makes it time consuming and requires good knowledge and experience to be able to search in the systems. This may work in some cases, but other situations might require quickly access to documents, and therefore this system is not optimal. In order to make this system more functional, it requires that all the different departments have access to each other's documents in one common system. Having more than one system creates problems and confusion among employees, and the company should therefore invest some time searching for a system that would work for all departments. In addition, there should be firmer regulations on how the documents are named in order to make it easier to locate the documents. Also, when the methods used in the different departments and offshore are not comparable, it makes traceability and transmission difficult and unmanageable, and does not contribute to continuous improvement.

6.2.2 Level

Projects are classified according to predefined criteria based on the scope of the work and when PM is handed the project, the PEDR says that PM team must confirm the level BA decided for the project. When reviewing the previous projects, there was no documents showing that the level was confirmed by the PM, and the findings from the interview shows that there were no documents to indicate that this is being done. However, if the project team do not agree on the level that BA decided, the PM will give a feedback to BA, because the more comprehensive the project is, the more risk, and that require for more risk reducing measures. The process does not imply that confirmation of the level has to be documented, and because of that it is therefore not contrary to the procedure. On the one hand, it is important to know what level they are working on to meet the requirements set for different types of levels and confirm this before the work is started. On the other hand, it seems that the project team has a good dialogue with BA and either way conducts the RA's that are required for the highest level. On that basis, it may not be so important that the confirmation of level is documented.

6.2.3 Management of Change (MoC)

The company has developed and implemented a MoC process which defines how a change should be handled in a secure and cost-efficient manner. According to the process manual a comprehensive RA shall be implemented to accompany the CR. The findings from the case study shows that not all changes were made according to the process manual, as some changes were missing a RA and had a comment that said *"not applicable"*. This can be unfortunate as some changes may seem insignificant, but constitute a major change in the risk picture, such as starting a project before signing the contract, which can lead to major financial consequences. The candidates from the interviews confirmed the results by elaborating that when a RA is not conducted it may not be suitable, and in some cases, it is enough to clarify the change with the customer and get the customer to sign for the new change. Even though the changes might not lead to major consequences, there should nevertheless be a procedure everyone must relate to, so there is a consistent implementation of the changes. The process manual has a firm procedure on MoC, but since it is not always followed, there should be some documented rules implemented for the changes that can be omitted from the procedure.

When a change has occurred, it is important to communicate this to all relevant personnel. For example, a candidate explained that if there is a change in the procedure, the operational workers who conduct the procedure will contribute during the RA and conduct a toolbox talk. It is further explained that before the job is conducted, all hazards are evaluated and communicated to the operational workers to assure that they are fully informed. The review of the change and the following risk may entail that it is a good way of ensuring that the workers know what risks they are exposed to, and thus allow them to take extra caution during the work. It can therefore be said that this part of the process works satisfactorily.

As for the employee's experience with the MoC process, there are some mixed answers. Some of the candidates see the process as straightforward and simple, while other see challenges with the process. One challenge is that it is not enough traceability, and it is difficult to determine which changes that have actually been made since it is not defined where it should be stored. The underlying reasons for these challenges may be that there is not a good system for storing the documents making it difficult to track them, and since some of the changes do not follow the correct process, it is even harder to locate the changes. Another challenge is that the organization is not properly set, leading to missing managers and it is not always defined who is responsible for approvals that must be signed. Another candidate stated that over the last

couple of years the candidate has tried to define good role descriptions and responsibilities in the project to assure that key personnel know what is expected from them. For these role descriptions and responsibilities to be useful, it is also important to have a clear overview of those in top management. Although the organization is not set properly, it should however be established a temporary organization so that is clear who has the top responsibility when signatures are needed to be signed.

As time is a big challenge in projects, there is often very little time for the operational workers to read through all of the papers that deals with changes, and one candidate stated that his impression is that most of them do not read all of them before they are sent to mobilizations. This may be unfortunate if the project involves something that is out of the ordinary, and for that reason highlights that the documents that the operational shall review must be as simple as possible. The expression "less is more" might be a good example in this case. If the workers are handed a large number of documents, they might not be capable to sort out the most important changes in that short period of time, therefore it could be better if they get a small document with only the information that are crucial for them to know.

Even though the MoC process has just been improved as mentioned earlier, there are always room for improvement, and with that said, it needs to be more integrated into the daily routine. A candidate elaborated that offshore workers are getting better on using it as a tool, but the rest of the company has some work ahead of them to make it part of their daily operations. Also, if the MoC process should be implemented and integrated as a part of their daily operations, it is important that is easy to handle and not time consuming. All of the MoC documents should also be stored in one place and filed under each project to make it easy to locate.

6.2.4 Lessons Learned Process

To prevent former mistakes from happening again, it is important to have a LL Process that is included in every project, and according to the process manual, LL must be capture and assessed. The LL Process shall be recorded in RMT, but as mentioned earlier RMT does not exists and is therefore not in alignment with the process manual. This is unfortunate as an Electronic Risk Management Tool could help Offshore AS to identify, assess and manage risks from the initial stages of BA throughout the life cycle of the project. This include, capturing LL that can be fed back into the business for continuous improvement in mitigating and managing risk.

Therefore, Offshore AS should consider whether to implement the tool or look for an alternative solution. The findings from the case study also indicate that there is no process for LL, even though previous LL have been conducted and sometimes included in Kick-Off meetings etc. It is confirmed in the interview that there is no formal or specific procedure for LL, and this might be a disadvantage as each project manager can choose the procedure. In this way, the LL Process will not be consistent between the different projects relating problems in inconsistencies regarding how the documents are created and where they are stored. A structured process using the same templates should be prepared in the process manual to ensure that all employees use the same method and contribute to the process being consistent. Capturing LL is a frequent strategy to transfer knowledge between projects and having a LL Process will help Offshore AS to convert tacit knowledge into explicit knowledge and make the knowledge available for future reference. To effectively enable this, Offshore AS should focus more on personal contact, regular interaction and trust.

There is a united desire for a better system, but at this point the company has pressure on time and resources, and thus less time is spent on LL, in addition to what the client requires varies. On large projects, the client is usually invited to a very formal LL Workshop, and the candidates stated that this is an activity they are managing. However, in the recent the large-scale workshops are downsized as a consequence of the high cost and they perform less formal options as brainstorming internally. Scaling down the workshop is not necessarily an issue, the most important is that the experiences gained in the project are thoroughly reviewed and documented. Another issue regarding the process is that the requirements are the same for small and big project, which can lead to problems as the company sometimes are lacking available resources. One idea may be that the LL Process are classified according to what level the project is, which can lead to more available resources and that no unnecessary time is spent on standardized projects with little associated risk.

For the conducted LL documents to be useful, it is also important that they are used when starting a new project. In order for this to be accomplished, the former LL documents must have a fixed storage point and be easy to access. When reviewing previous projects, it was difficult to locate all of the LL documents, and they were not stored consistent, which was also verified during the interview. The candidates elaborated that to find the appropriate LL for the ongoing project, you either have to have good knowledge about previous projects, or the ability to ask a coworker if they can recall some similar projects. This method does not provide easy access to

previous LL and is also time consuming. To be able to get a more functioning system, the previous LL should be stored in one system and be tagged with keywords to make it easier to find a specific LL document. Tagging each LL document with keywords will provide an easier and a quicker search to locate the appropriate document. For example, this may be if you are looking for å particular work task or a particular equipment, you can search with a specific keyword that provides all previous documents with LL from this particular work operation or equipment. This may be a better way of using previous LL and it will also be easier to include it in the ongoing project. Although a LL Review after completion of the project is good for the project team, both in terms of positive and negative experiences, it is of little use for the upcoming projects if the documents are not easy to locate.

6.2.5 Process Risk

According to the process manual, a readiness review meeting shall be held with key personnel to review all relevant concerns related to the project, and a checklist must be constructed to provide a short report of the business readiness. Findings from the case study shows that in six of eight projects this is done. The candidates from the interview elaborated that the checklist is outdated and not relevant for all projects, but it gives an indication of the important tasks in the projects. The result of missing checklists or poorly fulfilled checklists can be explained by the fact that candidates lack an understanding of the checklist's usefulness. The checklist refers to outdated documents and is not directly adapted to the projects in Norway, which is unfortunate as it could be a useful tool making sure every parts of the project is ready before mobilization. The checklist should therefore be revised and updated. Another candidate pointed out that although the process manual describes what is to be done, the customer's contract and their requirements are often emphasized the most.

The checklist is to ensure progress in the project and takes the user through critical things that must be in place before the operation starts, and if there are any outstanding items these should be actioned or mitigated. The candidates further elaborated that the routines before mobilization is perceived as good, and the customer sometimes require multiple crossings of the checklist. Further it is explained that the time is an important role when it comes to how thorough the review is conducted. Again, time is a dependent factor in how the company operates on RM, but in this case it might not be as crucial if the Risk Register is regularly updated.

According to the process manual, if the readiness review checklist is not performed, a pre-execution RM can be conducted as an alternative. In two of the projects where the readiness review checklist was not performed, there were no evidences that an alternative RA had been performed instead. A cause might be that some of the personnel have not familiarized themselves well enough with the process manuals, as one of the candidates was not familiar with the alternative option. Another reason may be that there is no formal way of documenting whether you have performed an RA instead of the usual Readiness Review Checklist, which may be the reason why the authors could not locate any alternative RA's. Therefore, the result for the case study may differ from reality, but on the other side, one of the candidates outlined that they often proceed even though the Readiness Review is not completed or insufficiently done, which reinforces the results from the case study. Another challenge might be how the company manages the risk transfer, if the checklist is not implemented. The results clarify a need for, first and foremost, revise and update the project manuals and then familiarize all personnel reading this topic.

Each project shall be subjected to a RA study before start-up of operations and according to the process this should be either HAZOP, HAZID or HIRA. Nevertheless, the process does not describe which one to use and the results from the case study shows that there is a variety in which of the RA's that are conducted. In some of the projects, several RAs have been carried out with a corresponding report, while in others, only one RA has been performed and in some cases the report is missing. This shows that there is no clear and consistent way of performing this although it is performed in alignment with the process. Further on, the RA's are filed in DMS and are often included in the Risk Register which enables the project team to follow up the risk throughout the project.

The candidates from the interview verified the findings from the case study, and also adds that which RA that is performed is often depending on customers requirement. Another candidate states that DNV guidelines describes which risk methods to use and it is very clear how to proceed, as well as the customers are well familiar with it. Using the same methods and terminology as the customers may improve the risk transfer and understanding between the two parties. The use of DNV guidelines provides a good approach to the ISO 31000 standard that the company has used as a basis in its processes, and by implementing these policies and descriptions in their processes, it can improve the understanding of how the risk should be managed. The basic idea behind a precautionary principle is to be up to date on the development

and knowledge of what a solid risk management is. By implementing the new and improved ISO 31000 standard, Offshore AS will comply to the precautionary principle.

On-Site RA is usually referred to as SJA analysis along with a tool-box talk and the impression from these activities is that they work for their purpose, except that they do not contribute to continuous improvement as they are rarely sent onshore. As previously discussed, these should be filed in a system so that the onshore team can access them.

Chapter 7 Conclusion

The purpose of this thesis was to study if Offshore AS's process manuals are adhered to and sufficient to manage risk throughout the project's life cycle. To address this, the master thesis was split into two research questions:

- *How does Offshore AS manage to transfer the risk from the tender process to completion of the project?*
- *How can Offshore AS optimize the risk management from tender process to completion of the project?*

The research question was answered by performing a case study and qualitative semi-structured interviews with relevant candidates from different departments in Offshore AS. The findings from these methods were presented in chapter 5 and analyzed in chapter 6 in relation to document review and theory presented in chapter 2 and 3 respectively. This chapter will be divided into three sub chapters, where the findings regarding the first research question will be summarized in sub chapter 7.1, while the findings regarding the second research question will be summarized in sub chapter 7.2. The last sub chapter will present suggestions for further work.

7.1 How does Offshore AS manage to transfer the risk from the tender process to completion of the project?

The evaluation of Offshore AS shows that they satisfy the processes to a large extent and many of the principles for good RM are implemented. At the same time, the processes are not always adhered to and there exist signs of errors and weaknesses which convey that the processes are not optimal and need improvements. The procedures and guidelines in the processes are not adequately described, which leads to inconsistency on how activities are interpreted and executed.

The risk transfer between the different departments is somewhat discontinuous. In addition to the fact that PM and HSEQ are rarely included in the preparation of the tender, BA seldom prepare a Risk Register which is to be transferred to PM and HSEQ. This, together with the departments using different RA templates, causes the risks identified by BA to be ignored when PM conduct their RA's. The fact that RMT does not exist, along with the Handover presentation

only includes risks and LL to a varying degree, limits the transmission of the risks and RA's to PM. It is therefore concluded that the risk transfer between these departments is not optimal and needs improvement. The risk transfer between PM and operation is satisfactory, but documentation in the system and feedback to PM is somewhat weak. Furthermore, PM does not prioritize giving feedback to BA, when something BA has bid do not match reality. As time is often limited, capturing LL throughout the project lifecycle is not prioritized nor sufficient within Offshore AS. This is unfortunate as it is an important part of the risk transfer and limits the continuous improvement process.

In order for the risk transfer to be improved between the departments, it is important that the processes that have been set are followed and that they are prioritized independently of available resources.

7.2 How can Offshore AS optimize the risk management from tender process to completion of the project?

In a company like Offshore AS with large amounts of data that are being processed at an ever-faster pace, there is a need for a well-function RM system that enables them to identify and manage risks, in addition to support the decision in addressing risk. Because the society is constantly changing, it also requires Offshore AS to focus on continuous improvement to optimize their RM.

In order for Offshore AS to be able to improve and optimize its RM, some measures should be implemented. To achieve an efficient RM, the company should examine the possibilities of either improving one of their current systems or look for a better system for managing and storing data. Optimally, there should only be one system, which is available and adapted to the different departments through a solid training program on how to use it. In addition, it should include a sorting and filtering function, opportunities, document control, registration of actual events and a notification function that clarifies when someone has updated or changed documents. Furthermore, it should involve a function that makes it possible to enter and search for keywords such as client, field, vessel, type of project etc. and receive all relevant information. To enables this, it is recommended to implement a naming standard that supports common terminology.

It is also recommended to revise and update the process manuals in addition to carry out a comprehensive training program to achieve a unified understanding of the processes, responsibilities, and content. The manuals do not match reality and contains some inconsistencies as discussed. Despite the fact that the process manuals outline RMT, LL Process and LL Database, it does not exist within Offshore AS. In addition, the processes do not mention anything about SharePoint, level 0 or the BMS system. Furthermore, the manuals are somewhat weak in defining and describing activities, procedures and role responsibilities. It is therefore recommended to implement a Project Controller function that is responsible for revising the process manuals.

Another recommendation is to apply and include a detailed description of the LL Process that support continuous improvement, to capture, analyze, store, disseminate and reuse lessons throughout the project lifecycle. For this, one need support from the organization and the top management. Furthermore, the process should facilitate the conversion of tacit knowledge into explicit knowledge to make the knowledge available for future reference. It is also recommended that Offshore AS implement and utilize a LL Database where relevant and timely lessons are stored and accessible. All personnel must be trained on how to use it.

Offshore AS should improve and update the RA templates. The entire set up should not be based on predefined questions, as this often leads to not taking all possible risks into account. However, a guide sheet with question in addition is recommended for inspiration. Furthermore, the authors suggest a pre-set RA document for different types of tenders. All departments should utilize the same RA templates, as this will ease the risk transfer. PM should go through the RAs created by the BA department and transfer the risks that they did not identify and mark of what is actually taken over and give feedback to the BA department on those they have not identified. For the RA's to be valuable, it is recommended to have aligned training for how to use the RA's and how to use the "product" of the actual RA. In addition, to make sure the content in the RA's is accurate and faultless, it is favored that HSEQ is the owner of the formats.

If Offshore AS implements the above measure, it can help them to improve their risk transfer and management. By looking at the current situation as shown in Figure 8, the risk transfer circle will be more coherent and continuous as shown in Figure 9, if they manage to implement and improve their RM.
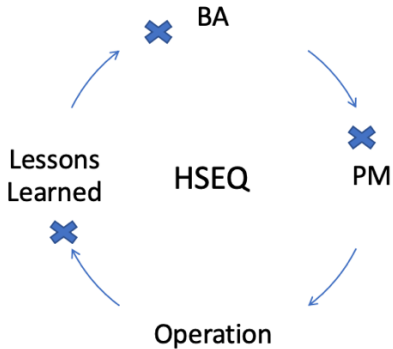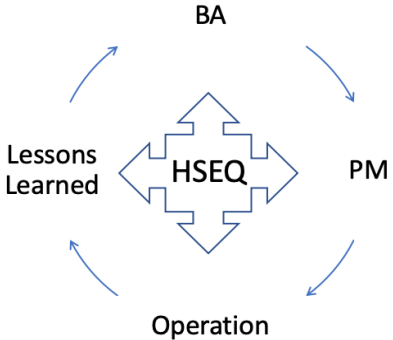

Figure 8: Current situation

Figure 9: Situation after implemented measures

7.3 Suggestions for further work

In this subchapter, there will be given suggestions for further work that is recommended that Offshore AS look into to improve their RM in the long term.

Implementation of the new, revised ISO 31000:2018 standard

Offshore AS has implemented ISO 31000: 2009 in their process manuals. This year, on the other hand, a new and revised version of the standard, ISO 31000: 2018, was introduced, which places particular emphasis on the involvement of the top management and the integration of RM in the company. It is therefore recommended that Offshore AS works towards the implementation of the new, revised standard. To satisfy and adapt the standard as much as possible to their processes, they can in addition apply recommended practice from DNV GL.

Implementation of a risk tool

In order for Offshore AS to be able to improve and optimize their RM, it can be an advantage for them to apply a risk tool. As they already use DNV GL, they should investigate if Synergi Life from DNV GL could be a suitable tool. This tool serves as a complete Risk & HSEQ management information system that are available on components such as workflow, mobile apps, dashboards and reports as standard features (DNV GL, 2019). It will equip Offshore AS

with business units and management with the essential information needed to manage to avoid unacceptable risk, share previous LL and handle corrective measures and actions.

The need for seeing beyond expected values and probabilities

As the scientific field have switched from describing risk in regard to probability to describing the risk in regard to uncertainties, the authors recommend Offshore AS to see beyond expected values and probability as they can camouflage uncertainties. Offshore AS should focus on assessing and discussing uncertainty to a larger extent as well as adopting a broad risk description which covers risk numbers, sensitivities and uncertainty factors. In addition, Offshore AS should address and describe the background knowledge that the probabilities are based on. Furthermore, Offshore AS should include uncertainty analysis at the same rate as risk analyzes.

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Appendix 1 Deliverable templates

1.1 Tender Deliverables & Review Template

This table 12 illustrates the procedure that was used during the analysis of the various projects in the Business Acquisition department.

Table 12: Tender Deliverables and Review Template

Tendering Deliverables & Review (DSA-BA-TP-054)				
	Project Level		**X**	**Focus area for thesis**
	Activity *(Identify required activities and reviews to be completed)*	**Document No.**	**Vessel Charters or Minor IMR Campaign**	**Areas that spesifically focus on risks**
Deliverable Requirements	Bid / No-Bid	DSA-BA-TP-039	√	
	Capture Plan	DSA-BA-TP-064	√**	
	Tender Responsibility Matrix	DSA-BA-TP-053	√	
	Tender Kick-Off (Local)	DSA-BA-TP-046	√	
	Tender Kick-Off (Corporate)	DSA-BA-TP-046	Level 3 & 4	
	Risk Assessment - Legal Contractual	DSA-BA-TP-033	√	
	Risk Assessment - Commercial Contractual	DSA-BA-TP-055	√	
	Risk Assessment - Technical Contractual	DSA-BA-TP-056	√	
	Insurance Review	DSA-BA-TP-035	√	
	Cost Estimate	DSA-BA-TP-051	√	
	Tender Readiness Review	DSA-BA-TP-052	√	
	Tender Board Review Presentation	DSA-BA-TP-049	Level 3	
	Tender Board Review Commercial Memo	DSA-BA-TP-057	Level 3 & 4	
	Tender Approval / Authority To Commit	DSA-BA-TP-001	√	
	Handover to Projects	DSA-BA-TP-058		
Preliminary Review	Strategic Review		√	
	Lessons Learnt Review		√	
	Constructability Review		Level 3	
Tender Submission Review	Schedule Review		Level 3	
	Project Management & Engineering Review		√	
	Method Statement Review		√	
	Qualifications Review		√	
	Finance Review		√	
	Independent Peer Review		Level 3	
	Cost Review		√	
Approval Review	Regional Review		√	
	CEO Review		Level 3	
	Board Review		Level 3 & 4	
	Tender Debriefing Review (Failed Tender)	DSA-BA-TP-030	√	

1.2 Project Execution Deliverables & Review Template

This template illustrates the procedure that was used during the analysis of the various projects in the Project department.

			Project Execution Deliverables & Review Template (DSA-PJ-TP-035)			Project No.	Focus area for thesis
			Project Level		X	X	
			Activity (Identify required activities and reviews to be completed)	**Document Type**	**Document No. / Deliverable Reference**	**Vessel Charters or Minor IMR Campaign**	**Comments** (Reason for deviation; additional or removed activities)	**Areas that specifically focus on risks**
Project Life Cycle	**(Controls & Reviews)**		Project Managers Report (PMR)			√		
			PMR Review (To Management)			√		
			Risk Register			√		(shaded)
			Feedback To Tendering			√		
			Schedule Review			√		
Stage 1 – Business Acquisition	**Phase 1 – Commercial Handover**	1,1	Commercial to Project Handover	Calendar invite		√		
		1,2	Handover Documentation	Handover sheet		√		(shaded)
		1,3	Record of Handover Meeting	Minutes (handover sheet)		√		(shaded)
		1,4	Confirm Project Level	Signed off version of project deliverables & review		√		
Stage 2 – Project Management	**Phase 2 – Project Kick-Off**	2,1	Establish Project Team			√		
		2,2	Internal Project Kick-Off Meeting	Presentation		√		(shaded)
		2,3	Interface with DOF Affiliates	Minutes of meeting				
		2,4	Kick-off meeting with key subcontractors	Minutes of meeting		√		
		2,5	Client Project Kick-Off Meeting	Minutes of meeting		√		
	Phase 3 – Project Preliminaries	3,1	Project Execution Plan	PEP (including HSEQ and audit schedule)		√		(shaded)
		3,2	Project Organisational Chart	Org chart		√		
		3,3	Design Basis	Document				
		3,4	Inspection & Verification Plan					
		3,5	Project Supply Chain Management	Document		√		
		3,6	Sub-Contractors Kick-Off Meeting	Minutes of meeting		(shaded)		
		3,7	Project Schedules	Document				
		3,8	Project Budget			√		
		3,9	Invoicing Schedule			√		
		3,10	Project Documentation Registers			√		
		3,11	Tax Management Plan					
		3,12	Contract specific plans (as appropriate)			(shaded)		

Table 15: Project Execution Deliverables and Review Template

Stage	Phase	No.	Description	Deliverable			
	Phase 4 - Constructability	4,1	Methodology Review	Agreed baseline methodology / review report			
Stage 3 - Engineering, Procurement & Construction	Phase 5 - Project Preparation	5,1	Master Document & Drawing Register (MDDR)	MDDR	√		
		5,2	Action Tracking Register	Register	√		
		5,3	Technical Queries Process (TQ)	Register			
		5,4	Variations Process (VO)	VORs / VOs	√		
		5,5	Management of Change Process (MoC)	MoCs	√		
		5,6	Non-Conformance Process	NCRs	√		
		5,7	Lessons Learned Process	RiskView record	√		
		5,8	Feedback to Tendering Process (FTT)	FTT forms	√		
		5,9	Project Manager's Report	PMR	√		
		5,10	Interface Management				
		5,11	Internal Interfaces	Minutes / Action registers			
		5,12	External Interfaces	Minutes / Action registers			
		5,13	Document Management	ProArc records	√		
		5,14	Engineering Design & Drafting				
		5,15	Installation Engineering				
		5,16	Procedures		√		
		5,17	Equipment Lists		√		
		5,18	Fabrication	Fabrication reports			
		5,19	Subcontractors				
		5,20	Procurement & Logistics		√		
		5,21	Mobilisation & Demobilisation Plans		√		
		5,22	Project Personnel		√		
		5,23	Hazard Identification and Risk Assessment (HIRA)		√		
Stage 4 - Operations	Phase 6 - Project Readiness	6,1	Project Readiness	Project readiness review sheet	√		
		6,2	Vessel readiness	Vessel readiness review sheet			
		6,3	Subcontractor Readiness Review	Subcontractor readiness review sheet			
	Phase 7 - Project Mobilisation		All Mobilisation activities will be performed in accordance with the project specific Mobilisation Procedures / Plans. The procedures / plans will be used to co-ordinate the following, but not limited to, activities:		√		
	Phase 8 - Project Execution		All activities will be performed in accordance with the project specific plans and procedures and the relevant Operations Manual (Vessel, Survey, ROV or Diving). In addition to complying with agreed corporate approved procedures.		√		
	Phase 9 - Project Demobilisation		All project personnel shall be demobilised as soon as their responsibilities and duties associated with the project are completed. All Demobilisation activities will be performed in accordance with the project specific Demobilisation Procedures / Plans.		√		
	Phase 10 - Project Completion		At the physical (Practical) completion of a project, the project close-out activities will commence. The Project Manager is responsible for identifying all items that remain to be completed, in accordance with the Project Close-Out checklist (DSA-QA-TP-034).			DSA-QA-TP-034	
		10,1	Completion Report				
		10,2	As-Built Reports		√		
		10,3	Lessons Learned		√		
		10,4	Subcontractor Close-Out				
		10,5	Variation Orders		√		
		10,6	Invoicing Schedule				
		10,7	Customer Feedback Survey		√		
		10,8	Marketing Datasheet		√		
		10,9	End of Project Performance Appraisal				
		10,10	Project (Legal) Close-Out		√		
Stage 5 - Project Close-Out	Phase 11 - Project Close-out		Project Close-Out is the final phase of the project. This phase is predominantly administrative and may take place after the project team has been redeployed.				
		11,1	Contractual Closure		√		
		11,2	Project Number Closed		√		

Prepared by	Name, Signature and Date	Management of Change *(where applicable)*
Project Manager		

Approval	Name, Signature and Date	
Regional Project Execution Manager		

Appendix 2 Interview Guide

2.1 Interview Guide Business Acquisition

Category	Question
Introduction	- A short introduction about the master thesis and the authors - Formalities about the interview - Interviewees background and position in the firm
Risk Assessment	- Are the RA's (templates) optimal and suitable for all types of tenders? - If no, why? - When performing a RA is BA collaborating with the HSEQ department? - How is the RA's documented and filed? - Who is responsible for identifying risks in tender?
Level	- Can you explain on what basis the level is chosen? - Is the process clear on how to choose level? - If any changes occur, will the level be reevaluated and updated? Or if the level chosen turns out to be too low/high, what do you do then? And how is it documented?
Qualifications Review	- When recording qualifications throughout the tender phase – are the risk assessments reevaluated and updated to show the actual risk in the project? - If no, why? - Which consequences can this lead to? - If there is a significant change in risk profile during the clarification process, how do you review and update the risks identified in the assessments?
Lessons Learnt Review	- How are previous lessons learned from tenders applied in a new tender? - Is it easy to access previous lessons learned documents? - How are the lessons learned communicated to all relevant departments? - How is a lesson learned supposed to be documented and stored?
Tender Readiness & Tender Board Review	When reviewing previous projects, we could only find two readiness reviews. Is there any particular reason that this is not conducted?
Risk Transfer	- How is the risk communicated from BA to project and operation? - In general, how easy is it to access and find the data/information you need? - What about data/information from the other departments? - How is data/information stored? - Are there any current challenges in transferring data regarding risk between the different departments?
Finishing	Anything to add?

2.2 Interview Guide Project Management

Category	Question
Introduction	- A short introduction about the master thesis and the authors - Formalities about the interview - Interviewees background and position in the firm
Handover	- Can you describe how handover from BA to Project is performed? - How is the risk from BA followed up in the project phase? - When reviewing previous projects, there was lack of documents of the handover from project to operation. How does the project management transfer documents regarding risk to operation, and how is this documented? - Can you describe how the Kick-Off Meeting is performed? - How is the risk identified in BA communicated and documented to the project team? - In general, how easy is it to access and find the data/information you need? - What about data/information from the other departments? - How is data/information stored? Are there any current challenges in transferring data regarding risk between the different departments?
Level	- How is the Project Level confirmed? - What do you do if the project level is not correct?
MoC	- Can you elaborate how changes are managed? - Do you use RA's to determine whether or not you are allowed to implement the change? - If no, is the change added to the Risk Register? - How is the change(s) communicated to all relevant personnel? - Are there any challenges with the MoC process?
Lessons Learned Process	- Are you familiar with and can you elaborate the Lessons learned process? - Is there any register where lessons learned documents can be archived and is it easy to access and find lessons learned from similar projects? - At the completion of a project one activity that should commence is Lessons Learned Workshop. Can you describe how this is conducted and documented?
Process Risk	- How do you ensure project readiness prior to operations? - The Project Management manual states that a project readiness review shall be held in form of a project readiness review sheet and/or a pre-execution risk assessment. How is this performed and documented?

	- If the readiness review is not completed or insufficiently done, how is it then decided to move on with the project? ● Offshore AS has a variety of selected methods for risk management (HAZOP, HAZID, HIRA) within project management and On-Site RA within operations. Is there any process for which risk assessment to conduct when? If not, should it?
Finishing	● Anything to add?