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VALUE OF RISK MANAGEMENT

Master Thesis in Risk Management by

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ABSTRACT

The overall aim of this study was to discuss the validity of the hypothesis that risk management contributes with added value to projects and the enterprise holding the projects, and consequently to the enterprise's stakeholders.

To examine this hypothesis, a case study of three projects taken from the same portfolio at Statoil was selected. The projects were said to have an active risk management. Data was collected from the project's documentation as well as interviews. The interviews were qualitative and conducted with four respondents: the project managers of the projects, the project control manager of the portfolio and the portfolio manager.

The findings of this study support the hypothesis that active risk management in projects does add value to the projects, the enterprise holding the projects and their stakeholders. The dimensions of value referred to here are monetary values (reflecting material worth) and non-monetary values (reflecting intrinsic worth), and benefits of risk management (describing the risk management's usefulness or usability). It was found in the study that main contributions to added value came from risk management serving as an aid to manage the project, as well as its impact on managing threats, seizing opportunities and Health, Safety and Environment.

The findings of the present study may have implications for future practice and work. They indicate that the ability to adapt a holistic view and see the "big picture" at all levels in the enterprise is another factor that might add value to the enterprise. However, this was seen as an area of potential improvement. And finally, increasing the competence and experience of the participants in the projects and those involved in the risk management process, might enhance the overall value of risk management.

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TABLE OF CONTENTS

1. INTRODUCTION

1.1. Background

In order to gain something, every enterprise needs to take some risk. Risk management is not only necessary for reducing risks and the associated uncertainties, but through risk management one is also able to discover and seek opportunities. Risk management can be defined as all measures and activities carried out to manage risk (Aven 2008). It has been widely recognised that successful management of uncertainty is largely linked to a project's or an enterprise's success. Risk management impacts a full range of areas in an enterprise, from financial impact, production impact to impact on health, safety and environment and so on. Thus, one should think that risk management should be of some value for a project, the enterprise holding the projects and their stakeholders. But what *is* this value of risk management? And what is the value of risk management for the stakeholders in a project or an enterprise?

In the event of a severe accident on an oil platform, the results could be major financial losses in terms of production downtime and increased costs for cleaning up after the accident. These are losses that are relatively easily estimated in NOK. Other non-financial impacts might be more difficult to estimate in exact monetary values. How would an accident affect an enterprise's reputation? How does one value a human life or the adverse effects an accident might have on the environment?

The term "value" may not necessarily be limited to be seen as the worth of something measured in money. Value can be used to describe the quality of a thing in relation to its usefulness or something that is worthy of esteem for its own sake (Guralnik 1979). Hence, the value of risk management should not be limited to only be measured by its equivalence in money, but *value* in terms of its usefulness and something having intrinsic worth, should be included.

When doing a literature review on the subject "value of risk management", little theory and few empirical studies were found. The literature was mostly related to the use of financial risk management tools. Hence, there seems to be a lack of theory and empirical studies that have examined *how* and *if* value is added through risk management.

Statoil ASA is one of the world's largest enterprises in the oil and gas industry. Embedded in the corporate values is an aim "to understand and manage risk" and a commitment to a zero harm philosophy: "to cause zero harm to people and prevent accidents". The main goal of the enterprise's risk management is to understand and manage risks with financial impact on Statoil's cash flows, risks related to integrity events, such as fraud and corruption, and Health, Safety and Environment events, in order to support the achievement of the corporate objectives (*Risk management and control* 2010; *The Statoil Book - version 3.0* 2011).

1.2. Aim of the Thesis

The overall aim of this thesis is to discuss the validity of the hypothesis that risk management contributes with added value to projects and the enterprise holding the projects, and consequently to the enterprise's stakeholders.

The specific aims are as follows:

- To explore and describe how value is added through risk management in projects that are considered to have an active risk management

- To describe and discuss how the added value through risk management in projects, is of value to the enterprise and its stakeholders

- To illuminate ways of enhancing the value of risk management and see if there are areas in the risk management process that have been overlooked, and need improvements.

1.3. Content

The first chapter gives an introduction of the thesis, the background and the aim of the thesis. In the following chapters, Chapters 2 and 3, knowledge is presented that is necessary to understand the aim of this thesis (Chapter 1), the method chosen (Chapter 4) and the empirical findings (Chapter 5). Chapter 2 also provides the basis for the discussion of the empirical findings in Chapter 6.

In Chapter 2 the theoretical background of this thesis is given. Definitions and explanations of key concepts used in this thesis are provided, together with relevant theory and literature and related studies. In Chapter 3 an overview of risk management in Statoil is presented. Chapter 4 examines the selected case study of three projects at Statoil and describes the method used in this thesis to arrive at the empirical findings presented in Chapter 5, while the method and the empirical findings are discussed in Chapter 6. A summary of the discussion and concluding remarks are also given in Chapter 6.

2. THEORETICAL BACKGROUND

The first section of this chapter comprises definitions and explanations of key concepts used in this thesis: Risk and risk management, threats and opportunities and the concept of value. Further on, literature and related studies relevant to the thesis, seen in the light of the earlier defined concept of value, are presented. A summary is given at the end of this chapter and an outline of areas that are not covered by earlier research is provided.

2.1. Definitions and explanations

2.1.1. Risk and Risk Management

Every day we make decisions that involve *risk*. This may be decisions related to financial risks, risks to limbs and life and risks that in other ways affect us. We may not know what the outcome of a decision will be, and there is an element of uncertainty as to whether the outcome will turn out to have a positive or a negative impact on us. Uncertainty about the consequences of an activity must be seen in relation to the severity of its consequences, severity referring to intensity, size, extension and so on, with respect to something humans value (Aven 2008; Wilson & Crouch 2001). The phrase " no pain, no gain", used in the everyday speech, indicates that in order to get what you want, something that is of value to you, you have to take a chance and play the game. The risk needs to be measured against the benefits, and some decisions are easier to make than others. Sometimes the consequences of the different solutions to a decision problem are known and one solution stands out as the best choice compared to the others. Other times, when there are uncertainties involved, the consequences are not as clear to us and make the decision making more difficult. This is where *risk management* becomes important: when dealing with decision making under uncertainty.

Smoking cigarettes and the process of developing cancer can serve as an example of risk and decision making. A smoker knows that he is at a higher risk of developing lung cancer than a non-smoker, and that there is a higher risk for a heavy smoker than a light smoker. However, he does not know if he will develop lung cancer at all, there is some uncertainty involved. The consequences are unclear and the smoker can choose to stop smoking, cut back on the daily cigarette consumption or continue as usual. This has to be measured against the "pleasure of smoking"- the benefit for the smoker. Both risk and uncertainty will also change with time. If

the smoker does develop cancer, the risk of dying of cancer will change, but it is still not certain that the smoker will die, and based on this knowledge the smoker has to make new decisions (Wilson & Crouch 2001). This also shows that risk management needs be an on-going task where risks are constantly monitored.

The definition of risk and risk management adopted in this thesis is in accordance with Aven (2008). Risk is understood as a combination of future events A, the consequences (outcomes) C of these events and the affiliated uncertainties U, associated with both A and C. Risk management is defined as all measures and activities carried out to manage risk, this includes all types of risks and is related to all activities, conditions, events and more that can affect an organization's ability to reach its goals and vision.

2.1.2. Threats and opportunities

Risk has traditionally been viewed as something negative and undesirable. When asked, the man on the street would usually see risk as "bad for you" and risk has represented loss, hazards, harm, danger and unwanted consequences – a threat. But the outcome or a consequence of an event may be negative for some and positive for others, and it is clear that if or when uncertainty strikes, it can have a range of effects on an organization's goals, from a total disaster to an unexpected welcome surprise. More recent theory has wanted to include the upside of a risk; as an opportunity, where uncertainties have a positive effect on an organization's goals. According to Hillson (2002) there are two options in how one can include the positive aspects in the definition of risk. The term "risk" can entail both opportunity (risk with a positive effect) and threat (risk with a negative effect), or risk can be viewed exclusively as a threat (an uncertainty with a negative effect), whereas opportunity is seen as an uncertainty with a positive effect. In this thesis the term "risk" refers to both threats and opportunities (Aven 2008; Hillson 2002).

Throughout the risk management process, focus should be held on both threats and opportunities, and both should be managed. Opportunities and threats are seldom independent, even though they sometimes can be treated separately. The two sides of a coin can serve as an example. Only one of the sides can be examined at a time, but they are not independent when it comes to tossing the coin. Often there is a solution to a decision problem that simultaneously offers a way to minimize threats and seize opportunities, which can provide an improvement in performance (Ward & Chapman 2003).

2.1.3. The concept of value

The *Webster's New World Dictionary of the American Language* (Guralnik 1979) offers various definitions on the term *value* that are relevant to how value is used in this thesis:

(1) A fair or proper equivalent in money, commodities, etc., esp. for something sold or exchanged; fair price or return.
(2) The worth of at thing in money or goods at a certain time; market price
(3) Estimated or appraised worth or price; valuation
(4) Purchasing power [the fluctuating *value* of the dollar]
(5) That quality of a thing according to which it is thought of as being more or less desirable, useful, estimable, important, etc.; worth or degree of worth
(6) That which is desirable or worthy of esteem for its own sake; thing or quality having intrinsic worth

Definitions (1) – (4) are related to material values that can be expressed in terms of money or some other medium of exchange. In this thesis, the definitions (1) - (4) are referred to when speaking of *monetary values*.

According to Webster's New World Dictionary, the terms "worth" and "value" are used interchangeably when applied to the desirability of something material, while the term "value" suggests the excellence attributed to something with reference to its usability and importance. This is in line with definition (5). When speaking of value, as in the usefulness or usability of risk management, the term *benefit of risk management* is used in this thesis.

The definition given in (6), of something having intrinsic worth and which is desirable or worthy of esteem for its own sake, is applied in this thesis when speaking of *non-monetary values*.

2.2. The value and benefits of risk management

It has been widely recognized that a project's or an entity's success depend on the management's ability to manage uncertainty when seeking to steer towards the desired goals, which has led to the popularity of risk management. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) has provided a framework for enterprise risk management. The framework links an entity's goals, which an entity strives to achieve, to enterprise risk management components which are needed to achieve the goals. In COSO (2004) it is stated that every entity, profit or non-profit, essentially exists in order to provide value for its stakeholders. This value for the stakeholders can be seen in relation to the earlier mentioned different concepts of value: Benefits of risk management, monetary and non-monetary values.

Faced with uncertainty, the entity's management has to determine how much uncertainty the entity can accept as it strives to develop stakeholder value. Management decisions in all activities will affect value creation, preservation and deterioration in the entity. *Value is created* when resources such as people, capital, technology and brand, are deployed in a manner such that the benefits exceed the resources used. The created *values are sustained*, among other things, when the entity's customers are satisfied, excellent quality on products can be offered and production capacity can be adapted to the demand. *Value can be eroded* when the entity's goals are not achieved due to poor strategy or execution. The risk management process should facilitate making the right decisions to provide value for the stakeholders. Value is maximized when there is an optimal balance between growth, return and other goals and the related risks, and where resources are used in an efficient and effective manner in pursuit of the entity's goals (COSO 2004).

2.2.1. The benefits of risk management

The benefits of having an effective risk management are pointed out in the COSO framework and it is stated that enterprise risk management "helps an entity to get to where it wants to go and avoid pitfalls and surprises along the way" (COSO 2004, p. 16). It helps management to achieve the entity's goals and prevents loss of resources and helps to ensure effective reporting and compliance with laws and regulation, thus avoiding damage to the entity's reputation and other associated consequences. According to COSO (2004) an effective enterprise risk management enables the entity to:

- align risk appetite and strategy
- enhance risk response decisions
- reduce operational surprises and losses
- identify and manage multiple and cross-enterprise risks
- seize opportunities
- improve deployment of capital.

The components of risk management described below, are related to the benefits of an active risk management, but will also affect the monetary and non-monetary values in an entity:

Aligning risk appetite and strategy

Management first evaluates different strategic alternatives, and then sets objectives aligned with the selected strategy, establishing a basis for operations, reporting and compliance objectives and develop mechanisms to manage the related risks. All of this has to be aligned with the entity's risk appetite.

Enhancing risk response decisions

Risk management provides support to identify and select among alternative risk responses. The risk responses mentioned in the COSO framework are divided into four familiar groupings (Hillson 2002):

Avoid:	Eliminate uncertainty by making a threat impossible to occur or find another way to achieve objectives that can reduce the impact of the risk to zero.
Reduce/mitigate:	Actions are taken to reduce the likelihood or impact, or both, of a risk to an acceptable level for the entity.
Share/transfer:	Reduce likelihood or impact of a risk by transferring or sharing risk to another stakeholder better able to manage the risk.
Accept:	Recognizing that the risk should be taken, and no action is taken to affect risk likelihood or impact.

Hillson (2002) also suggests four groupings when responding to identified opportunities, as the risk responses already mentioned above seem to be most appropriate when dealing with threats:

Exploit: Paralleling avoid. Seek and take measures to make the opportunity definitely happen.

Enhance: Paralleling mitigate. Seek to increase the likelihood and/or the impact of the opportunity in order to maximize the benefit to the entity.

Share: Paralleling transfer. Find a partner able of managing the opportunity, who can maximize the likelihood of it happening and/or increase the potential benefits.

Ignore: Paralleling accept. No action is taken.

Reducing operational surprises and losses

Through risk management entities gain enhanced capability to identify potential events, assess risk and establish responses, thus reducing unwelcome surprises and associated costs and losses.

Identifying and managing multiple and cross-enterprise risks

Facing numerous risks that affect different parts of the organization, the management needs to not only manage individual risks, but also understand interrelated impacts. Risk management enables effective response to the interrelated impacts, and integrated responses to multiple risks.

Seizing opportunities

By considering a full range of potential events, rather than just threats, the management is able to identify and proactively exploit opportunities.

Improving deployment of capital

Robust information can be obtained through the risk management process, which allows the management to effectively assess overall capital needs and enhance capital allocation.

2.2.1.1. Empirical studies: Minimizing threats and exploiting opportunities

In a decision situation there are usually both threats and opportunities involved, and to sum up the implications of the benefits listed in the COSO framework; having an active risk management should ensure that risks are identified and that threats are minimized and opportunities exploited. However, studies have shown that in the traditional risk management practiced, there is a tendency to concentrate only on threats and forget about the upside risk. And although risk managers acknowledge that seizing opportunities is part of the risk management process, often the identification of opportunities are not due to the risk management process, and opportunities are at best addressed reactively (Olsson 2007; Ward & Chapman 2003). Olsson (2007) found that empirical evidence supports that the risk management processes in entities that are known for being proactive in project management, could not be said to fully be able to manage opportunities.

2.2.2. Non-monetary values

What is the value of a human life? How much should one pay to avert a premature death? One could say that human life is priceless or that the price is how much the society should pay to avert a death or save a life, but that is difficult to measure. One measure one can use is the amount that the society has paid in the past to save a life or the maximum amount the society or decision maker is willing to pay to reduce the expected number of fatalities by 1. Empirical studies have shown that the value of a statistical life in the Western world, typically have values between 2-100 million NOK. The Ministry of Finance in Norway recommends a value around 15 million NOK (Aven 2007; Aven 2008; Wilson & Crouch 2001). Thus, one has attempted to measure the value of human life in terms of money. However, value may also refer to the intrinsic worth of the human life, that is worthy of esteem for its own sake. Value may be added through risk management in terms of non-monetary values. Risk management may have an impact on organization culture, health, safety and environment and may thus provide a positive payoff for the organization, its stakeholders and the individual.

The internal environment of an organization is a big component of risk management. An entity's risk management philosophy reflects its ethical values, influences its culture and operating style and affects the integrity and competence of the people in the entity (COSO 2004).

Creating a good safety culture, in which the risks taken are well understood by competent people, is crucial. The sanctity of life and quality of life may be easily forgotten in cultures where the focus is held only on production or profit. There may not be willingness to spend money on maintenance of equipment and putting up necessary barriers. Human capital may be treated as expenditure and thus sufficient training and development are not provided. Employees may perceive that it is socially accepted and that one "gets away with" taking dangerous or unethical shortcuts to make more money and risk taking is chosen over risk management. In the short-term an individual will see the risk taking as a positive payoff where the job is done quickly with minimal effort. With an effective risk management the positive payoff for the individual is on the other hand long-term: Preservation of life and health, financial security through the ongoing capacity to work and social acceptance within a good culture. This positive payoff also reinforces a healthy organizational culture (der Stap 2008).

2.2.3. Monetary values

Gathering quantified data and measure the monetary value of risk management activities can be difficult. Much of this can be attributed to the fact that the mere presence of risk management will have the effect of reducing some units of analysis and the impact of losses prevented or reduced through risk management activities cannot be easily measured (Olsson 2007).

Empirical evidence supports the assumption that the strongest motive for risk management behavior is *to avoid financial distress*. When enterprises implement risk management strategies aimed at avoiding the adverse affects of financial distress, shareholders ask for a lower rate of return as risk is lowered (Fatemi & Luft 2002). Several papers have been written on how the use of financial risk management tools, such as the use of derivatives, does enhance shareholders' value. In the theoretical perfect capital markets, modeled by the capital asset pricing model, profit maximizing managers would not like to invest in risk management. In theory, expenditures that exceed expected losses, while offering no other risk reduction than what is available through holding a diversified portfolio of securities, would reduce the value of the enterprise. Yet, in the real world enterprises do invest in risk management, such as fire insurance, even though the price exceeds the expected loss. It is shown that risk reduction measures add value to shareholders, because violations of the perfect market assumptions occur. One example is that risk reduction, specifically reduction in firm-specific

risk, protects the shareholders against imposed costs associated with severe financial distress in a way that investors cannot diversify away in the market, and thus value is added through risk management (Godfrey et al. 2009).

2.2.4. Summary

When doing a literature review on the subject "value of risk management", little theory and few empirical studies were found. The literature was mostly related to the use of financial risk management tools in order to enhance enterprise and shareholder value. To sum up, the relevant literature that was found, showed that there may be added value through risk management that is related to benefits of risk management, monetary and non-monetary values. Risk management may affect value creation, preservation and deterioration in an entity.

Studies show that in traditional risk management practiced, there is a tendency to concentrate only on threats and ignore opportunities. Empirical evidence supports that there is an absence of opportunity management, even in projects and enterprises known for an active project management, and that they are not fully able to seize opportunities through their risk management processes. Empirical evidence also supports that the strongest motive for risk management behavior is to avoid financial distress, and several studies document that the use of financial risk management tools that implies risk reduction, adds value to shareholders. However, to the author's knowledge, there are no empirical studies that have examined *how* and *if* value is added through risk management in terms of the benefits of risk management, monetary and non-monetary values.

3. Risk management in Statoil

This chapter provides an overview of how the risk management is carried out in Statoil. First, the decision process for investing in projects and the development of projects at Statoil are described. Then the risk management process and the risk management tool used at Statoil are presented.

3.1. Project Development and the Capital Value Process

The Capital Value Process (CVP) is used in Statoil as the decision process for investments projects, where projects are developed from a business opportunity to operations and where risk management has to be a continuous process throughout the project development. Each project runs through different defined phases. Between each phase there is a decision gate (DG); a milestone that has to be passed in order to proceed to the next phase. See Figure 3-A.

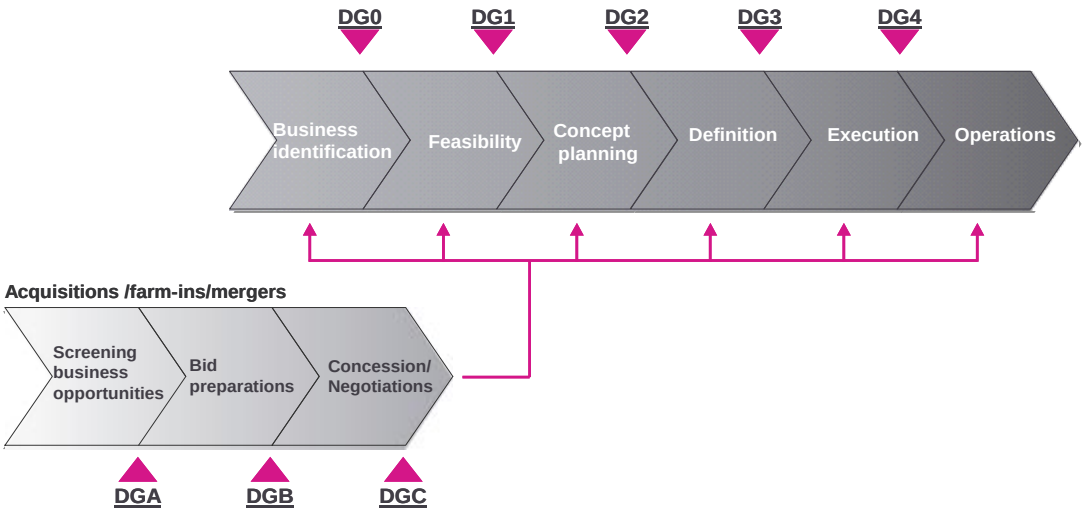


Figure 3-A The Capital Value Process

The *business identification phase* is prior to DG0, where at DG0 approval is given to establish a project and enter into the business planning phase. In the *business planning phase* further development of the business case and the establishment of the project is justified, where at DG1 approval is given to start concept planning. In the *concept planning phase*, different alternative concepts for the project are identified and a concept selected, and at DG2 a pre-sanction of the project is given. In the *definition phase* the main focus is to mature the project based on the selected concept for project sanction at DG3. The project then moves on to the *execution phase* where the purpose is to realize the business case to finally start *operations* when DG4 is passed (*Project Development* 2011; *The Statoil Book - version 3.0* 2011).

3.2. Risk management process

Statoil's risk management process is described in *WR2404* (*Risk management process* 2011) and *WR 2365* (*Risk Management in projects* 2010) and shown in Figure 3-B below.

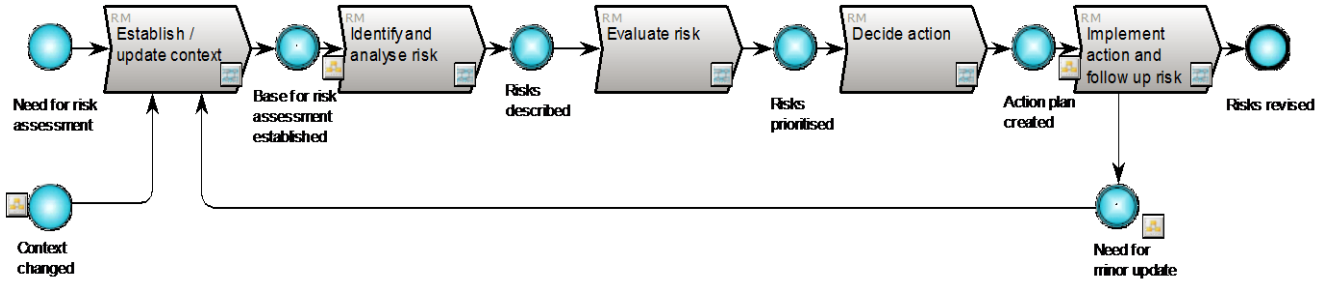


Figure 3-B Statoil's risk management process

When *establishing/updating context*; a risk owner who is responsible for risk management needs to be appointed. The internal and external contexts for the project need to be identified and understood to ensure a clear description of the business case. Objectives are set, and risk workshops and the use of risk tools and scales have to be planned.

In the phase of *identifying and analyzing risk*, risks that may impact objectives are identified, both upside and downside risks. One may use different approaches to identify risks, such as workshops, interviews, checklists, brainstorming, earlier experience and so on. Input should be cross disciplinary and the identification process a continuous process, performed at least monthly. Impacts and probabilities are estimated for each risk and each risk described, including effect and main sources, and then registered in a risk tool.

In the phase of *evaluating risk*, risks are evaluated toward risk tolerance and risk appetite to decide whether or not actions will be initiated. The risks, and the handling of them, are prioritized.

When all risks have been evaluated, the overall negative risk exposure should be lowered to a tolerable level and opportunities pursued. In the *deciding action* phase, actions that may affect the risk level are identified and cost/benefit is considered. Actions are prioritized and decided on, based on the effect on risk level, cost and benefit. An action plan including description, responsible and schedule is created.

In the phase of *implementing action and following up risk*, actions are implemented according to the action plan and the actions and the effect on the risks are followed up. Need for updates or changes in the action plan are considered and the risk register revised and updated.

3.3. Risk management tool

An increasingly larger part of Statoil use the Project Information Management System (PIMS) risk management module as a risk management tool. PIMS is aligned with the risk management process given in WR2404.

In PIMS one can add risks, assign a risk owner, add a risk assessment, categorize the consequences of the risk and add actions in order to minimize threats and exploit opportunities. The risk owner is the organizational unit or person with the authority and responsibility to manage the risk. PIMS provides a threat and opportunity matrix based on estimated probability and impacts of a risk. See Figure 3-C and Figure 3-D. The threat matrix is given in the colors red, yellow and green. Risks categorized as red are considered the most severe threats, with increasing probability and increasing consequence. Whereas risks categorized as green are considered less severe, with decreasing probability and decreasing consequence. The opportunity matrix is given in different shades of blue, where dark blue risks are the ones most favorable to exploit with an increasing probability and increasing consequence. The light blue risks are on the other end with decreasing probability and decreasing consequence (*PIMS R3 Help* 2012; *Project Risk Management with PIMS* 2011).

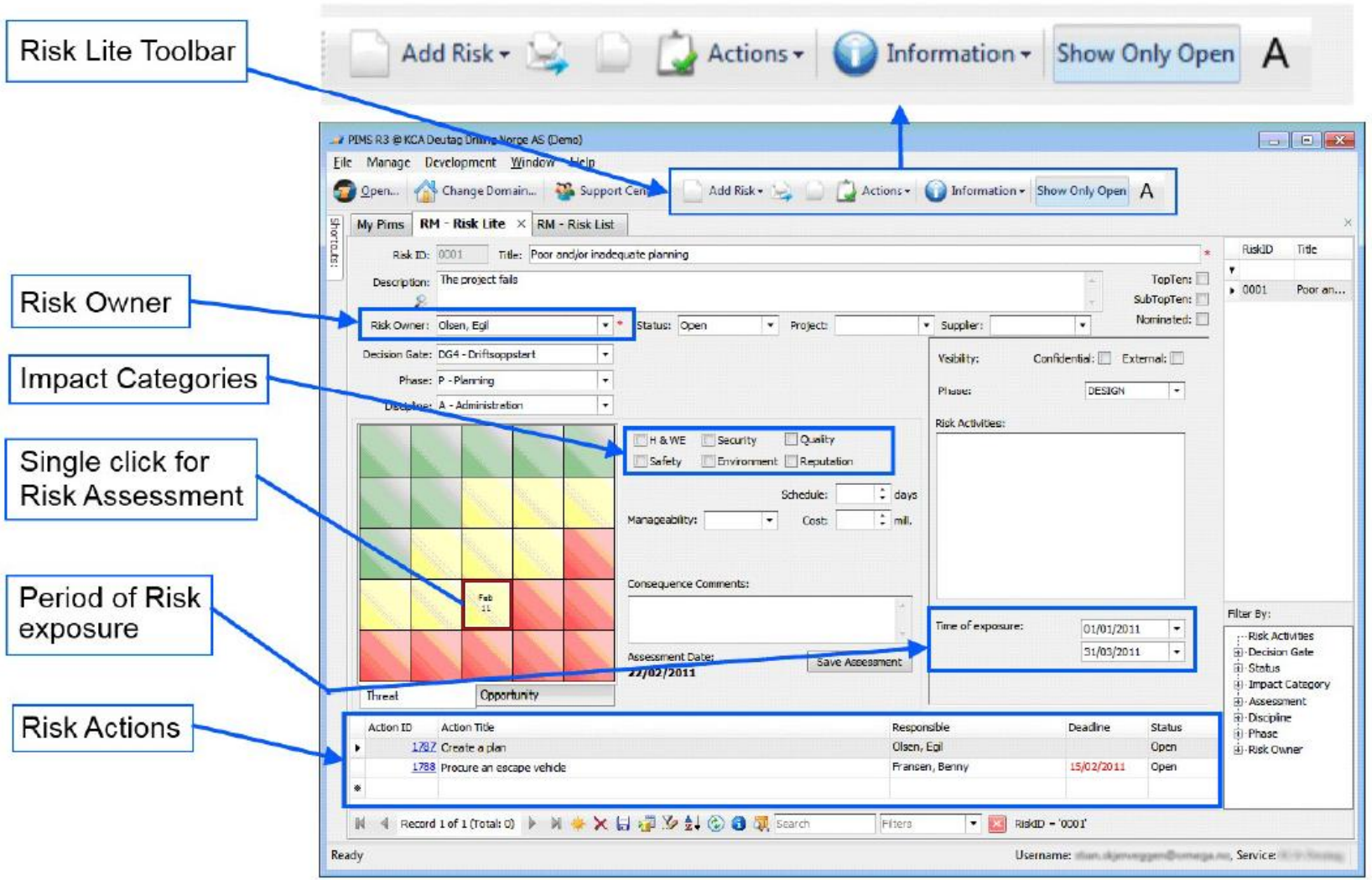


Figure 3-C An example of a Threat Matrix (*PIMS R3 Help* 2012)

Figure 3-D An example of an opportunity matrix taken from PIMS

The risk assessment in PIMS is first done by choosing the most relevant probability/consequence quadrant in the threat/opportunity matrix. Then one may select relevant impact categories like Health & Work Environment, Safety, Security, Quality, Environment and Reputation. One may add schedule and cost impact in days and million NOK and choose a level of manageability. Consequence comments may also be added (*PIMS R3 Help* 2012; *Project Risk Management with PIMS* 2011).

The probability scale, consequence scale and manageability scale are given in the Figure 3-E below, together with a consequence matrix that shows what category on the scale that should be used for the different consequence categories. The scale for financial and schedule impact will usually vary depending on the project, whereas the consequences C1-C5 are set for the other categories.

	HEALTH, SAFETY AND SECURITY	REPUTATION	ENVIRONMENT	FINANCIAL IMPACT	SCHEDULE IMPACT	QUALITY
C1 **Negligible**	First aid injury or occupational illness/effect with minor impact on health and ability to function	Negative exposure with limited importance	No or very limited impact on natural habitats. No impact on population level, only on individual organism level	0- millions	0- days	None
C2 **Minor**	Medical treatment injury or occupational illness or short term psychological stress.	Local/regional negative exposure in mass media or from authorities and costumers.	Adverse short term impact on natural habitats	- millions	- days	Minor effects on capacity/regularity
C3 **Moderate**	Serious injury, psychological stress or illness with possible permanent effects	National negative exposure in mass media. Negative exposure from national authorities/regulators.	Adverse medium or long term impacts on a significant part of habitats (e.g. restitution time 1-3 years).	- millions	- days	Moderate effects on capacity/regularity
C4 **Major**	1-2 fatalities on workforce. Serious illness, psych. stress or chronic exposure resulting in significant life shortening effects/death to workforce	Negative worldwide news coverage in media. Negative attention from important organisations.	Adverse long term impact on ecologically valuable natural habitats (e.g. restitution time 3-10 years).	- millions	- days	Major effects on capacity/regularity
C5 **Huge**	Several fatalities on work-force or fatalities to public. Serious illness, psych. stress or chronic exposure resulting in significant life shortening effects/death to public.	Legal proceedings with possible major legal impact. Extensive negative worldwide news coverage. Possible loss of license to operate.	Adverse permanent impacts on key ecosystem functions and services in larger natural habitats (e.g. restitution time > 10 years).	-> millions	-> days	Huge effects on capacity/regularity

*If activities are on critical path, grading of activities to be based on half the schedule impact.

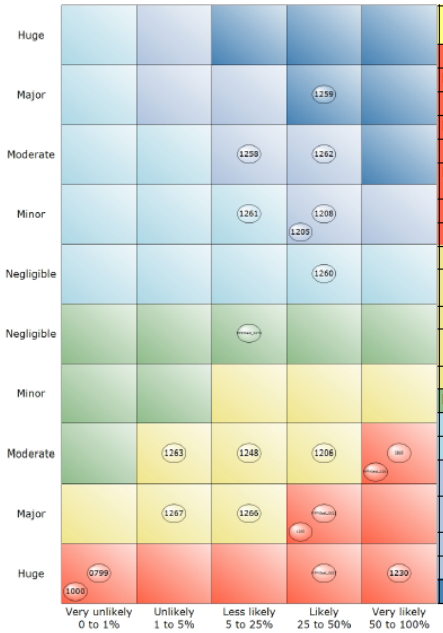
Probability Scale:	**Consequence Scale:**	**Manageability Scale:**
P5 Very likely 50% to 100%	- / + **C5** Huge	Low
P4 Likely 25% to 50%	- / + **C4** Major	Medium
P3 Less likely 5% to 25%	- / + **C3** Moderate	High
P2 Unlikely 1 to 5%	- / + **C2** Minor	
P1 Very unlikely 0 to 1%	- / + **C1** Negligible	

Figure 3-E Consequence matrix in PIMS

It is possible to produce a report of Top Ten Risks matrix in PIMS of risks. See Figure 3-F. Top Ten Risks are marked for those risks which are considered the most important at the moment and should be communicated to the project team and major stakeholders. (*Project Risk Management with PIMS* 2011).

Threat And Opportunity Matrix

Top ten



Risk ID	Title	Cost (mill)	Schedule (days)	Probability	Consequence
1230	Contractor trouble due to things			P5 : 50% to 100%	-C5 : Huge
MPPXtes	Installere nye livbåter på plass innen 1.10.11.	0	21	P4 : 25% to 50%	-C5 : Huge
1265	8 EPC contractor capacity			P4 : 25% to 50%	-C4 : Major ↓
MPPXtes	Test_Negativ risiko 2	0	0	P4 : 25% to 50%	-C4 : Major
0849	Existing piping: personell protection	300		P5 : 50% to 100%	-C3 : Moderate
MPPXtes t_0261	Fare for dårlig oppfølging av brukere av andre moduler under innføring av ny cost modul i R3	0	0	P5 : 50% to 100%	-C3 : Moderate
0799	Handling of large amounts of GP sand on rig			P1 : 0% to 1%	-C5 : Huge ↓
1000	Potential blow-out	0	0	P1 : 0% to 1%	-C5 : Huge
1266	9 Available drilling rig capacity			P3 : 5% to 25%	-C4 : Major ↓
1206	Not able to get return on investments due to failure in /or delayed deliveries of new solutions to oil sand project in Canada	300	0	P4 : 25% to 50%	-C3 : Moderate ↓
1267	10 Unplanned shutdowns at Galtvort			P2 : 1% to 5%	-C4 : Major ↓
1248	It is a opportunity to reduce the diluent consumtion by implement new technology (Yet shear technolgy)	0	0	P3 : 5% to 25% →	-C3 : Moderate ↓
1263	6 Reservoir capacity			P2 : 1% to 5%	-C3 : Moderate
MPPXtes	Fare for kuttskader ved bruk av kniv når en avmantler kabler.	14	0	P3 : 5% to 25%	-C1 : Negligible
1260	3 No or minor future modifications at Galtvort			P4 : 25% to 50%	+C1 : Negligible
1261	4 Fast track project			P3 : 5% to 25%	+C2 : Minor
1205	Not able to get return on investments due to failure in /or delayed deliveries of new solutions to oil sand project in Canada	-300	0	P4 : 25% to 50%	+C2 : Minor
1208	"Unable to deliver or delayed deliveries to: Cracking the Paleogene"	-450	0	P4 : 25% to 50%	+C2 : Minor ↓
1258	1 Future installation	0	0	P3 : 5% to 25%	+C3 : Moderate ↑
1262	5 Secure position as reliable supplier to Europe			P4 : 25% to 50% →	+C3 : Moderate ↑
1259	2 Extended operation at Galtvort			P4 : 25% to 50%	+C4 : Major

Figure 3-F An example of Top ten matrix taken from PIMS

The project manager is responsible for arranging a workshop with all relevant participants, at DG 4, to provide necessary input to an experience report to ensure the best possible transfer of experience both within and outside a project. In PIMS, a module called Extra is used to store experiences for projects and may be used for this purpose (Sannes 2010).

4. METHOD

4.1. The choice of a case study

The aim of this thesis guided the choice of method used in the present study. To be able to discuss the validity of the hypothesis, a case study of three projects at Statoil was chosen. According to Yin "*a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin 2003, p. 13). The case study is a preferred strategy when "how" and "why" questions are asked, as opposed to "how many" or "how much", and is suitable when the aim is to understand processes and behaviors because of the richness of data collected in context (Yin 2003).

To meet the aim of this thesis, it was found that a method that allowed one to gain insight into the questions raised, was needed in qualitative terms to gain a deeper understanding of the various aspects of the value of risk management in projects. One aimed to see this from the people in the projects' point of view and their experiences. According to Kvale (1996), a qualitative research interview "*attempts to understand the world from the subjects point of view, to unfold the meaning of peoples experiences*" (p. 1). In this case study, data was collected from the projects' documentation and interviews.

Qualitative methods build on two types of philosophies: phenomenology (human experience) and hermeneutics (interpretation). From a hermeneutical understanding, the interpretation of meaning is the central theme. Hermeneutics says something about understanding, how we understand and how meaning is obtained. This philosophy is concerned with what understanding is and the terms of understanding and interpretation (Kvale 1996; Malterud 2003; Thornquist 2003). What is written down in the project's documentation related to risk management represents a picture of people's interpretation and understanding of risk management in the projects. Statements in the interviews are the respondents' own interpretations of what they are asked. The interviewer's interpretation of the respondents' statements will also shape this understanding. Prior knowledge and experience influence the understanding of the interviewer. By conducting interviews, new knowledge will be gained and increase the interviewer's understanding.

4.2. Case study projects and interviews

4.2.1. Case study projects

One of Statoil's sub portfolios of projects, that is said to have an *active risk management*, are maintenance and modification projects that are rebuilding and replacing materials and equipment on an existing unit. From this portfolio, three projects were selected for this study. The projects are referred to as A, B and C in this thesis. The projects were selected because they were the three largest projects in the portfolio that were running at the time of the thesis being written, and which there was the most history on. All three of them had also used Statoil's risk management tool, PIMS, from project start. Project C started up just when PIMS was taken in use at Statoil, and had used the tool from the beginning. The scheduled duration of the projects from DG3 to DG4 were from 16 months to 4.5 years with project B and C at their final stages, and where project A was about halfway completed. The project's budgets were 140 million NOK for project A, 444 million NOK for project B and 907 million NOK for project C.

4.2.2. The case study interviews and the respondents

4.2.2.1. The respondents

The case study was based on interviews with the project managers of the projects, the project control manager of the portfolio and the portfolio manager (see Figure 4-A for an organizational chart of the portfolio). Interviews were conducted with four respondents:

1) Project manager A: Project Manager Execution of project A.
   Interview A, 10 April 2012

2) Project manager B: Project Manager Execution of project B
   Interview B, 18 April 2012

3) Project manager C: Former Project Manager Execution of project C and Project Director (Portfolio manager) of the portfolio
   Interview C, 20 April 2012 (first part)
   27 April 2012 (last/second part)

4) Project manager D: Project Control Manager of the portfolio
   Interview D, 24 April 2012

In addition, informal conversations and meetings were held with representatives from the Corporate Risk Management department and an Asset Owner Representative to gain more insight into some of the themes that came up during the interviews.

An organizational chart of the portfolio and the different roles in the portfolio is provided in Figure 4-A:

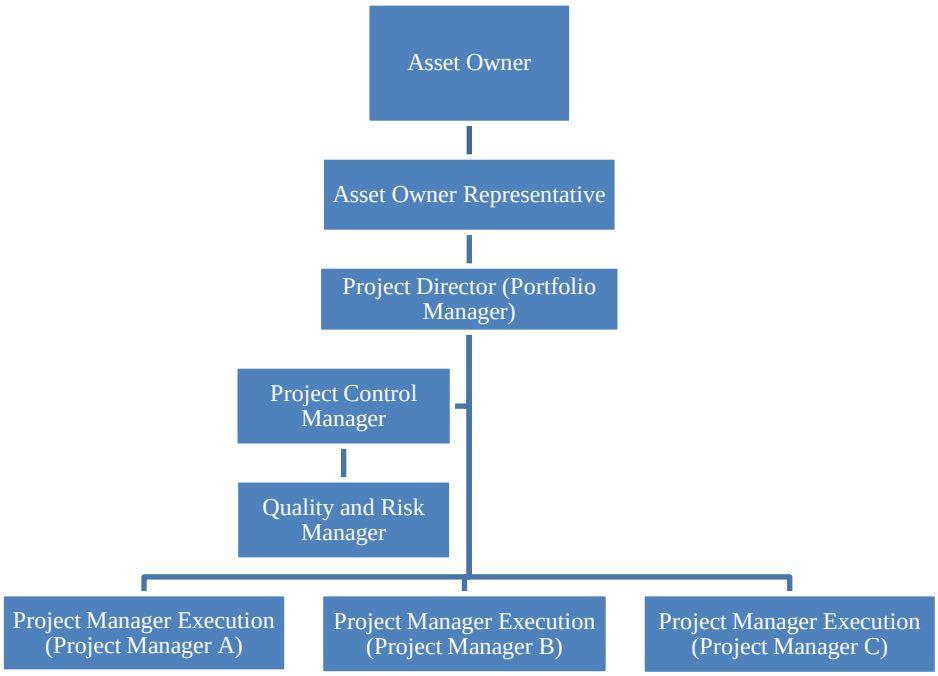


Figure 4-A Organizational chart of the portfolio

4.2.2.2. The interviews and interview guide

The interviews followed an interview guide (see appendix A). The interview guide was constructed around themes like the risk management process, areas in risk management and threats and opportunities in the project and follow up questions related to these themes. It was not an aim to follow the interview guide word by word, but to use it as a support to cover all the themes. In line with Kvale (1996) the interview was open for changes, both in the succession of the questions and in how the questions were worded. Thus, the interviews in this study are considered to be semi-structured (Dalen 2004; Kvale 1996). The interviews lasted about 1.5 hours and all the themes in the interview guide were addressed.

Before the interviews were conducted, a pilot interview was held with a project manager from another portfolio at Statoil. Based on the feedback from the pilot interview, it was decided

that the questions where the respondents were asked to grade the contribution from the risk management process, should be put in a questionnaire with a set scale, and given to the respondents during the interviews (see appendix B). It was thought that this would enhance the comparability between the respondents' responses. It was also decided that the respondents should be given information about some of the themes prior to the interviews, in order to prepare them for the interview (see appendix D).

After each interview had been conducted, it was recorded and transcribed verbatim by the author, to secure closeness to the interview situation. The total data comprised 74 pages of written text. The transcription process facilitated obtaining a thorough understanding of the data (Dalen 2004). Prior to conducting the next interview, the preceding interview and its transcription was assessed and reviewed, and the interview guide adjusted to contain new information and feedback from the respondents (Dalen 2004). This led to one additional question after conducting the first interview, a question about the immediate thoughts on the value of risk management. From the first interview it also became clear that attention should be paid to the roles and organization of the Quality Risk Manager (QRM) and the Asset Owner Representative (AOR), even though this was not formulated as a specific question in the adjusted interview guide. After conducting the second interview, a question about multiple risks was added to the interview guide.

4.3. Data analysis

The data analysis of the interviews in this thesis was inspired by the "systematic text condensation" method as described in Malterud (2003). The analysis procedure is recommended to be carried out in four steps:

1) To obtain an overall perspective
2) To identify meaningful units
3) To abstract the content of the individual units of meaning
4) To summarize the meaning of this

The preliminary analysis started at the first interview and was performed continuously throughout every respondent's interview. During the transcription work, prominent themes and potential units were noted such as "QRM roles", "threats", "opportunities" and "see the big picture".

After all the interviews had been conducted and transcribed, the transcriptions were read several times to get an overall understanding of the data and prominent themes noted. This led to 18 initial codes based on "meaningful units" identified in the transcriptions:

- Definition active risk management
- Opportunities
- Threats
- QRM roles
- Competence and experience in the project
- Customer
- Risk responses and decision process
- The big picture
- Value in general
- Plan-cost-production
- Tool
- HSE
- Learning effects and transfer of experience
- Reputation
- Quality
- Supplier
- Culture
- Personal value

The respondents' quotes were then collected into groups in an Excel workbook, with one spreadsheet for each code and its corresponding quotes. The quotes of each code were then thoroughly read through, summarized and condensed.

Next, these codes were grouped into themes and subthemes. An overview of how the themes and subthemes were created based on the initial codes is given in Table 4-A. The initial codes "definition of risk management", "reputation" and "quality" were left out of the themes. The quotes related to the code "definition of risk management" were used to clarify how the aim and the other themes should be viewed. The initial codes "reputation" and "quality" were left out, because the data obtained was assessed inadequate to be included in the findings.

Themes	Subthemes	Initial code
1.) Main contributions	An aid to manage the project	value in general, Tool
	Managing threats	Threats
	Impact on cost and schedule	plan-cost-production
	Seizing opportunities	Opportunities
	Impact on health, safety and environment	HSE, culture
2.) Value for the stakeholders	Personal value	personal value
	Customer satisfaction	Customer
	The success of other projects in the portfolio and Statoil	
	Learning effects and transfer of experiences	learning effects and transfer of experience
	Education of suppliers	educating supplier
3.) To see the big picture	Seeing the big picture in the projects	the big picture
	Seeing the big picture in the portfolio and for Statoil	the big picture
4.) Enhance the value	The people and their competence and experience in the projects (and the portfolio)	competence and experience in the project
	The competence and experience of the QRM	competence and experience in the project, QRM roles
	The competence and experience of the AOR	competence and experience in the project, customer

Table 4-A Creating categories and subcategories

These four themes and their subthemes are presented in the findings (see Chapter 5) in four headlines:

1.) Main contributions to the value of risk management
2.) Value for stakeholders
3.) To see the big picture: An area of improvement
4.) Enhancing the value of risk management

4.4. Ethical considerations

Ethical issues of a method have to been taken into account when performing a study. Ethical considerations are primarily linked to the interviews in this thesis. Information about the study was given in an information letter prior to the interviews (appendix D). Informed consent was obtained from the respondents before one started on the interview guide. The respondents and the projects have been anonymized in the handling of the data and in this thesis to ensure confidentiality (Dalen 2004; Kvale 1996). The respondents were informed that they could get the transcripts if they wanted to correct anything or withdraw any of the information. None of the respondents made use of this possibility.

5. EMPIRICAL FINDINGS

In this chapter, the findings of the case study are presented. Firstly, what where found to be the main contributions to the value of risk management in the projects are pointed out. Secondly, findings on the value for the individual, the customer and the enterprise are presented. The third part points to an area of improvement in the risk management, to see the big picture in the projects, the portfolio and the enterprise. How the value of risk management might be enhanced through people's competence and experience in risk and project management, is presented in the last part of this chapter.

This thesis aims to see how and if value is added to projects, an enterprise and their stakeholders, in projects that are considered to have an active risk management. Before the findings are presented, it must be clarified how the respondents defined "active risk management*"* in projects, and who they considered to be the largest stakeholders.

Active risk management

According to the respondents, an "active risk management" can be defined as focusing on risk and utilizing the risk management tools on a daily basis to manage the risks, and in turn manage the project. In this view, risk is placed on the agenda, and actions and measures are implemented and monitored, to see what impact they have on the identified risks. The risk picture in PIMS is not static; risks and actions are closed, the risks' impact and probability are changed and new risks and actions are added. In projects that are not considered to have an active risk management, entering risks in the risk register and the risk matrix in PIMS may be done only to fulfill a requirement or as means to get attention and more resources, rather than as means to manage the project. Project manager B put it this way:

> *What separates the active from the passive might be the need to satisfy the system, and you work on this, but do not use the system as a tool to help you manage your project.*

The respondents agreed that, in active risk management, there is a need for the project manager to take part in the risk management process, but this should not be limited to be a one-man job for the project managers only. The project team should also actively participate in the risk management.

In the present study, all of the respondents said that even though risk management in Statoil has had an ascending curve the last years, there was still room for improvement. This may

also be considered to be part of active risk management; to seek continuous improvement in the risk management process in order to create more value and a better way to manage risks in the projects.

Stakeholders

Apart from the shareholders, the supplier and other external stakeholders; the project team, including the project manager and portfolio manager, the QRM, the customer (represented by the AOR), and Statoil, the enterprise itself, were considered to be the biggest stakeholders by the respondents. Hence, these are the ones considered to have the biggest interest in the projects and are most affected by the risk management in the projects. In addition, these internal stakeholders are important when it comes to the risk management's contribution of value to the projects.

5.1. Main contributions to the value of risk management

5.1.1. An aid to manage the project

> *Well, yes, I tend to think that risk management is, to me, project management. Same thing. It is all about identifying opportunities and downsides, and actions to make these happen or not happen. Which, in a way, is what I do every day as a project manager too. Project management is just the same as risk management!* (Project manager A)

Project manager A's quote can serve as an example of what seems to be of greatest matter for the project managers that were interviewed: to have an active risk management is an aid that helps manage the project. Project manager B described what he thought was of value from the risk management in managing a project:

> *But as you do it systematically and recognize the value of it, right, you realize how you prioritize the assignments inside the project and focus on the hot topics. And people realize the benefits of this (…), and you focus your attention on what is necessary, you don´t take all the battles at once.*

A project may be complex, with many parties involved and many areas associated with uncertainties. According to the respondents, the risk management process provides a system and a structured way of dealing with and identifying those uncertainties and managing the project. It may create an awareness of possible obstacles to completing the project, and help plan for this in order to simplify the execution. In the project world, as in many other areas, time and people are scarce resources. The risk management process helps prioritize which areas are "under fire" and focus on what needs to be done. The effort and energy can be used toward the necessary activities at the right time. Thus, there was found to be value in using this system and the tool, in the sense that risks that could prevent the execution of a project and achievements of its goals are focused on and managed.

Some of the respondents also emphasized the value of having a risk management tool as PIMS, as means to delegating responsibility for the actions that need to be implemented and to provide ownership to the risks. According to the project managers, the tool is also used to supervise the implementation of actions, and whether the project members actually do what was agreed upon:

> *And in a meeting, when we put it in the risk matrix, it becomes more of an agreement, it is no longer as easy to hide away, if you know what I mean.* (Risk manager A)

Hence, the tool may be an aid in facilitating the management of the project and ease the burden for the project manager.

5.1.2. Managing threats

As stated in the previous section, risk management was seen by the respondents as an aid in executing the project. They considered the ability to manage threats that can stop the project or affect the project's ability to achieve its goals, a major part of managing projects. In all of the three projects, the project managers stated that most of the threats and the associated risk responses and actions were identified early on in the process, mostly due to earlier experience with similar projects. Additional risks were identified throughout the execution of the project, as illustrated by project manager A:

> *One of the most important meetings concerning risks that we have, takes place at the beginning at kick-off, we call it a risk meeting. We then run a workshop where we use brainstorming, identify risks, get our thoughts on the table. At that point we identify perhaps 70% of all risks. Afterwards, the important thing is to work with all the risks through the entire project process. As the project moves forward, new risks come up and some are removed.*

The project team was the major contributor to identifying the threats, thus the people in the team and their project experience was of great importance in identifying threats and actions. According to the project managers, most of the identified threats did actually strike, but the severity of the consequences was reduced due to the implemented actions; the threats were minimized:

> *Very often [the risk strikes]. It then becomes a matter of reducing the consequences; the risk strikes, but what you do is to minimize consequences. Sometimes you are able to avoid consequences altogether, nothing is better than that. But sometimes there is a consequence. So it is all about reducing consequence.* (Project manager B)

Some of the identified threats, such as bed capacity offshore, had a low manageability due to being related to areas where Asset was the decision maker and not the project. In those cases the risk management tool would serve primarily as means of communication to highlight the

risk, rather than reducing the consequences of the threat. Actions would be implemented, but in the end, the outcome was up to the decision maker:

> *For instance, if you find yourself in a situation you can do nothing about, you have communicated this to the decision maker, so that they are informed and have a complete picture of what might happen. And there are no surprises when you find yourself in that situation. It has been communicated, it has been accepted, and you then work to avoid it, but if it happens, it does not really come as a surprise to the decision maker that something has to be done, it has already been planned for.* (Project manager B)

In other words, the risk management contributed to identifying and managing threats. Most of the threats did strike, but were minimized due to implemented actions (see example in section 5.1.2.2.), whereas threats of low manageability were communicated to the decision maker through the risk management tool.

5.1.2.1. Impact on cost and schedule

The PIMS' risk register of the projects show that the estimated impact on cost and schedule due to threats for the projects were between 0.5-1000 million NOK and between 1-700 days. Project A ranged between 1-20 million NOK and between 1-300 days, project B between 0.5-1000 million NOK and between 7-300 days and for project C the numbers were 1-150 million NOK and 5-700 days.

When asked to what extent the risk management process in the projects contributed to adhering to the project's schedule, there was little consensus between the respondents, and there were four different answers, as evidenced by their four different answers: little degree (1), lesser degree (2), some degree (3) and high degree (4). See Figure 5-A.

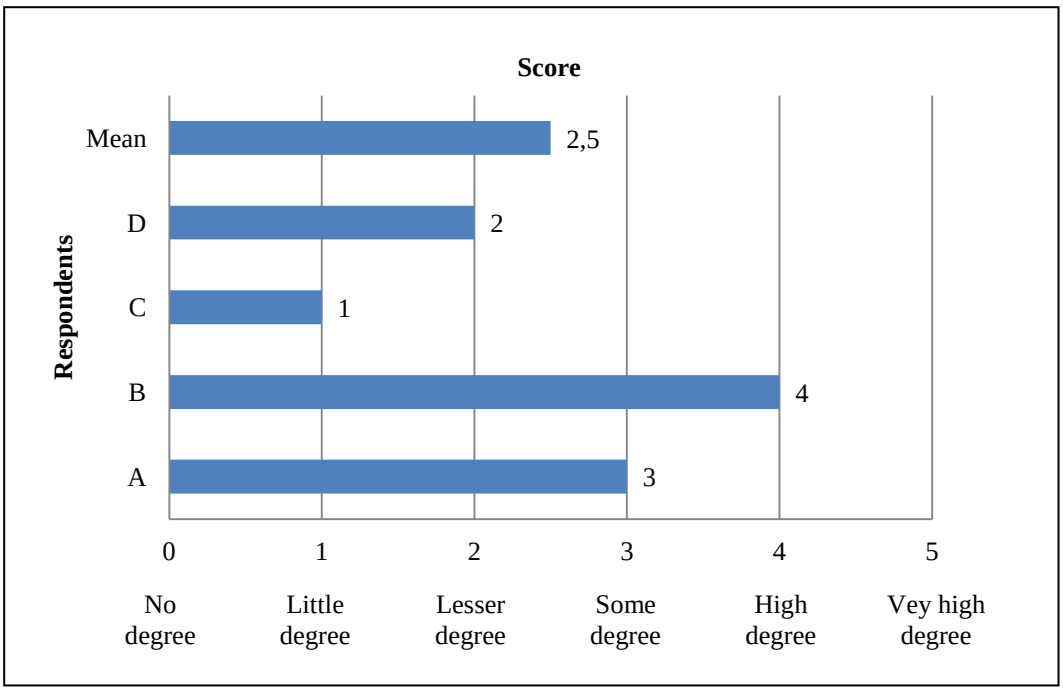


Figure 5-A Contribution to adhering to the project's schedule

Factors related to little contribution from the risk management process, in terms of reducing operational surprises and associated losses, were the earlier mentioned threats where the project was not entitled to make the decisions and had to give the call to Asset. Factors related to a higher degree of contribution were mostly the same factors that were said to help manage the project; providing a structured way of identifying threats, identifying and assigning actions to the project team and communicating the threats to the project team and the decision maker at an early stage. This was helpful to focus on the right activities, set the priorities and made it easier to plan for events that could have threatened the project.

5.1.2.2. An example of managing threats

In one of the projects, a risk of late delivery and limited capacity of the suppliers was identified: supplier X had limited capacity and their delivery would consequently be delayed. The next supplier, Y, said that this would cause a late delivery from them. This would cost the project about 150 million NOK and delay it with about 50 days.

It was decided to set aside a bonus for supplier Y if they could deliver on time, as an action to minimize the threat. This initiated a cost of 23 million NOK and the project schedule could be followed as planned. Thus, the project's budget had to be increased, but the effect was a saving of about 127 million NOK.

5.1.3. Seizing opportunities

All of the respondents included opportunities in their risk perspective and in the risk management of the projects, as illustrated by project manager B's statement:

> *Yes, well, you always have something on the plus-side or the opportunities-side of it. And where you systematically work to seize them.* (Project manager B)

But project manager A, however, did express that it is sometimes too easy to focus on the threats only and forget about the upside risk:

> *Risk is negatively loaded. People immediately think of downsides. I did too, before I started as project manager, one thought of risk as something negative, risk as a threat. (…) We're not good at seeing the upsides. And in a way, actions - all the time. Risk: what measures need to be taken in order to minimize risk? That´s how I think."*

And for some of the project managers, it seemed, indeed, to be easier to remember what had been the biggest threats in the projects, rather than major opportunities.

In all of the three projects opportunities were identified. In project A, the expected savings in cost and schedule, if able to seize an opportunity, was between 2 – 10 million NOK and between 30 – 360 days. For project B, the expected impact on cost and schedule of an opportunity was between 0.2 – 20 million NOK and 0 - 120 days. In project C, the numbers were between 3 – 750 million NOK and between 8 – 120 days. The numbers are taken from the PIMS' risk register of the projects. Some of these savings are actually due to identified opportunities for Asset, such as avoidance of production loss, in those cases this is reflected in the numbers.

Many of the opportunities were identified early in the risk management process, while others were identified along the way. The discovery of opportunities were said to come from all levels in the portfolio, from the portfolio manager to those executing, whereas Asset did not seem to be involved in the identification process.

When asked if they had been able to seize the opportunities that were identified, the respondents' reply was "most of them" or "not everyone, but some". Different reasons as to why the risk management process contributed to seizing opportunities came up during the interviews. The risk tool made a contribution to the process by highlighting the opportunities and providing a structured way of working with the opportunities to exploit them, when

setting actions and assigning them to the project team members. Opportunities that had a large contribution to the project and seemed realistic to exploit, were believed in and effort was made to exploit them. Attention was directed at such opportunities in risk meetings and baselines.

One aspect of managing opportunities that was emphasized by the respondents, was the need to balance the opportunity against an increased risk or threat at other areas, and seize those opportunities where the increased threats were manageable or tolerable:

> *However, this is an area of continuous debate, it shouldn´t affect the safety. We cannot push it so that, by realizing the gain, the risk is increased in other areas.* (Project manager B)

> *And this is an opportunity, while, at the same time, one is initiating a big risk. But you are willing to pay that price, because you view the risk as manageable.* (Project manager C)

An example of seizing an opportunity and balancing an opportunity against a threat is given in the next section.

5.1.3.1. An example of seizing opportunities

In one of the projects, an opportunity referred to as "RS10 scope is planned to be done in operation Q1-Q2 2011" was identified. This meant that, instead of doing activities during maintenance shutdown (RS), it was planned to do some of it during operation. It was decided to take about 9000 work hours out of the RS scope, which was estimated to reduce the RS period with 7-10 days and save 750 million NOK because of 7-10 days more of production.

The opportunity needed to be balanced against the increased risk of shutting down during operation. The probability was estimated to be low (1-5%) and one calculated that with the opportunity of saving 750 million NOK, about two to three unplanned shutdowns could be handled that year, and still save days of production. Consequently, the threat was assessed to be tolerable and manageable. 9625 hours of the RS-scope were taken into operation; this meant that 30 000 work hours were needed to finish the scope in operation and that risk reducing measures had to be implemented. This initiated a cost of 50 million NOK due to risk reducing measures, which meant that the project's budget had to be increased. No shutdowns occurred. Thus, the overall saving for Statoil due to seizing the opportunity was about 700 million NOK.

5.1.4. Impact on Health, Safety and Environment

Statoil's zero harm philosophy was regarded by the respondents to be of significance for a project's success:

> *This is part of what makes a project successful, HSE, if you have accidents in a project, it is not a success. You expect zero accidents by the completion of the project, zero is our philosophy.* (Project manager A)

Project manager B considered not being able to meet this zero harm philosophy as the biggest threat to the project:

> *I would say that is the human component, what safety is concerned, if something happens to people, to those who work for us out there.*

The risk management's impact on the HSE area was regarded to be of great importance to the project managers. When asked what he believed to be the value of risk management, project manager C replied:

> *If you can avoid losing a life within HSE, that value is infinite, and that is the case with good risk management as well. Good risk management can save lives, so it is in a way infinite. (...) I would say infinite. A horizontal number 8, I would say. Yes, I would, because it is infinite if you place it in a perspective of human lives.*

Project manager D stated that HSE was focused on in the projects, even though this did not have a direct financial impact:

> *The goal is often to deliver in terms of time and cost, and especially within the field of HSE, so here we have often flagged things that are important in the risk register. When it comes to focus on avoiding accidents and all that. Quite a lot of good work has been done in the risk register, both on the side of actions and risks, really. (...) In a way it doesn't have much of a financial influence, but there is an extreme focus on it within the company.*

All of the projects had up until the time of the present study been executed without any HSE incidents. The respondents seemed satisfied with how the risk management had been carried out to manage HSE related risks in the projects. Project manager D replied:

"I think we have done pretty well, at least on those HSE risks we identified, because we have avoided that anything has happened. On those big things we identified, we've had a good structure in the actions. And as far as I know, none of those big HSE risks have struck."

According to the project managers, the ability to identify early potential events that could be dangerous, and focus on these in the risk register and on risk meetings, were factors in the risk management that contributed to meet the goal of zero harm and prevent accidents. They felt that they had succeeded in defining and implementing actions that reduced the risks of HSE incidents. Another factor that was pointed to was that one through the risk management process had been able to affect the mindset of those executing on the platforms, to focus on preventing accidents and injuries. The competence and credibility of the people at HSE, and their ability to influence people and convince them of the significance of focusing on HSE, was also emphasized.

5.2. Value for stakeholders

The analysis revealed that the risk management in the projects might be of value for stakeholders outside of the project.

5.2.1. Personal value: Positive payoff for the individual

The project managers found that risk management in the projects could be of personal value and provide a positive payoff for themselves and the others in the project team.

The project managers believed that the risk management process helped them manage the projects, thus enabling them to do a better job and have an easier job. One respondent mentioned a feeling of security; that one is taken care of when there is a focus on risk management, as a positive payoff for the individual. Project manager B also emphasized risk management as an arena for learning and that one personally could learn a lot with the right attitude toward risk management:

> *I use it as an arena for learning as well. You sit there with four people who, really, know a subject you don´t. Where they present a risk, we discuss them, you get an understanding of what the risk really entails, why it is a risk, and what measures need to be implemented. That´s why I said that risk management is an amazing arena for learning, in many disciplines, and as you get there, without being an expert in those areas, you can still be a partner for discussion. And it helps both that individual and the future of the project, then, to focus on the right elements.*

And:

> *I believe everyone grows through this experience. When you sit in a meeting, if someone comes out and says "I haven´t learned anything". You then need question your attitude.*

Project managers C and D emphasized that the mindset one used in risk management could be adapted to areas outside of work, in one's free time, and thus being of personal value:

> *I do believe that, as time passes and you see that this is right. You then bring it into your spare time as well. You think twice about securing the car when you change the tires, it doesn´t just sit on the jack. Because you think in terms of risk. Consequences. So I do think that people do this. And then they bring it with them into the next project, and it becomes almost an automatic process.* (Project manager C)

I do believe that it influences the private mindset too, you attempt to work on the right things, both personally and at work to put it that way. Because it is quite an art really, at least the way it is now, with new tasks constantly coming in and everything just going by so fast, it is incredibly important to step into the helicopter every once in a while to get an overview. And I think it is important to keep a mindset of "where is it burning now, and what are the consequences of not doing anything?" (Project manager D)

Hence, risk management may add value to the individual stakeholders in the project team and be of personal value.

5.2.2. Value for the customer: Customer satisfaction

The project managers found the risk management process to be of value for the customer. The project managers were asked to what extent the risk management process in the projects contributed to achieving customer satisfaction. The question was rated with an average of 3.75 (between some degree to a high degree). See Figure 5-B.

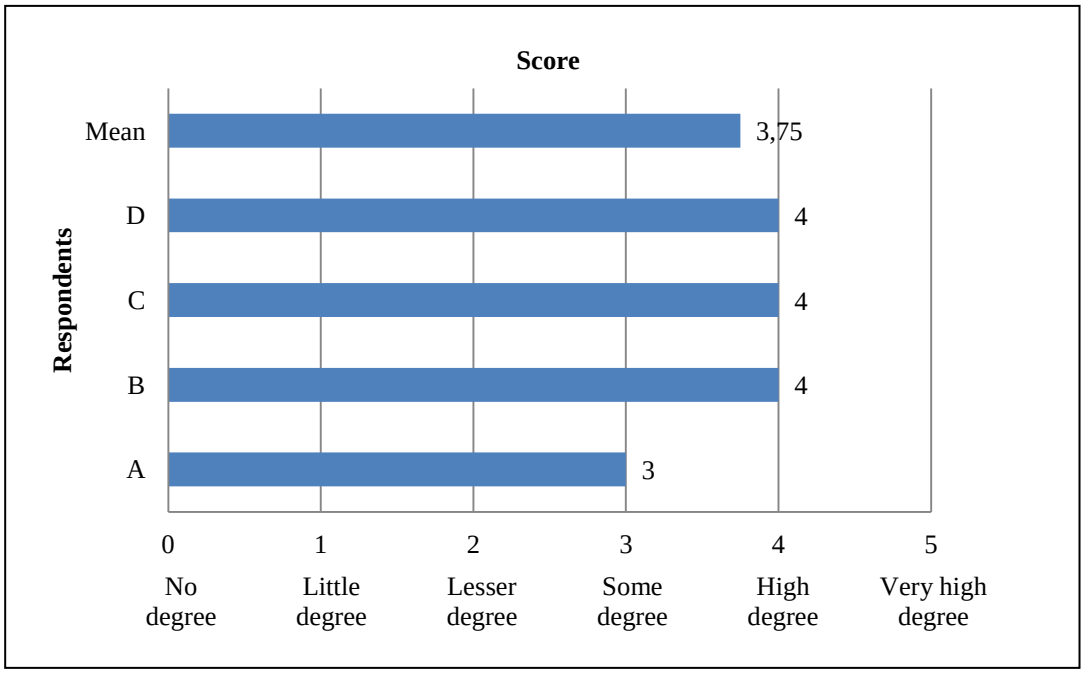


Figure 5-B Achieving customer satisfaction

The customer – Asset, expected the projects to have an active risk management and this contributed to increasing customer satisfaction, according to the respondents. When the customer recognized that the projects' risk picture was not static and that the risk matrix and its related actions, was thought through, this provided confidence in the project management,

even though risk reduction was not achieved. The degree of involvement and feedback from Asset on the risk picture and in the risk management process was said to be very varying and dependant on the AOR. But the risk management tool served as a communication tool. The risk matrix from PIMS was put into monthly reports to Asset and served as means of demonstrating how the project was doing and showed that the risk picture was not static, but that one was working with the risks:

> *My customer, Asset, expects us to work on the risk, so that they can continuously see any changes in the risk picture, to see that we work on the risk. So there is a lot more focus from Statoil´s side on the PIMS and risk and the matrix that is sent out, that it's used. (...) Yes, when you send over the monthly report, you'll include a copy of the risk matrix. Asset is then able to take a look at the temperature of the project, how it is doing. If there is a lot of red...if there are any reds, they call immediately. They want to see blue. So it contributes to increasing customer satisfaction. You are always told if it´s not included.* (Project manager A)

As illustrated above, the risk management contributed to increase customer satisfaction according to the respondents, and thus added value for the stakeholder - the customer.

5.2.3. Value for the enterprise: The success of other projects in the portfolio and Statoil

The respondents were asked to what extent the risk management process in the projects contributed to the success of other projects in the portfolio and Statoil. They thought that this was largely related to learning effects and transfer of experiences from the projects. Another benefit from the risk management process that came up during the interviews, was the education of suppliers in risk management.

5.2.3.1. Learning effects and transfer of experiences

The respondents were asked to rate the following questions:

- To what degree have transfer of experiences been prioritized in the project?
- To what degree are there learning effects from the risk management in the project that are transferable to other projects?

These were among the questions that were rated highest by the respondents on the questionnaire, with an average of 4 (to a high degree) on transfer of experiences and an average of 4.25 (between a high to very high degree) on learning effects. See Figure 5-C.

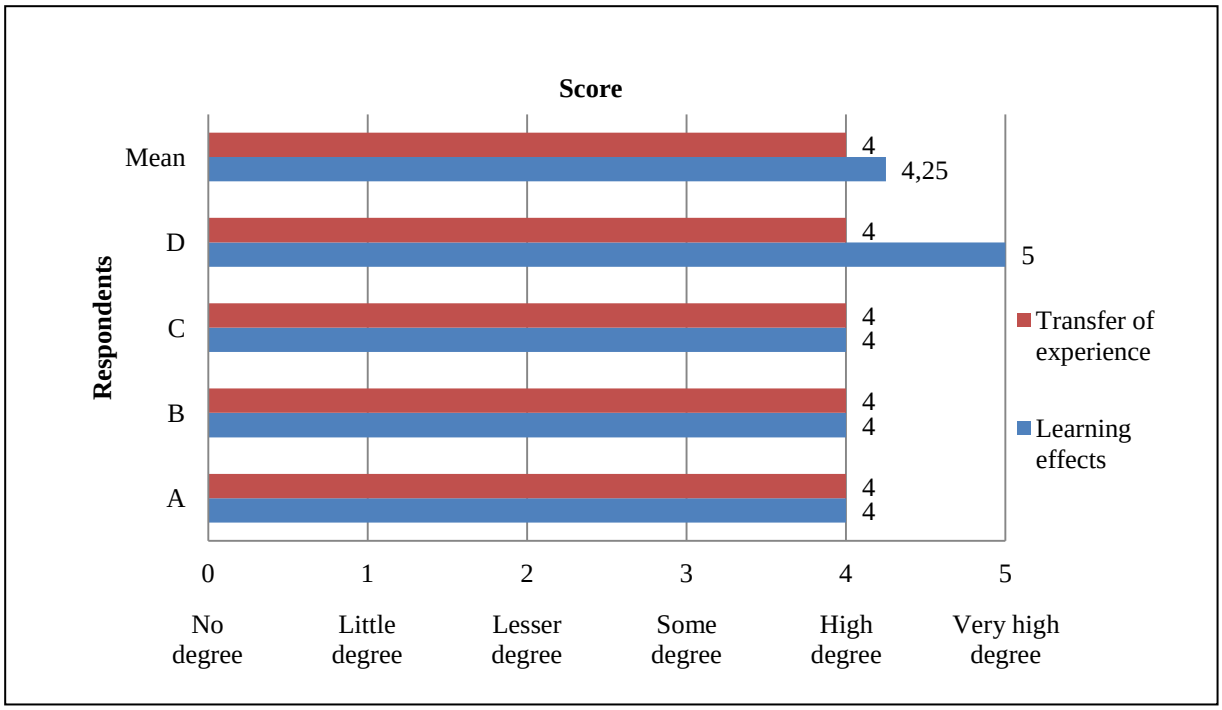


Figure 5-C Transfer of experiences and learning effects

The respondents said that there were many "lessons learned" from one project that could be transferred to another project, both in the way the risk management process had been executed and as means to identify risks at the initiation of a project, because one had the knowledge of how to manage such risks. Project manager B's statements illustrate this:

> *The value of risk management in Statoil's projects, that's a difficult one, but we use several of the same principles on X now as we did on B. So there is a lot of transfer of learning and experience from that project to this one. And at this phase where we are now, it then becomes a matter of identifying the risks, quantify them in terms of their impact on cost and plan, and make sure this is reflected in our cost picture and completion plan.*

And:

> *Because this is an immensely important area [risk management], a lot can be taken from it, it really is what we do every day in a very systematic manner. And if we are able to plan this thoroughly, so that the risk we always have, we are talking about experience here. Many of the risks we have, are based on experience from previous jobs, and those should be reflected in a systematic manner and worked on. We can take a lot from it. The pay-off lies in implementing, and hindering a repetition.*

The *experience of the people* in the project team played a major role in the transfer of experiences and learning effects:

> *Well, it is a lot easier, with the learning effect, when you have a team that has worked with a project and is entering into a new project, and have then seen the value of this. They have been in the process and know this. So the process is simplified in that way, compared to if you were to get it up and running from scratch. Because they have seen what have been under fire in the previous project, they are familiar with the challenges they faced, and it then becomes a matter of identifying the areas you have worked on for the past three to four years. So it makes the process a lot easier, which actions do I need in order to reduce, if I have a contractor who is struggling with the same issues. Or a business area as access, for example, how to ensure bed capacity. All of that is improved, which contributes to better results.* (Project manager B)

To *speak to people*, "face-to-face", seemed to be the preferred strategy by the project managers for gathering experiences and learning from of each other when initiating a new project. The experience database Extra was used to a lesser degree. Project manager A said that the experience database was new in PIMS, and that one had to learn to use it and how to use it. Project manager C found the experience database to be cumbersome to use, with documents with hundreds of pages to read. Project manager D felt that some experiences were better to share in person:

> *We do use it [the experience database]. But with this experience database, everyone has access. If you are a supplier, you can log onto the Statoil-system and have a look. So you need to be careful with what you actually write. If the supplier is absolutely terrible, you cannot write that. But you could say, in an internal meeting, that "those guys did not work out at all, find someone else." So the official database, I don´t know, there may be a new one now, but the old one was accessible for everyone, so what you write sort of becomes semi-political.*

Although learning effects and transfer of experiences were rated high by the project managers in order to succeed with other projects, they thought of it as an area of improvement, where there could be even more added value, by focusing on learning effects and transfer of experiences in the projects.

5.2.3.2. Education of suppliers

The suppliers of a project were seen as crucial for the quality of the deliveries and the execution of the projects. When interviewing project managers A, B and C, they all commented on the value of educating the suppliers in risk management and how this would benefit other projects as well. According to the projects managers, risk management is a relatively new field to a lot of suppliers. The suppliers often use a risk management tool to meet requirements from Statoil, without seeing the benefits of it. The suppliers had received some education already, but the project managers felt that there was more to gain in this field:

> *Because now, there is a plan, there is more of a system. Compared to how it used to be: "yes, we do need risk management..." For example, I approach a new supplier, and I then say, at the kick-off meeting, I say: "I expect you to present me with a risk matrix." "Sure", they say, and roll their eyes; they have never done this before, so we have to teach them about risk. And we have indeed ended up teaching risk management to several suppliers. And previously I would send QRM out to have meetings with them, to run risk meetings for them, perhaps serving as a facilitator to them, to teach them risk management. And this, of course, has helped the suppliers when it comes to risk management. So some of the suppliers have gone from zero to OK.* (Project manager A)

As seen, value can be added to the portfolio and Statoil through transfer of experiences, learning effects and education of suppliers. The project managers also said that even more value could be added from these areas.

5.3. To see the big picture: An area of improvement

The ability to see the "big picture" and adopt a holistic view, seems to be an area of improvement where the value of risk management could be enhanced at Statoil. For the risk management to not be limited to only manage individual risks and for the decision makers to be able to see the overall picture, this requires the ability to see the big picture both at the project level, the portfolio level and at the Asset's level, as the decision maker.

5.3.1. Seeing the big picture in the projects

It was found that in the projects one is faced with many challenges in order to adopt a holistic view; at the individual level and to avoid sub optimization by distinguishing between the goals and success of the project on the one hand, and the goals and success of the portfolio and Statoil on the other.

5.3.1.1. Individual level

At the individual level, it was said to be important to be able to look beyond one's own domain in order to see how the activity one is doing or is planning to do, might impose risks or affect other areas in the project or enterprise, which was found to be challenging:

> *However, people are different, if you have a skilled engineer and you ask "what is the biggest risk in this project?", there is a tendency to look into one´s own domain, this is what I work on and I have full control. But as a project manager you see things with your "umbrella sight" - "don´t you see that there could be other risks?", you kind of have to drag them along before they are able to look more broadly, outside of their own domain. But when looking into their own domains, the engineers are so detail oriented and focused that they do not see a lot of risks.* (Project manager C)

> *So I believe that most of us tend to think that it won´t happen with that small thing I am doing. But it is all about seeing the whole picture, isn´t it? If you mess up the small one, the consequences may be quite severe the next time around.* (Project manager D)

It may also be a challenge for the project team to identify the interrelated impacts of an identified risk and to identify the different areas a multiple risk might affect in the project. This is illustrated by project manager B's statement:

I think we keep a good focus on cost, schedule, and safety. What may be underestimated, even if you say that many of the projects you have been through that "quality" was actually crossed out. But the impact quality has on the others. You may tick off quality, but quality affects your costs, it affects your plans, and you then have to identify... actually, OK, if it affects your costs and plans... measures for those as well. Not that you just do some stunt to close them on quality. It might be too late, it might already have affected those other parts of the project.

In order to meet these challenges, at the individual level, it was pointed to the people in the project team and their competence and experience with projects and risk management. The use of PIMS as a communication tool was emphasized as a way to create a common understanding and alignment in the projects, because it enabled everyone to see the same picture.

5.3.1.2. Distinction between the project and the portfolio and Statoil

The project managers were asked to what extent the risk management process enabled them to distinguish between what was best for the portfolio and Statoil as a whole and what was best for the project specifically. This was rated by the respondents from "little degree" to "a high degree", and there seemed to be little consensus among the respondents. See Figure 5-D.

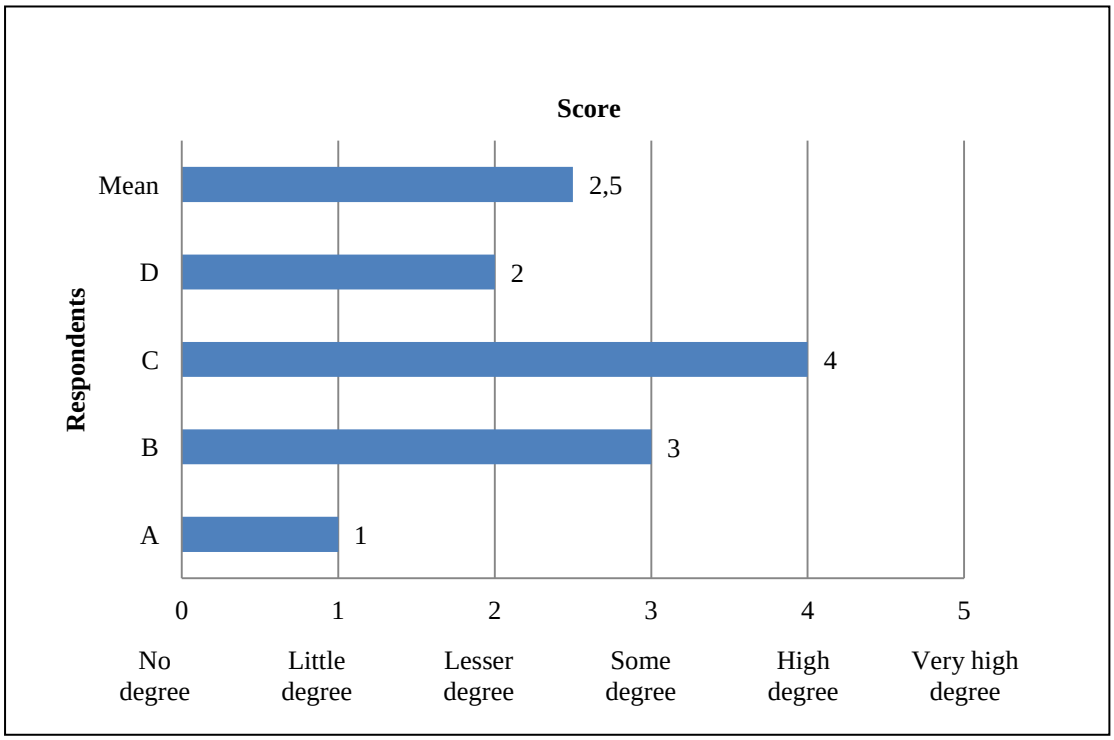


Figure 5-D Distinction between the portfolio and Statoil

In every project there are performance goals that are used to measure a project's success. These performance goals might interfere with the ability to separate between what is best for the portfolio and Statoil as a whole, and what is best for the project specifically. The performance goals for the project were mentioned as being a factor in rating the extent of distinction to a lower degree on the scale. A factor that pointed towards being on the other side of the scale, to "a high degree", was that one had been able to identify threats and opportunities that were risks that mattered to Asset. This could be an opportunity such as the one given as an example in section 5.1.3.1, which represented a major upside for Statoil, but which, for the project alone, imposed increased costs and risk and therefore was not an incentive for performing well on the performance goals. Or it might be a threat that, while not considered a risk for the project's ability to meet the performance goals, was still a threat to Statoil. Examples were given by project managers A and C:

> *We do have an opportunity that deals with, if they work offshore, but cannot get started because they need to take down a generator or a fire pump because it is needed for something else. Alternative work, they can do alternative work for others at Statoil, at installations. And it lies there as blue, and will continue to be blue, all the time until we are done. That´s an advantage for Statoil, we pay for them anyway and they can do other things while they're there.* (Project manager A)

> *To use a good example: If you are offshore, and identify a risk for shutting down the platform, you may ask the question: "Is this a risk to the project?" Definitely not, it is rather an opportunity. But for Statoil, it is a huge risk, a potential for loss.* (Project manager C)

The fact that one could communicate those identified threats and opportunities of importance to Asset through the risk management process, was considered to be an important contribution to see the big picture:

> *And, as previously mentioned, it is a tool that I use to present to them [Asset] too (...) I always present the risk picture and then focus on the areas we think require more focus from Asset´s side. For example, there are some of the risks where the project exerts no control (…) and it affects our plans and we are not able to complete the projects according to our initial schedule (…) They need to understand what the cost is, the totality and what schedule impact it has for them overall.* (Project manager B)

Risk management as a communication tool was considered to be important. On one hand, as a way to impact the decision process for the project. On the other hand, to enhance the quality of the decision process and the deployment of capital for Asset, because it allowed them to see the big picture:

> *We have used this directly towards Asset in certain circumstances. For instance, I think about the fire and gas side, flotel. Where we show them that "if you throw us off now, this is the consequence, the project will be prolonged for this long, it will cost this much more. It is up to you to assess." If all the projects did this, they would have a complete overview. This costs this much to throw off, that costs that much. "Ok then, this is what we choose."* (Project manager D)

The risk management tool and the risk management process also allowed the project to present Asset with a picture of how the project was doing and demonstrate how the identified risks in the project could affect the deployment of capital. Project manager D used an example from the baseline reviews in the projects:

> *(...) this applies to several of the projects, when it comes to going through the baseline reviews two times a year. But there is a full review of the project´s prognosis, for how long to keep it running plus what it will cost. And it is typical, we for instance did this in project C, which is in the final stages, that you make a prognosis of what you think it will cost and what is included, and there is a long list on the outside that is not included, which you enter into the risk register. So if we are doing this, it costs this much and the project will last 6 months longer, for example. This is the best example I have in terms of my own field. It is a good way to demonstrate it.* (Project manager D)

During the interviews with project managers A and D it became apparent that they thought the communication between the projects and Asset was not always effective and that Asset was not always familiar with the project's risk picture and thus not able to see the big picture. This was found to be an area that could be improved:

> *[At project C] they had this major accident remaining in the risk register for a long time, several months. All of a sudden there was a kind of, it might have been a steering committee meeting, where they brought a hard copy of the risk register, and then they noticed. There was quite an uproar. It turned out they had not paid attention to our register, they had not read what we sent them, before we printed it out and gave them a hard copy. So this demonstrates in a way, that it stops at our level, and it does not end up where it should be. So that´s not good.* (Project manager D)

They found that there was a "missing link" in PIMS. PIMS was used to lift important risks ("Top Ten Risks") to the portfolio level, but they could not be imported to Asset at the level above. And consequently they thought the AOR was not able to see the total picture of all the projects he was involved in. The risk matrix was only presented in the monthly report that was sent to Asset and not via the system:

> *In my project, there is a risk called "bed capacity", I cannot get access, am thrown off and etcetera, so if several projects come up with many similar red risks, a bell should ring over there, at Operations or Asset or Y [the platform]; there are a lot of red risks and we have the exact same case. Now, I do not know how good the AOR is at bringing the risks to the next level. (...) But risks need, sort of, to be transferred to the customer, not just via a sheet in the monthly report, that´s wrong, I think. And because I transfer risk to X [the portfolio manager], my risks in this project should be transferred to AOR.* (Project manager A)

> *If I were Asset, I would want to have the risks entered in via the system, not through a pdf-file, where I would have to punch it all manually. Because it can so easily become "lost in translation".* (Project manager A)

> *We have to cut the matrix out and place it in a report. But that is totally wrong, if you're the Asset Owner and in a situation where you need to make a decision, and you're not provided with a picture of what areas that are under fire.* (Project manager D)

According to project manager C, this has now been implemented to some degree. When the project managers tick off the "Top Ten Risks" in the project, these are lifted to the portfolio manager. Then the portfolio manager now has the possibility of choosing what risks from the Sub-Top Ten Risks that should be transferred to Asset, and tick those off. Through a conversation with an AOR it was also pointed to the fact that the AOR could access the project's domain in PIMS to see the details. It was hoped that this could aid the communication between the projects and Asset and contribute to enable the AOR to see the big picture.

5.3.2. Seeing the big picture in the portfolio and for Statoil

To have the ability to see the big picture in the portfolio and for Statoil, the analysis showed that alignment of risks and the roles and responsibilities of the QRM and AOR related to risk management were important.

According to project manager A, there had been an ongoing discussion within the portfolio on how to get alignment in the projects. It was discussed whether or not there should be set scales to define a red risk, a green risk, a dark blue risk and so on, depending on the impact on cost and schedule. One argument for having defined the scale to where a risk should be plotted on the risk matrix, was that it could make it easier at the portfolio and at the Asset level to see shared risks and what areas that was the most important to focus on. The problem is that the projects are different in both budget and time span and it would then be complicated to use PIMS for the risk management in the projects, especially in smaller projects. Project manager A put it this way:

> *Until instructed otherwise, I will continue to see this from the perspective of the project. This is how I believe PIMS is supposed to be used, for the project, not just for someone further up in the system to see the correct risks. (...) And I attempt to use the risk management process as a part, as a project management process. Project and risk management is the same thing, as I said earlier. I then need to be able to weigh the risks in the way I feel like. Mine - not a table weighting, I believe that´s wrong.*

Whereas project manager C discussed the matter this way:

> *So, there might be a case we could have carried out differently, and that's the issue of aligning the risk register, a red risk for you and a red risk for you, might be two widely different things. So I speak as highly of my little risk as your big risk. (...) They should have aligned the risk register, the scales of value. And in a way... but there is a challenge there, too, because you might run a project, where it never gets higher than green. So there is something about that, too.*

One suggestion to solve this problem was put forward by project manager C, where the QRM could have the responsibility of creating alignment of the risks in the portfolio. This suggestion could make it possible for the projects to report risks in a way that is considered the most effective for the risk management in the projects. At the same time the QRM could be given the responsibility to look for interrelated impacts and shared risks in the portfolio

and identify multiple and cross-portfolio risks, thus gaining insight into the big picture at the portfolio level:

> *The QRM facilitates in relation to aligning crosswise, a red risk for me is about the same as for you. (...) it might be the portfolio-QRM´s task to identify possible shared risks. For instance, if it becomes apparent that one supplier that delivers to many projects, stops delivering, he can then see the synergy across. At the same time, he needs to see the risk and impact across. If you have a risk, and I have a risk and I report it in bright red, and you in yellow. "Why is this the case?"* (Project manager C)

In order to identify and manage multiple and cross-enterprise risks at Statoil and see the big picture for the enterprise, it was suggested to look to the AOR. With the requested missing link in PIMS in place, this could according to the respondents provide a better communication flow of the risks from the projects to Asset. The AOR would then have an overview of significant risks in all of the projects he is involved in, and could be given the responsibility to identify and manage the multiple and cross-enterprise risks for Statoil.

5.4. Enhancing the value of risk management

This case study found that risk management in the projects adds value in different areas. Having an active risk management is an aid to manage the project, allowing the projects to manage threats and seize opportunities, and has an impact on HSE. Personal value, customer satisfaction, learning effects, transfer of experience and educating suppliers in risk management were also found to have a contribution with value to the stakeholders. It was seen that adapting a holistic view and see the big picture at the project level, portfolio level and Asset level, could contribute value for Statoil and was an area of improvement. Part of the aim of this thesis is to see if there are ways of enhancing the value of risk management in projects. One common factor of enhancing the value of risk management found in this case study seem to be the people at Statoil and their *competence and experience* in risk management and project management:

> *There might be a dimension you could conclude or sum up with. It [risk management] is easy for me, because I do it every day. For most of the people who do not work with it, it is difficult. Because it is complicated, very complicated. Especially when the projects are semi-large or large, it is a complex world. And I think about, the level of details all the way down to nuts and bolts, and there is strategy in the same document. That makes the range so huge. There is something there, that... you kind of have an entire grid of complexity and details, which make you speak of strategic things that are risks, major accident as a risk, an error in FAT, in the same picture, it makes it difficult to dimension the value. (...) So, in order to get a good risk system, much experience and competence is required.* (Project manager C)

This was seen in relation to both people in the projects and the portfolio, the QRM and the AOR, and their competence and experience.

5.4.1. The people and their competence and experience in the projects

> *Risk management... It always depends on who works with you on the project. Some people, they do not relate to it... It is hard to say, I would say that those who have no relationship do it because it is a requirement or because the project manager demands it.* (Project manager B)

Above, project manager B expressed how the quality of risk management in the projects is dependent upon the *people in the project* and their attitude toward risk management. According to project manager A, there is a tendency to give little priority to areas in which one lacks knowledge, such as lack of knowledge in risk management:

> *You sort of do not give priority to the things you do not know. You do not meet the challenge, you just think: "What do I prioritize?" Technical solution, department meeting or risk meeting. Most people think that: "This doesn´t apply to me."*

He thought that the risk management might be given little priority by the participants in the projects due to ignorance:

> *Ignorance. They do not know... they cannot... you never get any training in risk and risk management as part of a technology degree. You get no training in risk management when you start in one of Statoil´s projects. It just has to be learned.*

Project manager A emphasized the need for the project team to be educated in risk management in order to enhance their *competence and experience*. He thought proper training in how to use PIMS as a risk management tool would be an area of potential improvement. He then expected it to be used to a greater extent by the project team, and thought they would see the benefits of it:

> *However, everyone involved in our project has attended a PIMS-seminar. I have told everyone who works for me to attend the risk seminar, kind of to demonstrate the intention behind it.*

And:

> *There is always a potential for improvement, of course. This potential lies in training to be able to use the tool, if there is a new application in the risk management tool, it needs to be communicated and we need training. None of us... I have never attended a risk seminar, we are talking about pushing buttons and making mistakes and asking. There should have been much more training (...) So, no, training is everything.*

Project manager C stated that he was satisfied with the tools they used in risk management, but he believed that the projects might benefit from a *broader competence* to enhance the value of, and keep the focus on risk management in the projects. A broader competence could, in this context, be described as it is not enough to be a good engineer with great engineering skills, but that some additional knowledge in risk management and experience from projects is needed. Some of this competence could come from experience and be gained over time:

> *I believe this mostly comes down to our own competence and a somewhat wider competence than the project manager, when you see its use and so on. So I do believe it is mostly a matter of competence. (...) Having been doing this for so long, I learn that this is a much better system than the one I have previously used, and I see the benefit of it being an easy system to use. Because PIMS came around during this period.*

Hence, increasing the competence and experience of the participants in the projects, as well as providing training in risk management, might alter the attitude toward risk management, which could ultimately result in an enhancement of the general value of risk management by prioritizing it more and using the risk management tool to a greater extent.

5.4.1.1. Identify and manage risks and see the big picture.

The competence and experience of participants in the project team also affects the team's ability to *identify and seize opportunities and manage threats*. When asked how risks were identified, project manager B replied:

> *Again, experience is key. What we discuss, that´s why there is a lot of learning at that point. The ones sitting around the table as partakers in the discussion, they have done this before.*

The people involved also played an important role in finding *risk responses and actions* to manage the identified risks:

> *It depends on the people involved. Statoil has a procedure for everything, but you kind of have to know where to find them and how to use them. And, again, having a person or resource who knows where to look for, for instance, dropped objects. So there is probably a detailed list of how to avoid that. But having the person who knows where, and who has been out and knows where the actions are required (...) Yes, I might think this [experience] is the most important thing.* (Project manager D)

This implies that experience and competence of the participants in the projects are important also to see the big picture: in the project, in the portfolio, and for Statoil as a whole. Their experience and competence was found to affect the ability to see how one risk might affect other areas in the project and to identify risks that was important to the portfolio and Statoil:

> *People who come right out of school... you need some experience before you see this in a good way. Yes, you need to understand the totality of it, the critical line, you need to see things, and you then put them together and then it´s good.* (Project manager C)

> *It depends on the people in your team and their experience. The more experienced they are, the faster it goes. "But that one time, there was also a problem with Statoil´s reputation or shutdown". So, the more experience people in the team have with the kind of job that has been done earlier, the easier it is to identify which areas that will be influenced and keep the right focus on this.* (Project manager B)

Again, it was seen that the risk management process could never be better than the people involved. It was the people that identified the risks of both the project and for Statoil. They are needed to identify multiple risks and their potential impact on different areas. In order to improve the quality of the decision process, the risks need to be identified, evaluated and communicated, as illustrated by project manager B:

> *And the decision process that I referred to… well, you have this, you have a risk that you inform others of, how much ownership they take in it. And in my opinion, this is an area of potential improvement, because the process can never be better than the people involved. If they are not concerned with it, the foundation might not be good enough. And if they are concerned with it, they ask critical questions, which require having to think twice, how do I get there. And in terms of the decision process, I feel that, if no one asks the critical questions, the risk management tool is nothing but a static system, where you enter it in and all that. And this is partly what I felt we had at the beginning, when I entered the project. A risk register with many risks, positive and negative, but no one who critically looked at "ok, which risk do we have now, why is that a risk? Is it a risk or is it just an activity that we have defined?"* (Project manager B)

The analysis shows that increasing the competence and experience of the people in the projects might enhance the value of risk management by identifying and managing risks and enable them to grasp the larger picture.

5.4.1.2. To learn from each other

The assumption that the process "can never be better than the people involved" is also related to the enhancement of the value of risk management in learning from each other. If there are competent and experienced people at the project team, they can learn from each other and challenge and educate others both on the team and the suppliers. Project manager B regarded this as an area of improvement:

> *Well, yes, we do it, but again, the education cannot be better than what you bring yourself. So if you get someone without first-hand experience, it is very difficult for that person to teach others how to carry it through. There is a totality here.*

This would also impact an area such as HSE in educating and influencing people about the importance of HSE:

> *And that he or she has the ability to sell this into the project. If you are a HSE person who is enthusiastic about something, if he cannot transfer this enthusiasm to an installation manager at the platform, it is kind of a waste. You sort of need to be able to influence the people out there to think in the same way*. (Project manager D)

Thus, increasing the competence and experience of the participants in the projects might enhance the value of risk management through the education of each other and the participants' mutual influence on each other.

5.4.2. The competence and experience of the QRM

For the QRM to have sufficient competence and experience was emphasized by all the respondents as an area that needed attention and a crucial factor in increasing the competence and experience of other people in the project team.

The project managers emphasized that a qualified QRM should be a person that had experience in risk management as well as some knowledge about projects:

> *No, they [the QRMs] are not competent. (...) These are new people. Coming straight from school, not familiar with projects. You know PIMS, but not project work, and you really are... you do have the education, but no experience to see... because risk management to me is about having perspective. And if you know nothing about project execution, have never done it, you cannot really be a good QRM.* (Project manager C)

According to the respondents, a competent and experienced QRM should have the ability to be a driving force within risk management and be able to challenge people in order to educate and increase people's understanding of risk management:

> *And very often, the person you get as your risk manager in the project; do they know the subject, have they been involved in projects? Very rarely do you need a facilitator or secretary who does only the paper work, you really need someone to run the process, demand actions and follow up. And be at the level, I´d say, where you have the ability to challenge others. If you say something is a risk, why is that, what are you going to do about it, push it a little, so that it becomes more than this, a system you can satisfy.* (Project manager B)

> *(…) a very senior QRM person who, first of all, has a deep, profound understanding of it, and secondly can influence the direction of the others. (...) And it is then incredibly important to have someone with some seniority who can alter or enhance the general attitude among everyone involved, and in a way influence them to push together in the same direction. (...) Training. And in a way imprint this thing about understanding. What is a risk and why should we work on it? That aspect of it. I think that´s a challenge for us.* (Project manager D)

Project manager D stated that a QRM with the right qualifications could contribute to getting everyone more committed to the risk management process and get them to see the value of it:

> *Challenging people in Technical is important, because many of them see this process as a hair in their soup, so to speak. It's kind of a barrier they need to get through in order to*

start working on the fun part. And you need a person in this position who can convince them that it actually makes sense to do this. That there is a tool to work with those things, and we have quite a bit of potential for improvement here. (...) Yes, and it´s an important job, to ask the right questions. Often in these meetings, you ask questions, right, "what is the risk in these operations?" and the response is, typically:"None, this is so simple, we have done this a hundred times" and so on. Then you need to have the stamina to be able to sit there and say: "Listen, this is very important", because of this and that. And we are not quite there.

The project managers provided various reasons to why it may be difficult to get an experienced and competent QRM. Risk management is a relatively new field at Statoil and it is not easy to find a person that has the requested experience from projects and in risk management. Thus, it is maybe too easy to acquire a position as a QRM even without the proper qualifications. In many ways it can also be a demanding position. There seemed to be a tendency of the QRMs to not stay in the job long enough to be able to acquire the needed qualifications of what was seen to be a good QRM. This was described by project manager B and project manager C:

And I think we still lack good risk managers in this enterprise, we might have some, but those who are the driving forces. It isn´t supposed to be like, in an evaluation meeting with your boss, if you have a completely different type of job: "Well, what do you want to work with?" "QRM, is that ok?" And you respond: "Yes, sure, why not?" And you show up and you have no idea. You have never been involved in any project, you actually do not know what people are talking about. (Project manager B)

[If you have] a QRM who has been in Statoil for about a year and a half, starts to figure it out (…) and then gets himself a new job. (...) Comes from nothing, trains for a year - new job. That´s the problem. (Project manager C)

Project manager B summarized the challenges of the QRM's position and that without a qualified QRM one could not expect to see the full potential of the risk management process. He thought this was an area of improvement:

Risk management is fairly new in this enterprise, using it as a tool, focusing on the value of this, I don´t think we are quite there yet. (…) I think it needs to germinate. And people need to be qualified. It should be project personnel or people who get into this, to risk management, at least it requires people who know (!) what (!) we are talking about. I

think placing a newly educated person in a risk manager-role is unfair. There is a lot of good learning in it, but it can be parallel to someone, you really sit there and take over after a period of time. But if a lot is dictated… you learn, and maybe in the next project, you challenge. But then and there, OK, I get that it is a risk, but I am still not sure what the risk is, right? And it is unfair also in the sense that as a new person, you may not be comfortable challenging others either. The same goes for people where you change their assignments within the company, that really come from completely different parts of the business (…) And that´s really hard for them. For two reasons, one is that you may not get the respect you need, we see him/her writing these things down. And the second reason is that the overall quality is not very good.

Thus, the competence and experience of the QRM was seen as an area that could increase the competence and experience of other people in the project teams and the portfolio. As earlier stated by one of the respondents, the QRM could be given the responsibility to look for interrelated impacts and shared risks in the portfolio and in this way identify multiple and cross-portfolio risks. Hence, the competence and experience of the QRM will also be important for seeing the big picture at the portfolio level. Attention to this area might enhance the value of risk management in Statoil.

5.4.3. The competence and experience of the AOR

The competence and experience of the AOR was also seen to play an important role for enhancing the value of risk management in Statoil in this case study. If given the ability to identify and manage multiple and cross-enterprise risks at Statoil, and having the sufficient competence and experience; this could enhance the risk management's contribution to see the big risk picture for the whole enterprise.

6. DISCUSSION AND CONCLUSION

In this chapter it is discussed how risk management adds value to projects, the enterprise holding the projects and their stakeholders, in relation to the benefits of risk management, non-monetary values and monetary values. The methodological considerations of this thesis are then presented. Finally, a summary and suggestions for future work are provided.

6.1. Added value through the benefits of risk management

In the COSO framework (2004) benefits of having an active risk management are provided. Many of the findings in this study confirmed that there may be added value through the benefits listed in the COSO framework.

Aligning risk appetite and strategy

COSO (2004) states that an active risk management enables the company to "*align risk appetite and strategy"* when the set objectives of the company are aligned with its selected strategy and risk appetite, and mechanisms are developed to manage the related risks.

In this case study, the respondents overall linked the success of a project to the achievement of goals related to cost, plan and Statoil's philosophy of causing zero harm. Thus, managing risks related to these goals was seen as crucial. To achieve those set goals of the project, it was found that the risk management contributed in facilitating management of the project and provided a system and a tool in such a way, that risks that could prevent the execution of the project and its goals were focused on and managed. Through risk management, threats were minimized and opportunities seized in alignment with the risk appetite, which contributed to the achievements of those goals.

To add value to the enterprise from risk management in the projects and achieving Statoil's goals, it was seen as important that HSE incidents and unplanned production downtime and shutdowns were avoided, and that one had been able to save money through having more days of production. In addition, there was contribution of value in communicating risks of importance to Asset from the project, so that those risks could be assessed by Asset, aligned with the risk appetite and managed.

Enhancing risk response decisions

According to COSO (2004), active risk management should *enhance risk response decisions*. The results of the study show that many of the threats and opportunities in the projects and the associated risk responses and actions were identified early in the process, where as some were identified during the execution of the projects. The risk management tool was used to implement the selected risk responses and actions.

The support to identify and select among alternative risk responses through the risk management process, may in many ways be contributed to lessons learned from one project to another project. Through learning effects and transfer of experiences one could identify risks early in the initiation of a project, which facilitated estimating the impact and probability of the risks. In addition, one was familiar with what actually worked in managing those risks.

For the portfolio and Statoil, it is important that one is able to see the big picture, both in the projects, in the portfolio and at Statoil, in order to provide the decision makers with a sufficient basis to enhance their risk response decisions to risks that are not managed in the projects, but is of importance to the portfolio and Statoil. This was found to be an area of improvement.

The findings indicate that in order to further enhance risk response decisions through risk management and enhance the value, it is important to increase the competence and experience of both people in the projects and the portfolio, the QRM and the AOR.

Reducing operational surprises and losses

According to COSO (2004) risk management enables companies with an enhanced capability to identify potential events, assess risk and establish responses, thereby *reducing operational surprises and associated costs and losses*. The findings indicate that risk management has an impact on cost and schedule. The risk management process provides a structured way of identifying threats related to cost and schedule, identifying and assigning actions to the project team, and communicating those threats to the project team and the decision maker at an early stage. This contributes to focus on the important activities, set the priorities and plan for events that may threat the project. It may also contribute to identifying events that could delay or stop the scheduled production at the platform, which could in turn result in major financial losses for the enterprise.

According to the respondents, most of the identified risks related to cost and plan did strike, but the severity of the consequences was reduced due to the implemented actions and the threats were minimized.

The findings also suggest, however, that some of the identified threats did not reduce the impact on cost and plan because of their low manageability. But this was seen in relation to threats with an impact on cost and schedule from the projects perspective only, where the project was not entitled to make the decisions. PIMS and the risk management process were said in those cases to serve more of a communication purpose to highlight such risks for the decision maker rather than minimizing the threat.

One might ask if operational surprises and associated costs and losses were reduced for Statoil as a whole. This depended on one's ability to see the big picture and adapt a holistic view in the projects. In cases where one was able to be able to identify and communicate risks that were of significance to the decision maker and distinguish between what was best for the project specifically, and what was best for the portfolio and Statoil as a whole, the results indicate that operational surprises and losses were reduced.

Seizing opportunities

Hillson (2002) emphasizes the need to not only focus on the negative side of risk, but to include the "upside risk" or opportunity in the risk perspective. According to this view, the risk management process should be extended to manage opportunities. According to COSO (2004) effective risk management enables the management to identify and proactively exploit opportunities. The findings show that opportunities were included in the project manager's risk perspective and in the risk management of the projects. However, it was revealed that it at times was easier to focus on the threats only and forget about the opportunities. This is in line with earlier studies on managing opportunities (Olsson 2007; Ward & Chapman 2003). Olsson (2007) found that the risk management process in projects was not fully able to manage opportunities. Often, identifying opportunities was not due to the risk management process, and opportunities were at best addressed reactively. In contrast, the results in this thesis indicate that many of the opportunities were identified early in the risk management process. Emphasis was placed on opportunities at risk meetings and baselines on opportunities that had a large contribution to the project and Statoil, and which seemed realistic to exploit. The risk management tool contributed to manage the opportunities in

highlighting them, as well as in setting and assigning actions. Consequently, this may indicate that the risk management process contributed to seizing opportunities *proactively*.

Identifying and managing multiple and cross-enterprise risks and improving employment of capital

According to COSO (2004), effective risk management enables one to not only manage the individual risks, but also to understand interrelated impacts and *identify and manage multiple and cross-enterprise risks*. This was found to be a challenge in the projects. In order to understand and see interrelated impacts, the individual and the project team need to see the big picture. They need to realize how the activity one is doing or planning to do might impose risks, affect other areas in the project or the enterprise and identify the different areas a multiple risk might impact in a project. The risk management tool was said to be helpful because it allowed everyone to see the same risk picture, thus creating a common understanding and alignment of the identified risks. However, to meet these challenges in order to identify and manage multiple risks, not surprisingly, the people involved in the risk management process need sufficient competence and experience with projects and risk management.

To be able to see the big picture and adopt a holistic view, seem to be an area where the value of risk management could be enhanced at Statoil. This is also largely linked to the *communication* between the projects, QRM and Asset and the decision process. For the QRM and AOR to be able to create alignment in both the portfolio and the group, and to identify and manage multiple, cross-portfolio and cross- enterprise risks, adequate competence and experience with projects and risk management is required. Risks of importance to the QRM and AOR need to be communicated from the projects and the information received.

COSO (2004) states that risk management *improves the deployment of capital*. Robust information is obtained through the risk management process, which allows assessing overall capital needs and enhancing capital allocation. According to the findings of the present study, in the projects one needs to be able to distinguish between what is best for the project specifically and what is best for the portfolio and group as a whole. The results show that one had been able to identify threats and opportunities for the company that actually were not seen as risks for the project, and pass this information on to Asset. However, the performance goals for the project were said to conflict with this. To improve the quality of the decision process and hence the deployment of capital, the decision makers must see the overall picture and the

adequate information communicated and received. This requires that one is able to see the big picture both at the project level and the portfolio level and at the Asset's level, as the decision maker.

The risk management tool and the risk management process allowed the projects to present a picture of how the project was doing and highlight risks of importance to the AOR and QRM. However, the results indicate that the communication was not always effective.

6.2. Contribution through non-monetary values

The internal environment is a big component in risk management. The organization's risk management philosophy reflects its ethical values, influences its culture and operating style, and affects the integrity and competence of the people of the company (COSO 2004). Consistent with this view, the results of this case study suggest that Statoil's risk management philosophy and their zero harm philosophy had been adopted by the projects. Achieving this "zero vision" was regarded as critical for a project's success. The respondents were satisfied with the risk management of HSE-related risks in the projects and the projects had not had any HSE incidents. They thought that one had succeeded in defining and implementing actions that reduced the risks of HSE incidents and had been able to affect the mindset of those executing. The findings suggest that this was largely due to the competence and credibility of the people at HSE, who were able to influence people in the projects and make them realize the value of focusing on HSE risks.

Der Stap (2008) states that the sanctity and quality of life may be easily forgotten in profit- and production oriented cultures. However, according to the findings, this type of culture seemingly did not exist in the projects. Even if production and profit clearly had a high priority in the projects, the focus on HSE related risks might be said to be juxtaposed with the focus on production and profit, or the number one priority.

Further, der Stap (2008) says that effective risk management provides a positive payoff for the individual. Similarly, the findings indicate that risk management may be of personal value and provide a positive payoff for the individuals in the projects. Knowing that there is a focus on risk management may cause the project members to feel that they have *a safer and more secure job*. The feeling that one is taken care of, and that preservation of life and health is a number one priority, provides the basis for a *safe* job. One may also find that one has a more *secure* job. If one thinks that the risk management aids in creating financial values for the company and thus increasing its financial stability, this provides a positive payoff in having a stable occupation.

A positive payoff for the project managers might be that they are more satisfied with their own performance at work. Some of the responsibility can be carried away when risks have been communicated through the risk management process. If they think that the risk management process helps them in managing the projects, this enables them to do a better job

– the job becomes easier. Risk management as an arena for learning and adapting the mindset of risk management to areas outside of work, were also found to provide a positive payoff for the individual. Although of personal value, these positive payoffs could in turn impact the work environment and reinforce a healthy organizational culture, in line with the view held by der Stap (2008).

6.3. Contribution through monetary values

Studies support that the strongest motive for risk management behavior is the avoidance of financial distress (Fatemi & Luft 2002). If, through risk management, one is able to improve the deployment of capital, as discussed earlier, an effective risk management should provide organizations with financial flexibility, thus avoiding different categories of financial distress. This should enable the organization to take on profitable projects and investments and to avoid forced divestments, even during periods with bad market conditions.

One very visible way to see if a company is creating values for its shareholders is to look at the listing on the stock exchange. When the market becomes aware of bad management decisions, like taking on an unprofitable project, this is quickly reflected in the stock exchange. Major accidents or incidents that affect an enterprise's reputation will also be reflected in the stock price. The findings related to the management of threats and opportunities and the impact on cost and schedule have earlier been discussed. Trough risk management in the projects, it is obviously important to manage threats and opportunities that have an impact on cost and schedule, in order to maintain production or to save money due to more days of production, thus increasing shareholder value. Furthermore, to manage risks related to health, internal and external environment, safety, security, quality and reputation will also impact the financial conditions of an organisation. The results of this study found that the risk management had an impact on HSE. However, the study did not address the risk management's potential impact on external environment, security, quality and reputation, which might be an interesting area to look into, and a subject for future studies.

6.4. Methodological considerations

Throughout this whole study, one has attempted to ensure the study's quality and assessed its validity and reliability. In order for others to assess the study, and determine how applicable the results might be for other situations, the process from data collection to the final results is described in chapter 4 (Dalen 2004; Malterud 2003). In the presentation of the findings, some of the respondents' quotes have been used to illustrate the findings and how the data has been interpreted.

Prior to this study, the author did not have any experience with conducting interviews, thus the pilot interview was useful as a way of practicing her interview skills and increase her ability to create stimulating interactions, and as means to test the interview guide and get an increased understanding of the subject prior to the interviews. The interviews were recorded by two separate recorders to ensure an audible take. Recording the interviews proved to be very useful. The author was able to focus on the interview, concentrate on the respondents' answers and ask follow-up questions in order to ensure that the themes in the interview guide were adequately covered. In addition, the author did not have to rely on memory when the interviews were analyzed. The interviews were transcribed verbatim by the author, to ensure closeness to the interview situation (Dalen 2004; Kvale 1996; Malterud 2003).

The interview respondents have a busy schedule, which could have affected the interview situation and the richness of their responses and descriptions. However, each interview was scheduled for two hours, which seemed to be sufficient time. The interview subjects appeared to be knowledgeable and well motivated (Kvale 1996). The four respondents are highly educated individuals, and it is assumed that the information provided reflect their opinions. During the interviews, questions were raised to ensure that the respondents' opinions were correctly understood. Sometimes the informants corrected the understanding, other times it was confirmed.

After all of the interviews had been conducted, the findings were discussed with the AOR of project C. The AOR confirmed many of the findings and also provided more in-depth knowledge. Conversations with the faculty and external supervisors have also contributed to reflect on the quality aspects of this study.

In this thesis, a case study of three projects in the same portfolio at Statoil was performed. Surely, the study context and the individual characteristics of the projects and the respondents

have influenced the findings. A relatively limited numbers of interviews were conducted. The process of selecting respondents was not done within a framework of statistical sampling, but the four respondents were selected to provide deeper knowledge about how risk management of the projects was experienced by the project managers, project control manager and portfolio manager. Since the number of cases was relatively limited, future studies are needed for the results to be generalized to other populations. Rather the aim was to get an increased understanding of a phenomenon and to provide a comprehensive insight into a few cases that could be carried over to similar situations or cases (Yin 2003).

Primarily, this study can be used to get an increased understanding of the value of risk management in the chosen portfolio at Statoil. It is assumed that most of the findings also will be relevant for other projects at Statoil. Further on, this study might be a contribution to provide more insight into the value of risk management in projects outside of Statoil. Certain aspects of the findings, such as the risk management's contribution to manage the projects and the need to increase the participants of the projects' competence and experience and adapt a holistic view, might be related to other comparable cases in a similar context.

6.5. Summary

The findings of this thesis suggest that active risk management in projects does contribute with value to the projects and the company holding the projects. This value is related to different aspects; benefits of risk management, monetary and non-monetary values. Main contributions to adding value were found to come from the risk management's aid to manage the project, its contribution to managing threats and seizing opportunities and its impact on HSE.

It was seen that risk management adds value for the project's stakeholders, in providing a positive payoff for the individual and increasing customer satisfaction for the customer. For the enterprise and its shareholders the financial impact of the risk management is clearly important to provide value. In this context, it is obviously important to manage threats and opportunities that have an impact on cost and schedule, in order to maintain production or to save money due to an increased number of days of production. However, this should not set aside how the contributed value from the benefits of risk management and non-monetary values, also influences the financial impact of risk management. Consequently, there may be added value to the shareholders through the benefits of risk management and non-monetary values as well. In addition, the risk management's contribution to managing risks affecting the sanctity and quality of life might be said to be of value for several of the stakeholders.

It has been discussed that adapting a holistic view and seeing the "big picture" at the project level, portfolio level and Asset level, might add value for Statoil. The findings suggest that this is an area of improvement. One common factor of enhancing the value of risk management found in this case study was, not surprisingly, the people at Statoil and their competence and experience in risk and project management. This is related to the competence and experience of both people in the projects and the portfolio, the QRM and the AOR.

In particular, the findings revealed that the competence and experience of the QRM is an area that should be looked into, in order to increase the competence and experience of other people in the project teams and the portfolio. The competence and experience of the QRM will also be important for seeing the big picture at the portfolio level, if given the responsibility to look for interrelated impacts and shared risks in the portfolio and identify multiple and cross-portfolio risks. Attention to this area might enhance the value of risk management in Statoil.

6.6. Suggestion for future work

The findings of this thesis are based on a case study of three projects from the same portfolio at Statoil. To be able to get more insight into how risk management contributes with value to projects, an enterprise and their stakeholders, a suggestion for future research is to perform a similar case study on additional projects, either at Statoil or other enterprises in the oil and gas industry or in projects in other industries, and compare the results with the findings of this thesis. Another area to look into might be to compare the results with projects that do not have an active risk management.

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APPENDICES

Appendix A: Interview guide

First of all: Thank you for taking the time to attend this interview. Together with my supervisor at Statoil we have decided that in my thesis I will be looking at the value of risk management in projects and for Statoil. This is related to both financial and non-financial values.

The interview is estimated to last about one to two hours and the thesis will be based on information from the interviews. OK to tape and use this interview in the thesis?

Background:

- Can you say a few words about the project and your role/job description in the project?
    - For how long has the project lasted? Which phase is it at the moment?
- Have you been the project manager of the project the whole time? For how long have you been involved in the project?
- Earlier experience with projects and risk management in projects?
- How do you understand the term "risk"?
- How do you understand the term "risk management"?
    - What do you associate with active risk management?
- How would you describe the view on risk management among those who have been involved in the project?
- Describe how the risk management has worked in this project?
- Immediate thoughts when you hear the term "value of risk management"?

The risk management process:

- Do you agree/disagree that the risk management process contributed to making this a better project? How?

To what degree would you say the risk management process **in this project** has contributed to:

Grading: 0-5 No degree to very high degree (no degree, little degree, lesser degree.... etc.)

You are welcome to use examples throughout the interview!

- making the project an overall success
- adding value to the project and to Statoil
    - *How?*
    - *How do you understand the term "value" in this setting?*
- adhering to the project´s schedule?
- achieving the project´s (and Statoil´s) set goals?
- increasing the quality of the decision process?
- achieving customer satisfaction?
- the success of other projects in the portfolio and in Statoil?
    - In your opinion, how has one in risk management been able to separate between what is best for the portfolio and Statoil in general, and what is best for the project specifially?
    - Would you say there are any learning effects from the risk management in this project that can be transferred to other projects? Has transfer of experience been given priority in this project?

- Any examples related to the points above you would like to mention?
- What is needed in order to increase the gradation?
  (Potential for improvement in relation to the points above?)
- In your opinion, how did this project do/ perform on these points, compared to other projects you have participated in?

- Risk management activities:
    - Too much/little time used in the project? How/why?
    - Cost: spent too much/too little? Cost/benefit assessed? How/why?

Areas in the risk management:

Show on hard copy

Risk management may be related to areas such as:

- Health & Work Environment
- Security
- Quality
- Safety
- Reputation
- Environment
- Cost/financial impact
- Schedule

- In your opinion, in which areas did risk management have the biggest impact/influence?
- How do you understand the term quality etc….?
- Areas where risk management did not have any impact? Why? (not applicable/relevant?)
- Areas not covered by risk management? Why?
- Any additional areas that have not been included here?
- Any examples of how risk management in your project affected the various areas?
- Compared to other projects you have participated in?
- In any of your projects, do you see areas where you would like the risk management to have been done differently? Why?

- Multiple risks:
  - How to identify all areas affected by risk?
  - How to identify the interrelated impacts between risks through risk management?

- Any examples of situations in which the risk management specifically showed results?
- Any examples in which risk management affected non-financial values?
- Any examples of situations in which the risk management provided a positive payoff, a personal gain for the employee?

Threats and opportunities in this project:

- In your opinion, what were the biggest threats to this project? (Top 10 risks)
    - How were these threats identified? Who identified them?
- In your opinion, what were the biggest opportunities in this project? (Top 10 risks)
    - How were these opportunities identified? Who identified them?
- In the project, how were the identified
  threats dealt with?
  opportunities dealt with?
- How were the actions identified/defined?

- Are relevant stakeholders involved in the identification of risks?
- How does one determine which risks are Top 10 risks? Are these lifted (upwards)?

- How has the risk picture been communicated externally and internally?
- How is the cooperation/communication with Asset/Asset Owner/Asset Owner Representative experienced, in relation to risk management? Does the owner know Top 10 threats and opportunities?

Other questions:

- Anything you would like to add/that is unclear/questions?
- Anything else I should ask other interview subjects about?
- Specific questions related to each project and its project documentation.

Appendix B: Paper used during the interviews

To what degree would you say the risk management process in your project contributed to:

Indicate a number between 0 (no degree) and 5 (very high degree)	0	1	2	3	4	5
Making the project an overall success?						
Adding value to the project and Statoil?						
Adhering to the project's schedule?						
Achieving the project's set goals?						
Achieving goals for Statoil?						
Increasing the quality of the decision process?						
Achieving customer satisfaction?						
The success of other projects in the portfolio and in Statoil?						

Indicate a number between 0 (no degree) and 5 (very high degree)	0	1	2	3	4	5
To what degree has one in risk management been able to separate between what is best for the portfolio and Statoil in general, and what is best for the project specifically?						
To what degree has transfer of experiences been prioritized in the project?						
To what degree are there learning effects from the risk management in the project that are transferable to other projects?						

Influence on various areas in the risk management:

- **Health & Work Environment**
- **Security**
- **Quality**
- **Safety**
- **Reputation**
- **Environment**
- **Cost/financial impact**
- **Schedule**

Appendix C: Summary of rating

	A	B	C	D	Sum	Mean
Making the project an overall success?	3	3	5 - technical	3	14	3,5
Adding value to the project and Statoil?	4	4	3	4	15	3,75
Adhering to the project's schedule?	3	4	1	2	10	2,5
Achieving the project's set goals?	2	4	5	4	15	3,75
Achieving goals for Statoil?	4	4	5 - technical	4	17	4,25
Increasing the quality of the decision process?	1	3	2	5	11	2,75
Achieving customer satisfaction?	3	4	4	4	15	3,75
The success of other projects in the portfolio and in Statoil?	4	4	3	1	12	3

	A	B	C	D	Sum	Mean
To what degree has one in risk management been able to separate between what is best for the portfolio and Statoil in general, and what is best for the project specifically?	1	3	4	2	10	2,5
To what degree has transfer of experiences been prioritized in the project?	4	4	4	5	17	4,25
To what degree are there learning effects from the risk management in the project that are transferable to other projects?	4	4	4	4	16	4

Appendix D: Information letter to the respondents

Information about the study

"Value of risk management"

Thank you for participating in this study! In this letter I would like to give some information about the study and confirm our appointment for an interview the …. at….

Purpose of the study
This study is carried out in relation to a master's thesis in Risk Management in Offshore Safety at the University of Stavanger (UiS).

The purpose of this thesis is to:

- Investigate if risk management in projects adds value to projects and Statoil, in relation to both financial and non-financial aspects.
- To see if there are ways of increasing this value creation, and if there are areas of improvement in the risk management

Method
The method used in this thesis is based on qualitative interviews with four different participants. This means that I am interested in your point of view and experiences, and I would like to stress that I am not asking for any "definite answers". Attached is an overview of some of the themes and questions that will be addressed during the interview, which you can review in advance. The interview is expected to last approximately from one to two hours, and the thesis will be based on the interviews.

Duration of the study
The study is expected to be completed in June 2012.

Ethical guidelines
It is, of course, voluntarily to participate in the study and you can withdraw from it at any time. The interview will be recorded on audio tape, and all information will be treated confidentially. Tapes are deleted when the material is transcribed and the transcripts are deleted after examination. If desired, the transcription may be sent to you.

Any questions may be directed to:
e-mail: maamvi@statoil.com and amdalvik@gmail.com
phone: 48 11 98 04.

My supervisor at Statoil, Ernst Ove Wadel, may be contacted by
e-mail: eowp@statoil.com or phone: 99 11 37 98.

Again, thank you for participating in the interview. Your contribution is highly appreciated!

Sincerely,
Marie Amdal Vik

Themes/questions adressed during the interview:

The risk management's contribution to:

- Making the project an overall success
- Adding value to the project and to Statoil
- Adhering to the project's schedule
- Achieving the projects' (and Statoil's) set goals
- Increasing the quality of the decision process
- Achieving customer satisfaction
- The success of other projects in the portfolio and in Statoil
- Distinction between what is best for the portfolio and Statoil as a whole and what is best for the project specifically
- Learning effects/ transfer of experiences from the risk management to other projects

Time and cost on risk management activities. Ratio cost/benefit

Influence on various areas in the risk management:

- Health & Work Environment
- Security
- Quality
- Safety
- Reputation
- Environment
- Cost/financial impact
- Schedule

Threats and opportunities in the project (Top 10 Risks)

- How are these identified?
- Why are the risks closed?