



Oil boom at Technical Museum, Oslo
Photo: Petter Danielsen

SKIMMING THE OIL (OF WATER) – THRIVING DEVELOPMENT OR STATUS QUO?

*A study of **Oil Spill Preparedness**
through an organizational approach*

Master thesis in
EN310E 003 – MSc in Energy Management

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ABSTRACT

This thesis attempts to illuminate the challenges facing Norwegian oil spill preparedness, and how these can be approached in the best possible way, with the intent to make oil spill preparedness more effectively. Organizational aspects are in focus.

The research has an inductive approach. Interviews have been carried out with several companies producing services or products related to oil spill preparedness, including the three major players in the Norwegian oil spill preparedness – the Norwegian Clean Seas Association for Operating Companies (NOFO), the Norwegian Coastal Administration and one of the inter-municipal committees against acute pollution (IUA).

The main findings are as follows:

- Shipping represents the greatest risk of oil spills.
- Near-shore preparedness has room for improvement, while offshore preparedness is perceived as good.
- Challenges thought to be solvable are mainly of organizational nature – more specifically when it comes to the interaction between the players involved in oil spill response actions.

Practical implications constitute a proposal to include the organizational challenges in the quest to achieve effective preparedness. Theoretical implications relates to whether the theories of temporary organization, project management and risk management can be applied in an oil spill response action. The former of these is suitable, while the latter two can provide useful perspective on things, but needs to be adjusted to the situation in question.

Keywords: oil spill preparedness, environment, project management, risk management, temporary organizations, Lofoten, Nordland, Norway.

PREFACE AND ACKNOWLEDGEMENTS

This is a mandatory thesis in the two-year course of the Master of Science in Energy Management, and accounts for the final 30 credits in my five-year time at Bodø Graduate School of Business. I would like to show a general gratitude towards my school, for initiating this joint master program, and for placing the third semester in Russia. I enjoyed staying in both St. Petersburg and Moscow.

The decision of writing a thesis related to oil spill was made in late spring 2009 in my room at the dormitory on the campus of MGIMO University in Moscow. The major reasons behind choosing oil spill preparedness as subject, stems from a set of personal criteria I set up in order to find a motivating topic – which proved to be effective. I sat out to find a topic that should be of academic, personal and public interest – and oil spill preparedness was chosen. Since then, the subject has increased in relevance – especially public relevance due to the on-going oil spill in the Gulf of Mexico.

A number of people have contributed to this thesis, and I would like to thank you all for that. Rune Finsveen who helped me get in touch with my respondents through the Arena Beredskap cluster and for inputs in the early phase. Further on, a sincere thank to Rune Pedersen who helped painting the background picture, and offering input of practical and theoretical character in the early phase. I am grateful towards all respondents too, inviting me to their facilities, offering coffee and first-hand insight to this industry. The road trip I conducted in order to visit you turned out to be joyful and interesting. Respondents include Roy Charlsen, Sigve Olsen, Laila Torstensen, John Richards, Realf Hansen, Per Odd Krystad, Ottar Skog and Sjur W. Knudsen.

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I have focused on making this document as easy to navigate in as possible. Between each main chapter, you will find a figure, placing the actual chapter in relation to other chapters. In addition, I have chosen to include minor quotes which gives an alternative perspective on the chapter you are about to read. These must be read with an open- and humoristic mind – and they will not be followed up in any academic sense. If you are reading an electronic version of this document all references act as clickable links.

Research reports should be easily accessible, and not tucked away in a drawer. I therefore chose to make an electronic version of this thesis, which will be available at <http://oljevern.petterdanielsen.com> after the grading process has been completed. On this site, you will also find details on how to get in touch with me – something I encourage you to do if you have questions or remarks. As a courtesy of my fellow Russian students, I have also implemented a Russian abstract with keywords, in addition to the mandatory Norwegian.

Enjoy reading!

Bodø, May 19th, 2010

Petter Danielsen (sign)

The author is solely responsible for fails and mistakes in this thesis (and none of the people or organizations mentioned).

SAMMENDRAG (ABSTRACT IN NORWEGIAN)

Dette er en masteroppgave som forsøker å belyse hvilke utfordringer norsk oljevern er stilt overfor, og hvordan disse kan tilnærmes på best mulig måte, med den hensikt å gjøre oljevernet mest mulig effektivt. Organisatoriske aspekter er i fokus.

Oppgaven har en induktiv tilnærming, og er basert på intervju av private bedrifter som arbeider med tjenester eller produkter relatert til kystnær beredskap, samt de tre store partene i det norske oljevernberedskapet – Norsk Oljevernforening for Operatørselskap (NOFO), Kystverket og ett av de interkommunale utvalgene mot akutt forurensning (IUA).

Hovedfunnene er som følger:

- Skipsfarten representerer den største faren for oljesøl.
- Kystnær oljevern har rom for forbedringer, mens offshore oljevern er oppfattet som god.
- Utfordringer, som er antatt å være løselige, er hovedsaklig av organisatorisk art – og da gjelder det samspillet mellom aktørene som deltar i oljevernaksjoner.

Praktiske implikasjoner utgjør et forslag om å inkludere de organisatoriske utfordringene i søken etter å oppnå effektiv beredskap. Teoretiske implikasjoner relaterer seg til hvorvidt teorier rundt midlertidige organisasjoner, prosjektledelse og risikostyring kan anvendes i en oljevernaksjon. Den førstnevnte av disse passer godt, mens de to siste kan gi nyttige perspektiver på ting, men må tilpasses.

Nøkkelord: oljevernberedskap, oljeutslipp, miljø, prosjektledelse, risikostyring, midlertidige/temporære organisasjoner, Lofoten, Nordland, Norge.

РЕЗЮМЕ (ABSTRACT IN RUSSIAN)

В этой диссертации проводится попытка осветить проблемы, с которыми сталкиваются норвежские компании в отношении противодействия разливам нефти, а также рассматриваются пути преодоления этих проблем наилучшим способом и повышения эффективности противодействия разливам нефти. В центре внимания оказываются организационные аспекты вопроса.

Исследование строится на индуктивном подходе. Автором было проведено несколько интервью с сотрудниками компаний и организаций-поставщиков товаров и услуг, связанных с противодействием разливам нефти, в том числе, с тремя ключевыми игроками отрасли – Норвежская Ассоциация Чистых Морей для компаний-операторов (NOFO), Норвежская береговая администрация и один из межмуниципальных Комитетов по борьбе с загрязнением.

Основными результатами исследования являются следующие положения:

- наибольшую угрозу разливов нефти представляет судоходство
- система околберегового противодействия нуждается в усовершенствовании, в то время как система противодействия в открытом море является удовлетворительной
- разрешимые проблемы имеют, в первую очередь, организационный характер – в особенности в том, что касается взаимодействия между участниками системы противодействия разливам нефти.

Практическая значимость работы заключается в предложении включить организационные аспекты в пути достижения более эффективной готовности противодействия. Теоретическая значимость заключается в поиске ответа на вопрос, применимы ли теории временных организаций, проектного менеджмента и управления рисками к противодействию разливам нефти. В то время как первая применима, вторая и третья должны быть подведены под конкретную ситуацию.

Ключевые слова: противодействие разливам нефти, окружающая среда, управление проектами, управление рисками, временные организации, Луфутэн, Нурланд, Норвегия

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GLOSSARY OF CONCEPTS

Skimming oil:	A process that separates oil from water. Used as a part of mechanical oil spill response.
Oil spill preparedness:	Actions taken to reduce the chance for, and the consequence of oil spills. The focus of this thesis is the latter of these two.
Arena Beredskap:	A cluster of companies, aimed at delivering a “one-stop” solution for oil spill preparedness.

LIST OF ABBREVIATIONS

COSO	Committee Of Sponsoring Organizations of the Treadway Commission
EHS	Environment, health and safety
HHB	Bodø Graduate School of Business (Handelshøgskolen i Bodø)
IUA	Inter-municipal committee against acute pollution (Interkommunalt utvalg for akutt beredskap)
MGIMO	Moscow State Institute of International Relations (Московский государственный институт международных отношений (Университет) МИД России)
NCA	The Norwegian Coastal Administration
NCS	Norwegian Continental Shelf
NGO	Non-governmental organization
NOFO	The Norwegian Clean Seas Association for Operating Companies (Norsk Oljevernforening For Operatørselskap)
NOK	Norwegian krone
NRK	Norwegian Broadcasting Corporation (Norsk Rikskringkasting)
SINTEF	The Foundation for Scientific and Industrial Research (Stiftelsen for industriell og teknisk forskning)
SIVA	The Industrial Development Corporation of Norway (Selskapet For Industrivekst)
WWF	World Wide Fund for Nature

1. INTRODUCTION



*“You may admire a girl's curves on the first introduction,
but the second meeting shows up new angles.”*

Mae West, American actress (1893-1980)

In this chapter, I will describe the background for choosing my topic, argue for its importance, specify my concrete research goals, and at the end – give an outline for the rest of this thesis. The aim of this chapter is only to provide the reader with a glance of the thoughts behind my research, and must be viewed together with the entire report to make complete sense.

1.1 Background

1.1.1 Personal Relevance

The idea of writing about *oil spill preparedness* arose when I saw a documentary on this subject, made by the Norwegian Broadcasting Corporation (NRK). They concluded that today's oil spill equipment was useless in more than fresh breeze, i.e. wind speeds in the interval of 8.0 to 10.7 meters per second (NRK, 2009). I did some googling on the Internet, and found a lot of articles in the newspapers, which added credibility to what NRK concluded.

Then my natural thought was - how can this be? My impression, based on subjects taught at my school, was that Norway and the Norwegian oil and gas industry is a leading innovator and producer of cutting edge technology. “The best in the world”, in many areas, leading to a huge export of oil- and gas related services and products. In addition, we have some of the world highest standards regarding health and safety – and environment. Or is it so?

1.1.2 Relevance to the Industry

Based on impressions from different newspapers, it seems that the industry dealing with oil spill preparedness has great difficulties in arranging and maintaining satisfactory oil spill preparedness – and the specific problems seems to differ from incident to incident.

On the Norwegian Continental Shelf (NCS), a leakage from a loading process at Statfjord A caused an oil spill of about 25.000 barrels of oil – or 4.000 metric tonnes (Aftenposten, 2007a). In the aftermath of this incident, problems with instrumental detection of the oil spill were reported (VG, 2007). Due to harsh weather conditions, the oil spill was not combated in any notable way, and most of the oil disintegrated in the sea (Aftenposten, 2007b; Dagsavisen, 2007). Another minor oil spill occurred at the same oil field about six months later (Dagbladet, 2008). Besides these two, the major domestic incidents in recent years seem to stem from the shipping industry.

In January 2004, the M/V “Rocknes” ran aground in Vattlestraumen near Bergen. Besides being a tragedy in terms of the loss of 19 crew members, it also spilled most of its 470 cubic meters of heavy fuel oil, and about 70 cubic meters of diesel (SINTEF, 2008). Oil spill response turned out to be difficult due to strong currents, and 45 km of shoreline were contaminated.

Three years later the M/V “Server”, with 585 tonnes of heavy fuel oil on board, was shipwrecked in the municipality of Fedje in the county of Hordaland. Most of this leaked out in the sea, and about 135 tonnes of this oil was recovered, while the rest dissolved in the sea. Also this time, the weather conditions were hindering effective response (Firda, 2007).

In the summer of 2009, “Full City” ran aground in Langesund, in Telemark County. Carrying approximately 1000 tonnes of heavy bunker oil and about 120 tonnes of diesel, it caused a “considerable” oil spill (Kystverket, 2009), contaminating an estimated 120 km of coastal line (Aftenposten, 2009a).

In none of these incidents, at least according to the media, the oil spill responses were reported to go smoothly or to have an adequate effect. On the contrary, politicians and leading personnel in this industry, called for improvements in the oil spill preparedness. The Norwegian Clean Seas Association for Operating Companies’ (NOFO’s) director for research and development, Hans V. Jensen said that Norway has a very good level of preparedness on the NCS, but called for “new ideas” and improved methods in the sphere of combating oil spill (Teknisk Ukeblad, 2008a), and launched a development competition called “Oil Spill Response 2010” (NOFO, 2009).

If we look abroad, one incident has proceeded during the work with this thesis making oil spill response even more relevant to industry. This is the still ongoing massive oil spill in the Gulf of Mexico, where a blowout caused an explosion on the Deepwater Horizon drilling rig, which sank. The spill is expected to be worse than the Exxon Valdez accident, becoming the worst US oil spill in history (Daily Mirror, 2010). 11 people who were aboard the drilling rig are missing, and presumed dead (Oil & Gas Journal, 2010). A massive operation has been initiated to reduce the harm of this accident, including using oil booms, skimmers and lighting the oil spill on fire. However, due to the massive current blowout a special dome-shaped oil containment system will be lowered on to the well, which hopefully will reduce the leakage. A project of drilling two relief wells is also initiated (Penn Energy, 2010). Until any of these succeed, experts estimate that it may be leaking at a rate of as much as 25.000 barrels of oil, per day (The Wall Street Journal, 2010) – i.e. one “Statfjord A”-accident each day.

The oil industry is presumably dependent on a broad acceptance in the society, in order to meet political will when they wants to open new areas – and could encounter much opposition if they fail to ensure a sufficient emergency response. This implies that the relevance for oil spill preparedness could be drawn to another context – politics and society.

1.1.3 Relevance to Politics and Society

There are particularly two reasons that arguably will increase the threat of oil spills in the Norwegian waters in the future; increased activities in oil- and shipping. For instance, we have the Northern Sea Route, which effectively will reduce shipping time from the Pacific to the Atlantic coasts in Europe and North America. Aftenposten (2009b) has reported about the first commercial pass-through of cargo vessels without any assistance from Russian icebreakers, which up to 2009 was usual for this route. A new route, which seems economical and environmental favorable in terms of reduced fuel consumption and consequently lower CO₂-emissions, will in the long run mean a higher frequency of ships travelling alongside the Norwegian coast line. In addition there are vast deposits of energy resources believed to be alongside this route, adding more ships to the statistics. World Wide Fund for Nature (WWF, an environmental-focused international non-governmental organization) questions the increased traffic through the Northern Sea Route, and calls for more regulations to protect the environment in this region (Teknisk Ukeblad, 2008b).

The Barents region was made even more promising in terms of possible oil exploration and production, when Norway and Russia reached agreement in the negotiations on the maritime delimitation in the Barents Sea – solving a 40 year old dispute (NRK, 2010a). The Minister of oil and energy in Norway, Terje Riis-Johansen, stated that this opens for activity, value creation, ripple effects, and increased cooperation both at government level and between our industrial companies (NRK, 2010b).

Last but not least - as oil installations are moving towards the coast, a new situation arises. Is the level of oil spill preparedness able to meet the requirements which near-shore installations demands? Near shore installations put our precious coastline at risk. It is reasonable to believe that this is a different setting than the traditional one – when the petroleum industry only operated far out in the North Sea.

A sufficient preparedness will be critical when new blocks on the NCS are discussed to be opened or not. In short – the oil- and gas industry needs certain trustworthiness when it comes to emergency response capabilities – and this will be utterly important in the future debate on oil and gas development. Maybe, as Teknisk Ukeblad (2009) argues, that not even the best equipment is good enough? Perhaps we have unreasonable expectations to our oil spill preparedness – or are the industry hindered by major barriers? It seems interesting to investigate these questions – how is the level of preparedness, and is there something that prevents efficient preparedness?

1.1.4 Relevance to Research

When it comes to oil spill emergency response, there seems to be a technical focus, aimed at improving techniques for concentrating and retracting the oil from water. For instance, The Foundation for Scientific and Industrial Research (SINTEF) conducts important studies on how oil behaves, to improve the knowledge oil spill equipment is based on. NOFO's project, mentioned earlier on, is a pure technological development program.

However, this is all technological focused research. What about the resources put into oil spill responses in terms of management and organizational efforts? Few people have oil spill response as a fulltime job, which implies that an oil spill operation needs to combine several people and organizations in order to act comprehensively on oil spills. In this regard, there seems to be a lack of research – i.e. organizational and managerial research in the context of

oil spill emergency responses. For instance, a field of theories that will be discussed later on – temporary organizations – is in itself a field that needs more research. This evolved to be a core theoretical focus in this thesis – which will be elaborated more in chapter 2 and 6.

1.2 Aim of research

The aim of this thesis is to investigate and shed light on the dynamics of the oil spill preparedness in Norway, and try to identify the main challenges to improve the efficiency, and correspondingly what opportunities that lies within this industry. What is important in order to reach a sufficient level of oil spill preparedness? All added knowledge to this area seems welcome. I will set out to include perspectives from the major players in the chain of action, and gather knowledge from businesses that have experience on this field.

The major questions to be investigated are what the situation is today, and what challenges there may exist in achieving efficient preparedness.

1.3 Problem statement

In this master thesis, I aim to address the following problem statement:

How does the industry of oil spill emergency response operationalize the challenges facing this industry, and how could effective oil spill preparedness be successfully achieved?

In order to make the main problem statement more concrete, I will look into the following research questions:

- RQ1. How is the level of oil spill preparedness perceived by the industry itself?*
- RQ2. What is perceived as the most significant threat in terms of oil slick sources?*
- RQ3. Which challenges hinders effective preparedness in Norway?*
- RQ4. Are there any recent leaps in the development of oil spill preparedness?*

These questions will be picked up and discussed in the conclusion.

1.4 Focus (and limitations)

This thesis will only consider questions related to oil spill preparedness in Norway. Most of the respondents are located in Nordland and Troms County, in the North of Norway, and

whether experiences from this region can describe relations outside this geographically area will be discussed later on.

Furthermore, oil spill preparedness consists of two phases. Firstly, work related to reducing the risk of oil spills is carried out, i.e. prevention, which will not be focused on in this thesis. Secondly, it's the work related to combating oil spills, i.e. when the accident already has taken place. The latter is in the spotlight of my research, as shown as the red element in Figure 1-1.



Figure 1-1: Oil Spill Preparedness – The Focus of this Research

Organizational challenges will further on be elaborated on in more detail than technological, due to the nature of my competence.

1.5 Outline of thesis

The thesis is made up of out of seven main chapters, and these are structured as shown in Figure 1-2. The first main chapter is introductory, and provides the reader with background information and my thoughts on relevance of the topic in focus. The research question and major limitations in the research process is also presented.

Chapter 2 deals with important theoretical aspects. The following chapter, chapter 3, covers the methodical aspects of the thesis, describing the entire research process from idea to conclusion, and focuses especially on enhancing reliability of the thesis.

In chapter 4, I have chosen to provide the reader with a contextual chapter, aiming at giving an overview of important elements in oil spill preparedness in Norway, in order to give the reader a basic understanding of this topic. I will also give a comprehensive presentation of my respondents, and relate their organizations to oil spill preparedness. Further on my empirical

findings are presented in chapter 5, before I discuss these in the following chapter. The last main chapter aims at concluding the questions stated in the introduction.

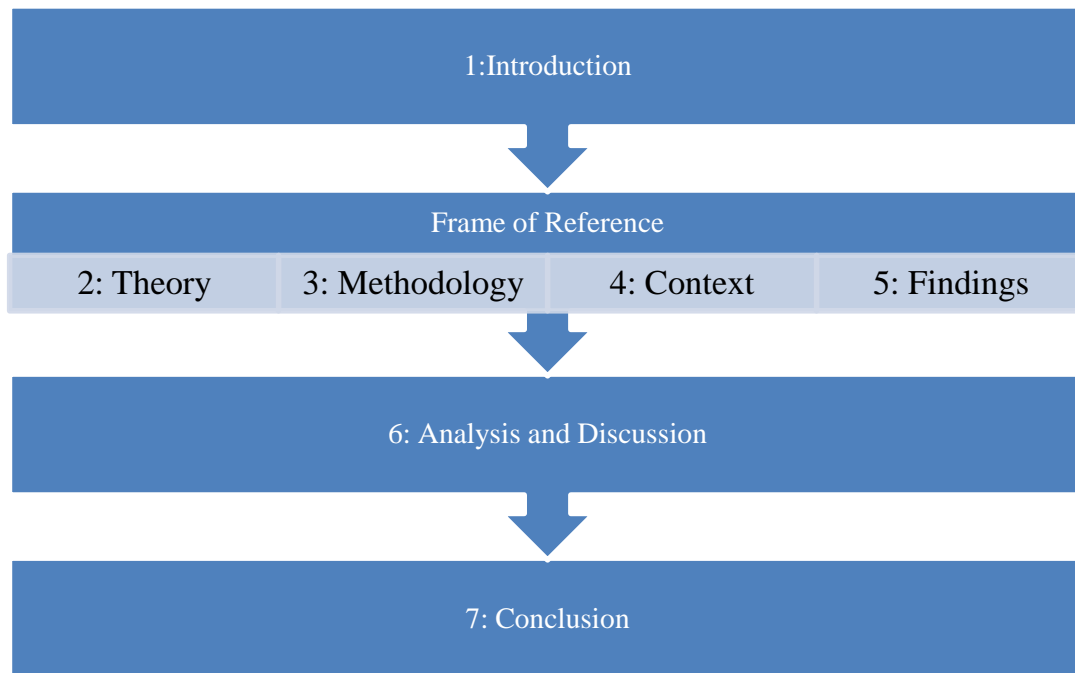


Figure 1-2: Structure of Thesis

2. THEORETICAL FRAME OF REFERENCE



“If the facts don't fit the theory, change the facts.”

Albert Einstein, theoretical physicist and philosopher (1879 - 1955)

In this chapter, I will present an overview of relevant aspects from *risk management* and *project management*. These will be combined with a “twist” of organizational academics – through the theories of *temporary organizations*. These will give me a framework which can be used when assessing my findings. Each of these three main parts of this chapter will have their own introduction, while I will give an overall summary in the end.

As my research is inductive, my theoretical approach will be mainly conceptual. This is elaborated more on in the chapter 3.2, but in short: my empirical data are not gathered on the basis of these theories.

2.1 Risk management

2.1.1 Introduction

The term *risk* in the English vocabulary stems from the French word *risqué*, which again is derived from the Italian word *risco*. It could mean *possibility of loss or injury* or *someone or something that creates or suggests a hazard* (Merriam-Webster, 2010). Oil spill will clearly represent an injury to the environment, and it is a considerable hazard for stakeholders. In order to investigate whether the preparedness that should protect us from oil spills could be approached on the basis of *risk management*, I will clarify some of the main concepts.

Related to the chain of oil spill preparedness, the focus of my thesis is circling around combating oil spills – see Figure 1-1. Many arguments could be made about whether risk management is fully applicable in the phase of combating oil spills – the hazard is already a fact. In preventing oil spills, it clearly does. Bear this in mind – i.e. that my focus is on combating oil spills, and that my perspective therefore is from *the organization(s)* that does this, and not organizations that uses risk management in order to prevent oil spills. In the

following, I will present a framework which offers a forceful explanation of risk as a phenomenon

2.1.2 Enterprise Risk Management

A widely used framework to approach risk is the framework made by Committee of Sponsoring Organizations of the Treadway Commission (abbreviated and often referred to as COSO), called *Enterprise Risk Management - Integrated Framework* (NIRF, 2005). The focus of sufficient enterprise risk management is emphasized by the Sarbanes–Oxley Act of 2002, which was enacted in the United States of America in the aftermath of corporate scandals such as Enron, WorldCom and others.

COSO has defined enterprise risk management in the following way:

“Enterprise risk management is a process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.” (NIRF, 2005, p. 16)

The framework is build up by three dimensions. The first dimension constitutes the entity’s objectives, categorized after phases as strategic, operations, reporting and compliance. The second dimension shows us the different levels in an organization, which the risk management should be implemented in – in order to achieve success. These are subsidiary, business unit, division and entity-level.

The last of these three dimensions are eight components that depict the process of risk management. These are:

- Internal Environment
- Objective Setting
- Event Identification
- Risk Assessment
- Risk Response
- Control Activities
- Information and Communication

- Monitoring

These dimensions could be summarized in “COSO Cube”, which is represented in Figure 2-1.

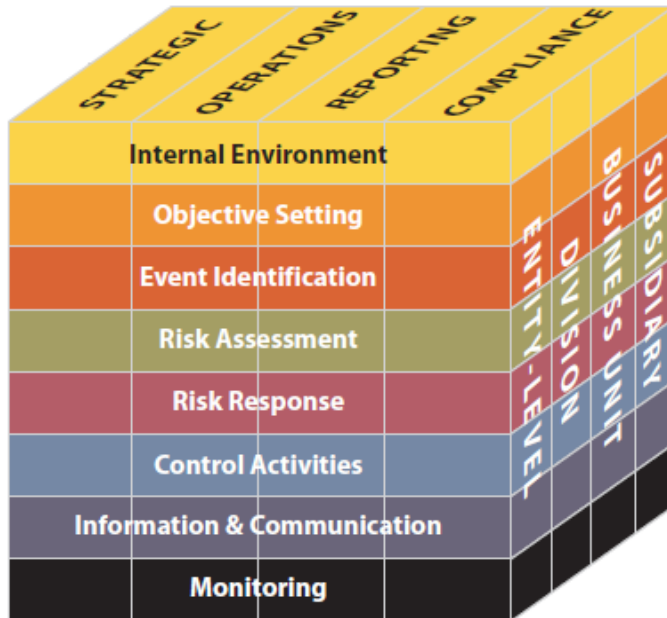


Figure 2-1: The COSO Cube (COSO, 2004, p. 5)

The component of *internal environment* states that the management should establish a risk management philosophy, which should include a description or assessment of their risk appetite. This makes up the basis of which projects and actions are judged on.

When the internal environment is well defined, the process should continue with *setting the objectives*. These must comply with the risk appetite decided in the first component, and must exist in order to be able to identify potential events that could hinder their achievement. Once these are set in stone, one should move on to *identifying events* that could affect the goal achievement. The next component is *risk assessment*, where risks are analyzed in detail. These two will also be elaborated in more detail in chapter 2.1.3.

Risk response is the fifth component of the process, and deals with *how* identified risks should be acted on. To ensure that orders are effectively put to life, one has to ensure *information and communication*, which constitutes the next component. The last, but definitely not the

least component of the COSO cube is *monitoring*. The process of risk management should be monitored constantly, in order to make necessary adjustments.

COSO emphasizes that risk management not necessarily is a successive process, where you go from one component to the next, but that it is more iterative and multidirectional, one component can influence another without regard to ranking or sequence order (NIRF, 2005).

2.1.3 Identifying events, assessing and acting on risks

In the organization's quest to identify potential hazards which could threaten their goal achievement, the naturally point of departure will be to revealing what kind of events could provoke such a hazard.

COSO define an event as an episode or state which could originate from internal or external sources, and influence the implementation of strategies or goal achievement. In this regard, an event could result in both positive and negative consequences. In this regard, *risk* is defined as an event that can prevent value creation, or even erode existing value. In short: hindering the entity doing what they set out to do. On the contrary, an event could also yield positive outcomes, meaning that it increases the level of goal achievement. This is defined as an opportunity (NIRF, 2005).

These events could, as the definition above implies, origin from both internal and external sources. In the process of identifying events, one should try to reveal which events could take place from the external environment, and which events could develop from internal relations. COSO exemplifies this with some categories of internal and external events

Table 2-1: Categories of events

External	Internal
Economical	Infrastructure
Environmental	Human resources
Political	Processes
Social	Technology
Technological	

The reasoning of categorizing events in the process of identifying events is to ease the identification process. Parallel to, for instance the SWOT¹-analysis, it seems to be easier to identify events when you have predetermined categories to relate them to.

When the potential events that could pose a risk are identified, the next step will be to assessing the seriousness of them – meaning an attempt to measure how hazardous they can be. In this regard, COSO uses the terms *possibility* for the event to occur, and the *consequence* if that event occurs – and these two makes up the risk (NIRF, 2005). When one assess the event, one should address these two separately, as one of these can be dauntingly large, while the other one is diminishingly small. Failing in doing so may leave the manager with an incorrect perception of the threat.

When risks are identified, we should take actions to align the risk exposure to the entity's own willingness to take risk. This means the management has to undertake some actions to face the risk. According to COSO, the main goal in risk management is to reduce the *inherent risk* of an event, down to a *remaining risk* which is at an acceptable level. This can be done by *avoiding, reducing, sharing or accepting* the risk (COSO, 2004).

2.2 Project management

2.2.1 Introduction

Could the academic field of project management be applicable in order to better understand the processes of oil spill preparedness? A *project* is defined as a specific, targeted and limited task that requires a coordinated human effort (Jessen, 2005). Other features include (Andersen, 2005):

- To perform a specific task
- Is time limited
- Is implemented by another organization
- Should deliver results
- Consists of several people from different backgrounds who work closely together
- Is the subject of interest and commitment from many individuals and groups within the project, and within and beyond the basic- or parent organization

¹ SWOT is a method to analyse strengths, weaknesses, opportunities, and threats of a business, by listing them

- Are exposed to uncertain factors both within and outside the project

An oil spill combating operation seems to fit well within the definition and the common features described above. In the following, central aspects of project management will be illustrated, included what seems to be a new perspective, path or even paradigm within this academic field: temporary organizations. A special focus will be attributed to critical success factors, or vice versa the generic challenges. “Project success” is understood as a process and an organization, that interacts and flows smoothly – where the main challenges are exogenous.

2.2.2 Project as a concept

A common way to describe a project is by the definition of “Project Management Institute” (PMI), who states that *a project is a temporary endeavor undertaken to create a unique product or service* (PMI, 2004, p. 4). This approach is referred to as a task perspective, which categorizes project management as an executive discipline (Andersen, 2005). This direction differs somewhat from “the Scandinavian school”, which adds important organizational aspects to PMI’s view (Andersen, 2010).

The view on a project as a systematic form of task solving was appealing, created clarity, understanding and made control possible. This *system* is defined in one of the following ways (Jessen, 2005):

- (1) A system is a set of parts (objects, components) that are connected together by links (relations) between parts and between their properties.
- (2) A system has a number of parts that are designed to achieve a goal in accordance with a plan.

The first points out that a system exists because it consists of certain relations. The latter indicates a purpose built relationship, i.e. that the system is constructed to achieve something consciously desired. Definition number (2) is applicable in the process of creating organizations in business, projects and project organizations. Moreover, these systems often are made up of resources, which among others can be categorized as (Jessen, 2005):

- (1) The technical and physical resources
- (2) The financial resources
- (3) The human resources

Some researchers within the project management field have tried to categorize different types of projects, among others by a two-dimensional matrix with technological uncertainty and complexity. Whether these attempts are successful, are debatable, but they have shown that projects differ in sizes and complexity, and that they need to be approached in different ways (Andersen, 2005). An intuitive normative approach to project types could for instance be as shown in Table 2-2. The table shows that projects surely differ in “type”, and that they should be treated differently.

Table 2-2: Classification of projects (Andersen, 2005, p. 59)

Known methods?	Known target?	
	Yes (know what)	No (do not know what)
Yes (know how)	Type 1: Soil Example: house construction	Type 3: Fire Example: system development
No (do not know how)	Type 2: Water Example: Product development	Type 4: Air Example: Research, changes in organizations

Even though projects seem to differ in type and characteristics, they seem to have one thing in common: the lifecycle (Jessen, 2005), and these will make up the structure of the following chapters.

2.2.3 The pre-phase of a project

Planning is something that is an initial task in many projects, and the start-up phase is often two-folded (Andersen, 2005):

- The start of the project – often determined by appointing a project manager
- The actual, physical start – the initial activities

The process of planning is often divided in three levels (Jessen, 2005):

- (1) Strategically planning: This level should describe a general approach to the challenges facing the project, and often an analysis of the situation today with prognostic views on the future. Level 1 creates the basis on which the next is based on.

- (2) Tactical planning deals with how the project could be conducive to position the organization in regard to its surroundings in a good, expedient way. This level creates a link between strategic and operational planning.
- (3) Operational planning is the executive parts, in which put plans into actions.

Within this phase of a project, Andersen et al. (2004) and Jessen (2005) points out the following possible pitfalls:

- (1) Inappropriate level of plans – i.e. either too superficial or too detailed. A two-folded system with one general plan and several detail plans.
- (2) Inaccurate or unclear formulation of goals or targets.
- (3) Inappropriate focus on completion date – in many projects, too much attention is given to the completion date, rather directing the planning toward what will be done by next Monday.
- (4) Inappropriate planning tool – partly a combination of the two above. You should choose a way of planning that encourages creativity and communication.
- (5) Too much optimism (or lack of realism) – underestimating the use of resources, overestimating the project participants' skills.
- (6) Oversights – One tend to forget that for instance people sometimes are sick, on vacation etc. Another problem is that people often are inexperienced to do the task sat out to do. This often leads to “check lists”, which again leads to items left out. One should focus, as point number 2 states – structure the planning in different levels.
- (7) Uncertainty – i.e. to be aware of the remaining uncertainty.

Jessen (2005) emphasizes that, although some of these pitfalls seem obvious, the planning phase often tends to be the weakest part of the project work.

2.2.4 Organizing and managing the project

The way a project is planned, could be categorized in several ways. Two extreme points seem to be the “executive organization” and the “political organization” (Jessen, 2005). This is based on the openness for different opinions and discussion, where the executive organization is focused on results and has no room for disputes and conflicts, and the political extreme encourage discussion.

The appeal of this way of categorizing is that it may help us understand what determines the efficiency in the project management. Another metaphor for these two extremes, are action and decision. When the focus within organizing is on *actions*, the number of choices is either less or predetermined, implying a high speed of decision making. The project participants have a unified vision, almost like an ideology (Andersen, 2005). The rationale behind *decision*-based, is that one should acquire as much knowledge and information as possible around the different choices, and make the decisions based on it. The latter accept and encourage different opinions, and do not necessarily look upon conflicts as something negative.

Common pitfalls within the phase of organizing and managing the project, are (Jessen, 2002; Andersen et al., 2004):

- Inappropriate organizing – meaning that one tend to organize projects as traditional business hierarchy, without putting a lot of thought to it. The focus should be to find a way of organizing that puts the organization in the best possible position to reach its concrete goals, and this is ad-hoc.
- Unclear lines of responsibility – we should aim at establishing principles for cooperation, and improve the relationship with the project and its project owner.
- Key resources not available – this is often a consequence of the previous. Key employees are often the busiest, and there must be agreements releasing these employees to the project as needed.
- Lack of motivation – the motivation stems from and seems to circle around the top management, thus it is important to ensure motivation throughout the organization.
- Wrong person as project manager – should one choose a leader with technical expertise, or one with good managing capabilities? The latter seems to be a better choice in many situations.

2.2.5 Follow-up and monitoring

Areas one should be attentive to within this phase are (Andersen et al., 2004):

- Lack of understanding for the purpose of follow-up. It should not be done to punish those who do not follow the plan, or praise those who do. The focus is to be able to correct the course before it is too late. In addition, it is important to be aware of that follow-up do not equal reporting – reporting is a part of follow-up.

- Plans are not suitable for follow-up – meaning that the plans neither encourage nor are suitable for follow-up work. This should be corrected in the first phase.
- The project manager lacks authority – i.e. the participants in the project choose to prioritize their own organizations before venturing themselves to project work
- Poor communication – often caused by unstructured conversations. One should strive to achieve both formal and informal communication in a project.

2.3 Temporary organization

2.3.1 Introduction

As I briefly mentioned in 2.2.2, Scandinavian researchers have made a new path within the field of project management by adding organizational aspects to it. This will be discussed more in this chapter and then especially the organization as a temporary phenomenon. The definition of a temporary organization usually follows the description provided for projects, see chapter 2.2.2 on page 14. Moreover, a temporary organization usually (Packendorff, 1995, p. 327):

- *is an organized (collective) course of action aimed at evoking a non-routine process and/or completing a non-routine product;*
- *has a predetermined point in time or time-related conditional state when the organization and/or its mission is collectively expected to cease to exist;*
- *has some kind of performance evaluation criteria*
- *is so complex in terms of roles and number of roles that it requires conscious organizing efforts' (i.e. not spontaneous self-organizing)*

The need for a new view on organizations as temporary stems from the fact that traditional organizational literature presupposes that an organization is or should be permanent – an eternal constellation. In everyday life, and perhaps in particular within the field of project management, organizations may not live up to this assumption. Several researchers claim that we have to consider this when doing business in constellations that are limited in time, by looking into *expectations, action and learning* in project settings (Packendorff, 1995).

The “field” of temporary organizations is in an early stage, with rather few researchers devoting themselves to it, and searches in well known databases of academic journals currently returns around ten articles dealing with it directly. In the following, I will present

some of the main theories in field, structured as internal and external relations, related to the temporary organization.

2.3.2 Internal relations

Lundin and Söderholm (1995) have tried to develop a theory of temporary organizations, and base this around the need for *action* rather than *decision*. They advocate four concepts that will forcefully explain why action is important: time, task, team and transition (often referred to as “the four Ts”).

Time is fundamental to understanding the temporary organization, since it is a characteristic that distinguishes temporary organizations from the perpetual. Not to say that time is not scarce in traditional organizations, but in temporary organizations the time dimension is literally limited – it ends. We should therefore approach time with this in mind, and this demands time schedules and synchronization (Lundin & Söderholm, 1995).

Task is another concept in the theoretical field of temporary organizations. Solving a specific task is often the main reason to create a project or temporary organization, and can metaphorically be linked with a permanent entities’ strive to reach their goals. As concept, it can be divided in two kinds of tasks: repetitive and unique, and some basic features of these two are summarized in Table 2-3.

Table 2-3: Unique and repetitive tasks (Lundin & Söderholm, 1995, p. 441)

	Repetitive tasks	Unique tasks
Goals	Immediate, specified	Visionary, abstract
Experience	Own or codified by professions	Others’ or none
Leadership/owner of temporary organization	Low or middle managers	Top management
Development process	Reversible	Irreversible
Evaluation	Result orientated	Utility orientated
Learning	Refinement	Renewal

Team is the third concept, and denotes that temporary organizations are created by and around people. The team is important in two ways: internal and external in the organization, i.e. (1)

internally as the relation between individuals (project participants) and the team, and (2) externally as the relation between the team (or organization) and the environment. Regarding (1), one should focus to build commitment, and this may be tough in temporary organizations as each member bring their own expectations and thereby contributes to the atmosphere in the team. In addition, the team participants often have other “homes”, and have to relate to them before, during and after their participation in the team. Regarding (2), the aim is legitimization of the team in the society.

Transition is the fourth and last of these basic concepts, and this is related to the progression and accomplishment of the organization. The task concept implies that there is something to be done, and this concept describes two dimensions of it. First, it is the physical performance of the team, measured as a difference between “before” and “after” the organization was a fact. Secondly, by a change in the project participants’ ideas about how the team can solve the task in a best possible way.

2.3.3 External relations

Projects are usually carried out in order to give the project owner an output. This is also the case with temporary organizations, where the basic organization illustrates the permanent, perpetual organization (i.e. project owner), and the temporary organization illustrates the project and the project management. See Figure 2-2.

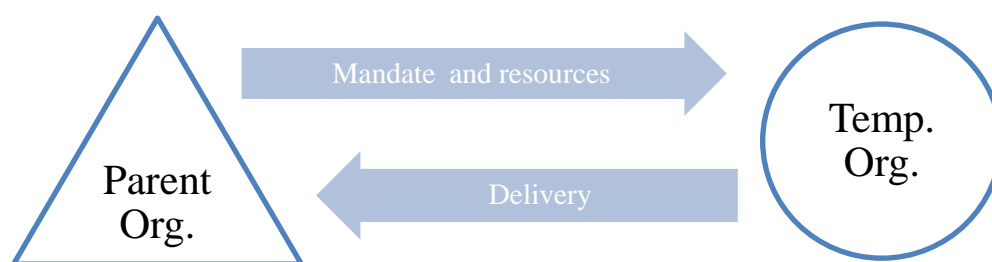


Figure 2-2: Relationship between parent- and temporary org. (Andersen, 2010, s. 19)

The relationship illustrated in Figure 2-2, could easily be extended to include a third party, a principal, demanding deliveries from the temporary organization, and paying for this to the parent organization. Moreover, the reason for dragging this into the theory of temporary organizations is that the temporary organization not only works as an executive branch – it also affects the decisions. The relation between these two parts is vital, and one theory used to

understand this is the P/A-theory with principal and agent (Andersen, 2010). This theory will not be included in this thesis, and I will content myself by saying that this relationship demands a good line of communication.

Another part of the relationship between the parent- and the temporary organization was researched in a military context (de Waard & Kramer, 2008). By investigating the Dutch Armed Forces, the relationship between the organizational design in the parent- and the temporary organization was investigated. Is there a link between the organizational design of the parent organization, and the speed this organization is able to effectively mobilize a temporary organization? Their results shows that you do not automatically get a “plug and play”-system, by using modular design, but that this can be done by standardization, co-ordination and socializing capabilities.

2.3.3 Project success in temporary organizations

Andersen (2010) suggests a two folded approach to define success, where two perspectives judge the performance of a project:

- (1) project management success
- (2) project product success.

The overall project success is the sum of (1) and (2). These concepts clearly stem from the field of project management, but I will try to use them in a broader sense. In project management, an early definition to success was when the project managed to deliver within predetermined time, within the budget and with the correct quality. However, more criteria were needed to determine project success within the approach of temporary organizations, where the project is judged as to what extent the project helps the parent organization(s) to reach their goals, which led to (1) and (2).

Project management success is the responsibility of the project manager, and could be achieved by carrying out the tasks mandated to the project. This implies deliveries on time, within budget and with the correct quality. This type of success can often be judged immediately after the project phase is over (Andersen, 2005).

Project product success, on the other hand, is related to the utilization of what the project aims to produce, and can often not be judged until it has been months or years (Andersen, 2010).

Some includes a perspective by measuring customer or client satisfaction. . The responsibility for achieving this type of success lies with the parent organization (and should not be attributed to the project manager).

2.4 Summary

I have presented three separate (though overlapping) academic fields, with theories that will be useful to gain a better understanding of my findings – i.e. risk management, project management and temporary organizations. In risk management I looked into a general approach to handling risk, and focused in particular on identifying and assessing potential risks. Following that, project management was presented with important characteristics and review of general pit-falls related to phases of a project. This was then put into a context of temporary organizations. In the latter, such organizations were investigated and related to internal and external factors.

An overall focus has been on success (through listing success factors and reviewing common pitfalls) – which implies that this will be used as a basis of discussing oil spill preparedness. To gain a more nuanced approach to success, I have chosen to include a framework for that as well, which opens for different degrees of, and different types of success.

As my research is inductive, the overall goal is to see whether my findings could be induced to theory. In more concrete manners, I will see if the challenges my respondents point at, could be compared to generic challenges within these three fields. If this is so, could other aspects from these theories, be assumed to be applicable in this industry? This will be discussed in the analysis chapter, but first I will go through the methodological aspects of my thesis.

3. METHODOLOGY



“By three methods we may learn wisdom: First, by reflection, which is noblest; second, by imitation, which is easiest; and third by experience, which is the bitterest.”

Confucius, Chinese philosopher (551 BC - 479 BC)

3.1 Introduction

In this chapter, I will present the practical techniques used in answering my research questions, and discuss the underlying philosophical assumptions of these techniques. The main goal of this chapter is to enhance the reliability of this thesis through providing a comprehensive documentation of the entire research process

Method is derived from the Greek word *methodos*, which means something like “the road to a goal”. It tells us how to gather information about the reality, and how to analyze this information. The final goal is to achieve a new understanding of relations or processes in the society (Johannessen, Kristoffersen, & Tufte, 2004).

The ultimate goal of this chapter is, as mentioned, to give an account for major methodological considerations. In order to do so, all methodological aspects need to be taken into account. I have therefore chosen to first present a figure (Figure 3-1), summarizing a general research process. The elements in this model, which are yet to be covered, are highlighted with red, and will then make up this chapter.

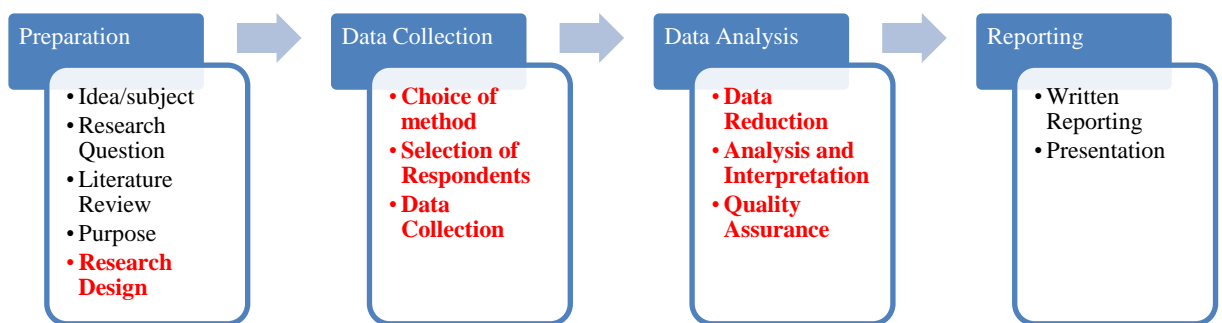


Figure 3-1: Research Process (Johannessen et al., 2004, p. 39)

Idea, research question and purpose are covered in chapter 1. Research design will be dealt with in chapter 3.2. All elements regarding data collection will be covered in chapter 3.3. Further on, the chapters will concern data analysis (3.5). In addition, I have chosen to devote one chapter to review the ethical considerations that were encountered during this research.

3.2 Research design

Designing research is about decisions and choices on what will, and will not, be observed – and this is often a written statement which should depict the researcher’s anticipation on how to best be able to move from start to finish in a research process (Johannessen et al., 2004; Easterby-Smith et al, 2008). This vague definition does not differ, at first glance, significantly from the definition of *methodology* in chapter 3.1. Another explanation is that the design should be like a blueprint of the research (Yin, 2003). My understanding however is to deal with ‘research design’ in order to describe (in concrete terms) and justify some of the important aspects of my research.

In order to do so, I will give brief descriptions of the two dominating philosophical positions, which will be used as “extremes”, which one can relate to when I am discussing my own decisions. These are positivism and social constructionism, and instead of explaining these, I will simply start by provide a table that gives the main lines (see Table 3-1) and relate to these when describing my own research.

Table 3-1: Philosophical positions (Easterby-Smith et al., 2008, p. 59)

	Positivism	Social Constructionism
The observer	must be independent	is part of what is being observed
Human interests	should be irrelevant	are the main drivers of science
Explanations	must demonstrate causality	Aim to increase general understanding of the situation
Research progresses through	hypothesis and deductions	gathering rich data from which ideas are induced
Concepts	need to be defined so that they can be measured	should incorporate stakeholder perspectives
Unit of analysis	should be reduced to simplest terms	may include the complexity of ‘whole’ situations

Generalization through	statistical probability	theoretical abstraction
Sampling requires	large numbers selected randomly	small numbers of cases chosen for specific reasons

In the following, I will use a framework suggested by Easterby-Smith et al. (2008), which points out five features of research design which seem to be of importance:

Identifying the unit of analysis describes the entity that any sample will be drawn from.

Related to my problem statement, I intend to investigate the dynamics and processes of the industry of oil spill preparedness in Norway. Hence my sample needs to be drawn from this area or sector. The sample will contain people with insight in this field of industry, and I have chosen to focus on managers in companies and organizations that play important roles in the chain of this preparedness. The researcher with a positivistic position will have to decide the unit of analysis before collecting data – since this often is the basis of where the researcher seeks for data, while it is critical to the researcher with constructionist approach, related to the problem of *seeing the wood for the trees* (Easterby-Smith et al., 2008, p. 103).

Further on, a decision should be made whether I aim at producing *universal theory or local knowledge*. Being able to draw conclusions from observations and theories derived from one context to another, is often a goal among positivistic forms of research – for instance by generalizing. In this way, positivists can judge validity with statistical precision – and produce universal theories. On the contrary, one can argue that generalized statements about social constructions are likely to be hindered by masked relations between the researchers that postulate them and to whom they are applied (Easterby-Smith et al., 2008). In a nutshell – the theories should be related to the context where it derived, reducing chances of generalizations. My goal is to discover the major challenges and barriers, and this will in my understanding always belong to the context of *oil spill preparedness*. The major question in my research will therefore be if there is possible to generalize my findings (which derive from a sample of businesses and organizations) to the industry of oil spill preparedness. In my research, I do not aim at producing universal studies – and my findings must be evaluated within the context of oil spill preparedness.

The next feature is to decide in which order one should gather and investigate information – *theory or data first*? A general goal in social science is to create links between theories and empirical findings, and the researcher needs to decide a “point of departure”. Positivists generally start with theories, and test the usability of these within their empirical data. This approach is often referred to as *deductive*. In my research, I want to investigate and describe what managers see as the main challenges and opportunities within oil spill preparedness, and my starting point will be their descriptions of these challenges and opportunities. Therefore, I will start with empirical data, and subsequently see if these findings could be understood through theoretical frameworks. My research could therefore be categorized as *inductive* (Hellevik, 2002).

Reductionism versus holism is closely linked to whether the researcher wants to describe a large number of people or organizations, or to explain the background behind their observations. The first is often carried out by relativistic or positivistic researchers through surveys and questionnaires (Easterby-Smith et al., 2008). This technique can be useful to reveal patterns and frequencies, but do rarely give good explanations of the underlying social constructions which led to these. The latter – to explain *why* patterns exist, is more related to the constructionist research, and is investigated through more qualitative ways of research. My aim is to find the major challenges and barriers – and this could actually be well described through questionnaires. However, my quest is to reveal more in-depth reasons to what constitutes good preparedness, and therefore I have chosen a constructionists approach – interviews.

Verification or falsification is the final choice to be made, of particular significance, and stems from Karl Popper’s distinction between these two routes (Easterby-Smith et al., 2008). Instead of trying to reach a proof of your assumptions, Popper says that a researcher always should look for evidence that disconfirm one’s existing view. The classic example of white swans applies: as long as you count white swans, you add credibility to a verification of your hypothesis – all swans are white. But you cannot conclude with this fact, and should rather search for non-white swans in order to falsify your hypothesis. This debate is often related to positivistic researchers, but important lessons can be drawn for constructionists also, to avoid the problem of only looking for evidence which supports your initial thoughts. Related to my research, I need to bear this in mind during the interview sessions by formulating my questions in an open-minded way, and when I subsequently analyze these findings.

3.3 Data collection

3.3.1 Data collection method

Data is plural of the Latin word *datum* which means *something given*, and represents observations and measurements of the reality (Johannessen et al., 2004). The choice on which data to include in a thesis is often closely related to the problem statement, and practical limitations. Data is often divided in primary and secondary data, depending on whether the researcher has gathered it him- or herself, or if he uses data that already have been gathered, respectively. I have chosen to gather data myself, which makes my research based on mainly primary data.

In order to gather primary data, I have chosen to interview respondents. The reason for this corresponds to the advantages behind interview as a method of data collection, mainly that it is a good way of acquiring an in-depth view into my respondents' knowledge. According to Mason (2002), this is based on the ontological perspective where the researcher believes that the respondents' knowledge, understanding, experience and interaction give meaning to the topic being studied. I am searching for my respondents' experience and their understanding of oil spill preparedness, and this will best be discovered through qualitative interviews.

3.3.2 Selection of respondents

You can follow different paths in selecting the right respondents, and it is important to also achieve the right amount of respondents. In positivistic research, ones goal is often to generalize, and thus we need a representative sample. In my qualitative research, my method of choosing respondents shows several similarities to the *snowball method*. This is a convenient way of selecting informants, where you start by identify persons with the knowledge you are seeking, and ask them for other relevant persons to interview (Johannessen et al., 2004). In my quest for knowledge on my thesis' topic, I talked with several professors at Bodø Graduate School of Business (HHB), and ended up with a recommendation to contact Arena Beredskap. Initially, Rune Finsveen, Project Manager in this cluster, recommended me to talk with Rune Pedersen, consultant at Arena Beredskap-member Norwegian Petro Services AS in Harstad. I ended up with interviewing several members in this cluster and even a few outside this network (but recommended by it).

In total, I have 9 informants, directly representing 10 organizations in this industry. Those marked with an asterisk are members of the Arena Beredskap network.

Table 3-2: Respondents

Respondent	Organization
Rune Pedersen	Norwegian Petro Services AS*
Sigve Olsen	Poseidon Consulting AS*
Roy Charlsen	NorLense Beredskap AS*
Laila Torstensen	Reno-Vest Bedrift AS*
John Richards	Mercur Maritime AS*
Realf Hansen	Grovfjord Båtbyggeri AS*
	SMV Hydraulic AS*
Per Odd Krystad	The Norwegian Coastal Administration*
Ottar Skog	Lofoten and Vesteråen inter-municipal committee against acute pollution
Sjur W. Knudsen	NOFO

A more comprehensive description of the respondents is given in the context chapter (see chapter 4.3 on page 41). Detailed information about interview locations and durations are given in appendix 2.

3.3.3 Interview, and the process of interviewing

Most of the interviews were carried out in the respondents’ respective offices, typical in their meeting room. The atmosphere was loose, and the situations felt informal. Moreover, I started all interviews by provided a “brief” where the interview was put in context and central information were given. I told what my goal by doing these interviews was, and linked this up against my research aim. Further on, I asked for permission and explained the reasoning to use digital voice recorder – something all of them accepted. The degree of anonymity was discussed, where I described how I would use the interview material afterwards – in short: listing the informants who contributed, in the thesis, but not link any of the quotes directly to them. The decision to make the data “anonymous” in this way was made after the first interview (see chapter 3.3.5). This resulted in reduced possibilities to use quotes with elements that could possibly identify my respondents – however, this was seen up against the

usability of the report in the aftermath (compared to making it confidential), and the pilot interviewee's suggestion to give my respondents "a certain level of anonymity".

Further on, I conducted the interview on an open-minded, freely way, and ticked the topics on my interview guide as the interview proceeded. Follow-up questions makes up the majority of questions posed during the interviews, and my respondents was asked to elaborate more on subjects, explain them further, relate them to their organizations perspectives and so on.

A "debrief" followed the interview, where I asked if my respondents wanted to add something. A majority of them did – most of these again emphasizing things said earlier on. During this process, the digital voice recorder was turned off, opening for a possibility to give further remarks "off the record". In addition, I asked for permission to make further contact later on in the research process. The use of "brief" and "debrief" creates a framework of the interview process itself which gives information and encourages the interviewees to pose questions related to the process (Kvale, 1997).

3.3.4 Interview guide

Qualitative interviews can have different degrees of structure, where the main categories are (Johannessen et al., 2004):

- *Unstructured interviews* are informal interviews with open-minded questions, where a topic is given and the questions are formulated during the interview session.
- *Semi-structured interviews* are interviews conducted on the basis of an interview guide, where the exact formulation of questions and the sequence differs from interview to interview.
- *Structured interviews* are interviews with predetermined subjects and formulated questions.
- *Structured interviews with fixed answers* is the most rigid, where the researcher just tick a suitable answer during the interview session.

Due to the fact that my research is inductive, and that I didn't know very much about oil spill preparedness before I started gathering data, I chose to do semi-structured interviews. I believe that "the good conversation" is a freely spoken one, which flows smoothly. On this basis, I made a brief interview guide (attached as appendix 1), only to ensure that some central aspects of my research were dealt with during the interview.

3.3.5 Pilot interview

The first interview conducted, could be regarded as a “pilot interview”. The goal by doing this was to get general feedback in order to improve the questions and interview process before interviewing the rest of my respondents. It was also useful in a more in-depth way, since the first respondent had a high degree of knowledge and competence around the research field itself. The interview guide is partly based on experiences from this.

In addition, a “pilot interview” is useful in order to test technical equipment – i.e. the use of digital voice recorder, and how it performed to do this task. It is also a way of gaining first-hand interviewing experience, and one should evaluate one self’s interviewing performance afterwards. Pilot interviews should always be carried out in qualitative research in order to the interview questions and interviewing capabilities (Dalen, 2004).

3.3.6 Transcription of Interviews

In order to ease the process of structuring and analyzing the interviews, I chose to transcribe them. To avoid any bias at this stage, the transcriptions were done on a word-by-word basis, which also opens for using the transcript as a base for selecting direct quotes afterwards. Several hours of audio files are tough to navigate in, and this process was considered critical to achieve easy and fast access to the data.

To depict in concrete terms, the empirical data that underlies this thesis, I have chosen to summarize information about interview duration (measured in minutes duration of the recorded interview, along with the number of pages and a word count of the transcription.

3.4 Ethical considerations

A researcher should strive to achieve high ethical standard in his research. There are two main objectives: maintaining the ethical interests to all subjects or informants involved in the research, and ensuring accuracy in the process itself in terms of reliability and validity. The latter of these will be discussed in chapter 3.6, while the first is dealt with in this chapter.

Easterby-Smith et al. (2008) provide 10 principles in the quest for adequately ethical standards – see Table 3-3. Most of these principles address the importance of treating the research participants (i.e. my respondents) in a respectful manner. In the following, I will try to link these with specific aspects from the course of my interaction with my respondents.

Table 3-3: Key principles in research ethics (Easterby-Smith et al., 2008, p. 134)

1	Ensuring that <i>no harm</i> comes to participants
2	Respecting the <i>dignity</i> of research participants
3	Ensuring a fully <i>informed consent</i> of research participants
4	Protecting the <i>privacy</i> of research subjects
5	Ensuring the <i>confidentiality</i> of research data
6	Protecting the <i>anonymity</i> of individuals or organizations
7	<i>Avoiding deception</i> about the nature or aims of the research
8	Declaration of affiliations, funding sources and <i>conflicts of interests</i>
9	<i>Honesty and transparency</i> in communicating about the research
10	Avoidance of any <i>misleading</i> or false reporting of research findings.

When arranging the interviews, I emphasized a good flow of information. Initial contact with respondents within Arena Beredskap was carried out by an e-mail with information about my thesis (sent from project manager within this network). A few days after this, I made contact through telephone, and afterwards – confirmed all details of our arrangements by e-mail. Contact with other respondents (non-members of Arena Beredskap) was carried out by at least one telephone call and one e-mail (containing general information and confirmation about practical manners). This provided a written and clear description of me and my research, and reduced the risk of any misunderstandings. This corresponds to principle 2, 3 and 7 in Table 3-3.

Within this line of communication, a remark regarding *anonymity* were included – where I stated that my thesis would contain information about *who contributed*, and *what information that came out from these interviews* – but no direct link between these two. This means that I have the possibility to use quotes from these interviews, as long as I make the respondents anonymous. I found this to be a good balance between confidentiality and the degree of user-friendliness of my report. However, there is always a chance of other people (readers of this report) being able to unveil my respondents as long as I use quotes and pass on my respondents point of view or opinions. Therefore, I said to my participants that they would be *relatively anonymous* in the initial e-mail, and explained this orally in the start of every interview – during the brief. These remarks corresponds to principle 5 and 6 in Table 3-3.

I used a digital voice recorder during all interviews. This is obviously due to practical causes, but I decided to ask all my respondents for permission in advance, and provided an explanation of this usage. One time during the interviews, a respondent got a private call on his or hers mobile phone – and during this conversation, I paused the recording in order to provide some privacy for this respondent. These considerations corresponds to principle 3 and 4 in Table 3-3.

It is hard to judge your own ability to correctly reproduce and report the research findings. The fact that the thesis is written in English which is not my mother tongue, and neither the language used during interviews, I found it reasonable to try to enhance at least the use of direct quotes, and to avoid subjective interpretation. In addition, I found it important to not picture my respondents through quotes that are poorly formulated – they formulated themselves well in Norwegian, and the same should be done in English. In this regard, I chose to seek professional help, and found a translator who helped me out and corrected my own quote translations. I used the services of a translator² with license to do government-approved translations – the highest certified level of proficiency in language.

3.5 Analysis and interpretation

Data reduction is essential in qualitative research, where a large amount of pages needs to be reduced to a more manageable size. In this part, I will give a brief account of how I systemized and analyzed my data.

The analytical part of my research process started in the process of transcribing interviews. During this process, I reviewed all interviews through listening at and writing them, which gave me an early perception of major categories and where things could be found. Further on, I used the transcripts, and systemized my data in overall topics by marking, cutting and pasting sections. Furthermore, I read through them, while noting down logical and intuitive categories, and marking interesting parts with colors. All interviews were later gone through again, where I assigned categories to interesting paragraphs. All challenges identified for instance, stems from categories (these are discussed in chapter 5 and 6), and arose during the process of analyzing. This approach is called “coding into *categories*” (Kvale, 1997).

² Dr Tanja Christiansen helped me translating the quotes. She can be contacted at www.norwegianenglish.no/. General information about governmental-authorized translators could be found at www.statsaut-translator.no/.

Furthermore, more descriptive in-depth analysis were made in each categories, where I either searched for good formulations on how these categories could be explained and related to my research questions, or paraphrased my respondents in a briefer manner. This way of analyzing data is called *condensation* (Kvale, 1997). The majority of the direct quotes used in chapter 5 stems from this process.

In a broader sense, my analytical approach shows similarities to *grounded analysis* (Easterby-Smith et al., 2008), where the categories are revealed during the process (and not in advance). This corresponds to my overall research approach; open-minded and inductive, searching for. The opposite extreme within qualitative analytical methods is called *content analysis*.

3.6 Quality assurance

How trustworthy should this report regarded? It will always be a readers own consideration in the end – however, I will try to picture my own thoughts on this by reviewing validity and shedding light on possible weaknesses of my own research – starting with the latter of these.

3.6.1 Possible weaknesses

Up till now, I have focused on describing my approaches on methodological choices, and related them to the advantages by choosing them. However, I will now review some of disadvantages and possible weaknesses of my chosen design.

Throughout the thesis, I have considered these points as possible weaknesses:

- (1) Too few respondents?
- (2) Correct level of structure in the interviews?
- (3) Leading questions?

Regarding (1), it is tough to determine when you have reached an adequate number of respondents – so this could pose as a methodological weakness. One recommendation is that you should continue interviewing until you no longer reveal new information. However, when it comes to judging this, is easier said than done. What is new information, and how vital should it be before demanding further respondents? In my interviews, I feel that the big surprises were greatly reduced after the initial interviews. However, despite that the interviews conducted mid-way did not bring any new significant information, the last ones

did. My initial thought was that the respondents represented different perspectives and roles in the preparedness, which of course is also a fact. Whether I have a sufficient number will I let remain unsaid – but an increased number of respondents would certainly not do any harm.

Inductive research is usually open-minded and combined with interviews of low structure. Whether I have chosen the right degree of structure (2) could pose as another drawback to my design. This is not based on an academically test, but rather a feeling that this could have been carried out in a more structured way. This feeling arose during the analysis, where I thought that more structure would have yielded a more comparable situation among respondents, but this could also be said to be rather normal on studies of this design. However, a more structured way will have demanded additional pilot interviews in order to establish more concrete topics to investigate.

Could my questions be categorized as leading questions (3)? If so, then people that might be uncertain of their standing on a particular question, be led to answer along with the direction of the question (Hellevik, 2002). Formulating questions on the spot, (beyond those mentioned in the interview guide i.e. follow-up questions) could be hard to do in a neutral, well-formulated way. In the same time, I found it to be an effective way of confirming an analytical interpretation made during the interview – if I for instance have a vague sense that the informant believes that lack of personnel resources is a barrier (based on what he have responded), I could have asked “do you view personnel resources as a barrier?”, and receive a simple yes if I have perceived the situation correct. On the contrary, if I am suggesting a wrong stand point, I would have triggered the respondent to give a longer explanation of why I am wrong – and that is useful too. However, the question posed is pointing in a direction that personnel resources is a barrier, hence it could be drawback in some situations.

3.6.2 Validity

Measuring research quality is important in quantitative as well as qualitative research. In the first of these two, one could use tools that stems from the statistical academic field, and providing a fairly certain answer – and in this respect the terms *validity* and *reliability* is used (Hellevik, 2002). Reliability is about *how* the research is carried out, and the inherent quality of the research process. Validity, on the other hand, deals with *what we are measuring* or how well the researcher manages to measure what he or she set out to investigate (Lund &

Haugen, 2006). Definition wise validity arise when we moves between theoretically defined variables and operationally defined variables, while overall validity of data connects theoretically defined variables and data. Reliability, on the other hand, is the relationship between operationally defined variables and data.

However, in qualitative research, such terms may be insufficient. Dalen (2004) suggests doing another approach that involves an assessment of four features of interview-based research:

- (1) Role of the researcher
- (2) Research design
- (3) Data
- (4) Interpretations and analytical approach

Regarding the first, one should describe the researcher's relations to the unit of analysis, so the reader could be able to by himself interpret what may have influenced the research. Subjectivity and bias are other words describing what we want to avoid. Or should we avoid it? My focus has been to explain my thoughts throughout the thesis. To pin-point my standpoint, I must say that I have attended an educational program where most of the students and professors are positive when it comes to exploration and production of oil, including more fragile areas such as the Lofoten Islands and the Barents Sea. In this regard, I may have a bias.

When it comes to (2), the research approach, sample quality and methodological choices need to be investigated. Could data drawn from a sample, be applied to a population? Well, this concept is mainly derived from quantitative research in terms of generalization – and a more appropriate question is simply how well my sample gives relevant information? In this regard, I have chosen to include all three major players when it comes to oil spill preparedness on the NCS – in addition to seven other companies working in this industry. In terms of data amount, I feel fairly comfortable to say that my respondents give information that is relevant for the industry as a whole. However, the private companies interviewed (members of the Arena Beredskap cluster) is physically located in Nordland or Troms – and another business cluster exists farther north, and other companies provide similar services near and in Stavanger in the south of Norway. Thereby, experiences and thoughts that my respondents have shared with me may include elements of geography, reducing their relevance for the industry as a whole. Further on, one should investigate the methodological choices in a critical manner. I have

started this process in chapter 3.6.1, pointing at possible weaknesses. However, the main point is that this research could have been done in various ways. I could of course say that I have aimed at a high level of proficiency on a general basis – but it will be too vague to add credibility to my work. My approach has therefore been on clarifying and explaining the decisions I have made during my research – and I hope that my methodological descriptions in this chapter do so.

Regarding data (3) differs from sampling quality discussed two paragraphs ago, by putting demands on the researcher in order to “trigger” or to reveal the interesting statements from respondents. In this regard, I performed a pilot interview in order to improve my capabilities to ask “the good questions”. I felt comfortable in achieving it too, and the next step in enhancing the quality of questions would be a deductive approach, where the questions stem from concrete literature.

When it comes to analytical considerations (4) my approach has been to describe the methodological approach to analysis, through a paragraph in this chapter, and a comprehensive introduction in the empirical- and analytical part. In addition, I have chosen to include a context chapter, describing things that have been in my mind during analysis – and not described elsewhere. In this way, I hope to give a more complete picture of the “entirety” that I have seen myself.

Then – to end both the validity discussion and the entire methodological chapter, I will pick up my overall aim with this chapter, as posed in the introduction – to describe my methodological choices in order to improve the trustworthiness of my research. If I succeeded in doing so, is up to the reader.

4. CONTEXT – OIL SPILL PREPAREDNESS IN NORWAY



“Taken out of context I must seem so strange.”

Ani DiFranco, American singer (1970-)

The aim with this chapter is to shed light on some important features of oil spill preparedness in Norway today, which are not treated elsewhere in the thesis. It is in my understanding that these may be useful in order to understand the context of this industry.

4.1 Organization of oil spill preparedness in Norway

4.1.1 Legislation, roles and main players

Norway has a unique model on organizing its preparedness against acute pollution, unlike most other countries. This uniqueness stems from the different roles and players in the preparedness, and the interaction between these.

The main roles and responsibilities are regulated by the law on protection against pollution and waste from 1981 (Lovdata, 2010). The first level of preparedness against acute pollution is assigned to private companies, which states that anyone who does business that may cause acute pollution have to ensure the necessary preparedness to prevent, detect, stop, remove and limit the impact of pollution. This is the general rule, which implies that the operators on the NCS are liable to have preparedness towards oil spills caused by their own activities. This is operationalized through NOFO, who aims to manage and maintain an emergency response that includes personnel, equipment and vessels to acute pollution. They have extensive oil spill response resources.

Moreover, municipalities have a responsibility and shall provide the necessary emergency response to minor cases of acute pollution that may occur within the municipality – and not covered by the private preparedness. This is operationalized through 34 IUAs, who act on all kind of acute pollutions. 20 of these have entered into an agreement with NOFO, to assist them if an oil spill caused by an operator reaches shore.

Further on, the State shall ensure preparedness against major cases of acute pollution not covered by the preparedness to local municipalities or private actors. This responsibility is assigned to the Ministry of Fisheries and Coastal Affairs, who have delegated it to the Norwegian Coastal Administration, who operates on behalf of the government in this matter. All acting parts of this preparedness could be illustrated as in Figure 4-1

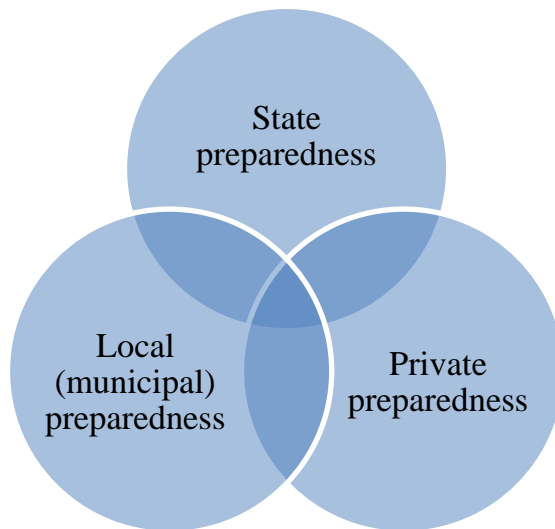


Figure 4-1: Oil Spill Preparedness in Norway

As Figure 4-1 shows, there is a certain overlap between these roles, indicating that they cooperate and interact in different ways. For instance, the Coastal Administration has the authority to take over an action, wholly or partially, if the private or municipal preparedness are inadequate. In such cases, the private, municipal and state preparedness should be coordinated, under the control of the Norwegian Coastal Administration. Another example, is as mentioned earlier, the agreements between NOFO and IUAs.

Further on, the preparedness has some general principles of prioritizing, which follows:

- (1) Life
- (2) Health
- (3) Security
- (4) Natural resources
- (5) Business interests

4.1.2 Private companies and NGOs

Besides the three major players described in the previous chapter, several private companies and non-governmental organizations (NGOs) provides assistance in oil spill response actions. Arena Beredskap consist of several companies that have experience from for instance M/V Full City, where they participated in the beach cleaning process. Some of them did this to gain experience, while others participated to test out their products and to pass their experience on to others.

Furthermore, NGOs plays an important role – and especially the environmental organization World Wide Fund for Nature (WWF) who educates and have a “pool” of people ready to act as volunteers if needed.

4.2 Recent accidents

In this chapter, I will give a brief account of major oil spills in the Norwegian history. These are often referred to by my respondents, and are therefore appropriate to describe in order to give a more complete insight in major oil spill actions. The incidents are presented in reverse chronological order.

4.2.1 “M/V Full City” (2009)

On the night to 31st of July, 2009, the bulk vessel M/V Full City ran aground in Langesund, in Telemark County. Langesund is not far from a bird sanctuary, and is also considered a popular recreational area. M/V Full City was anchored, but failed to hold its position due to stormy weather. However, the ship failed to make proper reports of their problems to the authorities, and two of the ship’s officers were charged with violations of the Pollution Control Act and the Ship Safety Act in the aftermath of this incident. On the 3rd of May, 2010, the captain was sentenced to six months imprisonment, while the first mate received a sentence on 60 days. This was in the District Court, but will be appealed to a higher court (NRK, 2010c).

M/V Full City caused a leakage of between 50 and 200 tonnes heavy fuel oil. The ship carried 1000 tonnes of oil and about 120 tonnes of diesels when she ran aground (Kystverket, 2009). The oil spill contaminated about 120 kilometers of coastline, and 250 people from the Norwegian Army, The Coastal Administration, the local IUA and several volunteering

organizations and private people participated in the first project phase of beach cleaning from August till December. The cleaning process continued in April, after a period of winter break.

4.2.2 Statfjord A (2007)

On 12th of December 2007, StatoilHydro (now Statoil) announced that they had released approx. 4,000 cubic meters of crude oil during offshore buoy loading between Statfjord A and the tanker Navion Britannica. This was 160 km from shore, near the border with the British sector. Oil spill response was coordinated by NOFO. Due to harsh weather conditions, the collection of spilled was delayed, and only lasted for a few hours when it started two days after the oil spill – mainly because the oil then already had evaporated and dissolved in the sea masses (Miljøverndepartementet, 2007).

Investigations showed technical and organizational weaknesses, and the main cause was proved to be a rupture of loading hose in connection to the loading buoy. Statoil was fined with 25 million NOK (OilInfo, 2009)

4.2.3 “M/V Server” (2007)

On the 12th of January 2007, the cargo ship M/V Server ran aground at Hellisøy lighthouse in Fedje municipality, in the county of Hordaland. A state action against oil pollution was initiated under command by the Coastal Administration. The ship had 585 tonnes of heavy fuel oil aboard, along with 72 tonnes of diesel, and some lubricating oil, a total of 676 tons. Approximately 380 tons (56.2%) remained in the marine environment (Norconsult, 2008). The spilled oil reached the shoreline at 230 places in 13 municipalities. In addition to state resources, the IUAs of Bergen, Sogn and Sunnfjord, and Nordfjord participated, in addition to other actors.

The oil combating action after this incident was up to 2009 the most expensive action in Norway, costing about 220 million NOK.

4.2.4 “M/V Rocknes” (2004)

On 19th of January, 2004, the “specialized flexible fall pipe vessel (FFPV) "Rocknes" accident occurred, in the Vatile stream near Bergen. The ship capsized and claimed 18 human lives. Moreover, the ship also had 585 tonnes of heavy fuel oil on board, and about 135 tonnes of this oil was recovered, while the rest dissolved in the sea (Firda, 2007).

Costing an estimated 108.5 million NOK, the oil spill response action in the wake of the "Rocknes" accident was, up to this date, the most costly ever conducted in Norway. After the accident, the Norwegian Coastal Administration routinely evaluated the incident with an aim to improving current procedures and plans (Kystverket, 2004).

4.2.5 Bravo blow-out (1977)

On Friday, 22nd of April 1977, the largest oil spill accident on the NCS occurred at the Ekofisk "B" (thereby known as "Bravo") platform, through an uncontrolled blow-out. About 2 800 tonnes of oil, and 1,5 million cubic meters of gas flowed freely each day in more than a week, causing a total oil spill of 12 to 20 000 tonnes of oil. The famous oil well fire fighters "Red" Adair and "Boots" Hansen were flown in from the U.S. to assist Phillips Petroleum's people to tame the well, and managed this on the 30th of April (Kulturminne Ekofisk, without date).

About 800 tonnes were recovered from the sea, while an equally large size was chemically dispersed. An estimated 50 % evaporated. Without some 100-1000 seabirds that were killed in the nearby area, reports indicated that the oil spill did not cause any environmental impacts, and the level of hydrocarbons in the sea masses was reversed to the normal level a week after this incident (Børresen, 1993).

4.3 *Presentation of respondents and their organizations*

In this chapter, I will go through all respondents who contributed to this thesis, and shed light on their background and the organization³ they represent.

Rune Pedersen is consultant in **Norwegian Petro Services AS**, which is located in the city and municipality of Harstad. He is a former military officer from the Norwegian Army, and has experience from different teaching positions, including at the Norwegian School for Firemen. He also holds a degree within the field of pedagogic. Norwegian Petro Services offers consultancy services to the petroleum industry, whereas their main focus is operational preparedness planning. Services offered include preparedness planning, and



³ The logos presented here, are property of their respective owners.

training and exercises in near-shore oil-spill preparedness. In my thesis, the interview with Pedersen served as test or pilot interview, meaning that it was somewhat more detailed, and contained some other aspects and questions than the other interviews. In addition, it gave fruitful information about where to direct my core focus, and information about what would be interesting contributions to the industry as a whole. The interview guide referred to in chapter 3.3.4 was not used.

Sigve Olsen is Chief Executive Officer (CEO) in **Poseidon Consulting AS**, which is located in Leknes in the municipality of



Vestvågøy. Olsen holds an engineer degree in computer electronics, and has extended this with studies in business management. Poseidon Consulting offer services on a domestic as well as international basis. The business is subsidiary of the Poseidon Group, who offer services related to maritime training simulators. Furthermore, they offer consultancy services in maritime education and safety. Their core competency is management for hire, economics, project management, surveys, and services, consultancy within maritime training, capacity- and institution building.

Roy Charlsen was on the time of the interview, CEO in **NorLense Beredskap AS**, but returned to his profession as fire fighter on 1st of April, 2010. Before entering NorLense Beredskap AS, Charlsen



served many years in the local fire department, which also handle oil spill preparedness equipment. Charlsen have in-depth knowledge about **NorLense AS**, the producer of oil booms, which also owns 55,6 % of the shares in NorLense Beredskap AS. NorLense AS and NorLense Beredskap AS are co-located on Fiskebøl, in the municipality of Hadsel. The business has recently undergone a process of rebranding, and was named Nordnorsk Beredskapssenter AS until January 2010. NorLense Beredskap AS has unique skills in terms of oil spill prevention, and the competence to act and deploy emergency equipment associated with an oil disaster very fast and accurate. They offer crisis management, seminars at different levels and training, together with hiring out equipment and operating crew.

Laila Torstensen is a consultant and former CEO of **Reno-Vest Bedrift AS** in the city and municipality of Sortland. She holds a degree



in business, and has worked with marketing in several years. Reno-Vest Bedrift AS offers a complete solution for managing waste, to both the private and the public sector. This includes

consultancy services within, collection, environmental questions, transport and treatment of several categories of waste.

John Richards is CEO of **Mercur Maritime AS**. He is educated as a toolmaker in Wales in Great Britain, which is his native country. He has held different positions in Mercur Maritime AS since 1983.



Mercur Maritime AS offers services and production to the offshore, marine and land based industries. Construction and assembling services are provided by skilled certified employees, comprising welding, machining, hydraulics and coating. Mercur Maritime AS in co-operation with Ingenium AS perform pre-engineering studies, design, production and installation of tools & equipment. In addition services offered comprise modification-, repair- and maintenance work.

Realf Hansen is the Chairman of the Board in **Grovfjord Båtbyggeri AS** and **SMV Hydraulic AS**. He is originally educated as a mechanic, but has supplemented this with studies in engineering, business management and marketing. He holds



experience from various positions within business consultancy and has experience from network such as clusters and business parks. Grovfjord Båtbyggeri AS is a modern, mechanical company which is specialized in construction, reconstruction and service on fishing vessels. In relation to oil spill preparedness, they have developed a floating stage for operations in beach cleaning. SMV Hydraulic AS is another mechanical company, and they are specialized in hydraulics and engine services. In relation to oil spill preparedness, they develop and produce specialized winches to store and manage oil booms, for instance to the oil booms that NorLense AS produces.

Per Odd Krystad is Section chief in **The Norwegian Coastal Administration**. He holds education from the Norwegian Army, and have supplemented this with studies in pedagogic. He has worked with preparedness in more than 30 years, among others as a manager in the civil defense and chief county preparedness officer in the counties of Nordland and Vestfold. The Norwegian Coastal Administration (Kystverket) is the national agency for coastal management, maritime safety and -communication in Norway.



KYSTVERKET

Ottar Skog is division director in Vågan Municipality and leader of **Lofoten and Vesteråen IUA**, which is an inter-municipal committee against acute pollution. Skog holds a degree in environmental engineering and has supplemented this with studies in community planning (city- and regional), and studies in organization and business. He has been in various positions in Sortland Municipality, among others as technical supervisor and chief fire and preparedness officer.

Sjur W. Knudsen is the CEO of the Norwegian Clean Seas Association for Operating Companies (abbreviated to **NOFO**), which is an association for operators on the NCS. NOFO ensure preparedness related to the operating companies' oil spill associated with the exploration for and production of oil and gas. NOFO aims to manage and maintain an emergency response that includes personnel, equipment and vessels to acute pollution, and have extensive oil spill response resources. These resources will reduce the environmental damage of any oil spill from the petroleum industry, along with state and local resources. Knudsen has held various positions in Hydro (now Statoil) for 20 years, after 17 years in the Norwegian Royal Navy. The CEO of NOFO is, according to their statutes, an employee in one of the member organizations, meaning that Knudsen is officially employed by Statoil.



4.4 Arena Beredskap

4.4.1 Introduction

Arena Beredskap has played an important role in achieving information about the industry of oil spill preparedness, and is mentioned several times throughout the thesis. Therefore, I have chosen to give a brief introduction of this cluster or network, and list the partner organizations.

Arena Beredskap is a part of the Arena program, which is owned by Innovation Norway, The Industrial Development Corporation of Norway (SIVA) and the Research Council of Norway. This program provides advisory services, and offers financial support for long-term development of regional clusters of industry enterprises. A goal is to establish connections between privately owned businesses, research and development projects, research institutions and the public sector.

Arena Beredskap aims, in concrete terms, to develop a “one-stop-shopping” solution to preparedness- and oil combating near-shore. Their perception of the oil preparedness in Norway today, is that there is a gap between the offshore preparedness and the beach cleaning process, in terms of mobilized resources and time – and they aim to fill this by providing a complete range of services aimed at this part of the preparedness. Further on, they aim to cooperate with the major organizations on preparedness – and not compete with them (NOFO, The Coastal Administration, IUAs etc) (Arena Beredskap, 2010).

4.4.2 Partners

This cluster mainly consists of companies in Nordland and Troms County, which offers services and products in different areas of oil spill preparedness. Those who contributed to this thesis through interviews are marked with bold type in the Table 4-1, which shows a complete list of the partners as of 2010. For the sake of clarity – neither NOFO nor any IUA are currently a partner of this network.

Table 4-1: Partners of Arena Beredskap (Arena Beredskap, 2010)

Business partners	Governmental partners
<ul style="list-style-type: none"> • Arctic Protection • Grovfjord Båtbyggeri AS • Mercur Maritime • NorLense AS • NorLense Beredskap AS • Norwegian Petro Services • Poseidon Consulting • Reno-Vest Bedrift • Seaworks • SMV Hydraulic AS • Vacumkjempen Nord-Norge AS 	<ul style="list-style-type: none"> • The Norwegian Coastal Administration
	<p>Research- and development partners</p> <ul style="list-style-type: none"> • Bodø University College • Kunnskapsparken Bodø AS • The Norwegian University of Science and Technology • SINTEF • The National Institute of Technology

4.4.3 Model on effective preparedness

Within this network, they use a model to describe the factors that constitutes *effect* in oil spill preparedness. This model depicts a relationship in which that the three factors *equipment*,

competence and *organization*, multiplied together, yields *effect*. In addition, *command* and *control* must be present – see Figure 4-2.

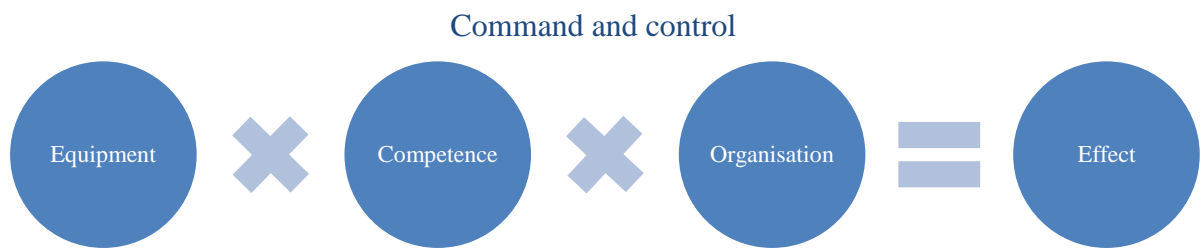


Figure 4-2: Model on effective preparedness (Arena Beredskap, 2010)

This model is based on military theories, which seems as a reasonable approach as oil spill preparedness shares many similarities to military operations. Many of my respondents have military experience, see chapter 4.3 on page 41.

5. EMPIRICAL FINDINGS



“When I was young I thought that money was the most important thing in life; now that I am old I know that it is”

Oscar Wilde, Irish writer, poet and aesthete (1854-1900)

5.1 Introduction

In this part, I will describe my findings made on the basis of the gathered data. Coding and categorizing my findings proved to be complex, as many of the fields tends to overlap each other. The level of abstraction among my respondents varies a lot; some respondents are very concrete while others point out the major lines. In addition, the level of knowledge and experience differs among my respondents, as do their perspectives on preparedness.

The structure of this chapter follows more or less the way I have worked with my data, through interviewing, systemizing and categorizing them. However, it is important to give a brief description of this way of presenting my data, and relate them to my research – see Table 5-1. All these topics and categories have developed during the research, and do not stem from theories or hypothesis. Categories are just briefly described here, but a more comprehensive description follows in the corresponding chapters.

Table 5-1: Structure of findings

Ch. #	Essence	Categories
5.2	General level of today’s preparedness	Near-shore and offshore
5.3	Source of threat	Shipping or oil installations
5.4	Challenges in achieving effective preparedness	Knowledge, equipment and various organizational categories
5.5	Other topics	Leaps in development, possible boosts, important factors, model, and “the world best”.

These categories may seem unstructured. However, one should bear in mind that these are not as uniform and categorical as what perhaps is possible to achieve through a deductive approach. The main work of coding and categorizing is made under the process of identifying and assessing the challenges this industry are facing. However, other important topics that were discussed with respondents (directly or indirectly) are also included, beginning with a general review of how my respondents perceive the overall level and what they see as the most significant source of threat. In the end of this chapter, various other topics are included, before it all is summed up.

In some of the categories, I have found it useful to present the variations or the essence of responses in tables – or to use tables in order to summarize. In these situations my respondents are referred to as a randomized letter from A to I (consistent throughout the thesis) – this reasoning behind this is explained in chapter 3.3.3 and 3.4. However, in some of the tables, you will find a “-“, which represents either a non-response, non-relevant for the respondent in question or an answer that proved to be too difficult to paraphrase in order to achieve an adequate anonymity.

5.2 General level on today’s oil spill preparedness

5.2.1 General level – near shore preparedness

I started all my interviews by asking the respondents about their perception of today’s level on the oil spill preparedness in Norway. Variation in their responses might indicate that the expectations and their general understanding vary a lot. In this section, a focus will be given to whether my respondents think that the level of oil spill preparedness is “satisfactory”, or not. Challenges will be thoroughly identified and examined in chapter 5.4.

There seems to be a tendency that respondents start listing challenges when I ask about their perception of oil spill preparedness level. Most significant, there seems to be a general understanding that the IUA has a lack of experience. One respondent put it this way:

The level varies a lot. If one starts at the municipal level, there is a lot of difference. Some IUAs are active, talented and have a high degree of emergency preparedness, while others lag behind, and barely know what type of equipment they have at their depots.

The quote above illustrates my general perception of how my respondents view the situation – varied. Another said:

Every time things happen there is an element of chaos. The IUAs that are responsible only really learn when a disaster actually takes place. At least that's my impression.

One respondent's points at the preparedness resources are not uniform, and that the preparedness itself seems to be scattered.

Several respondents points at the importance of accidents, and nearly all respondents mentions the three accidents accounted for in chapter 4.2 on page 39 – namely: the three motor vessels Full City, Server and Rocknes. These have resulted in experience and training, and, according to my respondents, badly needed financial resources from the government, which again have resulted in an improved level of preparedness. One respondent described the situation like this:

There has been an improvement during the last two years, as a result of accidents. As the oil industry moves closer to the coast, ambitions have grown. The response time has been reduced from 72 hours to 5 hours, for example. This has created a completely different basis for the discussion of oil spills. And – well, dare I say we have been "fortunate" enough to experience two accidents in the Oslo fjord, making people realize just how wrong things can go.

Three respondents said it clearly – that the level of preparedness is "satisfactory". But these respondents said this on the basis of the guidelines given by politicians and governmental agencies, thereby aligning expectations and outcome.

Further on, many of my respondents said that "we" (in the northern part of Norway) have been undeservedly lucky when it comes to oil spills from ships. One of them put it this way:

I usually say that the only thing we can be sure of is that an unwanted incident will occur. The fact that there hasn't been one yet, the fact that so far we have been spared on the Norwegian coast, that is just statistical fluke...

There are numerous agencies, companies and organizations that are put to action when there is an oil combating action, and the interaction between these are highlighted by all of my respondents in various ways. One respondent calls it a "voluntary communal work". Another

says that we have enormous resources in “the Norwegian model” on oil spill preparedness, and stated:

There is a lot of respect for the participants, both in terms of developing emergency preparedness, improving it and also taking steps when accidents occur.

In sum, only three respondents think that the level of near-shore preparedness is satisfactory. However, these also came with several suggestions of improvements later on. All the other seems to focus on pitfalls in today’s system of preparedness, which I interpret as that they feel that it not is satisfactory. Next, the offshore part will be treated, and then a summary of the overall perception of oil spill preparedness will be given in chapter 5.2.3.

5.2.2 General level – offshore preparedness

When it comes to offshore preparedness, it is mainly handled by NOFO. Unlike the near-shore preparedness, offshore preparedness is therefore mainly carried out by one organization and not a variety of them. Further on, there seems to be a general understanding that the preparedness carried out by NOFO is sufficient, and my respondents point at bigger budgets and better equipment compared to the near-shore preparedness. When talking about offshore preparedness, one of my respondents said:

Yes, I think that it is as good as is possible in practical and technological terms. They use the best equipment there is, it is part of offshore preparedness. It is state of the art oil booms, modern skimmers with tremendous capacity and flexibility, and the vessels are ideal.

This preparedness is, as pointed out before, operationalized through NOFO. This organization is viewed to be a professional actor, with high degree of proficiency. Another respondent said:

NOFO are excellent at oil spill preparedness, they have several depots around Norway, and the oil companies stand behind them. They generally have a lot of money.

There seems to be a general understanding that the private preparedness (i.e. by NOFO and their members) is generally good. One respondent praised the government for why NOFO and the private preparedness have succeeded, and said that their tax regime had worked effectively in improving the preparedness:

And given that the tax system imposes an 80% tax on results, this means that it's me and you, it's society, that funds 80% of development costs - even as regards oil spill preparedness. Although the industry has been the driving force. So I think that the most effective way of doing this is what the state has done - namely, that it has given both a tax incentive but also put demands on private sector preparedness.

However, some of my respondents points at the fact that there have been more accidents in the near-shore region, and that the offshore preparedness thereby perhaps lacks experience. On the contrary, the degree of exercises and such activities is viewed to be good at the offshore part of the preparedness.

5.2.3 Summary

To briefly summarize the main thoughts on today's oil spill preparedness, I have gathered each respondent's opinion in Table 5-2. The main lines are that three respondents judge the near-shore preparedness to be "satisfactory", while nearly all thinks that the offshore preparedness is good. The table also depicts the general variation in how my respondents view preparedness, and which perspectives they may have and how these differ.

Table 5-2: Summary - perceived oil spill preparedness level

Respondent	Answer
A	Varying level due to varying level on IUA. Good offshore.
B	Satisfactory both near-shore and offshore.
C	Generally scattered - cultural clash between private and public preparedness.
D	Enough equipment, but lack of experience near-shore. Seems to be adequately offshore.
E	Lack of people and management systems near-shore. Good offshore.
F	Many improvements could be made near-shore. Good offshore.
G	Believes that there is a continuous improvement, but do not have enough knowledge to give a statement.
H	Increased level the last two years near-shore. Satisfactory in both sectors.
I	Generally seen, the level is good.

5.3 Main source of threat

Another important discussion when talking about “preparedness level” is to also examine how my respondents judge the risk of oil spills in terms of origin or sources. Here, somewhat surprisingly to me, there seems to be a general understanding that the shipping industry poses the most significant threat. All of my respondents have a better faith in the preventive measures taken by operators (i.e. oil installations) on the Norwegian continental shelf, than the measures taken by the shipping fleet. This could also be linked to the findings in the previous chapter – that my respondents have a generally better belief in the offshore oil spill combating capabilities, than the near-shore which often is the sector that will be acting on accidents in the shipping fleet. One respondent said:

Nevertheless, we have quite a lot in heavy traffic, close up to coastal areas. And sometimes it is just sheer luck that nothing goes wrong, really wrong. Some of the boats carry a lot. I am not that afraid of the oil industry itself... But as regards the shipping fleet we have probably had more luck than we deserve.

Another said:

There is no doubt that shipping is the biggest threat. And we see this globally too. Well, the oil installations are – well... both floating or fixed, security is good. After all, this is an industry that is built up around security

Several similar quotes could be used here – on this question all my respondents answered rather similar. Another included oil activities on the Norne field, and described the threat in this way:

The threat picture in the Lofoten Islands consists of two things. There is the drilling on the Norne-field off Sandnessjøen. Then there are the 5,000 vessels passing the Lofoten and Vesterålen each year. These include large tankers from Russia, which transfer oil and go down along the coast and on to the continent with oil. So that's where the threat lies.

Another respondent argued that it is important to bear in mind that it is an important distinction between crude oil and refined products, and argued that oil from oil installations is more easily broken down by the nature itself – and called it a *natural product*. However, since this is not a technical or chemical focused research, this was not discussed with other respondents.

To depict the main sources, I have listed every respondent's viewpoint in Table 5-3. All my respondents fear oil spills from ships in a bigger extend than from oil rigs.

Table 5-3: Main source of threat

Respondent	Answer
A	Mainly shipping, but also the Norne-field
B	Mainly shipping.
C	Mainly shipping.
D	Mainly shipping.
E	Mainly shipping.
F	Mainly shipping
G	-
H	Mainly shipping.
I	Mainly shipping.

5.4 Challenges

5.4.1 Identification of challenges

In this chapter, a quantitative assessment of the various challenges mentioned during the interviews will be carried out. The aim of this is to give a structural picture of what my respondents actually perceive as challenges. The challenges will only be indentified here, and are elaborated in succeeding chapters. I have identified challenges by going through transcripts of all interviews, and then counted how many of my respondents that mentioned each challenge in one or another way. "1" means that the corresponding challenge was mentioned (one or several times), and 0 means that my respondent did not bring it up during the interview.

Table 5-4: Identification of challenges

	A	B	C	D	E	F	G	H	I	SUM
Knowledge & competence	1	1	1	1		1	1	1	1	8
Equipment	1	1			1	1	1	1		6
Training & exercises	1	1			1	1		1	1	6

EHS (environment, health and safety)	1		1			1	1	1		5
Logistics	1		1	1	1			1		5
Lack of people	1	1		1	1			1		5
Financial resources		1		1			1	1	1	5
Weather	1			1		1		1		4
Operation management			1		1	1				3
Not clear/disorderly roles			1			1		1		3
Communication			1			1				2
Financial liquidity				1						1
Cultural aspects			1							1

Many of these challenges overlap one or more of the others, and some are a determinant for others. Knowledge, for instance, could be seen as a determinant for “lack of people”, in the sense that “people” is often defined as people with certain knowledge, and so on. “Weather” is exogenous, and is mentioned by four of my respondents. Further on, “financial resources” and funding is often exogenous (or political) given, and works as a determinant for many of the other challenges.

In the following, I will treat the two highest ranking challenges individually (with “knowledge & competence” merged together with “training and exercises”), before moving on to “organization” which deals with aspects of all the remaining challenges.

5.4.2 Knowledge and competence

Knowledge seems to be a very important factor in achieving good preparedness – and this is often linked to the amount of training, exercises and experience. Much of the experience is gained through real disasters, and they do – luckily – not occur that often. The location is also somewhat random, as one respondent said it:

Yes, there is no doubt that training and exercises are key words in this field. Boats don't run aground every year, and if they do they tend to do so at different locations.

Further on, the lack of knowledge that respondents point at, can be divided in two categories: competence in the IUAs, and competence in the Norwegian Coastal Administration. The first of these two categories is most frequent mentioned, and it seems that a majority of my

respondents do not have faith in that the IUAs have an adequately level of knowledge and a reasonable frequency of exercises. One respondent regarded the level of competence within the IUAs as the most significant challenge facing the oil spill preparedness today. Secondly, three of my respondents are concerned that the competence level is diminishing in the Norwegian Coastal Administration, due to naturally retirements. This was however contradicted by another respondent, who said that the Norwegian Coastal Administration had systems to prevent this.

When asked about how to improve “knowledge”, two respondents actually praised me for choosing to write about this subject. This points at an important matter – there is in general not much research on the managerial- and organizational part of oil spill preparedness. The focus has been on technical research, where for instance SINTEF makes considerable contributions. Moreover, crisis management seems to be a steadily growing academic field, and several of my respondents mentioned that it exist education opportunities on this field on three to four universities and graduate schools in Norway.

When that is said, two of my respondents wanted a dedicated, mandatory subject on “oil spill preparedness” included in the education of fishermen and other marine occupations. This was justified by their understanding of that we already have a high level of education in these professions today (at least compared to what the situation was for a generation ago).

To sum up “knowledge and competence”, this is viewed as a challenging but important part of oil spill combating processes. A majority of respondents points at lacking competences within the IUAs, while a few points at issues within the Norwegian Coastal Administration. NOFO is not mentioned in this regard. Regarding solutions, an increased amount of exercises and an implementation as preparedness as a mandatory subject in maritime education is proposed.

5.4.3 Equipment

When talking about equipment, my respondents mainly refer to three different categories of equipment:

- (1) Oil booms
- (2) Skimmers
- (3) Beach cleaning equipment

The first two are used together, and are often referred to as a “system” (some of my respondents include tug boat(s) in this definition). The main function of oil booms is to concentrate the spilled oil, while the skimmer removes it from the water. This is called mechanical collection, which is the most desirable way to collect oil spill according to my respondents, as long as it is on the water. The alternative, i.e. using dispersants that dissolves oil into water, does not come without negative environmental impact.

Equipment can, according to my respondents, be challenging in two ways;

- (a) inappropriate equipment (i.e. low capacity under certain conditions)
- (b) low availability (i.e. in the wrong place at the wrong time).

Regarding the first of these two challenges, weather is an obvious factor, and it seems to be a fact that today’s equipment (especially oil booms) do not work when wind and waves becomes too strong. One respondent points at problems when the waves are more than two to three meters, but says that the oil booms produced by NorLense today are among the best in the world.

However, an important thing is that most of my respondents do not see this as a solvable problem. This is nearly considered a “given” factor, due to the dependence on weather conditions. Does this imply that the focus should be on other areas than technology development?

When asked about the development of technical equipment, several respondents says that technology behind oil booms have been more “polished” than “reinvented” over the years, and the main construction that existed for 30 years is more or less the same today.

Improvements have been made – but this is mainly through the use of better materials and improved techniques (for instance welding rather than sewing). Other improvements include better handling possibilities, with advance reels that automatically inflate oil booms, reducing the demand of people to only one or two in the process of deploying the oil booms. One respondent calls for innovation, and says that the industry needs to think “outside the box”, and not be limited by the traditional way of collecting spilled oil – i.e. to concentrate and skim it.

An important finding in this regard is that most of my respondent does not believe that this situation will improve significantly, and three of my respondents points at the existence of certain “natural laws” when explaining why. One said:

It has a physical limitation, at approximately two-meter waves, and a current of two knots. (...) So... When the weather gets bad, there is not a lot of help to be had.

One respondent mentioned that some oil booms used during the Full City accident was 30 years old. This shows two things, according to this respondent: lack of investments in equipment renewal and high material quality on the old oil booms.

When it comes to the second challenge – availability of equipment – a majority of my respondents view the situation as improved during the last five-or-so years, and this is further on linked with incidents as M/V Rocknes, M/V Server and M/V Full City. Both the Norwegian Coastal Administration and NOFO have, according to my respondents, been granted financial resources and initiated processes of procuring new equipment. When it comes to the remaining of the three main participants in the Norwegian preparedness – the municipalities (or IUAs), my respondents have a quite different opinion. Some points at the equipment, and says that it is old and outdated, while other opposes to this. Some says that the equipment of IUAs is at the best – varied. Of course, new equipment is never a bad thing, but the other respondents choose to focus on training and competence building, rather than equipment renewal.

One respondent view the equipment as good, but says that we have to little of it when it comes to major incidents.

The equipment level is not that bad. There is too little equipment for a major operation. There is way too little equipment. And this is what the experience with Full City showed us, the equipment is used up, they need a lot, and ... It is brought in from all over the place. And this was a small operation. And if I imagine a large operation, well, we have far too little equipment, in my opinion.

On the contrary, several respondents view the oil booms as adequately in a technical sense, and are more optimistic regarding improvements and further development on beach cleaning equipment. Two members of Arena Beredskap have equipments that are currently being used

in mechanical removal of oil from beaches (namely Mercur Maritime AS and Vacuumkjempen AS). One respondent put it this way:

The age of buckets and spades is probably over. I hope so, for the sake of the people using them. (...) But finding standard beach cleaning equipment is difficult. Many players. Many smart ideas, to put it that way.

However, a major part of this work is still manual labor, and some of my respondents see a gap in development here. These respondents believe that the field of chemical cleaning of beaches will improve, and reduce the need for buckets and spades. One solution could be to find a kind of chemical dispersant that does not come with too many environmental drawbacks. Another respondent, however, equalizes the development opportunities within oil booms with chemical dispersants.

To sum it up in brief – equipment can be challenging due to improper capabilities or being on the wrong place to the wrong time. Equipment used to mechanical collecting of oil on water is seen to have certain physical limitations that are hard to overcome by improving technology. Regarding the use of chemicals or dispersants, and techniques for beach cleaning, my respondents see a more exciting future. However, a main tendency is that respondents perceive technology as “given” and choose to focus on other things when discussing challenges.

5.4.4 Organizing operations

The remaining challenges, not dealt with in the two preceding chapters, are the following (see also Table 5-4 on page 53):

- Environments, health and safety (EHS)
- Logistics
- Lack of people
- Financial resources
- Weather
- Operation management
- Communication
- Not clear/disorderly roles
- Financial liquidity

- Cultural aspects

A focus on EHS is important in oil spill preparedness. This focus is given through the prioritizing principles (see chapter 4.1.1 on page 37) and legislation, but achieving it in an effective way is viewed as a major barrier. This is due to several things, and to start with the obvious - the fact that combating oil spill often inevitable involves human contact with spilled oil which comes in numerous types and have a variety of characteristics. Further on, it requires a system of cleaning clothes and equipment. Another aspect of it is the fact that accidents rarely happens in good weather. One respondent used a metaphor of tire puncturing on cars – which seem to happen only when it is raining. But EHS is important and just to walk on slippery, oily and wet rocks could be a hazard to personnel safety. Systems to safeguard adequate EHS standards require comprehensive planning. Waves and wind could serve as a threat to people, either working in boats on the water, or in a beach cleaning process. Five out of twelve respondents mentioned EHS as a barrier, and one respondent told that EHS takes precedence over everything in his/hers organization. When that is said, one respondent also pointed at the fact that the new reel systems used in combination with NorLense’s oil booms, requires only 1 person on deck when deploying the boom into water, which paints a picture that technology can improve EHS.

Further on, logistics seems to pose as a major barrier. This is described as the entire process of physically getting the right equipment (oil booms, skimmers, boats, trucks and so on) and the right people to the right place – in the first phase. Secondly, you need to provide a good infrastructure that is able to transport people, food, and waste, not to mention transport of collected oil. This is perceived as a challenge by five of my respondents, while two of them see it as the most significant one. One of these two said:

There is of course room for improvement in terms of equipment, etc, but logistics and handling are huge challenges. (...) Most of our coastline has no infrastructure. How do you get the equipment, manpower and especially the waste out?

During an oil spill response operation, especially if it involves beach cleaning, you will need massive resources, and people are one of them. This is seen as a challenge in the northern part of Norway, and one respondent explained this with saying that an incident creates equally much spill if it happens in the northern part of Norway, compared to southern parts – and there are significantly less people to choose from in the north. Regarding professionals, my

respondents mention that fire fighters, who often are important staff members in IUAs, do have another important related job – which is prioritized (safety before environment). This must be balanced and coordinated. Further on, my respondents seems to be afraid that there will be a lack of volunteers in beach cleaning operations in the upper north. Cold, harsh weather may reduce the number of people listing themselves as volunteers, according to two of them. In total, lack of people was considered a challenge of five of my respondents. One respondent described a possible solution to this challenge in this way:

Then we need to transport people from down south, and perhaps from abroad. Put them on the plane at the airport and get them up there. There is no doubt that a major, long-lasting beach cleaning project would be a huge challenge.

Financial resources are an obvious determinant, and are mentioned as a challenge by five respondents. This is just briefly touch upon by four of them, in the sense that they call for more money in general, and says that more money equals improved preparedness. However, one of them is more concrete, and says that we need to have a system of consistent year-to-year grants to the Norwegian Coastal Administration, and not only allocate money to them in the aftermath of an incident. Further on, one of these respondents points at a situation with a 300 million NOK in lag of funding from the authorities a few years back in time, but that this has changed significantly due to incidents as Full City, Server and Rocknes. One respondent viewed this as the most significant challenge, and said:

It's the economic aspect which is the biggest problem, always. Making sure that central and local government have enough money to invest in equipment to hold in readiness, I think.

Weather – or to be more precise: bad weather – is mentioned as a challenge by four respondents. This is mostly seen as an exogenous or given condition by others, in which you must adapt. Nevertheless, four people operationalize this as a challenge. Some tells me that it is because they consider the northern part of Norway as a more challenging region over others, while other simply says that it permeates the entire chain of oil spill preparedness.

Operation management is brought up by three of my respondent, and viewed as a challenge. Standardization of processes seems to be an overall wish. One respondent sees a need to gather all information in a computer based software system, which then will ease the process of gathering these manually. Moreover, this system will be universal, in terms of including as

much information as possible, and will form a fundament which the management could take their decisions upon. A uniform approach is mentioned as important, i.e. not having several non-standardized software. Another respondent says that it is only the Norwegian Coastal Administration who has experience and expertise in managing larger oil slick operations, and the third says that the Norwegian Coastal Administration should have a pool of action manager who could be deployed into other oil spill operations (i.e. under the command of IUAs or NOFO). For the sake of clarity, it should be mentioned that NOFO already have established a group of 50 hand-picked persons with competence on oil spill operations, which constitutes a special emergency team, ready to be deployed on short notice.

Moreover, communication is perceived as a challenge by two of my respondents. Also in this regard, standardization is wanted. One respondents tells about a different naming of concepts in the different parts of an oil spill response – and that NOFO has one set of concepts while the Norwegian Coastal Administration have others, not to mention the IUAs, who have a various knowledge of concepts all over the line – according to this respondent. This is connected with competence, and as one respondent said – a uniform education of people, through, for instance the Norwegian School for Firemen, would help to standardize concepts among the different organizations. This is exemplified by one of my respondents, with the Full City incident, where the IUAs used concepts that not were rooted in the Norwegian Coastal Administration. This created friction in communication. Another respondent told me that a great deal of communication is about the flow of information, and that it is increasingly important in large, complex, integrated operations

Financial liquidity is mentioned as a possible challenge by one of the private companies interviewed. These will during a beach cleaning process, participate and have expenditures related to their activities (for instance by using sub suppliers), which in the end should be paid by the IUA, who will collect it from the polluter (often an insurance company). However, the time span between when the expenditures actually happen and when it is collected from the next level in the chain of resource flow is seen as a barrier in terms of liquidity. This respondent also proposed a solution to this - to establish a sort of preparedness fund, which could be used to pay private participants without too much bureaucracy. However, another respondent, with experience from one incident, did not see any challenges in liquidity, but said that the system for approving and managing expenditures in an operation could be improved, and suggested a system which is internet-based – a web page where private actors

could apply for funding to their actions, and get a consent from the operation management, in short time.

The “Norwegian model” on preparedness (explained in chapter 4.1.1 on page 37) involves a three folded preparedness responsibility, with private, state and municipal response roles. This role division is not clear enough, according to two of my respondents, creating uncertainty about “who should do this?” and “whose responsibility is that?”. This creates a bad environment for decision making, and going into details to make this clear during an operation, takes unnecessary much time. One stated that:

I'm not sure if I would call it poor, but vague, yes, the roles are messy. Who is the first on the scene, who directs the process, etc. Maybe the division of responsibilities looked good on paper, but wasn't that good in practice? Maybe implementing these roles in practice has been impossible?

This system of organizing is not entirely negative, but it needs effective ways of organizing in order to work properly and to take advantages of all the resources that actually exists.

Achieving it is challenging, and one respondent put this up against the general assumption of lacking equipment, and said:

A keyword here is coordination. We have quite a lot of resources in Norway. And coordination is one of our principal tasks - to get all positive factors to work together in an organization that interacts well, and utilizes all the capabilities and competencies that exist.

Another respondent point out a challenge related to the responsibility of the Norwegian Coastal Administration, who has a supervisory responsibility in addition to a response responsibility. This is seen as unfortunate, and my respondent believes the Norwegian Coastal Administration will be reluctant to intervene in actions as long as they oversee them – since they will begin to audit themselves in such a situation. This specific “two hat” responsibility to the Norwegian Coastal Administration is also mentioned by another respondent, making it two that perceive this as a challenge. In addition, one sees the general challenge with unclear roles, making it three that feel the role division as a challenge. Talking about roles, one respondent formulated the general situation in this way:

But what I see, as a bit of an outsider watching all of this; well, what I normally say is that we are a nation of four and a half million people, and we have enormous

emergency preparedness assets and skills - assuming that we succeed in coordinating municipal, state and private emergency preparedness.

Further on, the interaction between the private and the public parts of the preparedness is considered challenging by one respondent. This person points at different cultures, which creates conflicts when these meet each other. The private sector is thought to have greater resources, simpler decision-making structures and lower response time than the public sector – but the majority of organizational skills in an operation stems from the public part. However, the “vast” resources make people within the private part act as “know-it-all”-persons, which irritate people in the public sector.

There are lots of people who by virtue of working in organizations with a sound economy – they are so f... dynamic, they are so efficient – there is just no end to it. They believe they know it all. And in the meeting with the state-run oil spill preparedness a culture clash occurs.

In addition to the concrete challenges within the sphere of organization, several respondents pointed at challenges with “organizing” on a general basis. One pointed out that the preparedness was too fragmented, and that a uniform approach was hard to achieve.

Norwegian emergency preparedness is based on the voluntary principle, where you establish an organization in a given case, which should work smoothly. Experience suggests that it is difficult to achieve this in practice.

One respondent sees a solution in having organizations that are standardized and modular, in order to be familiar with the organizational structures during an emergency response. Related to the IUAs, this respondent said:

The simple fact that they have a similar organizational model, that they organize oil spill response actions in the same way that the fire department plans for a major flood disaster or forest fire or snow avalanche, etc. The fact that they have easily recognizable organizations. In Norway today, everybody uses their own log system, and has separate emergency preparedness plans, and all have their own way of organizing themselves. So standardization and coordination in this respect would be very useful.

To sum up organization as a challenge, this poses as a major challenges that is constituted by various sub-challenges, which all seems to stem from the fact that several organizations needs to interact, and that time is a scarcity when accidents happens. There seems to be a general

need for standardization of concepts, management and systems used when approaching oil spill accidents.

5.5 Other approaches

5.5.1 Recent leaps in oil spill preparedness

During the interview, I asked all my respondents to think of recent leaps in the development of oil spill preparedness. Besides an improved tugboat readiness and new technology on early detection of oil spills, none of my respondents could come up with any recent “major leaps” in the oil spill preparedness. The answers are summarized in Table 5-5.

Table 5-5: Recent leaps

Respondent	Answer
A	Do not know of any.
B	Continuous improvement on equipment, but no “quantum leap”
C	-
D	Do not know of any.
E	Tugboat readiness
F	-
G	Early detection systems.
H	-
I	Continuous improvement on equipment, but no “new technology”

Although nothing unexpected was revealed here (all these are mentioned in their judgment on the general level of preparedness), one interesting thing is that all respondents (or at least B, E, G, and I) seem to focus on technology. This is perhaps not so evident in the table, but respondents only discussed equipment development (and availability) when reasoning, before ending up with “I don’t know of any” or one of the equipment-related answers above.

5.5.2 What could give a boost to the preparedness?

After talking about the situation of today’s preparedness and focusing on the challenges therein, I choose to try a more positive approach and asked my respondents to think of something that would give a boost to the preparedness. The essence of their answers is collected in Table 5-6.

Table 5-6: Boost in preparedness

Respondent	Answer
A	Knowledge – through education of fisher men
B	More resources to competence building – and a bigger focus on research and development.
C	-
D	Gather IUA with funding authorities.
E	Knowledge – through a mandatory part on oil spill preparedness in all maritime education.
F	Innovation on equipment (think outside the box) and improve organization structures.
G	Do not know any specific, besides more financial resources.
H	More money to the Norwegian Coastal Administration.
I	Allocation of resources to renewal of equipment

The logic behind this approach was to turn around the question, and to see what my respondents see as possible effective changes. Thus, this perspective include an element of ranking – and the answers above describes what will be the most effective change in order to “boost” the level of preparedness. All of these could be found as challenges also, which is reasonable – these poses as possible (abstract) solutions to the challenges facing today’s preparedness. Five of my respondents call for increases in resource allocations, while three see the most effective change as improved knowledge on oil spill responses. One pointed at improvements in technology and organizational structures. The variation of answers proves again that this is a complex dynamics, and that my respondents have different perspectives.

5.5.3 Factors constituting effective preparedness

Another approach I tried was to ask about what my respondents perceive as factors in an ideal, effective system of preparedness. Here, two of my respondents immediately pointed at the importance of early detection systems. One said:

Obviously, here in Northern Norway seeing the oil slick in the winter, at night, or in the middle of the day for that matter, is essential if we are to put preparedness measures into place.

Another respondent remarked that there has been an impressive development on the use of systems that detects the oil spill, even at dark, in recent times. For instance, my respondent mentions the use of radar and IR, and prospected use of satellites. Yet another respondent included the importance of early detection systems, but add a routine perspective to it, and said:

First of all, we need good notification procedures when an accident takes place. The second is to have sufficient personnel resources. Personnel have to be trained and have experience in the use of the equipment available. The third is having the best possible equipment available, wherever the accident takes places. Having sufficient resources in terms of boats and crews to carry out the measures.

Besides these responses, nothing new was revealed through this approach.

5.5.4 Model on effective preparedness

Further on, inspired by seeing a model on “effective preparedness” at a presentation of Arena Beredskap, I asked my respondents if this was a good way to picture the major relations that constitute effectiveness. The model says, in short, that equipment, competence and organization, multiplied with each other, yields, given command and control – effect in preparedness (see Figure 4-2 on page 46).

Although giving a superficial picture, it could be interesting to check what my respondents think about it, and if they for instance would prioritize some of these factors. Most of my respondents believe that the model is a good way to picture their experience. However, one respondent would emphasize personnel resources, rather than equipment.

The importance of an effective, smooth-working organization was mentioned by several respondents. One said that without the ability to organize, you could forget the two others, since you cannot even get the equipment from the depot without a functioning organization. Another said that he would emphasize knowledge and organizing. Knowledge in itself would, according to another respondent, never be left alone – as knowledge points at the importance of the other factors. Communication was added as a factor, by one of the respondent, who said that it is so utterly important that it should be treated explicit and not considered a part of organizing. A summary is given in Table 5-7.

Table 5-7: Model on effective preparedness

Respondent	Answer
A	This model doesn't say anything.
B	Good model.
C	Good model.
D	Absolutely descriptive.
E	Good model, although it is very universal.
F	-
G	The model should emphasize human resources rather than technical resources.
H	Good model.
I	-

5.5.5 “The world’s best” oil spill preparedness?

A goal within the network of Arena Beredskap, is to deliver “the world’s best” preparedness systems. Moreover, Statoil has stated that they will require “the world’s best preparedness” when entering the Barents region. So – what is then “the world’s best” preparedness? Most of my respondents review this as a goal or vision, and felt comfortable with having it as a guiding star. You should aim at matching Barcelona, one responded said, using an analogy to sports. However, one respondent outside this network, had a different opinion, and stated:

Hah! I will respond to this very, very briefly. You are referring to a political statement, and I'm professional. I'm not a politician. To put it this way: the world's best preparedness is not a measure of quality. The world's best oil spill response preparedness may turn out to be inadequate.

This is an interesting finding – could actually the “world’s best preparedness” be inadequate?

Related to this, another respondent described it in this way:

This is a level of ambition we cannot get the politicians to define. As per today it is actually the suppliers that define development. You see, there is a problem with demand worldwide. If you want technological development in this area, you need a customer who is willing to pay the price.

As mentioned in the introduction, I intuitively compared the level of preparedness to the technological level on exploration and production equipment – where Norway could be said to be one of the leading nations. When asked about how to achieve an elite position in the world on oil spill preparedness, one respondent did the same comparison, but said that the government had an explicit goal to establish competence and concentrate the development when it comes to oil extraction in Norway. Further on, this respondent believes that we could achieve such an elite position on oil spill preparedness too, if the government poses the same guidelines on the preparedness industry.

5.6 Summary of findings

My findings suggest that the situation today, as it is perceived by my respondents, is good offshore. NOFO, operating on behalf of the operators on the NCS, is believed to be well trained through exercises, but do not have much real experience. On the other hand, the near- and on-shore preparedness is insufficient, and this is mainly connected with a challenging interaction between private, state and municipal preparedness (respectively NOFO, the Norwegian Coastal Administration and IUAs).

Further on, the main threat is considered to be shipping. This was substantiated with that Norway has a large number of vessels passing near shore, and that their preventive measures to avoid oil spills seems inadequate. It must also be mentioned that my respondents generally have a better faith in offshore preparedness, than near-shore.

The major challenge seems to be the organizational structure, and respondents pointed at a too fragmented structure, unclear roles and a numerous of others aspects of it. Other challenges were identified to include, among others: ensuring knowledge, available and adequate equipment, and a sufficient level of training and exercises. The majority of these seem to stem from the interaction between the three major players on oil spill preparedness in Norway. Therefore, I have decided to have an core focus on organizational aspects in the analytical part following on next page.

6. ANALYSIS AND DISCUSSION



“The aim of argument, or of discussion, should not be victory, but progress.”

Joseph Joubert, French moralist and essayist (1754-1824)

6.1 Introduction

In this chapter, I will review my findings with respect to theoretical aspects presented in chapter 2. The aim is to make connections between empirical data and theory, and thereby try to understand the findings better. The challenges identified in the empirical part will be in focus of the analysis, and an overall focus is of organizational nature.

Bear in mind that my research approach is inductive, and that the theoretical links presented here, have arose naturally during the process of gathering and processing data. In the beginning, I naturally assumed that my findings would best be investigated through innovation literature, or entrepreneurship theories. This is important, as it underpins one of the major findings of this thesis – that this industry perhaps should have an alternative focus.

Related to the two success criteria posed in chapter 2.3.3 (on page 21), with project product success and project management success, my starting point for analysis is that the focus should be to at least achieve *project manage success*. To elaborate this, I will use two extremes as example: either project product success or product management success. You can have the first one, without having the last one – which is referred to as the “Sydney Opera House Paradox” (Andersen, 2010). This project is characterized by a failing project management; the initial cost estimate was on 9,6 million Australian dollars, while the final cost exceeded 100 million – i.e. over 10 times more. However, this building proved to be an enormous success, and is ranked as one of the best known buildings all over the world. Andersen (2010) compares this with projects in the early oil age of Norway, where projects blew budgets, but proved to be very successful in the aftermath (due to rise in oil prices). Project product success can of course be hoped for in relation to oil spill preparedness, but this should not become the sole focus.

However, on the contrary one can achieve project management success without having project product success. This could for instance be situations where everything goes as planned, and everything works just fine – but where some external factors limit the project outcome. These limitations could for instance be financial resources or stormy weather. Related to Andersen's definition (2010) the responsibility of this kind of success lies with the parent organization and this excludes the exogenous factor *weather*. However, financial resources devoted to project could be attributed to the parent organization (either direct, in terms of budget allocations, or indirect, by the parental organization taking part in the political debate which could culminate in increased funding). Therefore, we should aim at project management success, and judge operations thereafter.

The further structure of the analysis is based primarily on the main academic fields presented in chapter 2, namely risk management, project management and temporary organizations – in reverse order. These will constitute the three next two-digit topics. Moreover, sub chapters will be devoted to specific challenges, or different theoretical divisions (implying the challenges). This is done to emphasize the major links to theory. In the end, I will provide a overall summary.

6.2 Organizational approach

6.2.1 Could oil spill operations be viewed as organizations?

As many of my respondents found organizational aspects to be challenging, it is important to elaborate on the organizational perspective. This organization is established when an accident occurs, and is terminated afterwards. I will use an analogy to military terms, and call these two situations for “peacetime” and “wartime”. In “peacetime”, that is between incidents, all contributing organizations seem to be living their own lives. Some of them interacts also at this situation, for instance through Arena Beredskap, but these are not consistent and formal throughout the line. However, it is when an incident happens – in “wartime” – an organization is established, with parts from all the contributing organizations. These could be the three major players, i.e. NOFO, the Norwegian Coastal Administration, or IUAs. In addition, parts from private companies take part in this action, together with environmental organizations.

To picture this situation, one can look in to the most recent incident – M/V Full City, where IUA, the Norwegian Coastal Administration (NCA) and NOFO collaborated, together with

private companies and the environmental organization WWF. I have tried to illustrate this in Figure 6-1 and Figure 6-2 – a normal situation, and a situation with an ongoing incident that demands immediate emergency response. For the sake of simplicity, I have included only two private companies, in addition to one NGO and the three main players. A real time situation would most likely be more complex than this.

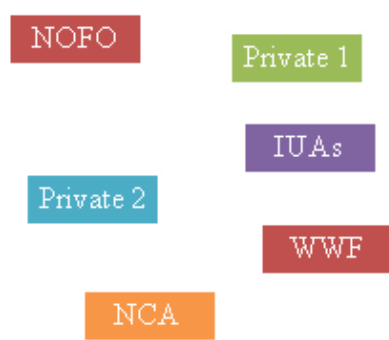


Figure 6-1: Situation – peacetime

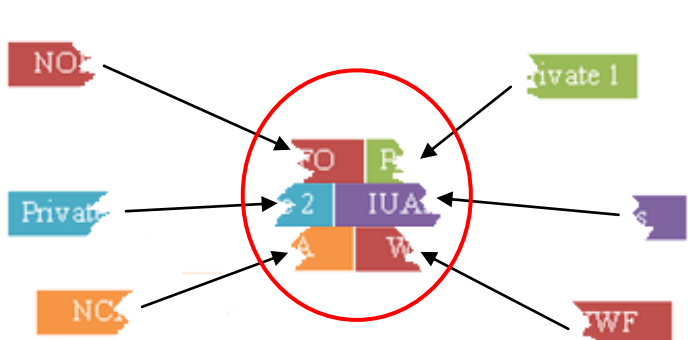


Figure 6-2: Situation – wartime

The red encircled part in Figure 6-2 depicts the temporary organization, which consists of parts from the surrounding organizations. In this regard, NOFO, NCA, WWF etc., acts as parental organizations, while they together form a project organization.

So, could this be said to be a temporary organization? According to the literature, the organization should be a collective course of action, aimed at solving a non-routine task (as defined by Packendorff (1995) - a complete list of the criteria could be found in chapter 2.3.1 on page 18). This fits the nature of the Norwegian preparedness well; we have parts from many organizations that aim to solve something together. In addition, numerous external factors (weather, location, infrastructure, oil quality etc) paint the picture of a non-routine process.

Further on, the organization is pre-determined life cycle – it will be put to life when an incident happen, and will consist during the entire emergency response. If the oil reaches shore a project phase of beach cleaning is needed, which can lead to change in participation in the organization. However, the organization will ultimately be terminated, and the situation will again be as Figure 6-1 depicts. Thereby another criterion – i.e. the limited time aspect – for temporary organizations is fulfilled.

Moreover, the temporary organization should have some kind of performance evaluation criteria. My empirical findings show that my respondents perceive the offshore preparedness as more satisfactory than the near-shore, which implies some kind of performance evaluation. Due to, for instance “weather”, it is hard to at first glance, tell something about how well an emergency organization performed.

Lastly, it needs to fulfill yet another criterion, namely to have a certain level of complexity in terms of roles. Many of my respondents pointed at a too fragmented and complex organizational structure in the preparedness, while others pointed at “messy roles” which proved to be challenging during operations. “Who will do what, and when?” one said. Thereby, I feel comfortable to conclude that the last criterion is fulfilled.

So, in terms of the definition to temporary organizations, I can with a fairly certainty conclude with that this could be viewed as a temporary organization. But what does this imply? Well, first of all, we have a major link to the academic sphere, which make us able to search in literature to find ways to make this organization streamlined. In the following, I will see this in the context of temporary organizations, and what such theories suggest. Following that, since I have established this as an organization, I will look into two other organizational or managerial academic fields – project management and risk management.

6.2.2 Directing focus

According to Lundin and Söderholm (1995), a temporary organization should aim at actions – as opposed to decisions. At first glance, this may not seem as a big difference – however, Lundin and Söderholm advocate for the need of action-based theories. This is differentiated from perpetual organizations through “the four Ts”, time, task, team and transition.

Time is an obvious characteristic of temporary organizations – they are temporary by nature. This demands a highest possible efficiency in managing operations. An intuitive approach to this is to improve the degree of planning, which will be discussed under project management. Operation management, however, was found to be challenging, and the proposed software solutions that saves time could be one pragmatic approach to this. Training is another, as it is reasonable to believe that training will both reveal time-consuming activities and improve the performance in terms of time used. This shows that a perception of time is perhaps already in place, focusing on actions.

Further on, the *task*-perspective adds legitimacy for the organization, and could be used as opposite to a goal-approach, in order to focus on actions. The focus may differ, according to what category of task oil spill preparedness is connected to. Is it repetitive or unique?

According to Table 2-3 on page 19, the tasks facing oil spill operations must be said to be close to “repetitive”. However – some of the challenges, for instance EHS and lack of training, suggests that these tasks has an element of uniqueness in themselves, and that the tasks are not repeated in a sufficient number of times. The theoretical closest link would thereby be repetitive tasks.

The next “T” is *team*, which constitute the people who have established and are parts of the temporary organization. This adds an element of teamwork in this kind of organizations. To achieve a focus of action in emergency response organizations, Lundin and Söderholm (1995) suggest using a project management approach in order to motivate and aligning beliefs, attitudes and expectations. Communication was found to have elements of varying use of concepts, causing misunderstandings during operations – which ultimately will result in events to be more time-consuming than they could have been. A unified approach to this, for instance by implementing central concepts in education, could be one solution.

The last “T” is *transition*, implying that the organization must transform something during its lifetime. This could be either a physically transformation measured by “before” and “after”, and in relation to emergency response – to accomplish their tasks in terms of combating oil spills – which could be compared to project product success discussed in the introduction to this chapter. Another view is the transition or change among the project participants – and their ideas and thoughts on how to solve the task they sat out to do. This includes an element of learning or organizational changes. Related to my findings, the focus on learning is between incidents, where experiences are drawn from reports on earlier incidents. If such transitions are to take place during operations, this must probably be facilitated through operational management.

To sum it up, there seem to be a possibility to directing focus on actions, which will save time in emergency operations, through the approach of temporary organizations.

6.2.3 Clarifying roles

Unclear role division in the “Norwegian model” are found to be a challenge. Unclear intentions and a “two-hat” responsibility for the Norwegian Coastal Administration (both overseeing and responding to private oil spills) were regarded to be unfortunate by respondents.

The concrete responsibilities will best be determined through plans and laws. However, viewing this situation as a temporary organization would perhaps help clarifying the role pattern?

The relationship, as shown in Figure 2-2 on page 20, tells us that the parent organization gives mandate and resources to the temporary organization, and defines a desired delivery in return (Andersen, 2010). In other words – the parent organization wants to achieve something in return. Under the assumption that this relationship exist in a temporary organization consisting of several members, it could be applicable to oil spill preparedness, and the situation will not look very different from and Figure 6-2 on page 71. However, the main point is to show that mandates, resources and deliveries may differ from organization to organization – or from member to member of an emergency response operation.

Regarding NOFO, the Norwegian Coastal Administration and the IUAs – reviewing these could easily turn out wrong, or prove to be political “touchy” or incorrect. But a question could be – what is *actually* the goal to NOFO, for instance, to participate in oil spill operations, given their already mentioned legislative responsibility? And what is the goal to private companies?

One respondent said, although not emphasized in the empirical part, that he or she felt noble about his or hers organization working with environment through oil spill preparedness. However, this respondent emphasized that their overall goal was to earn money. With this in mind, one should perhaps view private participants in emergency operations as agents for their organizations, aimed at gaining experience that in the end would make them earn money?

6.2.4 Modular organization structures?

A familiar organizational structure was proposed to be a time-saving effect in the empirical part, and it was mentioned that the Norwegian Coastal Administration now has a similar organization structure in “wartime” as well as “peacetime” – with the intend to have familiar organizational structures when accidents happens. With multiple organizations, this shows similarities to modular designs.

In a research of military task forces, de Waard and Kramer (2008) states that organizations that repeatedly uses temporary organizations need parent organizations that could work as a stable platform for the temporary part. Further on, their look into a modular design, where the parent organization is build up of modules, that in the case of an event, act as building blocks in the temporary organization.

This will not be elaborated further in this thesis. A summary of the approach of temporary organizations follows in 6.5.

6.3 *Project management approach*

6.3.1 Could oil spill combating be regarded as a project?

Could help be drawn from project management theories, in order to achieve a clutter-free, smoothly management in wartime? Structured by the general life cycles of a project, this will be discussed in the following.

First, could an oil combating operation be viewed as a project? Based on the defining criteria posed in chapter 2.2.1 on page 13, I will view these up against a general oil spill response. A project should perform a specific task, which in this case will be to reduce the impacts of any oil spills. Further on, it is limited in time, which oil spill operations also are. They are initiated when an accident happen, and terminates when there is no possibility to do any further efforts of collecting oil or reducing damage. Moreover, a project should generate results, which in an oil spill response operation will be of practical and non-economical art – i.e. reducing discharges of environmental harming oil. Though it includes aspects of financial management, the ultimate goal is not to achieve a pre-determined return on equity etc.

Further on, it should be a subject of interest, both from people participating in the project, but also beyond the project in terms of the parent organization, and in the society. Oil slicks harm societies, and the motivation to reduce these will probably always exist. Although the majority of people working with oil spill responses are paid by different organizations, you will find people devoting themselves to environmental cases such as oil spills – for instance voluntarily people from WWF. Furthermore, a project is often exposed to uncertain factors, both from within and outside the project management. My respondents point at challenges such as harsh weather, which always will be an uncertainty that stems from the surroundings. Other uncertainty aspects include, among others: logistics, challenging EHS, cultural challenges and communication challenges.

To sum it up, all criterions for projects seems to fit well with the task discussed: stopping or reducing the harm of oil spills. This creates a basis, in which we could apply further theories within the field of project management, to clear up and perhaps reduce the challenges mentioned by my respondents.

6.3.2 Improving planning activities between incidents

Project management theories suggest that projects have a pre-phase, in which planning activities can be initiated. The regular two-folded approach to define the start of a project, i.e. the distinction between appointing project manager and the initiation of activities, could perhaps not be fully applicable in the setting of oil spill preparedness. Could it perhaps be differentiated as peace- and wartime? To determine this further, we will need to look in to what kind of plans that ought to be made, and review challenges up against pitfalls.

Project management often divides the planning process in three parts: strategically, tactically and operational planning. Which plans that should be made when, would probably differ from challenge to challenge. EHS is for instance one challenge, brought up by respondents that probably could be planned in advance, in various cases. This is an example of tactical planning. Further on, logistics is mentioned as a challenge. This consist of some familiar factors, such as transport resources in terms of available trucks, boats etc. However, it does consist of unknown factors as well, as pointed out by my respondents. How could we for instance approach the logistical aspect in a case with a near-shore oil slick on a site without connecting roads? Perhaps we could establish a preliminary traffic route over a harvested field, and use a nearby farmer's tractor to drive back and forth? This was just an example –

the main goal is to be aware of that there should be a balance between what can be planned in advance, and what can be improvised. All things that could be planned before accidents would ultimately conserve time resources, which are scarce by nature in emergency responses. This is also mentioned as a possible pitfall within project management – having either too superficial or too detailed plans.

Another pitfall within project management is to have unclear formulation of the project targets. What should actually be carried out, and what is the ultimate target? Obviously, this could be several of the challenges revealed in the empirical part, and perhaps most notably those concerning operational management or frictional communication. Further on, inappropriate focus on completion date is considered a pitfall in project management planning – however, this do not seem to fit with any of the challenges found. Usually, there is two major phases of emergency responds, the initial phase which deals with physically combating oil spills on water, while oil slicks that reach shore could demand a project phase of beach cleaning in the aftermath. However, inappropriate planning tools are considered a pitfall in project management. And, connected to communication and operational management again, you should plan in a way that encourages information.

Oversights are common pitfalls within project management, i.e. missing central aspects of the availability of resources. A general awareness around this subject will be discussed further in chapter 6.4.1 – however one should be aware of that people, for instance, could be lacking in the northern parts of Norway, as my respondents points out as challenging. Could people be flown from other parts of the country?

To pick up the question posed on the previous page – what should be done of planning and when? As briefly mentioned, this is probably to a certain extent ad-hoc based, as a goal should be to get as much planning as possible done between the “heats” in terms of accidents. Related to the three levels of planning, strategically, tactical and operational planning, one should perhaps aim at getting the first two done in advance, leaving the core operation management left with the operational planning?

6.3.3 Managing operations during incidents

Project management offers an approach on how to organize and manage projects or operations. Related to the extremes described in chapter 2.2.4 on page 16 – executive and

political organizations, effectiveness in decision-making seems naturally to be the most desired characteristic when time is limited. Therefore, I assume that an effective organization would be most appropriate during wartime, or oil spill response operations. Respondents mentioned that small things such as the organizations having different concepts in their line of communication, posed as a frictional element in communication. This suggests that misunderstandings, or disagreements, are unwanted during wartime. However, as the Arena Beredskap network is a good example on, discussion is needed in order to develop good solutions – but this should be concentrated during peacetime, or in between oil spill combating operations.

The other metaphoric view on these extremes is whether the focus is attributed to action or decision. An equal reasoning could be applied here; the focus should be on effectiveness and actions during operations – and on making the good decisions on a most-possible informed basis, derived from discussion, between operations (in peacetime). Plans should focus to reduce the time used to take decisions during emergency responses, and rather provide a basis to take actions.

Also at this stage, project management theories pose common pitfalls. The first is inappropriate organizing, meaning that the organizing structures are made without an adequate basis. In my findings, several respondents points at challenges related to this point – one said that we need to have familiar structures during emergency responses. This could be carried out by having an “emergency” structure on the everyday business hierarchy, which for instance the Norwegian Coastal Administration has done. Thereby, they feel comfortable with the way their organization is structured, both in peace- and wartime.

The next common failure is to have unclear lines of responsibility. In the Norwegian model, this could be seen first as a mismatch between the actors working together to combat oil spills. This is mentioned as a challenge by several respondents, one pointed at “messy roles”. In a further extent, it could represent the relationship between the parent- and project part of an organization, although no respondent pointed at this as a challenge.

Further on, failing to have key resources available is also a possible pitfall, derived from project management. The top management of IUA consists of people who have other day-time jobs, for instance in Lofoten and Vesterålen where the manager has a regular occupation

as section chief in the municipality. Agreements must exist, in order to free these persons from other positions, to avoid hindering of this type. Lacking availability of leading personnel was not mentioned as a challenge, however, some respondents pointed at the fact that IUAs mostly consist of fire men, and that they have other important jobs as well and may be unavailable.

Another challenging area is lack of motivation around the people on the ground floor, or in this case, in the boats or on the beach – due to the fact that most of the motivation circles around the top management. However, due to the fact that we have lots of people who are doing this on a voluntarily basis, this does not seem to be applicable for oil spill preparedness operations. None of my respondents pointed at this as a challenge in this form, however, some said that voluntarily people usually get fewer when the temperature sinks and the wind increases in strength.

The last common pitfall derived from project management is to have based the choice of project manager on a wrong criterion. Should one choose a person with technical expertise, or a person that has experience with management? This was not brought up as a problem by my respondents, probably due to the fact that most of the oil spill responses is led by persons with both technical and managerial experience.

6.3.4 Focus on follow-up and monitoring

Follow-up and monitoring is a phase of project management, and the importance of follow-up in oil spill responses is clearly utterly important. However, the concrete boundaries are blurred here, regarding what one should see as a follow-up phase during an oil combating operation. Is it the time between accidents and emergency responses – where we learn from the mistakes on the previous incident? Or should we aim at having a process going during the emergency response itself? If the latter is the case, this could add a perspective on what kind of management that is needed during an oil spill response. A uniform approach is seen as a challenge by my respondents – could project management through follow-up and monitoring add perspectives to this approach?

Uniform handling of experiences gained through accidents could, according to my respondents, help to level out the degree of or share knowledge among the IUAs. This was actually seen as one of the most significant challenge by a few of my respondents, who

referred to that only a few IUAs in the southern part of Norway had real experience from oil spills. If the follow-up should be carried out in between accidents, then this could be an idea to aim at – i.e. making a system of experience sharing. Perhaps it could be included in the education material, which again could be used to make knowledge more uniform?

However, pitfalls within this phase, according to project management, could be three things. First by constructing plans that are not suitable for follow-up. Perhaps it lacks routines for reporting, or fails to produce documentation that could be used in the aftermath? It seems to be difficult to propose a normative answer, and my empirical data does not help me either, as no respondents have touched upon aspects like this. Secondly, project managers could lack authority. This is also not brought up as challenging by my respondents. Third, and last, poor communication seems to hinder adequate follow-up and monitoring routines. On an abstract level, communication is found to be a challenge in the empirical part.

6.4 Risk management approach

6.4.1 Supplementing exercises?

All experience that could be drawn from accidents, and the emergency responses following them, are important lessons in improving oil spill preparedness. Many respondents refer to different accidents when posing examples, although some of them do not have real experience. This means that some of the challenges, as revealed and discussed in the empirical part, are based on these reports. However, could this organization that combats oil spill become aware of these challenges in advance, i.e. before they appear through accidents? A possible “tool” or approach to do this could be through risk management, and a framework for this is posed in chapter 2.1 on page 9. In the following, I will apply this approach to oil spill response operations, focusing on identifying, assessing and managing risks.

First, risks should be identified. This is done through identifying events that could hinder the organization to reach its goals, i.e. an oil slick emergency response organization that not is able to reduce the effects of an oil spill. In this definition, a challenge in itself will fit on a general basis, so most of the challenges mentioned by my respondents could be interesting to view through this approach. Among others, my respondent mentioned weather, logistics, communication, equipment.

The next step within this framework is to assess the magnitude of the risks identified. This is done in a two-folded measuring process: assessing the possibility for this event to occur – and measuring the consequence if this event occurs. For instance, how likely is it that wave are above 3 meters, or currents to be stronger than 2 knots? This could easily be assessed by reviewing meteorological reports. However, the consequences could prove to be harder to assess. This could for instance be done through testing.. This was one example, related to weather as a challenge. Related to logistics, for instance, one could identify engine failure at a tug boat as one risk. Further on, this should be assessed by possibility and consequence. Perhaps the possibility is fairly low, but the consequence big enough to, in sum, make this scenario a major risk? Then, this concrete challenge could be acted on in advance of any accident, and necessary alternative tug boat agreements could be implemented in time.

Further on, managing risks has as a goal to reduce the inherent risk of any action, down to an acceptable level. This could be done by avoiding, reducing, sharing or accepting the risk. *Avoiding* usually means to quit the relevant activity – and EHS is an example in this regard. Putting the safety of participants in this response operation at too severe safety hazards, will ultimately cause losing important personnel resources due to damage or in worst case scenario – death. This will of course hinder the emergency organization achieving its goals. *Reducing* the risk could be exemplified through competence, which is found to be an important factor in combating oil spills. The risk for ending up with uneducated personnel could be reduced through training and education systems. As several respondents posed as a solution – to include oil spill preparedness as a subject in maritime educations, and thereby increase the availability of competent people.

Sharing the risk proved to be hard to exemplify, but it usually means that two or more organizations agree to collaborate on a project, which ultimately will reduce the consequence if something goes bad. Within the industry of preparedness, this could be thought to serve well between regions, for instance. The last of these four managing possibilities, to accept the risk, usually means that the inherent risk is on an acceptable level, and that it does not require any actions to be taken. However, the gain is that the organization is aware of this risk, and is familiar with it.

6.5 Summary

An organizational approach to oil spill preparedness is interesting. Firstly, I found that the constellation made when an accident occur, could be viewed as a temporary organization. This implied most significantly a basis for which to apply other organizational theories on. In addition, it seems to be a good way of viewing this constellation of people and organizations – and it may be a way to approach some of the challenges found in the empirical part.

Secondly I looked into project management. Also here, at least definition-wise, there seems to be similarities between oil spill response activities and project as a concept. A further discussion of challenges (from the empirical part) and common pitfalls (from the theoretical part) shows that the similarities between oil spill preparedness and project management theories are evident in some respects. However, in other respects, it became far-fetched. How could the difference between peace- and wartime be handled through project management? These theories showed some interesting aspects, but *project management* is not fully applicable to oil spill preparedness without further investigation.

Thirdly, I reviewed risk management as yet another tool, and proposed this as a supplement to training, which was found to be challenging. The rationale behind this is to reveal possible pitfalls. Risk management could on a general basis increase the proficiency in approaching challenging events. However, as with project management, there seem to be a more complex situation when organizations turn out to be temporary.

When that is said, one should bear in mind that the main analytical approach has been to review challenges up against theoretical aspects – which could hardly say to be a comprehensive approach to it. The wisdom drawn from the analysis should rather be to review the discussion in itself, and to encourage to further research.

7. CONCLUSION, CONTRIBUTIONS AND FURTHER RESEARCH



“I think and think for months and years. Ninety-nine times, the conclusion is false. The hundredth time I am right.”

Albert Einstein, theoretical physicist and philosopher (1879 - 1955)

7.1 Conclusion

In this chapter, I will review my analysis in order to answer the research questions posed in the introduction, and discuss my problem statement. My aim with this chapter is to gather all major threads in the thesis, conclude on some of them, and suggest further research on others. Bear in mind that these conclusions must be seen together with the entirety of my thesis, and not drawn out of context.

All my research questions stem from the early phase of research, and have just been slightly adjusted. RQ1, RQ2 and RQ4 are fairly easy to answer, while RQ3 require a more in-depth approach.

RQ1. How is the level of oil spill preparedness perceived by the industry itself?

According to my findings, the level is satisfactory in the offshore sector, i.e. preparedness carried out by NOFO. When it comes to near-shore preparedness, the preparedness was found to have several challenges (ref. RQ2), and are therefore not considered as satisfactory.

RQ2. What is perceived as the most significant threat in terms of oil slick sources?

The most significant threat is by all means the shipping sector. My respondents have a generally better faith in that oil installations carry out adequately preventive measures to avoid oil spills. This must be seen together with the previous research question, where my respondents sees the offshore preparedness (that is those who combat oil spills) as more effective than the near shore preparedness.

RQ3. Which challenges hinders effective preparedness in Norway?

Challenges were identified to include knowledge- and competence level, equipment, training and exercises, handling of environment, health and safety, logistics and various other organizational-related challenges. Knowledge and competence are viewed as both challenging and important factors in oil spill combating processes, and are linked to training and exercises. Experiences are drawn from accidents and exercises, but they vary in place, extent, amount and time. A more uniform approach is called for by respondents.

Equipment is viewed as hard to overcome, and most of my respondents view this as a challenge that stems from “natural laws”. Respondents seem to have better faith in future improvements on beach cleaning equipment, rather than offshore gear. However, it must be said that this thesis does not focus on the technological barriers in themselves, and see them more as a part in a larger context. Organizational challenges seem to be the larger group of challenges. The majority of challenges stem from the interaction between the actors in emergency response operations, and these have been in focus.

RQ4. Are there any recent leaps in the development of oil spill preparedness?

Tug boat readiness and new shipping lanes, together with new technology for early detection of oil spills were perceived as leaps in the development of oil spill preparedness. However, regarding equipment, most of my respondents view this as a continuous improvement through the use of better materials and better techniques – but do not see any major leaps. My respondents seem to focus on technological aspects when reviewing recent leaps.



To sum it all up – I am left with the impression that the industry of oil spill preparedness in Norway struggles to achieve an effective way of organizing themselves. The majority of challenges found in this research, seem to stem from the interaction between the parties of an emergency response operation. A more uniform approach could improve this, where the focus includes educational- and organizational (in addition to the technological) challenges. In the following, I will review implications and further research.

7.2 Contributions

7.2.1 Practical Contributions

The conclusion shows that it is not only lack of technological development that hinders effective preparedness. The findings suggest that the organizations included in oil spill operations fail to interact in an efficient way. This creates a basis, in which discussions and improvements could be made. My overall contribution in this regard, is to say that organizational aspects should be included in the quest for effective oil spill preparedness, and perhaps be a focus in itself.

Related to the model on efficiency in preparedness within the Arena Beredskap cluster (see Figure 4-2 on page 46), my findings suggest that the model depicts all important factors. My conclusion, however, may suggest that an emphasizing of the organizational matters.

7.2.2 Theoretical Contributions

When it comes to theoretical contributions, I have showed that the complexity in organizational relations make an effective oil spill response operation easier said than actually achieved. However, the completeness in links between empirical data and theories seems to be hard to achieve in inductive research.

The main theoretical contributions are that an approach to oil spill preparedness through temporary organizations seems applicable and explanatory. A unified approach to this, on the basis of viewing this organization as a *temporary organization*, may prove to be fruitful in the sense that it creates a basis in which other organizational academically theories could be applied.

In this regard, I have looked into project management and risk management. These shows some similarities to the challenges found. However, my inductive research only creates a basis to start investigating this – and a more thoroughly investigation could bring more answers.

7.3 Further Research

I have conducted my research as described in chapter 3. Other approaches in terms of the different methodological choices could constitute various approaches of further research. For

instance, other parties such as NGOs and governmental agencies could help shedding light on oil spill preparedness from other perspectives. Other perspectives could include middle managers, as my respondents are mainly CEO or chairman in their respective organizations.

Moreover, I would like to see a quantitative approach that aims to identify, in a more comprehensive and structured way, challenges facing this industry, and how each challenge is rated in quantitative measures. In this regard, it would be important with one or more pilot interviews, in order to achieve adequate questionnaires – as this is found to be a complex field.

A focus in this thesis has been on organizational matters. In this regard, I must say that knowledge seem to be an important factor in oil spill preparedness. In this regard, studies on ensuring and sharing knowledge in this industry, would be interesting to see.

Last, but absolutely not least, I would propose a further deductive study of oil spill preparedness. My research direction has been inductive, where I moved from the empirical sphere and into the theoretical field. This created limitation in what extent I could conclude on what academic fields that could be useful in increasing efficiency in emergency responses. Further studies regarding oil spill preparedness through organizational approaches would be interesting, including, among others, project management and risk management.

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Dato:

Sted:

APPENDIX 1: INTERVIEW GUIDE

”Formålet med dette intervjuet er å lære mest mulig om oljevernberedskapen, og hvordan dynamikken er i denne. Samtidig vil jeg se på sammenhenger, begreper, forventninger, barrierer og lignende.”

”Det vil bli brukt båndopptaker, dette er av praktiske hensyn.” Nevn anonymitetsbemerkning.

Bakgrunnsinfo:

Bedrift:

Antall ansatte:

Omsetning:

Etableringsår:

Kontaktperson:

Telefon:

E-post:

Del 0: Bakgrunn

- Beskrivelse av bedriften, og relasjon til oljevernberedskap
- Din bakgrunn?

Del 1: Oljevernberedskapen i Norge

- Hvordan vil du beskrive situasjonen til oljevernberedskapen i Norge?
 - Relasjon til nivåer
 - Hvor trykker skoen?
 - Store fremskritt i den senere tid?
- Hva er viktig for å oppnå effektiv oljevernberedskap?
 - Relasjon til nivåer
 - Barrierer?
- Hva kan gi beredskapsevnen et skikkelig løft?
- ”Verdens beste beredskap i Nordområdene” – hva er det?
- Sammenheng: *materiell x kompetanse x organisering = effekt* (husk kommando & kontroll)
 - Syntes du denne modellen er beskrivende?
 - Hva er viktigst av disse elementene?

Del 2: Deltagelse i Arena Beredskap

- Bakgrunn for deltagelse
- Hva betyr Arena Beredskap for bedriften?
- Hvordan oppleves samarbeid? Hva med konkurranse?

APPENDIX 2: DETAILED INFORMATION ON INTERVIEWS

Respondent	Date	Location	Duration	Pages	Words
Rune Pedersen	28.02.2010	Harstad, NPS' Office	2 h 5 m	21	8 750
Sigve Olsen	09.03.2010	Leknes, Poseidon's Office	45 m	10	4 450
Roy Charlsen	09.03.2010	Fiskebøl, Norlense Beredskapssenter's Office	55 m	16	5 900
Laila Torstensen	10.03.2010	Sortland, Reno-Vest's Office	35 m	12	4 550
John Richards	11.03.2010	Harstad, Mercur Maritime's Office	30 m	9	2 450
Realf E. Hansen	11.03.2010	Tjeldsund Kro, a tavern and hotel near Harstad	1 h 5 m	22	8 550
Per Odd Krystad	18.03.2010	Phone	50 m	14	5 450
Ottar Skog	19.03.2010	Phone	60 m	15	7 050
Sjur W. Knudsen	23.04.2010	Phone	40 m	9	4 200
SUM			8 h 25 m	128	51 350