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MASTEROPPGAVE

Emergency preparedness organization for offshore oil recovery operations in Norway

A study of the Norwegian emergency preparedness system and how to organize Host Nation Support in Norway

EN310E: Master of Science in Energy Management

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Abstract

This is a study of the Norwegian emergency preparedness organization and response system. The aim of the study is to look at structure mechanisms important for strengthening the relations between preparedness institutions at strategic and operational level. Moreover, this study intends to identify advantages and disadvantages of introducing Host Nation Support in Norwegian contingency plans, in case of large-scale oil recovery operations at the Norwegian Continental Shelf.

A large amount of resources and equipment are necessary to cope with environmental damages during large-scale oil spill incidents such as the Deepwater Horizon accident. After the DwH accident one experienced a gap in contingency planning and management structures. As such there is a need to illuminate the Norwegian emergency preparedness organization, due structure mechanisms and managerial roles necessary for achieving effective response effort.

I have highlighted these issues through looking at organization theory with special implications on complex organization, structuring of crises organization, managerial roles and organizational context.

In order to collect my results I have studied Norwegian emergency preparedness institutions at strategic and operational level. The findings are based on data collections found through conducting in-depth interviews with relevant emergency preparedness actors in national and private preparedness institutions. Additionally, secondary sources such as articles, books and government documents were used.

Important findings indicate that one may improve coordination and communication across national and private preparedness institutions by increasing situational awareness, and implement similar preparedness and response systems, aiming to promote a common understanding of important concepts and terminologies. The study also highlights that complex organizations does not require complex structures and systems. One should rather keep the structure simple, and as similar as possible to the daily preparedness organization.

Keywords: **Emergency preparedness organization, Response, Structure mechanisms, Host Nation Support**, **Incident Command System (ICS), Managerial roles**, **Context**

Preface

This master thesis concludes my final studies at my Master degree in Energy Management at Bodø Graduate School of Business and MGIMO University in Moscow.

This semester of writing my master thesis has been a splendid and interesting time for me. I have gathered interesting, and highly important and informational material from key persons working within the Norwegian preparedness field.

I would like to thank my supervisor Professor Odd Jarl Borch for his guidance and constructive criticism while writing my thesis. He has been an important resource regarding important focus areas of my thesis, providing relevant literature, information and discussions along the way.

Finally I would like to express a sincere gratitude to all the interview participants for their willingness to participate in this study and sharing their knowledge and information within the field of the study. Their knowledge, experience and information have been essential for the ability to conduct this study. I am really grateful for the permission and help to examine the structures and systems within the Norwegian emergency preparedness field.

Bodø, 18th of May 2015

Carina Figenschau

Sammendrag

Dette studiet dreier seg om norsk beredskapsorganisering, hvor målet er å se på struktureringsmekanismer som er viktige for å styrke relasjonene mellom beredskapsinstitusjoner på strategisk og operativt nivå. Videre har denne oppgaven identifisert fordeler og ulemper ved å innføre vertsnasjonsstøtte (Host Nation Support) i norske beredskapsplaner.

Store mengder ressurser og utstyr er nødvendig for å håndtere miljøskader som følge av store ulykker, som Deepwater Horizon utblåsningen i Mexico Gulfen. I etterkant av denne ulykken ble det oppdaget mangler i beredskapsplaner og ledelsesstrukturer. På bakgrunn av dette er det viktig å belyse viktige struktureringsmekanismer og ledelsesroller i den norske beredskapsorganiseringen.

Jeg har studert dette feltet ved å benytte organisasjonsteori som teoretisk grunnlag for mitt studie. Her ønsket jeg å trekke frem komplekse organisasjoner, strukturering av kriseorganisasjoner, lederroller og forskjellige kontekster som påvirker effektiviteten av beredskapsarbeidet.

For å samle inn relevant data har jeg studert norske beredskapsinstitusjoner på strategisk og operativt nivå. Funnene er basert på datainnsamlinger fra dybdeintervjuer med relevante beredskapsaktører i nasjonale og private beredskapsinstitusjoner. I tillegg ble sekundære kilder som artikler, bøker og offentlige dokumenter benyttet.

Viktige funn tyder på at man kan forbedre koordinering og kommunikasjon på tvers av nasjonale og private beredskapsinstitusjoner ved å oppnå felles situasjonsforståelse. Man bør også benytte felles systemer for å fremme felles forståelse av viktige begreper og terminologier. Studiet viser også at komplekse organisasjoner ikke behøver å benytte komplekse strukturer og systemer, hvor uttrykket ”det enkleste er ofte det beste” er et bra utsagn for hvordan beredskapen bør være strukturert. Man bør ha en enkel struktur, som er lett å følge. I storskala ulykker hvor det kreves enorme mengder ressurser og utstyr, er det viktig at man benytter en beredskapsstruktur som er tilsvarende den daglige organiseringen.

Terms and definitions

Organization: Organization is a tool people use to coordinate their actions to obtain something they desire or value (Jones, 2013)

Preparedness: Planning and preparing measures to deal with adverse events in the best possible way after they occur. Prevention is a measure seeking to reduce the probability of adverse events to occur, and reduce consequences of an incident (NOU 2006:6).

Risk: is defined as the combination of possible consequences and associated uncertainty (NOU 2006:6).

Vulnerability: Vulnerability is an expression of the problems a system will have to work when subjected to an incident, and the problems the system gets to resume their activities after the event has occurred (NOU 2006:6).

Safety: Used to describe security against unwanted incidents that occur as a result of coincident (NOU 2006:6).

Security: Used to describe security against adverse events that is a result of overlay and planning (NOU 2006:6).

Management: Management includes coordination and control of activities in order to ensure that organizational goals are met successfully (Jones, 2013).

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List of Acronyms

DSB – Norwegian Directorate for Civil Protection

DwH – Deepwater Horizon

ELS – Enhetlig ledelsessystem

FOH – Norwegian Joint Headquarters

HNS – Host Nation Support

HSE – Health, Safety, Environment

ICS – Incident Command System

IUA – Inter-municipal Committees for Acute Pollution

NCA – Norwegian Coastal Administration

NCS – Norwegian Continental Shelf

NOFO – Norwegian Clean Seas Association for Operating Companies

PSA – Petroleum Safety Authority

Table of Contents

1.0 Introduction

The introduction chapter contains a brief overview of this study. First the background behind the chosen topic is given. Thereafter I give a brief presentation of the purpose of this study. Further on the problem statement and research questions are presented. Finally there is a presentation of the structure of this thesis.

1.1 Background

The high north has become an important area for oil and gas production during the recent years. The first Norwegian production in the Arctic region started in 2007 at the Snøhvit LNG field in Hammerfest (Statoil, 2007). The Arctic region is regarded as an area of special concern due to potential oil spill accidents. The area is regarded as challenging because of extreme weather conditions, cold climate, vulnerable ecosystem and poor developed infrastructure. This makes it more difficult to organize the right resources in order to respond quickly in crises situations (AMAP, 2007, p.2-4). The Arctic is in this study defined as the area above the Polar Circle. The area above the Polar Circle is situated from 66^{o} north and covers around 6% of the Earth's surface (DNV, 2012, p.4). Quick and massive response is required and necessary to mitigate the environmental impacts of oil spill accidents. Mobilization of resources and effective coordination and cooperation between government authorities, agencies and private companies is necessary for preventing damage to nature and society.

Risk is defined as the combination of the probability of an event to occur and the consequences of the incident (Norsk Olje&Gass, 2014, p.14). Risk cannot be eliminated, but it can be reduced by governmental regulations and jurisdictions, as well as establishing an adequate preparedness system. It is necessary to develop preparedness and response systems that describe what to do, how to mobilize and allocate resources, and who are responsible to assist if an accident occurs at the NCS.

After the Exxon Valdez accident in 1989, new regulations and legislation was introduced regarding oil spill and crisis management. This accident lead to changes in the attitudes among oil companies in respect to preparedness and response in crisis situations. After this accident research began to look into how to improve the ability of organizing an oil spill

response system, and establish an effective response management culture (Skinner & Reilly, 1989). The report presented by Skinner and Reilly (1989) after the Exxon Valdez incident represents one of the first steps in the research and improvement of preparedness and response systems.

Petroleum activity represents increased activity at the NCS. Incidents with major risk potential for causing harm to personnel and environment need to be prevented. Complex operations and contextual situations demand a more elaborated preparedness and response system (Borch, 2013). Increased activity at the NCS may lead to increased acute environmental incidents. Looking at the period 2001–2010, the frequency of near accidents that could have led to an acute oil spill was at its lowest in 2010 (PSA, 2011, p.20). After the Macondo blowout in the Mexican Gulf, the Norwegian Oil and Gas Association composed a broadly functioning working group. The purpose was to conduct and assess all facts related to the Macondo incident, in order to estimate possible measures at the Norwegian Continental Shelf, to better cope with extreme events (Norsk Olje&Gass, 2014, p.30). Today's activity at the NCS is referred to as high, due to larger investments in recent years. The Norwegian Environment Agency is concerned about the increased oil activity along the Norwegian Cost, causing environmental and social risk.

It is argued that if an emergency accident of larger scale occurs, there is a need for requesting Host Nation Support, as Norway cannot manage the situation alone. The Macondo blowout in the Gulf of Mexico has highlighted the importance of international support and cross border alliances, promoting stakeholder coordination and contingency planning. Emergency preparedness systems are needed to ensure availability of resources during environmental catastrophes such as oil spill incidents (IMO, 2014).

1.2 Purpose of the master thesis

This thesis emphasizes the organization of oil spill emergency preparedness and response systems and therefore belongs to the field of hazard and disaster studies within the social sciences. My contribution to the field is to look at how Norwegian preparedness and response system is organized at strategic and operational level, with special emphasis on the structure mechanisms and management system that affects national and private preparedness institutions.

A general finding from the Macondo accident is related to failures of management and leadership, as it is claimed that the personnel who worked on the Macondo field was surrounded by an organization culture, where leadership and management responsibilities were not taken seriously. Managerial failures may be affected by failures of decision-making and prioritization processes due to managerial and operational changes. Further, organizational changes may cause ambiguities due to unclear roles, responsibilities and authority, as well as lack of communication and information sharing both within individual companies and between operators and suppliers. Insufficient information sharing and lack of necessary resources with expert competence is largely about the failure of coordination between offshore and onshore personnel. A review elaborated by the Norwegian Petroleum Safety Authority (PSA) after the DwH accident indicates that monitoring and supervision of inexperienced personnel and replacements of key personnel, was undertaken during critical phases of the project, without qualifications to be properly checked out (Ptil, 2011, p.84-85).

Organization and management related to security refers to establishment of structures, visions and management, as well as ensuring that systems work in practice. An important realization is that the DwH accident could have been avoided if priorities, procedures, and communication skills had been improved. In the review published by the Norwegian Petroleum Safety Authority (PSA), it is indicated that there were lack of compliance and enforcement of already established rules, procedures, structures and management systems (Ptil, 2011, p.92).

After the DwH accident findings reveals that emergency organizations need to follow up management roles, capacity and expertise, training and exercises, maintaining roles and responsibilities, as well as creating a better information culture and system for learning. Learning is not something that only happens after major incidents and accidents. Learning takes place all the time, therefore it must be ensured that organizations have sufficient capacity and expertise (Ptil, 2014, p.18).

This thesis will look into aspects concerning the importance of well-elaborated emergency preparedness structures and systems. The DwH accident illustrates the importance of possessing necessary resources with expert competence and skills. It also raises the issue of improvements of coordination and communication across preparedness institutions at strategic and operational level. Looking into the integration of oil spill recovery capacities and

resources from other nations, one may propose improvements of response efforts by introducing Host Nation Support.

1.3 Problem statement and research question

In this study I will examine how the Norwegian emergency preparedness and response system is organized. I will look at how the organizational structure is functioned during large-scale operations, and what structure mechanisms that is important for effective response effort, and how operational context and coordination of international support affects the emergency preparedness structure during large-scale oil recovery operations.

In crises situations it is difficult to define which roles to take on, and how to allocate and mobilize resources efficiently. Maintaining clear defined roles and responsibilities is fundamental for efficient response work, as crucial resources need to be familiar with their roles and responsibilities, and what authority they have to take major decisions. One needs to elaborate plans and systems for how to perform response activities in the most efficient way. In emergency preparedness organization there has been implemented a broad range of standards and regulations on how to deal with critical incidents. One standard is the American Incident Command System (ICS), which the Norwegian Unified Command System "Enhetlig ledelsessystem" (ELS) is based on. All Norwegian emergency institutions, except the police and defense authority, have implemented the ELS structure into their preparedness organization. In my thesis I will study functions of the Incident Command System (ICS), its motivation and how it is organized in relation to alternative organizational concepts as a standard for Norwegian emergency preparedness and response operations. In this study, I look closer into the management structure in the interface between private companies, government authorities and agencies, as well as organization of emergency preparedness support from other nations. I will examine essential structure mechanisms important for obtaining effective emergency preparedness system. The main research question will be as follows:

What structuring mechanisms are important for emergency preparedness organizations responsible for large-scale oil recovery operations?

In addition I will examine the managerial roles and challenges that influence the structure mechanisms of emergency preparedness organizations. A role is an organized set of behaviors that is associated with a particular position. Mintzberg (1980) claims that what managers do,

can best be described by looking at the roles they are obliged at work. The term management role is defined as specific categories of managerial behavior. In this thesis I aim to study the efficiency of cooperation and communication between actors participating in emergency preparedness activities. I will also look closer into resource capacity, meaning if the Norwegian emergency institutions can handle the crises situation alone, or if there is a need to request international support to cope with the scale of the incident. The first research question will be:

R1. How will managerial roles that has to be taken care of, influence on the structuring mechanisms of the preparedness organization?

Secondly, I will examine how implementation of Host Nation Support can be coordinated across emergency preparedness institutions. Coordination is defined as dependencies between activities, and is attached to resource allocation, which is needed in order to manage the interdependence among activities (Malone & Crowston, 1994). Coordination mechanisms are related to dividing organizational mission and goal into a number of distinct tasks, and then coordinate all these tasks to accomplish the goal of the organization (Mintzberg, 1980).
I will study different coordination mechanisms needed to deal with Host Nation Support. Thus I will look deeper into how one can coordinate activities and allocate resources the best possible way when requesting international support during large-scale incidents. Second research question will be:

R2. How will Host Nation Support influence on the structuring mechanisms of the preparedness organization?

Lastly, I will look at geographical or regional differences, and contextual challenges concerning the external environment the field operates in. Context is defined as specific conditions that the organization faces (Anthony & Gales, 2003). The contexts of emergency incidents are related to factors such as geography, climate or weather. Organizations need to select different structures to respond to these contextual conditions. A large-scale incident such as a blowout from the Goliat or the Johan Castberg field in the Barents Sea will meet other contextual challenges related to climate, temperatures, infrastructure and longer distances in comparison to a blowout further south at the NCS. As such, different contextual

situations may demand distinctive and more complex organizational systems attributed to the specific region and scope of the incident. Third research question is as follows:

R3. How will operational context influence on the structuring mechanisms of the preparedness organization?

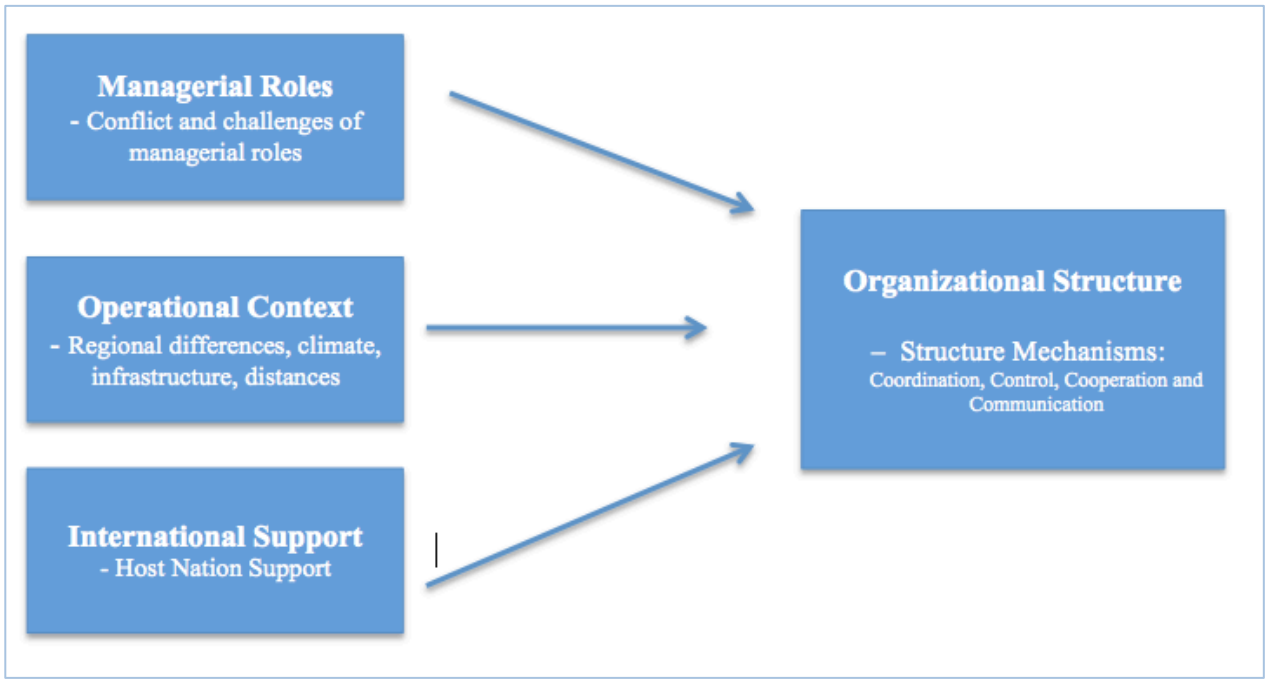


Figure 1: Illustration of research problem

Explaining the figure:

Organizational structure plays an important role for emergency preparedness and response activities. I will examine which structuring mechanisms that are relevant for achieving efficient response actions in critical situations.

The three variables affecting the organizational structure are managerial roles and challenges, context and scope of the incident, and introduction of international support. These three variables are all affecting the organizational structure of emergency preparedness and response operations. In the analysis part I will apply these variables to achieve a better understanding of why important structuring mechanism such as coordination, control, cooperation and communication is important for emergency preparedness organizations during large-scale oil recovery operations.

1.4 Limitations

There are some limitations to my study that is important to indicate. First of all, this thesis is limited to study the emergency preparedness and response system during large-scale accidents from offshore installations.

This study is narrowed to look at Norwegian emergency preparedness organization during large-scale offshore incidents causing critical environmental impacts. First step in all emergency preparedness operations is related to 1st line preparedness at tactical level, which includes rescue operations implemented to save human lives. When the rescue operation is over, one can start emergency preparedness operations meant to limit environmental damages, causing threat for environment and society in general. This thesis will look into four structure mechanisms important for achieving effective emergency response effort. These are as follows: coordination, control, cooperation and communication.

1.5 Structure of the master thesis

The master thesis has been structured in five parts:

The first part is the introduction where I explain why my study is relevant for the preparedness and response field.

The second chapter presents the theoretical basis of the thesis, where main focus is organizational theory, complex organizations, managerial roles and theory related to operational context.

In chapter three methodology and research design are introduced. This chapter explains and argues how the study has been conducted due to the chosen methodology. In this chapter I explain the methods used to gather the empirical data. Qualitative studies are linked with the questions of validity and reliability.

In chapter four the collected empirical data is gathered and presented. Here I present both primary and secondary data. Primary data is conducted through in-depth interviews. The secondary data is mainly from articles, books and reports.

Chapter five represents analyses, linking theory to empirical data.

The final conclusion is presented in chapter six, giving contributions to the field and

suggestions for further study.

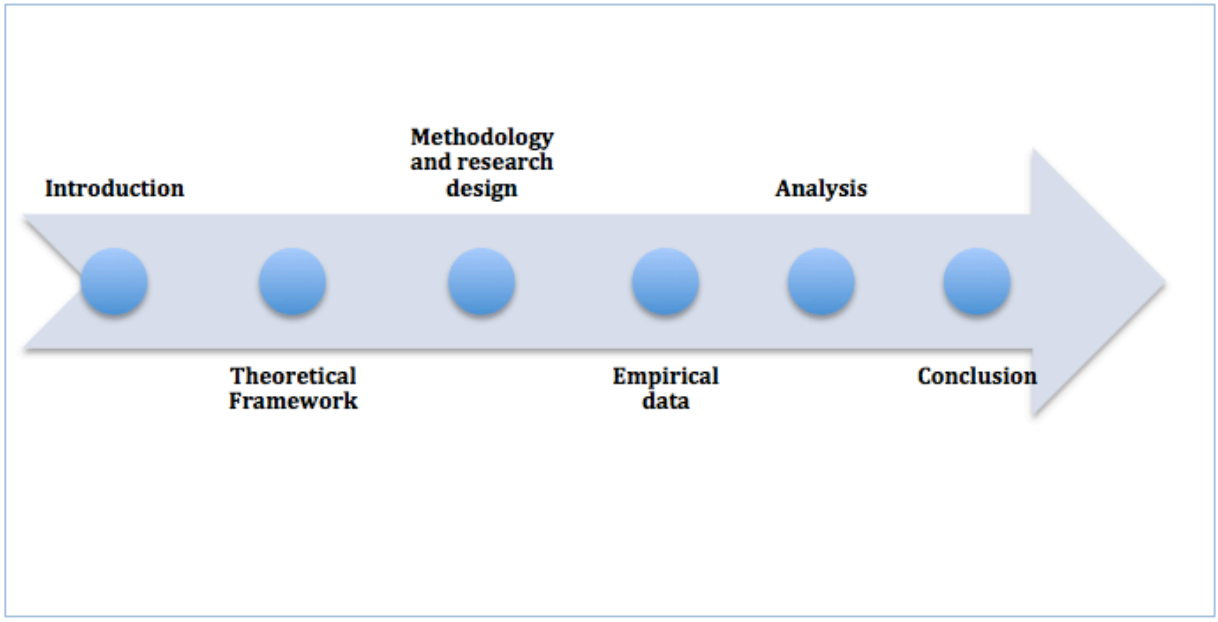


Figure 2: Structure of the master thesis

2.0 Theoretical framework

This chapter presents the theoretical basis for conducting my study.

The first chapter starts by introducing the core issue of the thesis: organization theory. In order to understand how emergency preparedness and response activities are organized between government authorities, agencies and private companies this concept must be examined. Further, the importance of complex organizations, organizational structure, managerial roles and context will be discussed. This will give foundations for the discussion regarding application of various organizational systems and structures of emergency preparedness and response organization.

2.1 Organizational Theory

Organizational theory is the study of how organizations function and how they affect and are affected by the environment in which they operate (Jones, 2013, p.30). Organization is a tool people use to coordinate their actions to obtain something they desire or value. Organizational environment is the set of forces and conditions that operate beyond an organization's boundaries where one acquire and use resources to create value (Jones, 2013, p. 24-25). Organizations are seen as a group of people working together to accomplish a goal which one person not could have done alone. Likewise, complicated tasks should be divided between people with different skills, knowledge and education. Anthony and Gales define an organization as two or more people working together cooperatively within identifiable boundaries to accomplish a common goal or objective (Anthony & Gales, 2003, p.10). Organizations are regarded as complex systems because of a variation of human resources. In order to aim efficient organization, one have to divide people with different skills and knowledge into departments where one can benefit from their knowledge. Organizations consist of different members such as employees or volunteers, which works towards a common goal.

According to Daft (2004) organizations are social entities that are goal directed and designed as structured and coordinated activity systems. An organization exists when people interact with one another to perform essential functions that help attain goals. To get an understanding of organizations one need to see it as a system where interactive elements that acquires inputs from the environment, transform and discharge outputs into the external environment. Daft

(2004) describes a figure by Mintzberg where he explains the system of organizations. The figure is divided into five parts, where Technical Core includes people who do the basic work of the organization. Technical support functions help the organization adapt to the environment. Administrative support function is responsible for the operation. Management is responsible for directing and coordinating other parts of the organization. Top management provides direction, strategy, goals and policies for the organization, whereas middle management is responsible for implementation and coordination at the department level (Daft, 2004, p.11-16).

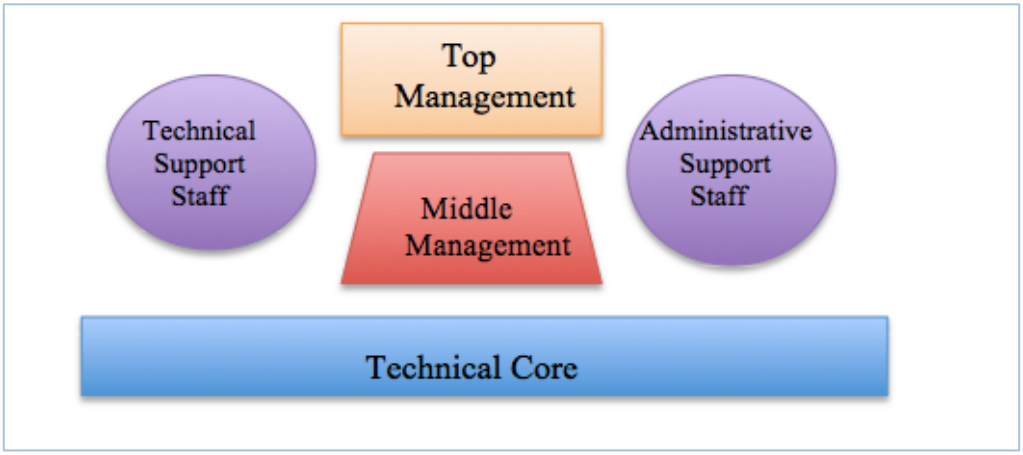


Figure 3: Organizational Structure (Mintzberg, 1979)

Definition of organizations also includes systems. Systems theory provides a simple way to model organization by focusing on the structure and relationships or interdependence among parts of the organization. System theory differs between closed and open systems. Closed systems are self-perpetuating and receive no outside energy or resources, as they have no interaction with their environment. As organizations depend on the external environment it cannot be characterized as closed systems. On the other hand, open system imports energy from physical, human and financial resources (Anthony & Gales, 2003, p.12-13). Open systems acknowledge that organizations must receive energy (inputs) from important resources in order to achieve an output, which is the goal of the organization.

2.1.1 Complex organizations

This thesis will look into emergency preparedness organizations. Accordingly it is essential to analyze complex organizations operating in harsh and complex environments.

Thompson (1967) described a complex organization as a set of interdependent parts, which together make up a whole that is interdependent with some larger environment, whilst Scott (1992) claims that complexity refers to the number of different items or elements that an organization need to deal with simultaneously (Anderson, 1999, p.216). The society has gone through enormous changes in the last century and the environment has become more complex, with high interaction and dependency between actors and activities. Complex environments are characterized with rapid and often unpredictable changes (Njå, 1998).

Pearson and Clair (1998) claim that an organizational crisis is a low probability and high impact event that threatens the viability and the goal of the organization. Although crisis events are unpredictable they are not unexpected (Massey, 2001, p.154-157). Crises involve threats to individuals and organizations. Svedin (2009) state that crises can be viewed as *"a serious threat to the basic structures or the fundamental values and norms of a social system, which under time pressure and highly uncertain circumstances where it is necessary to make critical decisions".* Cooperation is an effective and efficient way to be more resilient in case of threat from critical incidents. Crises bring an acute demand for resources, and cooperation is the way to get access to scarce resources (Svedin, 2009, p.1).

Large-scale crises such as blowouts from offshore installations, requires cooperation between private companies, governmental and local agencies, as well as volunteers. The society expects governmental institutions to intervene and respond in crises situations. In fact the basic social contract requires the state to take care of its citizens. In crises situations there is not a clear command structure, but governmental institutions has their own emergency preparedness plan, where task are divided and the responsibility is distributed (Svedin, 2009, p.2).

The High Reliability Theory seeks to explain why some large organizations manage to achieve high levels of performance in the area of safety. It emphasizes the priority placed by managers on safety, due to human and material resources, and the development of a high reliability culture, by the means of training, and lastly the comprehension of complex technologies by means of learning processes. Large and well-trained organizations are usually equipped with quality leadership, control centers, emergency plans and other crisis necessities. Anyway they often seem to be chaotic when they face with real crisis situations, bringing a wide range of partners into the game (Lagadec, 1997, p.24-25).

Reaching a goal will in the case of emergency preparedness organization implicate efficient mobilization of resources, in order to cope with the critical incident as soon as possible, and thereby prevent harm on the environment. Input subunits of the organization are responsible for importing resources and information into the organization. For emergency preparedness organization human resources will come from private companies (e.g. operators), government authorities, agencies or local institutions. Management is responsible for coordinating and controlling activities of the various subsystems to ensure that the organizational goals are met successfully (Jones, 2013, p.52). Structure mechanisms are important for organizational theory, describing which factors that must be present in order to achieve efficiency in complex situations. Daft (2004) claims that organizations use several structural alternatives to help them achieve purpose and goals.

2.1.2 Structuring mechanisms

Organizational structure describes the internal relationships, division of labor and coordinating activities within the organization. Structure includes things such as decisions making, how labor is divided and how departments are formed and which rules, policies and procedures controls the activities. It is important for managers to structure the organization in order to control and coordinate internal activities. Since organizations are open systems affected by uncertainties, constrains and resources available in the external environment, the structure must be designed so that managers can control or adapt to these external conditions (Anthony & Gales, 2003, p.16).

Organizations use several structural alternatives to help them achieve purpose and goals (Daft, 2004, p.86). Daft (2004) claims that organizations should be designed to provide both vertical and horizontal information flow. Vertical information structure is used to coordinate activities between the top management and lower levels, and include written information and communication. On the other hand, horizontal information structure refers to communication across departments, and is based on the organization to routinely exchange information about problems, opportunities, activities and decisions (Daft, 2004, p. 91-92).

Organizational structuring focuses on division of labor of an organizational mission into a number of distinct tasks, where coordination of all these tasks accomplishes a mission or a goal. Mintzberg (1980) talk about five different coordination mechanisms in organizations.

In *direct supervision* one individual give specific orders to others and thereby coordinates their work. In the *standardization of work process* the work is coordinated by the imposition of standards to guide different work aspects such as orders, rules and regulations. In *standardization of outputs* the work is coordinated by the imposition of standard performance measures or specifications concerning the output of the work. *Standardization of skills* is the work coordinated by individuals with standard skills and knowledge. Lastly, *Mutual adjustment* is when individuals coordinate their own work by communicating with each other (Mintzberg, 1980, p.324).

Organizational structure is recognized by two key elements: differentiation and integration. Differentiation means breaking up the work into different tasks. Integration refers to coordination among these various tasks to ensure that the overall goals for the organization are achieved. Organizations can be subdivided horizontally into distinct positions at the same organizational level, or vertically integrated into levels of hierarchy, where division of work is divided from top management down in the system. Horizontal differentiation is when tasks are done at the same organizational level. Vertically differentiation is where division of work is divided between level of authority or a chain of command. Here work is divided on the basis of the authority each unit or person has over the other unit or person in the organization (Anthony & Gales, 2003, p.33-35).

2.1.3 Structuring mechanisms of crisis organizations

In an emergency situation, achieving coordination will become more challenging, because of many different organizations and resources. Organizational structure includes division of work into units, allocation of resources and responsibilities among actors, and a hierarchy of authorities (Mintzberg, 2009). General structuring of standard emergency response systems contains standard coordination mechanisms. In emergency situations the speed of adapting to the specific organizational structure will be essential. Bigley and Roberts (2001) state that structuring mechanisms consist of at least four basic processes; structure elaboration, role switching, authority migrating, and system resetting. *Structure elaborating* is the fundamental processes of organization construction, where the management is organized on-scene during the course of an incident. Thus, they must be capable of rapidly organizing required human resource under critical circumstances. *Role switching* involves the assignment and re-assignment of personnel to different positions within the organization, in order to get a more structured function. *Authority migrating* is related to critical expertise or capacity in a certain

emergency area, which can be de-coupled from the official hierarchy and moved to another authority when needed. *System resetting* is another mechanism, aiming to match changing situational factors and working conditions (Bigley & Roberts, 2001, p.13-18).

Mintzberg (1980) state that organizational structuring focuses on a number of mechanisms organizations are able to use when designing their structures, and these are referred to as design parameters. There are three important design parameters that relates to crisis organizations. First, *training and indoctrination* is a design parameter where skills and knowledge are standardized. *Planning and control* are design parameters where outputs are standardized in the organization. There are two types of planning and control systems; action-planning focuses on predetermination of specific decisions or actions, and performance control focuses on the measurements of performance of all decisions or actions. Lastly, liaison devices are when the organization encourages mutual adjustment across units. The liaison establishes informational connections across units (Mintzberg, 1980, p.325-326).

There are several types of organizations. Professional bureaucracy organizations are the one who fits best with the term complex organizations, such as crisis organizations. In bureaucracy organizations, behavior can be standardized by coordination mechanisms in the standardization of skills. Professional bureaucracy organizations hire highly trained specialists or professionals. The professional bureaucracy appears in both complex and stable environments. Complex organizations demand the use of personnel with skills and knowledge that can be learned through extensive training. Moreover, stability ensures that these skills settle down to become the standard operating procedures of the organization (Mintzberg, 1980, p.333-334).

Malone and Crowston (1994) define coordination as: *"managing dependencies between activities"*. This means that if dependence does not exist there is nothing to coordinate. Theories like cooperation, collaboration and competition all involves managing dependencies between activities. Coordination is attached to resource allocation, which is needed in order to manage the interdependencies among activities. The most common analyzed case of managing interdependency among activities is called "top-down" process and occurs when an individual or group decides to pursue a goal and then break up this goal into activities or sub goals that will help to achieve the original goal. An important role for all managers in a traditionally hierarchy structure is to break up the goals they are given into tasks they can

delegate downwards to people who work for them. The "bottom-up" process of goal selection is when actors realize that the things they are already doing could lead to cooperating and working together to achieve a new goal. This process can often engage commitment between the actors that are already involved (Malone & Crowston, 1994, p.90-96).

Lack of resources, lack of coordination and poor communication are recurring problems for organizational performance in disaster operations. Distribution of resources is a problem of coordination, meaning that organizations may have resources, but they may not be distributed efficiently to people who need help. Collective learning and actions are therefore essential to facilitate coordination (Comfort et al., 2004, p.296-301). A common coordination problem could be if a particular activity requires specialized skills. This may lead to constraints due to which actors that are able to perform the specific activities. This dependency between activities and actors arise in some form in nearly every organization. Coordination theory search's to identify and study common dependencies and their related coordination mechanisms across a wide variety of organizational settings. The aim of coordination theory is to clearly define processes and attempting to improve performance, in order for actors to reach a common goal (Crowston, 1997, p.159-160).

Emergency situations are often characterized with limited physical resources as well as competent personnel in and around the organization. This increases complexity and uncertainty about how external resources can be integrated into the emergency preparedness organization. High volatility and complex organizations call for a broader set of roles and more sophisticated coordination and structuring mechanisms (Borch & Andreassen, 2015).

2.1.4 Managerial Roles

Organizations dealing with crisis often have to cooperate closely with other preparedness institutions. Binding mechanisms where two or more organizations with different managerial systems are matched have to be included. This requires roles and structuring mechanisms that is adapted to different settings. Managerial role is about types of actions and activities and the responsibilities that are assigned to them (Borch & Andreassen, 2015).

Often managers are overloaded with responsibilities, which contributes to less time to analyze the aspects of situations. Hence they may make decisions in uncertain conditions not knowing which outcomes will be the most suitable. Manager's face constantly changing situations, and a decision that seems right today may prove to be wrong the other. The range of problems that

managers may face is enormous. As a consequence they must take quick decisions using their intuition and experience of previous situations to guide them. Mintzberg (1973) claims that managerial roles within an organization can be classified into three main groups: interpersonal, decisional and informational.

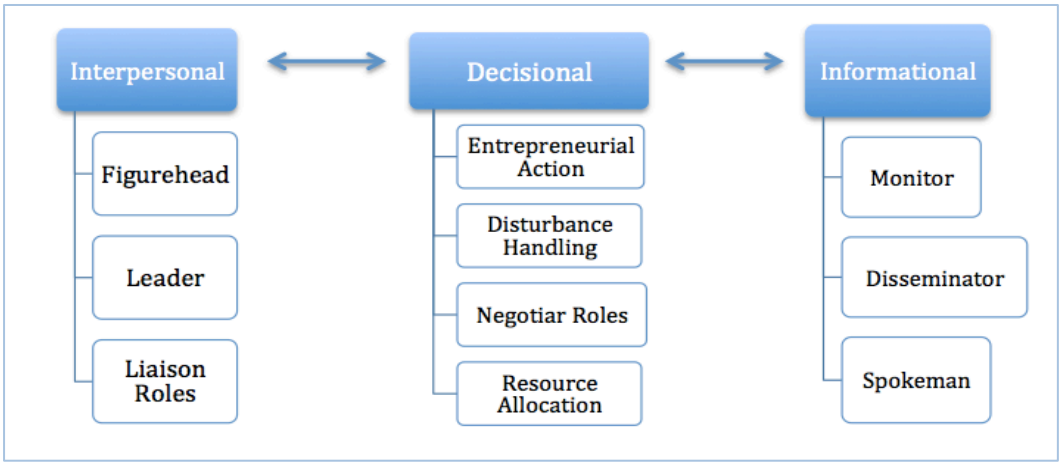


Figure 4: Managerial Roles (Mintzberg, 1973)

Interpersonal roles include the manager's position in the organization and which tasks he is obliged to perform. The interpersonal roles comprise of figurehead, leader and liaison roles, which arise directly from formal authority and involve basic interpersonal relationships between the manager and the employees. Figurehead role is the position as head of an organizational unit, responsible for future organizational goals. The leader is responsible for giving direct commands and orders to their subordinates, and take decisions regarding the use of human resources. An example of a leader role in preparedness organizations is the scene commander. This person must maintain an overview of the situation in order to allocate the right resources, and delegate tasks and responsibility. Liaison is responsible for coordination and communication between different departments. *Decisional roles* include input to decision making and is important for the study of managerial work. Information is the basic input for managers in decision-making. Decisional roles include the entrepreneurial action, disturbance handling, resource allocation, and negotiator roles. The manager plays an important role in the decision-making system. First, the entrepreneur role is when the manager seeks to improve his unit, to adapt it to changing conditions in the environment. Emergency preparedness organizations need to adapt their preparedness and response structure to the specific situation or context. The disturbance handler role describes how the manager responds to pressure. For preparedness organizations pressure may come from society or media. The resource allocator

is related to allocation of available resources among different tasks and units. For emergency preparedness organizations it is essential to have a person being the resource allocator. The negotiator roles are the part between having all information inside the unit and contacts from outside, and decide about all available resources. This person communicates across preparedness institutions in order to coordinate the available resources. *Informational roles* include the monitor, disseminator, and spokesman roles. These roles are central in the organizational unit. Managers constantly scan the environment for information, and further pass information to subordinates and people outside the unit. The monitor's role is to maintain control by evaluating the performance of emergency preparedness activities, and take corrective actions to improve their performance. The disseminator is responsible for information sharing between emergency actors and departments at different levels (Mintzberg, 1973).

Borch and Andreassen (2015) state that coordinating and controlling tasks are essential in organizations. The coordination of tasks refers to having a systematic relationship between decisions about resources and processes in order to achieve desired outcomes. A challenge for emergency preparedness organizations may be tight coordination between institutions within varied organizational systems. The joint emergency organization may include national institutions such as the defense and coast guard authorities, local institutions like the fire brigades and the police force, as well as private preparedness organizations and volunteers. The formal structure and other mechanisms established to ensure the coordination of resources are important. This includes laws and regulations, international agreements, contingency plans and operational guidelines (Borch & Andreassen, 2015).

Allocation of resources between different actors depends on the situation, and what resources that are available and needed. In order to utilize these resources the best possible way, one is highly dependent on communication and information sharing between the actors. As such, resources need to be organized where they are easily available during crisis situations, in case the situation demands more resources (Njå, 1998).

2.1.5 Operational context

Organizational structure should be dependent on the context. Managers select organizational structures to respond to specific conditions that the organization faces. These conditions are called organizational context or contingency factors (Anthony & Gales, 2003, p.16).

Contextual factors are factors that influence the organizational performance and outcomes. The term complexity have been traditionally associated with a description of the working environment of an organization, and in broader systems also with external environment like weather conditions, ecologies, information networks and number of stakeholders (Borch & Andreassen, 2015).

Contingency theory emphasizes the influence of context on the organization. A contingency is an event that might occur and must be planned for because of changing environment. An organization can design its structure in many ways to increase control over its environment (Jones, 2013, p.34). The basic of contingency theory is that one should assess the contextual conditions and select the appropriate structure designed for the organization (Anthony & Gales, 2003, p.21). The relationship between structure and size, technology and environment are depended on the situation or context. Which organizational structure to use in emergency management depends on the scope of the incident. Geographical differences such as localization of offshore installations causes different environmental challenges, and therefore requires distinctive technology.

The organizational environment is made of outside the organizations boundaries. One can say that organizations and their environments exist in a global context. Anthony and Gales (2003) claims that organizations can be effected by external events. The context of incidents varies depending on geography and climate conditions. Environmental incidents are unpredictable and uncontrollable which requires appropriate emergency preparedness plans.

Summary

This chapter has presented organizational theory as the foundation for theoretical framework in this thesis. The chapter starts up with an introduction to organizations, and thereafter describes complex organizations such as preparedness and crises organizations, and structuring mechanisms of crises organization, which is the dependent variable in this study. Moreover this chapter looks into the independent variables examined throughout this study, where the main theories are managerial roles and organizational context. The theoretical approaches in this chapter are the foundation of the data analysis, which will be prepared in chapter five.

3.0 Methodology

In this chapter I will explain the choice of the data collecting methods. I will also argue for the methodology that was used for conducting my data. Further, I will explain the methods and techniques that were used for analyzing and finding the answers for the problem statement and research questions.

3.1 Research Design

Research design explains how the research is organized and how data is collected and analyzed to answer and explain the research question. It is the research question and the purpose of the research that determines what research method that will be used. In a research project objects can be divided into three parts with the aim to explore, describe or explain questions (Easterby-Smith et al., 2012).

Quantitative and qualitative designs are two different approaches of conducting a research. It is important to understand the difference between these techniques in order to find the most proper way of collecting primary data for the problem statement and research question. Qualitative analysis draws on the assumptions and research designs based on relativism and nominalism as well as on social constructionism in an epistemological approach. Quantitative analysis is inspired by the realist ontologies and by positivism in terms of epistemology (Easterby-Smith et al., 2012).

Easterby-Smith et al. (2012) claims that there are two different views on how to conduct a research, either through positivism or social constructionism. The application of positivism in the social science stems from the view that reality is not objective an exterior but socially constructed and given meaning by people. Social constructionism focuses on the ways that people make sense of the world through sharing their experiences with others via the medium of languages. A researcher with a positivistic view sees the world as external, and measure properties through objective methods instead of sensation intuitions. The social constructionist on the other hand focuses on people's thoughts and feelings, and how people communicate with each other. The task among social scientists should be to appreciate the constructions and meanings that people place upon their experience (Easterby-Smith et al., 2012, p.23-24).

The philosophical position is the underlying factor in the research design, where the researcher is drawn from different epistemological perspectives when conducting his research. Epistemology is different ways of enquiring into the nature of the world and will affect which methodology the researcher chooses to address (Easterby-Smith et al., 2012).

Researchers tend to view the world as socially constructed, given meaning by people. This study aims to increase the general understanding of structuring mechanisms for emergency preparedness organizations responsible for large-scale oil recovery operations. I will base my study on social constructionist research approach, as I will perform in-debt interviews with relevant interview participants, aiming to get results that are based on general and mutual understanding of the situation through detailed information.

3.2 Qualitative Research Design

Writing my thesis I need to decide upon the methods to use for data collection and analyses. This means taking a decision whether to use a qualitative or quantitative approach in this study. Occasionally qualitative methods are more appropriate than the quantitative ones when you want to explore and get a deeper understanding of a situation.

In my master thesis I decided to apply a qualitative approach to my study because it fits better to my research. In this thesis it is appropriate to use a qualitative research approach, since I will collect required data and information through statements from the interview participants while conducting in-debt interviews. Applying a qualitative research approach will provide better access to information, since qualitative research design is suitable for discovering the aspect, perspectives and opinions from interview participants. In order to answer the research question the interview participants need to give information about the relevant topic (Easterby-Smith et al., 2012).

In this thesis social constructionism fits better to the requirements of social science, as it assumes that people make sense of the world through sharing their experiences with others via the medium of languages (Easterby-Smith et al., 2012). In my study data collection and analysis are based on the social constructionist epistemology, which helps me as a researcher to gather the required information through semi-structured in-debt interviews with key persons in Norwegian government authorities and agencies. I decided to apply this approach

in order to collect, analyze and present the results of my study in the best possible manner.

Both quantitative and qualitative research can be used to answer my research question. Quantitative research is often used to conduct a large sample with relevant information and experience. Quantitative research is often less flexible and it would be difficult to gather clear and good data used as exploration in this study. Qualitative research is primarily exploratory research, aiming to get an analytical description and understanding of the research problem. Qualitative Data collection is an approach aiming to use language data to gain insights into social and organizational individuals and groups through in-dept interview (Easterby-Smith et al., 2012, p.126). Qualitative research projects are case-oriented intended to provide in-depth information on a smaller selection of units. In order to answer the research problem, techniques such as observation, interviews or document analysis may be used. In my thesis I want to explore the structuring mechanisms for emergency preparedness organizations responsible for large-scale oil recovery operations. Thus it will be appropriate to use a qualitative research approach in order to gather rich and informative data through statements from interview participants. By using a qualitative research approach one are able to discover the perspectives and opinions among interview participants related to the field of the study, where the researcher intends to answer the research question (Easterby-Smith et al., 2012).

3.3 Case Studies

In this master thesis I decided to use the comparative case studies approach in order to analyze and present my findings. This method is based on epistemological perspectives such as positivism and social constructionism. In the literature one may find the claims that case studies can be designed both from the positivist and constructionist perspective. A case study looks in depth at one, or a small number of organizations, events or individuals over time. The case study approach consists of single cases or multiple cases. Single cases generally come from constructionist epistemology, whilst multiple cases usually fit more with the positivist epistemology (Easterby-Smith et al., 2012, p.54). In my master thesis I decided to apply the type of case studies that is inspired by the positivistic point of view, since I will look closer into six emergency preparedness institutions over time, by conducting in depth interview with relevant actors.

The case study approach in social sciences consists of detailed examination of an aspect of an episode in order to develop or test explanations that may be generalizable to other events

(Bennett & George, 2005, p.5). Case study methods include both analysis of single cases and comparisons of a small number of cases. Case studies are characterized as "small-n" studies in contrast to "large-N" statistical studies, with reference to the difference in the number of cases studied. The term "qualitative methods" is sometimes used to encompass both case studies carried out from a positivist view of the philosophy of social science and those implemented with a postmodern or interpretive view. Bennett and George (2005) state that the case study approach seeks to develop and apply clear standards for judging whether some generalizations fit the social world better than others. Case studies are generally strong where statistical methods and formal models are weak (Bennett & George, 2005, p.17-19).

The strengths of case study methods are conceptual validity, deriving new hypothesis, exploring causal mechanisms as well as assessing complex causal relations. The case study approach is on the other hand criticized for being incapable of case selection bias, meaning that the design of the study or the phenomena being investigated suffers from systematic errors. The case study approach is also criticized for the "degrees of freedom" problem, meaning the inability to discriminate between competing explanations on the basis of the evidence. A third criticism is related to lack of representativeness of diverse populations, and lastly it is criticized for "overgeneralizing" findings to types or subclasses of cases that differs from those actually studied (Bennett & George, 2005, p.19-32).

3.4 Data collection process

In this thesis I will use qualitative methods for data collection and analysis. In order to collect the required information I used a research technique of collecting data through semi structured in-debt interviews. This study has been based on both primary- and secondary data sources. Primary data was collected through in-debt interviews with people that possess relevant information about Norwegian emergency preparedness organization. This was mainly Norwegian government authorities, agencies and private companies. Secondary data was based on former emergency preparedness research, government reports, articles and books.

3.4.1 Primary Data

Primary data is defined as new information that is collected directly by the researcher (Easterby-Smith et al., 2012, p.12). Primary data gives the researcher an opportunity to explore new areas of research and phenomena by getting insight into information possessed by relevant people. The value of primary data is that it may lead to new insights and greater

confidence in the outcomes of the research (Easterby-Smith et al., 2012).

Primary data gives insight and information into topics that one may not cover by secondary data. As such, the researcher may look closer into old research areas or explore new areas that have never been examined before. In this study primary data was conducted from informants with different experience within the Norwegian preparedness field. Because of limited time and resources all interviews were conducted through telephone. There are some disadvantages related to conduct telephone interviews. First of all, there may occur misunderstandings due to bad connection on the mobile network making it difficult to hear what is being told. In addition misunderstandings of definitions and formulations may arise. Moreover, conducing interviews through telephone is disadvantageous due to lack of body language and other physical impressions that may influence the interviewers impression of the studied phenomena. Luckily I did not experience any of these disadvantages from conducting phone interviews. All the information given was clear, and the recordings were successful, which made it easy to transcribe the interviews.

Johannesen et al. (2004) emphasize that the relation between the interviewer and the respondent influences the degree of information from interviews. To ensure a good relationship, one should create a bidirectional trust between the two parts. As such, I needed to possess some background information within the field in order to ask suitable follow up questions, and understand the expressions and terminologies that were stated. Another factor that influence the relationship between the interviewer and the participant is the language used. I conducted all the interviews in Norwegian, as it was most appropriate since all interview participants are Norwegian. Easterby-Smith et al. (2008) believe that using the native language makes it easier for the respondent to be more honest in his or hers answers. When transcribing the interviews from Norwegian to English I found some difficulties of translating Norwegian expressions into English.

In order to make interviews as successfully and significant as possible the interview guide was designed and sent to all the interview participants in advance of the interviews. This way the participant could prepare themself for topics and questions that were relevant, in addition this was favorable for me as a researcher in order to obtain desired information from the respondents.

3.4.2 Semi-structured interviews

Before doing an interview the researcher needs to make interview preparations. The researcher need to look at the number of issues that he or she need to consider in order for the interview to be successful. The interview approach is often claimed to be the best method of gathering information, but it contains complexity related to data collection. Firstly, it is time-consuming for the researcher to prepare interview questions and collect data from all interview participants. Using less structured interviews helps the researcher to make choices of which questions they should explore further and which should be abandoned (Easterby-Smith et al., 2012, p.127).

Semi structured in-debt interviews make it possible for the interview participants to provide more detailed information and be more personal when responding to the questions. Additionally, it also allows the researcher to identify non-verbal clues such as body language and facial expressions that can be observed during the interview. These non-verbal clues can help to understand the meanings and interpretation of the examined subject. When conducting interviews the researcher needs to be flexible as he or she seeks to understand the respondents "worldview" and their opinions and believes about the research problem. Since the field of my research is highly complex, it is essential for me as a researcher to be flexible when conducting the interviews. The interviewer needs to possess sufficient skills in order to understand the interview participants, but also to assist them to explore their individual beliefs and thoughts. To avoid confusion of the respondents, and increase the quality of the interview design it is essential to formulate the questions in a neutral and understandable manner, not using leading questions, jargon, colloquialisms and "yes or no questions". Using this approach may help the researcher to minimize the possibility of experiencing misunderstandings. It is important that the researcher obtain trust from the interview participants, and that there are appropriate social interactions between the researcher and interview participant. Promoting mutual understanding the researcher is committed to use suitable and understandable language (Easterby-Smith et al., 2012).

Structured interviews allow for a high degree of standardization of questions and answers, whilst more open interview questions give higher degree of confidentiality, as the respondents tend to be more personal in their replies. The aim of in-dept interviews is to uncover the meanings and interpretations that people attach to events. In order to avoid bias researchers can leave questions open. The main aim of qualitative interviews is gaining an understanding

of the respondent's perspectives and viewpoint (Easterby-Smith et al., 2012, p.132). Qualitative method approach aims to collect information that captures the meaning and interpretation of a phenomenon.

Through the interviews I wanted to develop an understanding of the respondents perspectives and opinions within the preparedness and response field. Moreover, semi-structured interviews contribute to increase the amount of information from each question by using the so-called laddering technique where you get to know what is important to the respondents and why it is important. Laddering is a technique that will help the respondent to move from statements of fact or descriptive accounts about the questions posed in such a way that they begin to reveal the individuals value base. This technique is valuable for researchers while conducting interviews. Laddering down is when the researcher seeks to obtain illustration and examples or occurrences of events. For example the researcher may ask the interview participants to give examples of the specific situation in order to get a better understanding of the field being examined (Easterby-Smith et al., 2012).

I provided the interview participants with an interview guide some days in advance of the interviews. This was useful in order to give the respondents insight into the topics and questions that were going to be asked. As such they could prepare themselves, giving me as a researcher the advantage of obtaining desired and necessary information during the interview. Constructing a topic guide for my interviews was useful for maintain focus within the frames of the research questions. I designed four main topics of the interview guide, deriving from the theoretical foundation:

- Coordination and organization of Norwegian oil spill preparedness
- Roles and responsibilities
- Context
- International support

The interview participants provided relevant and accurate data to the study, giving me clearer insight into different areas of the preparedness organization and structuring of complex organizations. I got informational and well-elaborated answers from the respondents, showing both shared situational awareness and conceptual understanding, but also differences due to situational awareness, definitions and terminologies.

3.4.3 Sampling

In order to collect valid primary data, it is essential to interview the right institutions, holding key people that are familiar with and has knowledge within the Norwegian emergency preparedness field. In this study the chosen population is the people working in government authorities, agencies and other relevant actors in emergency preparedness organizations. Sample is regarded as a subset of the population from which inferences are drawn on evidence (Easterby-Smith et al., 2012, p.345). Sample is the people the researcher draws from the population, and is a very common used tool for conducting surveys and interviews. It would be optimal to interview all the relevant members of an organization, but this is impossible both due to limited time and access to resources. It is therefore essential to pick a sample that gives the best representation of the population (Easterby-Smith et al., 2012).

In this study a non-probability sampling design are used because one cannot state the probability of each member of the population. Non-probability sampling methods are not able to state the probability of any member of the population being sampled. This study uses three of the non-probability sample designs. Firstly, the convenience sampling method involves selecting sample units on the basis of how easily accessible they are. All interview participants lived in other regions of Norway and were also very busy, which made it easy for them and for me to conduct the interview over the telephone. Secondly, quota sampling was used to divide relevant population into categories and select a specific sample. I divided the preparedness actors into different groups according to their roles, function and experience within the field. Thirdly, snowball sampling is the method used when the researcher ask the interview participants for other people that could be of interest to interview. I asked some of the participants for recommendations to other people that could be relevant for my study (Easterby-Smith et al., 2012, p.228-229).

The empirical data in this thesis is collected from national and private institutions responsible for preparedness and response actions at the Norwegian Continental Shelf. In order to gather empirical information to the thesis, there were in total 7 interview participants interviewed, from 6 different authorities and companies. There were 1 person from the Norwegian Coastal Administration (NCA), 1 person from the Norwegian Directorate for Civil Protection (DSB), 1 person from the Norwegian Coast Guard, 1 person from the Norwegian Clean Seas Association for operating companies (NOFO), 1 person from Statoil and 2 persons from DNV GL. The interview participants were chosen based on the responsibilities of the government

authority or agency in which they work. NOFO was chosen because it links the private and national preparedness and response organization. Statoil was chosen in order to get the perspectives of operators at the NCS. Lastly, DNV GL was chosen due to its third party consultant position within the preparedness and response field.

From the Norwegian Coastal Administration I conducted a interview with Ole Kristian Bjerkemo, who is Senior Advisor in the Department for Emergency preparedness and response. Bjerkemo is also chair in the Arctic Council working group Emergency Prevention Preparedness and response (EPPR). Bjerkemo gave me a detailed description of the Norwegian preparedness system, regarding coordination mechanisms, the Unified Management System (ELS) and he also gave me detailed information about Host Nation Support in Norway.

Two participants from DNV GL were also interviewed. DNV GL provide third party verifications, approving certifications and procedures based on established standards that regulate this. DNV GL is responsible for inspecting that procedures are followed when different standards are established. Their goal is to safeguard life, property and the environment, by delivering classification and expert consulting to companies in the maritime, and oil and gas sector (DNV GL, 2014).

One representative from Statoil gave me detailed description of Statoil's emergency preparedness and response system, in order to get insight into the preparedness structure of the operators at the NCS.

A representative from NOFO, Henning Lysgaard, were also interviewed. Lysgaard is Director of NOFO's Preparedness. He provided me with detailed information of NOFO's preparedness apparatus, and their role in the Norwegian preparedness organization, combining national and private preparedness.

Another interview participant was Yngve Kristiansen from the Norwegian Coast Guard. Kristiansen provided me with descriptive information of the Coast Guard's role in Norwegian preparedness organization.

Lastly, I conducted an interview with a representative from the Norwegian Directorate for Civil Protection (DSB). Hans Kristian Madsen is head of the Fire and Rescue department, under the unit of preparedness, recue and emergency. Madsen gave me detailed description of the structure of the Unified Management System (ELS), coordination and communication mechanisms in the Norwegian preparedness and response system, as well as managerial roles and responsibilities.

Name	Company/ Authority	Position	Interview Type	Date	Time
Ole Kristian Bjerkemo	NCA	Senior Advisor – Department for Preparedness	Phone	20.03.2015	12.00-13.30
Øyvind Roland Persson Rune Pedersen	DNV GL	Senior consultant – safety analyzes in the oil and gas industry Consultant – Environmental Section in the oil and gas sector	Phone	27.03.2015	12.00-13.00
Geir Helge Johnsen	Statoil	Leading Engineer Emergency Response	Phone	27.03.2015	09.30-10.30
Henning Lysgaard	NOFO	Director Preparedness	Phone	30.03.2015	15.00-16.00
Yngve Kristiansen	Coast Guard	Commander Captain/ Staff Officer	Phone	09.04.2015	10.00-11.00
Hans Kristian Madsen	DSB	Head of Department - Fire and Rescue Unit of Preparedness, Recue and Emergency	Phone	13.04.2015	11.30-12.30

Table 1: Overview of the interview participants

3.4.4. Secondary Data

Easterby-Smith et al. defines secondary data as: *"information that already exists in form of publications or other electronic media, which is collected by the researcher"* (Easterby-Smith et al., 2012, p.12). The main purpose of the secondary data is to complement the information obtained from the conducted interviews. Secondary data provided additional perspective of the preparedness and response field, which is the examined phenomenon. The secondary data sources used in this study are collected from Norwegian government authorities, agencies and petroleum companies. In order to get an overview and insight into former and current research within the field it is essential to use data such as reports, articles and books. This way the researcher can acquire knowledge and get an understanding of the field being examined. There are some disadvantages related to the use of secondary data. First of all the researcher does not have control of the sample and the specific data collected, when using former research. Secondly, the data may be unreliable or incorrect. Hence it is very important to use reliable and right sources (Easterby-Smith et al., 2012). The secondary data I have used in my study are confident and reliable, intended to give complementary information and high quality to my statements. In this thesis it is necessary to provide some former knowledge and information about the emergency preparedness organization and structure, in order to conduct high quality interviews.

3.5 Data Analysis

The empirical data has been collected through conducting semi-structured interviews with six key persons within the preparedness field. Information from interview participants was recorded in order to acquire all necessary information and statements when transcribing the interviews subsequently. All interview participants confirmed that recording was appropriate. Afterwards, the gathered information was transcribed into written documents consisting of 52 pages in total, where each interview contained a great amount of data. The transcribed data was then coded and marked by different colors in order to categorize the information and data, in order to get an overview and distinguish between the different information, understanding and opinions of the participants, in relation to different topics. The interview transcriptions were looked through several times to ensure that no relevant data was missing.

3.6 Reliability and validity

Thagaard (2009) claims that reliability is related to the concerns on how trustworthy the research are, referring to how data has been developed (Thagaard, 2009, p.198). Reliability of a study may tell if a research project will produce the same results and scores in another research project that is carried out on the same bias. In most cases it is unlikely to have the same results when performing the same study within similar conditions and circumstances (Easterby-Smith et al., 2012). One may distinguish between internal and external reliability, where the former refers to obtain accordance in the construction of data (Thagaard, 2009, p.199). External validity on the other hand concerns research project that may be transformed and applied to similar phenomena (Johannessen et al., 2011, p.247).

According to Easterby-Smith et al. (2012) validity is defined as *"the extent to which measures and research findings that provide accurate representations of the things they are supposed to describe"* (Easterby-Smith et al., 2012, p.347). The concept of validity is important in order to define and select the most appropriate methods for collecting data. Validity refers to the interpretations that derived from the study, meaning that the researcher should examine his or hers interpretations and get them confirmed by other studies (Thagaard, 2009, p.201).

Reliability and validity need to be considered in order to avoid errors of the gathered data. Errors can occur from mistakes such as poor choice of methods, choosing the wrong samples or data. For the research to be reliable the researcher needs to be honest, presenting the data in a logical and correct way. The researcher should avoid expressing their opinions, leading the respondents in a desired direction. Another issue of reliability is related to the researchers own interpretations of the information. The way the researcher interpret the data, provide guidelines for the outcome of the study.

Reliability in this study concerns the way the interview guide were constructed. Avoiding leading questions made the study reliable. In order to avoid that the conducted data from interviews were unreliable, primary data was supplied by secondary data from government documents, articles and reports. This study may question reliability of gathered information because all interviews were conducted through telephone, which could have caused misunderstandings in interpretation of the definitions and terminologies. But if something was unclear I asked the participants for deeper explanation. As such, I believe that this research is reliable because of the approaches of which the information was gathered.

The issue of generalization is in this thesis related to whether the conducted material can be applied in other similar research. Ensuring generalization of the study, one should keep in mind the method of the study to be applied in other settings, as concerns other studies within the preparedness and response field.

3.7 Ethical considerations

In any research the ethical considerations are important to have in mind during the entire process. It has been important for me to follow the ethical guidelines throughout this study. Ethical considerations especially concern the respondents of this thesis. Easterby-Smith et al. (2012) presents ten important ethical principles. Seven of these are related to protecting the interest of the informants.

The researcher should not bring harm to the interview participants. This refers to issues such as sensitivity to difficult issues, and not disclosing confidential information. Further, the researcher should respect the dignity and protect the privacy of the participants. The researcher should also ensure confidentiality of the data and protect anonymity of individuals in the organization if it is desired. Lastly, ethical considerations related to ensure accuracy and lack of bias in the research result the researcher should be honest and transparent when communicating with participants. The researcher should also avoid misleading or false research findings (Easterby-Smith et al., 2012, p.95).

In order to protect the interest of the participants and organizations I asked for permission to tape the interviews. All my participants agreed upon this, because there was no confidential information. The transcribed interviews were sent to participants in order for them to confirm the material. As a researcher I will not publish any data that can bring harm to individuals or organizations (Easterby-Smith et al., 2012).

3.8 Summary of methodology chapter

This chapter has described the methodology, methods and techniques that were used to conduct this study. First, I present the choice of philosophical position, considering the research design and how to address the research problem. Then I present and argue for the choice of qualitative research, through conducting in-depth interview as data collection method. This chapter further gives an overview of how primary and secondary data was collected. Additionally, the reliability and validity of the data collection has been addressed

along with ethical considerations of the study. The following empirical chapter will give an overview of the data collected in this study.

4.0 Description of the Norwegian Emergency preparedness organization

In this chapter of my master thesis I will present a description of the Norwegian emergency preparedness organization.

The first chapter begins with a description of the Norwegian emergency preparedness organization. Further this chapter will give a brief overview of the examined authorities, agencies and companies in order to give the reader better insight into their roles and responsibilities in emergency preparedness operations at the NCS. I will also look at the functions of the Incident Command System (ICS) and the Norwegian Unified Management System "Enhetlig ledelsessystem" (ELS).

The second chapter is related to structuring mechanisms I have found important to focus on after collecting the primary data. The important structuring mechanisms emphasized in this thesis are control, coordination (e.g. allocation of resources), cooperation and communication.

The third chapter presents data related to Host Nation support. Here I will a description of the benefits and challenges related to introducing international assistance across borders. I will describe how to request international assistance, and look into aspects and functions that need to be in place in order to successfully receive incoming personnel and equipment from other nations.

The last chapter describes the context and complexity of operating in the Barents Sea. Firstly, I will present the history and development of offshore installations in the area, and thereafter I will look at the contextual complexities of operating in the Barents Sea.

4.1 Norwegian Emergency preparedness organization

In this chapter I will describe how the Norwegian emergency preparedness system is structured and organized. It is important to look at who is responsible to contribute in response actions, and how this is organized between Norwegian Governmental authorities, agencies and private companies if an accident occurs.

The emergency concept is complicated. Emergency preparedness concerns complying with events that may occur in the future and which will have major consequences for the environment, human lives or material assets. Contingency planning require working proactively, which means thinking ahead regarding situations that might occur in the future,

and how great the impact of the event may be. It is essential to ensure that the right resources are available if an accident occurs. Preventing or reducing the risk of the accident may be obtained by planning for potential events and incidents before they occur. Preparedness is therefore about organization of resources and various measures and emergency situations that may arise (Hovden, 2010, p.11).

Preparedness is about time, meaning how long it takes for the authorities to have response actions in place when an accident occurs. One example is related to how long it takes for the fire department is in place when there is a fire, or how long it takes for the ambulance or police force are in place after a traffic accident. Preparedness and crisis management should be coordinated among many institutions and the organizations must be adjusted quickly. Crisis management is associated with activities, organization or measurements that is created during the crisis in order to protect life and health, environment or material values.

Crisis management is bounded in a variety of safety principles. These are as follows; the principle of responsibility, the principle of equality and the principle of subsidiarity. The principle of responsibility is related to the authorities responsible for emergency preparations intended to handle emergencies or critical incidents. The principle of equality means that emergency organization on a daily basis should be similar to the emergency organization introduced during crises situations. The principle of subsidiarity builds on crises to be handled at the lowest possible organizational level (Hovden, 2010, p.15). If these three principles should have an optimal function for the organization and obtain efficient management of an accident or crises situation, it is important to maintain a well organized system where one can distinguish between different decision-making levels, responsibilities and duties imposed on the certain agency or authority.

Norwegian preparedness organization is structured into three different levels. Strategic level includes an overarching goal or values and strategies to establish effective emergency organization. At the operational level planning, coordination and allocation of resources are central. Operational level will act as a liaison between strategic and tactical levels. Tactical level concerns the direct leadership and coordination of resources allocated according to action plans. On a national level, this is established between defense, police and other emergency-related organizations. Preparedness organizations require cooperation and

coordination between organizations at the same level in order to achieve effective emergency preparedness structure (Hovden, 2010, p.15).

Strategic level	Government
	Ministries
	Directorates
Operational level	Emergency Preparedness establishment
	Emergency Services
	HRS / Coordination responsibilities
Tactical level	Scene of accident / priority area

Table 2: Three levels of emergency preparedness organization (Hovden, 2010, p.17)

Preparedness organization in Norway is divided into three different parts; private, governmental and municipal emergency preparedness. The former is about the responsibility that lies within the oil companies or the operations of the companies. If a company has a potential risk of acute pollution they can ask the Norwegian Clean Seas Association for Operating Companies (NOFO) for help. NOFO is responsible for maintaining emergency preparedness on behalf of the companies operating at the Norwegian Continental Shelf. The Norwegian Coastal Administration (NCA) lies under the Government, and is therefore responsible for the governmental emergency preparedness system. The NCA should take an action if the private or municipal emergency response system does not work optimally. Then private, municipal and governmental preparedness will cooperate in combating the oil spill, where the NCA will serve as the responsible leader of the preparedness operations. NCA is delegated its authority through the Pollution Control Act, when there is acute danger of pollution. Thirdly, Municipal preparedness is based on risk assessments of activities in the municipalities, and coastal pollution. There are Inter-municipal Committees for acute pollution (IUA) in each of the 34 emergency regions, covering all municipalities in the country. The function of the IUA is to safeguard emergency duties to handle minor spills (Hovden, 2010, p.46).

4.1.1 Norwegian Coastal Administration (NCA):

The main goal for the Norwegian Coastal Administration is to ensure that the Norwegian coast and waters are safe and pure, as well as being responsible for national preparedness for

acute pollution (Kystverket, 30.09.2011). The Norwegian Coastal Administration is divided into five regions: South-Eastern Coastal Administration, Western Coastal Administration, Central Norway Coastal Administration, Coastal Administration in Nordland and Coastal Administration in Troms and Finnmark. These regions have a delegated regional responsibility for the Norwegian Coastal Administration's operative and administrative tasks on behalf of the Director General (Kystverket, 10.10.2011).

Picture: The NCA's 5 regions (Kystverket, 10.10.2011)

The Norwegian Coastal Administration preparedness plan ensures that the Norwegian state will meet the Maritime Safety and Emergency challenges in a rational and efficient manner. It is necessary to have regular exercises and evaluations in order to incorporate experiences from performed actions. Undesirable events that may impose an environmental threat at land or at sea, will be managed by the operator responsible for the pollution. If the responsible polluter does not have capacity to take an action, the NCA may according to the plan "*Prosedyre for Statlig aksjon mot akutt forurensning"*, take over the management and control

of the incident on behalf of the company. The preparedness plan describes how the NCA will act to prevent accidents in order to limit environmental damages.

"Norwegian preparedness and responses system is organized in such a way that it is the Coastal Administration who owns the equipment, and during national preparedness actions, it is the NCA and not the Armed Forces that leads the operation. The Coast Guard is responsible to assist in rescue operations, providing vessels" (Kristiansen, Coast Guard, 2015).

The Norwegian Coastal Administration should as soon as possible after an accident occurs, provide information about the incident and which measures they are planning to implement. The NCA should appear as an open and trustworthy information provider, bringing clarity into responsibilities and roles (Kystverket, 15.02.2012).

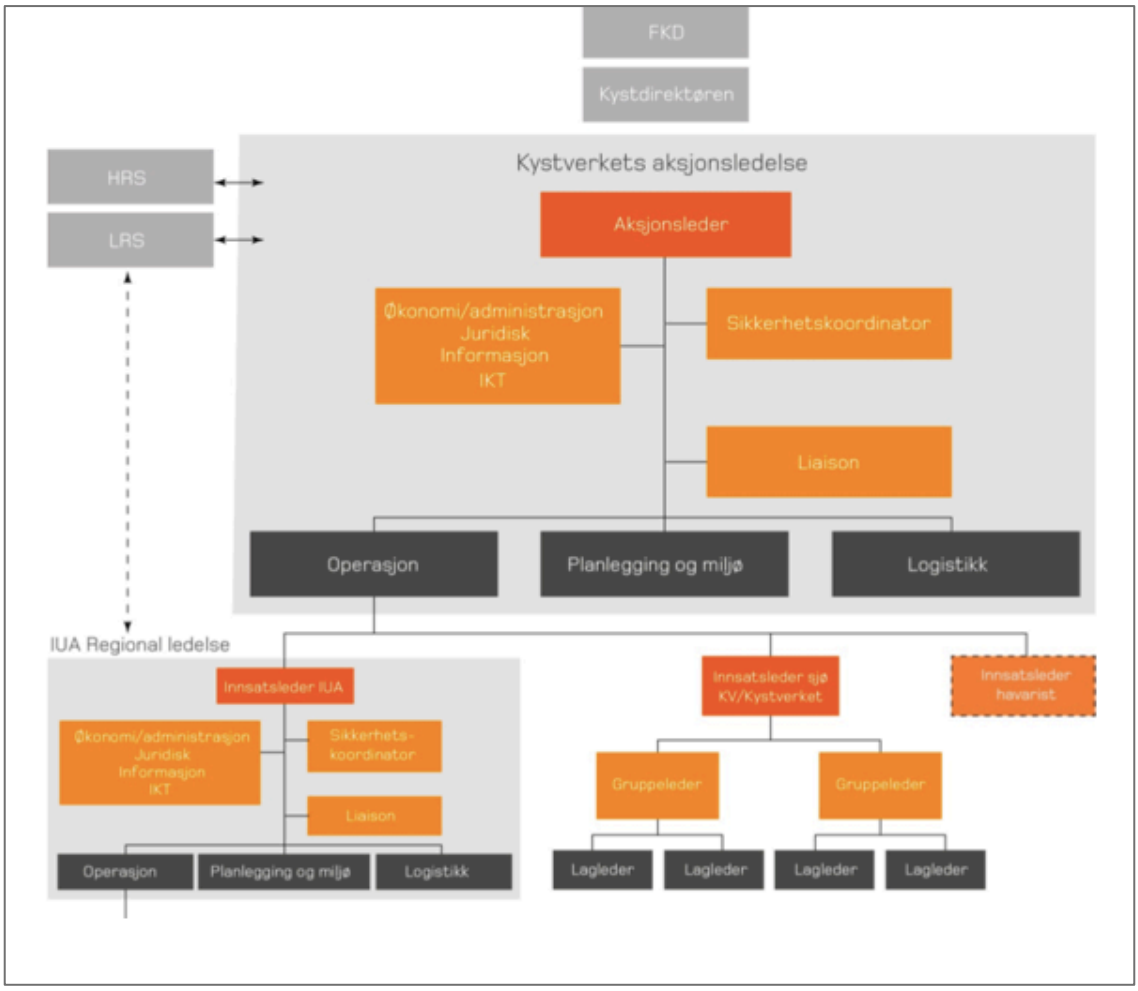
"When an incident occurs, the NCA requires that the first action plan need to be elaborated within few hours. This action plan is based on a small amount of information as the accident is new and the situational picture is unknown. The first action plan should ensure clarification of roles and responsibilities. An action plan is a guidance document related to how one coordinates resources and responsibilities during crisis situations. Firstly, the NCA introduces a startup plan, giving continuously updated information. This plan will be valid throughout the entire acute phase, as long as there is oil at the sea. Later, they will implement other plans if the oil spread into the shoreline. Then the NCA will provide guidelines to the IUA, proposing what tasks to be carried out in the emergency response work" (Bjerkemo, NCA, 2015).

4.1.1.1 Organization of the Norwegian Coastal Administration

When the NCA establish an action for acute pollution, this will be organized as in the Figure below. *"Aksjonsleder"* will be the person managing the operation and the approved action plan and action orders. The leader of the action is responsible for strategic planning, coordination and information. *"Assisterende aksjonsleder"* has executive powers when the action manager is unavailable. The Deputy action manager should focus on the practical and operative actions, as well as maintaining an overview of the situation and coordinate the function leaders. *"Leder planlegging og miljø"* is the leader of the function within planning and environment, and has the authority to make decisions on the basis of available information on the situation of the incident, as well as being responsible for managing and

allocation of resources. *"Leder operasjon"* is the leader of the operation function, and has the authority to execute action plans and action orders. The leader of operations is assigned tasks such as management and safety coordination. *"Leder logistikk"* is the leader of the logistics, and has the authority to obtain resources following the action plan.

In addition to the primary functions it may also be established support functions under the NCA's action management. Finance and Administration should on behalf of the action leader safeguard economic conditions during the action. The Legal function is responsible for safeguard the exercises of the authority and other legal tasks. Information is together with the action leader responsible for preparing information strategies. ICT (IKT) is responsible to provide all necessary information- and communication technology, whilst the Security Coordinator safeguards HSE conditions (Kystverket, 2014, p.2-3).



Picture: Organization of the Norwegian Coastal Administration (Kystverket, 2014).

4.1.1.2 Emergency preparedness systems – different approaches

The DwH accident in 2010 had significantly impact on society and the importance of a well-established security system in the global petroleum industry. Today there are enforced requirements for international safety regulations, coordination and establishment of regulatory requirements and well elaborated emergency preparedness systems (Ptil, 2011, p.111).

The guideline about the Unified management system (ELS) is elaborated for handling incidents of fire, rescue and acute pollution by the municipal fire and rescue service, the Civil Defense, the inter-municipal committees for acute pollution (IUA) and the NCA, which possesses the Norwegian state's actions against acute pollution. The purpose of this guideline is to describe a standardized management system, for handling events in a professional, efficient and secure way. Events should be handled in a recognizable and predictable manner, regardless of type or size of event. The Unified management system are based on the American Incident Command System (ICS), but adapted to the Norwegian principles of responsibility, equality and subsidiarity (DSB, 2011, p.5).

DSB is national fire authority above the municipal fire and rescue services, as well as being the governance authority of the Norwegian Civil Defense. DSB develops legislation, regulations and guidelines in various fields, and administers and enforces the Fire and Explosion Act and the Civil Protection Act. NCA is responsible for preventive measures to reduce the risk of acute pollution from the maritime sector. NCA is also responsible for the nationwide responsibility for coordinating the private, municipal and governmental preparedness for acute pollution. The municipalities are responsible for emergency preparedness duties in smaller cases of acute pollution, within the municipality's boundaries that is not covered by private emergency preparedness level. Municipalities cooperate on preparedness through thirty-three inter-municipal preparedness regions led by inter-municipal committees for acute pollution (IUA) covering all Norwegian municipalities (DSB, 2011, p.5).

The Norwegian Coastal Administration organizes their emergency preparedness organization according to the Unified Management System "Enhetlig ledelsessystem" (ELS). Further in this thesis, I will look at the American Incident Command System (ICS) in comparison to the Norwegian Unified Management System (ELS):

"ELS and ICS promotes splitting into clearer functions and responsibilities, by reducing span of control in a hierarchical structure. These two systems are used both in smaller accidents and during major oil spill accidents" (Madsen, DSB, 2015).

"When emergency institutions in a country use the same command system, cooperation and coordination becomes easier. One need to find the right contact point for interaction and cooperation across departments, because establishing a common conceptual understanding is important" (Johnsen, Statoil, 2015).

The Incident Command System (ICS)

The ICS provides a structure for emergency preparedness actors to work efficiently and effectively in order to respond to an incident. Through providing a framework for how incidents can be managed, including prevention, protection, response, mitigation and recovery, the ICS aims to promote effective and efficient management. The ICS intend to integrate issues such as facilities, equipment, personnel, procedures and communications between authorities and agencies involved in crises situations (Commission of Oil Spill Response Coordination, 2012, p.3-4).

The ICS is a flexible and integrated organizational structure. The fundamental design of the ICS was given according to the complexity and demands of the Deepwater Horizon incident, and allows personnel to coordinate and communicate without being obstructed by jurisdictional boundaries (Commission of Oil Spill Response Coordination, 2012, p.33).

The Unified Management System "Enhetlig ledelsessystem" (ELS)

The Norwegian Directorate for Civil Protection (DSB), the Norwegian Coastal Administration (NCA) and the Environmental Directorate regulates their respective parts of the Norwegian preparedness system. In order to establishing a more consistent organization of emergency preparedness, regardless of the type of event, the three authorities established a joint unified management system, the ELS system. The Norwegian ELS system is based on the equivalent Incident Command System (ICS).

"The ELS system follows UN standards, building upon the American Incident Command System (ICS). The ELS structure follows the principles of responsibility, equality and subsidiarity" (Kristiansen, Coast Guard, 2015).

The reason for the development of ELS was the experiences of a number of major events in Norway (forest fires, terror and shipwreck) where there was a need for cooperation between several emergency preparedness institutions. Experiences indicated a need for a common management system, ensuring strategic management and staff support. The purpose of a unified management system is to ensure that incidents are handled in a predictable manner regardless of size and scope (Norsk olje&gass, 2014, p.30-31).

ELS has its origins in handling short-term events, and may expand so large-scale incidents can be handled within the same system. One of the success factors of the system is that all incidents are handled by the same system and organization. During smaller events, one leader will manage tasks and functions related to handling the incident. In incidents of a certain size tasks must be delegated in order to manage the incident effectively. For large or complex events it will be necessary to expand the support network by creating an internal organization to ensure that tasks are handled in the best possible manner. All incidents are handled by the same recognizable structure, where the organization expands by inserting more personnel and more leaders, as the complexity increases (DSB, 2011, p.11).

"The ELS structure was introduced through collaboration between DSB, NCA and the Environmental Directorate. These three authorities have been a triangle of cooperation through many years. One succeeds very well in establishing a common concept in how to handle crises situations" (Madsen, DSB, 2015).

"ELS is introduced as a basis structure for Norwegian emergency preparedness organization, aiming to ensure the same concepts and terminology across authorities and agencies" (Bjerkemo, NCA, 2015).

4.1.2 Government support institution – Norwegian Directorate for Civil Protection

The Norwegian Directorate for Civil Protection (DSB) is a governmental administrative agency under the Ministry of Justice and Public Security. The purpose of DSB is to support the Ministry of Justice and Public Security in their coordination role for risk and vulnerability development in the society. In acute crisis and emergency situations it is the directorates that act as advisors above ministries. For example, DSB is responsible for taking initiative to prevent acute crisis situations to occur. They should implement preventive measures and ensure that adequate preparedness is available if an accident occurs. If security and contingency plans are not sufficient, DSB can take responsibility for monitoring the

responsible authority. The directorate is responsible for publishing guidelines for reporting and notification of accidents (Hovden, 2010, p.41). DSB has no operational and tactical responsibility in emergency preparedness operations, but is responsible for support functions through the Civil Defense and the local fire and rescue services. DSB is responsible for ensuring that safety measures are taken care of in a proper manner, in order to obtain a safe and secure environment. DSB assists the Ministry of Justice and Public Security in facilitating the best possible coordination between local, regional and central emergency preparedness arrangements (DSB, 19.04.2015).

"DSB does not have any operational or tactical responsibility, as they have no authority role. They serve as a national fire authority and central supervisory authority. Their task is to control the municipal fire and rescue services and be a support function for the Norwegian Civil Defense. DSB has no authority but they are responsible for ensuring that the municipalities are doing their job through the Explosion Act. They cooperate with the Coastal Administration and Environmental Protection Agency on municipal preparedness for acute pollution, which is part of the Norwegian public oil spill preparedness" (Madsen, DSB, 2015).

4.1.3 Aid resources

During large-scale accidents there is a need for assistance from local, regional or national resources. Receiving resources are related to aspects such as management, coordination, command and control. Institutions that requests assistance receive personnel and equipment in order to combat and manage the incident.

The Civil Defense

The Civil Defense is subjected to the Directorate for Civil Protection (DSB). The Civil Defense is a government reinforcement resource with a legal basis in the Act of 25 June 2010, on municipal emergency preparedness, civil protection measures and civil defense, through the civil protection law (DSB, 2011, p.29).

Figure 5: Organization of the Norwegian Civil Defense

The Norwegian Civil Defense is our main state amplification resource, providing operational support to public safety agencies and other agencies with primary responsibility for handling accidents and special events. The Civil Defense is an important player for civil protection during daily operations and when major events occur. The Parliament has decided that the Civil Defense should be a government reinforcement resource providing support to emergency services by a wide range of incidents. The Civil Defense will participate in the handling of larger, long-term and complex events, such as wildfires, severe accidents, naturally occurring events and terrorism. Civil Defense constitutes a resource that can be used in a wide range of events. The terror incident on July 22 in Oslo and Utøya also showed that there is a need for a predictable, state actor that can provide support to the emergency services when they face challenges that are beyond what primary agencies can handle themselves (DSB, 2012, pp.3-9).

The Norwegian Civil Defense structures their preparedness organization through the ELS structure, explained in the previous chapter of NCA organization. Implementing a common preparedness system among government authorities and agencies will help strengthen the coordination and cooperation across preparedness institutions.

The Norwegian Armed Forces

The Norwegian Army provides support to the civil society during incident that threatens life and health of the society. Support can be wide, ranging from rescue efforts and assistance to crises and natural disasters. The Norwegian Joint Headquarters (FOH) plans and coordinates the operational support to the civil society. FOH has at any time an overview of the military resources that the requested to the police force or other civil authorities.

The Armed forces assistance to the NCA are governed by an overarching agreement between FOH and NCA, and a number of underlying agreements, by government actions against acute pollution (DSB, 2011, p.29-30).

Notably it is essential to notice that the Norwegian Armed Forces and the Police Authority uses different emergency preparedness systems than the other Norwegian authorities such as the NCA, DSB and NOFO, who structures their preparedness operation through the ELS structure.

"The police are not willing to establish the ELS in their preparedness structure, and the Armed Forces has its traditional structure that is based on very many years of experience. There are not major differences in the way one organizes the ELS compared to these two systems, but there are still some significant differences that need to be taken into consideration" (Bjerkemo, NCA, 2015).

"The Armed Force operates with a different system, but this system is similar to the ELS in the way it is organized" (Lysgaard, NOFO, 2015).

"The Armed Forces uses a different system, but there are similarities of concepts and definitions" (Kristiansen, Coast Guard, 2015).

International assistance

The UN coordination mechanism addresses both to the Civil Protection and Marine Pollution. This means that Norway may request assistance from the UN, during incidents such as larger wildfires and oil spill pollution. Norway will comply an aid request to the UN coordination office concerning this type of assistance (Monitoring, Information and Communication - MIC) which is located in Brussels.

In connection to the acute pollution act, the NCA can request assistance from neighboring countries directly. This is based on agreements between the countries. The most important agreements are the Copenhagen Agreement, the Bonn Agreement and the bilateral agreement on oil spill preparedness between Norway and Russia (See appendix 2). NORDRED (Nordic Rescue Cooperation) is an agreement between the Nordic countries on mutual assistance in case unexpected events and crises. Experience show that regional cooperation across borders is becoming increasingly important (DSB, 2011, p.32).

4.1.4 The Norwegian Coast Guard

The Norwegian Coast Guard is the primary authority to perform jurisdiction of fisheries control in Norway, and is subject to the Defense Ministry. Monitoring of fishing in Norwegian waters under the Norwegian Fisheries Jurisdiction has been and still is the Norwegian Coast Guards highest priority task. Other tasks for the Norwegian Coast Guard are related to sovereignty, search and rescue preparedness and assistance to fishing fleets (Regjeringen, 15.10.2014).

The Norwegian Coast Guard has an important role in the national environmental preparedness. The Coast Guard most central tasks are fisheries inspection, environmental protection, search and rescue, and customs supervision. The Coastguard Act gives the Coast Guard the authority to carry out control of a number of governmental agencies, and cooperate with partners such as the police, the Customs Service and the Norwegian Coastal Administration (Forsvaret, 14.01.2015).

"The Coast Guard operates under the defence headquarter in Bodø and is therefore regarded as a military organization. The Coast Guard is assigned police authority according to the Coastguard law. The Coast Guard has potential to be more present at the Norwegian Coast than they are today, but because of limited financial resources from the government this is not possible. The main tasks of the Coastguard are assigned to them through the Coastguard law of 13th of June, 1997. This law defines where they should be present and which tasks they can or are obliged to perform" (Kristiansen, Coast Guard, 2015).

4.1.5 The Norwegian Clean Seas Association for Operating Companies (NOFO)

The Norwegian contingency model combines state, municipal and private oil spill resources. This unique organizational relationship between the public and private ensure that

responsibility and command are clearly defined. NOFO is a nonprofit organization for oil spill preparedness, established to maintain oil spill preparedness on the Norwegian Continental Shelf, in order to combat oil pollution on behalf of thirty operating companies. NOFO's purpose is to manage and maintain oil spill response that includes personnel, equipment and vessels. NOFO manages extensive oil spill response resources in order to reduce environmental damages by the petroleum sector. NOFO's main tasks are to fulfill members' needs for efficient and robust oil spill preparedness. This may be done by continuously improvements of oil spill response through the development of technology, knowledge and competence level within coastal and shoreline preparedness, as well as strengthen local environmental efforts through active collaboration with Inter-municipal Committees for Acute Pollution (IUA) (NOFO, 18.04.2015).

"*All operators at the Norwegian Continental Shelf must be members of NOFO. They are responsible for thirty oil companies, where they act as a common association being the industry's emergency preparedness organization. If an accident occurs at the Norwegian continental shelf, the company responsible for the oil spill will contact NOFO, which is obligated to perform emergency response actions on behalf of them"* (Lysgaard, NOFO, 2015).

The oil companies operating offshore need to follow preparedness requirements and HSE-regulations for petroleum related activities. Petroleum companies operating at the NCS have the overall responsibility for combating oil spills from offshore installations on the seabed or surface. At such, they are responsible for establishing their own preparedness and response structure and system for combating potential oil spills. All operating companies are members of the Norwegian Clean Seas Organization for Operating Companies (NOFO), which operates on behalf of the operators. NOFO places equipment and technical staff at the afflicted companies' disposal. It is the duty of all companies to develop preparedness plans in order to respond to acute pollution incidents (NCA, 2014, p.26).

The Norwegian coast is long, extensive and vulnerable. As such, NOFO has established bases that acquire equipment and personnel that are ready to respond if an accident occurs. There is equipment stored at five onshore bases, and permanent equipment has been placed offshore on eleven standby vessels. These are manned 24 hours a day, aiming to ensure good emergency preparedness organization at the NCS (NOFO, 2013, p.8).

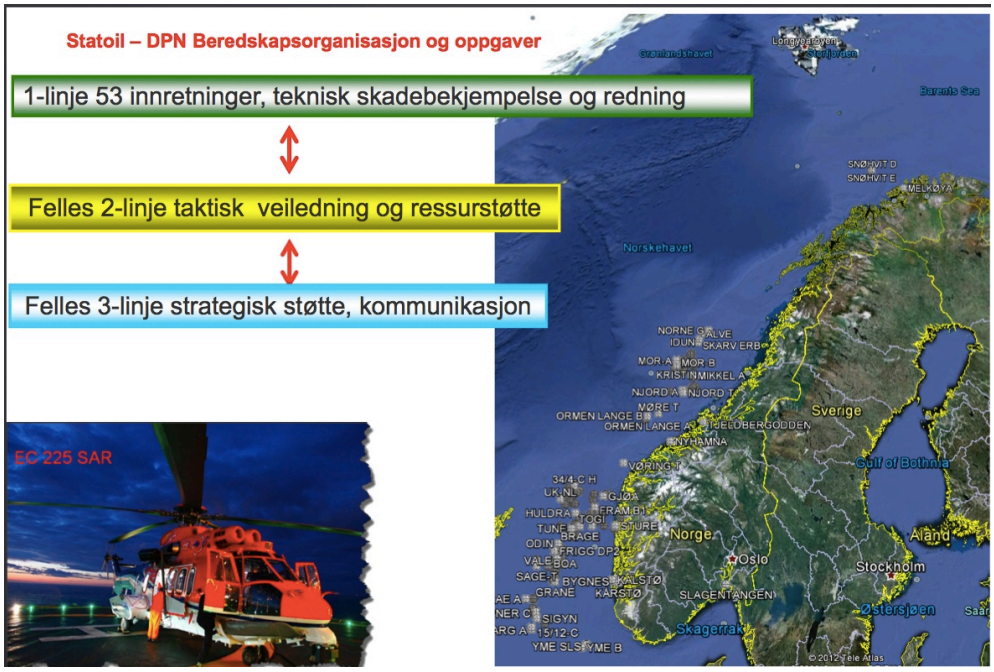
In the event of oil spills from offshore facilities, the operator will be responsible for combating the oil spill. The operators use NOFO to carry out all practical measures. NOFO may also use its agreements to collect national oil spill response resources, including those belonging to the Norwegian Coastal Administration (NCA, 2014, p.26).

4.1.6 Private support institution – the oil companies

Interview participant Johnsen in Statoil describes the private preparedness organization by the operating companies very well. Accordingly I have chosen to use his comments when describing the private emergency preparedness support institutions:

"As an operator at the NCS, oil companies need to implement a separate emergency preparedness system in order not to impose extra work for the community and external environment. This is a responsibility that applies to all operators at the Norwegian Continental Shelf. Operators at the NCS base their operational preparedness system on NOFO's emergency apparatus. Oil companies operate with a separate preparedness organization, but if an accident occurs NOFO will be integrated into the oil company's internal preparedness system, as they have a large number of standby vessels available. Oil companies will then cooperate with NOFO and provide resources to NOFO's emergency preparedness organization" (Johnsen, Statoil, 2015).

"The preparedness organization of operators at the NCS is divided into first, second and third line preparedness. The second line work to support the first line in action. This is called tactical support because the second line offer resources to the first line. Second line is also responsible for notifications and updating information as well as being collaborators. Third line is the strategic part based on long-term operations and response actions, aiming to preserve the organization when the incident is over. Today the second line has a flat structure composed of the preparedness manager, staff manager and other functions at the same organizational level. This is the best way of organizing emergency preparedness work in smaller crises. But for complex accidents one will struggle with this type of organizational structure. After the Macondo accident in the Mexican Gulf one could see that a flat emergency preparedness structure is not effective in large and long term oil spill accidents. As such, operators at the NCS need to alter their preparedness organization adjusting it for large-scale accidents" (Johnsen, Statoil, 2015).



Picture: Preparedness and response structure in Statoil (Stangnes, 2012, p.3).

4.2 Structure mechanisms in Norwegian emergency preparedness organizations

Norwegian emergency preparedness work is based on the principles of liability, conformity, decentralization and cooperation. Organizations with preparedness responsibility should be able to set up a crisis management unit with staff support functions. In order to maintain control and establish a structure for crises management and operations, the ability to mobilize and structure resources is essential (DSB, 2013, p.35).

One example of organizational structure in emergency preparedness effort is related to coordinating resources and activities in order to make the best use of their knowledge, skills and experience. Organizational structure may help to facilitate effective response actions in crises, due to solving problems of coordination and allocation of resources.

Cooperation is another structure mechanism important for effective emergency preparedness work. This means that government authorities, agencies and companies depend on a well-developed information system in order for the information flow to become easier between emergency preparedness actors. In order to achieve improvements related to response time in emergency preparedness work, it is important to quickly mobilize the right resources and response actions.

Furthermore, control is a structure mechanism important for efficient emergency preparedness operations. Control is related to fundamental information needed to determine whether the organizational goal is reached in relation to quality and effectiveness of emergency actions.

Lastly, communication is an important structure mechanism related to effective emergency preparedness actions. In order to get access to the same information, communication across authorities, agencies and departments must be in place. Promoting direct contact between different sectors and departments can be done through introducing a liaison role. This person is responsible for communication and coordination between departments in order to make cooperation and interaction easier.

From conducting in-debt interviews with relevant actors in Norwegian emergency preparedness authorities and agencies, I found that the most relevant structuring mechanism

for effective emergency response actions are related to coordination (e.g. allocation of resources), communication (e.g. information flow), cooperation and control.

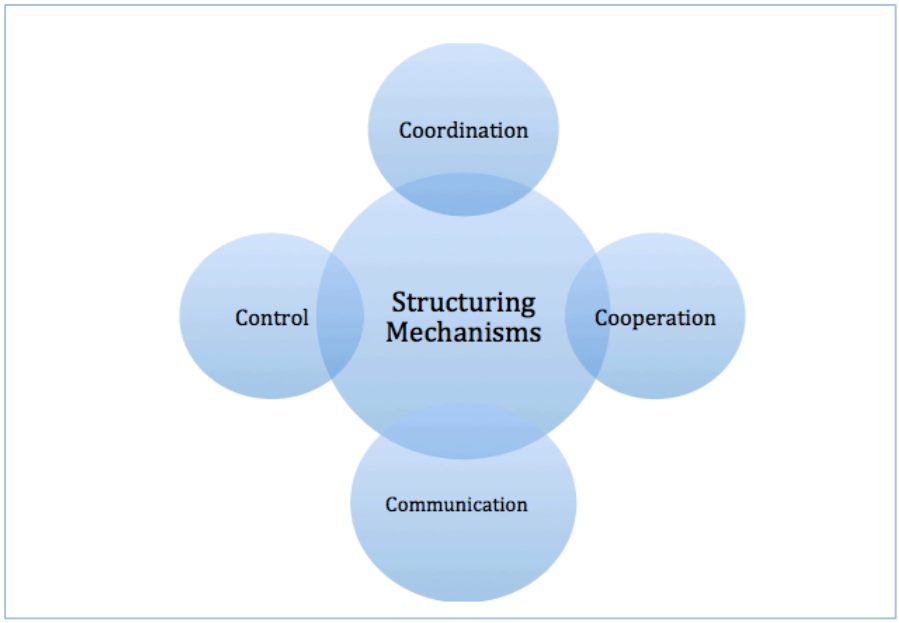


Figure 6: Structure Mechanisms

4.2.1 Coordination and control in Norwegian emergency preparedness organizations

Coordination and control of crises situations is structured in an inter-organizational way, which requires a clear command structure for allocating and mobilizing resources. There has been a need for administrative restructuring to achieve better coordination among agencies and departments responsible for the emergency preparedness management. Emergency preparedness management is about planning for crises situations in order to limit uncertainties and prevent damages. Emergency preparedness planning is important in order to mobilize resource and coordinate tasks.

If a crises situation occurs there will always be need for coordination, both within organizations and with partners, to ensure that ongoing and planned activities and resource allocation support each other. Coordination of resources is important for solving acute resource shortage and at the same time making sure that resources are used in a proper way. Effective coordination will provide better conditions for determine when resources may be recalled without weakening the crisis management effort and emergency response operations (DSB, 2013, p.43).

Interview participants from the Norwegian Directorate for Civil Protection (DSB) and the Norwegian Coast Guard state that achieving better coordination between emergency preparedness institutions can be done through establishing fewer and larger operational centers, where governmental authorities and agencies like the Norwegian Coastal Administration (NCA), the Coast Guard and the Joint Rescue Coordination Centre (JRCC) are located in the same building. This may improve coordination and obtain better cooperation between actors. Maintaining an ongoing information flow between emergency preparedness actors could help obtain a common understanding of the situation:
"Emergency actors should attempt to adjust in the same direction to attain an equal approach regarding allocation of resources, and mobilization of tasks and responsibilities" (Madsen, DSB, 2015).

In a Norwegian context, responsibilities are regulated between different actors through including the Framework Regulations §7. These regulations claim that the operator causing the pollution or oil spill is responsible for ensuring that all performed tasks, are linked to the requirements in the health, safety and environmental legislation (Ptil, 2011, p.89).

Interview participant from Statoil state as follows:
"One should have a clear command structure, where actors work towards the same overarching goal. It is important to have units with the same organizational structure, corresponding with the organizational goal" (Johnsen, Statoil, 2015).

Control is essential for measuring effectiveness of response actions. Emergency preparedness organizations can obtain control by having frequent status meetings, updating on the status of the incident. This way one can ensure that emergency institutions have the same situational picture, which makes coordination, cooperation and communication between institutions easier. Norwegian emergency institutions may also obtain control by carry out exercises and trainings to practice on real situations that might occur:

"In order to obtain control one should have frequent status meetings, especially in the early phase of the incident, as the situations may change rapidly. This way one may get access to crucial information important for managing response activities" (Bjerkemo, NCA, 2015)

"In order to improve coordination and control across emergency preparedness actors, it is important to perform training and exercises several times a year, practicing on allocation of resources and responsibilities" (Lysgaard, NOFO, 2015).

4.2.2 Cooperation in Norwegian preparedness organizations

Theory claims that crises involve threats to individuals and organizations, and therefore bring an acute demand for necessary resources. As such cooperation is the way to get access to scarce resources (Svedin, 2009).

"It is important to start oil recovery operation as soon as possible, to prevent drift and spread. One must have a dialogue and cooperate across authorities and agencies in the response work" (Bjerkemo, NCA, 2015).

"Emergency preparedness organization should be as similar as possible across emergency preparedness institutions. Looking at responsibilities and boundary issues are important for establishing cooperation between preparedness institutions" (Madsen, DSB, 2015).

"Performing exercises and trainings show that cooperation is efficient when we do exercises to clarify responsibilities between institutions" (Lysgaard, NOFO, 2015).

4.2.3 Communication between Norwegian emergency preparedness actors

The Norwegian Directorate for Civil Protection state in their report from Exercise Barents Rescue (2013) that: *"many resources are available, and that there is a major challenge within the exchange of information and coordination between authorities at national and international levels"*. Improvements in horizontal and vertical communication at strategic, operative and tactical levels are required. The main purpose of the Exercise Barents Rescue was to improve communication, cooperation and coordination between countries and authorities that may become involved in emergency incidents in the Barents region. There is a need for developing approaches for increasing efficiency of international cooperation in emergency prevention, preparedness and response systems (DSB, 2013, p.7-10).

Interview participants from DSB and NCA state that: *"it is important that government authorities and agencies communicate and share information, in order to maintain continuously communication and information flow across institutions. Emergency preparedness solutions must be planned, practiced and well known at all levels".*

"Information flow between agencies could have been better, for example if we could establish a common operation center where government authorities and agencies could be located in the same building. This could improve cooperation across departments. If we could use the same GPS transponder system as the police it would be easier to know who is where and which resources that is available" (Kristiansen, Coast Guard, 2015).

"Emergency preparedness actors should adapt to the new "Nødnett" – a Norwegian Public Safety Network, which is built out across the country. Since Norway is a small and elongated country we need to implement equal emergency preparedness systems in order to improve communication across institutions, and cope with different response actions" (Madsen, DSB, 2015).

4.3 International assistance - Organization of Host Nation Support

The Norwegian Directorate for Civil Protection (DSB) has on behalf of the The Ministry of Justice and Public Security, developed a guide for Host Nation Support, stating how to request, receive, support and end international assistance needed in large-scale accidents and disasters that demands extraordinary amount of resources (DSB, 2014, p.6). The key goal of Host Nation Support is to avoid unnecessary delay and complications when receiving international assistance.

Host Nation Support is used by international organizations that work with disaster management. Introducing international support in the emergency preparedness management aims to gather crucial resources and get access to necessary equipment in preparedness operations. International assistance is needed when the host nation are unable to control the impacts of the crises situation themselves. For instance if the Norwegian governmental authorities could not manage to control a large-scale blowout in the Barents Region alone, as a consequence of lack of necessary resources and equipment. Cooperation between emergency preparedness institutions experience difficulties both due to strict requirements from bringing equipment and resources across the border. Secondly, organizational and

structural differences may lead to complications in communication and cooperation on response actions. Hence, there is a need for a broadly elaborated plan for how to organize international assistance in crisis situations.

"The Norwegian Directorate for Civil Protection (DSB) together with the Norwegian Coastal Administration (NCA) are establishing guidelines for how to introduce Host Nation Support to Norway" (Pedersen, DNV GL, 2015).

"Introduction of Host Nation Support must be well known and embedded in action plans, and rehearsed during annual emergency exercises" (Madsen, DSB, 2015).

The elaborated guidelines for introducing Host Nation Support to Norway describes how to request, receive, support and end assistance from other nations. The first thing to happen when assistance is needed from abroad is that the responsible authority in Norway makes a formal request. In most cases this type of request follows a fixed routine via established channels by a Norwegian competent authority. In other cases this may be regulated by a bilateral or multilateral agreement signed by the respective authorities (See appendix 2).

DSB has established a national contact point. DSB's national contact point is staffed 24 hours a day, and has established fixed lines of communication and procedures with NATO, the EU and the UN. DSB may, via their national contact point, send requests for international assistance at any time. During oil spill preparedness accidents, the responsibility for requesting international assistance lies with the Ministry of Transport and Communications and the Norwegian Coastal Administration.

Once a request for international assistance has been sent, an assessment must be made of whether receiving this assistance will require extra resources for Norway in relation to following up these resources during response operations. When receiving international assistance one may establish a contact person responsible for communication between the requisitioning authority and the incoming personnel. A useful function is the HNS liaison, which will function as a link between the Norwegian authorities and the incoming personnel.

The operation will end when the responsible authority regard the situation as under control, which means that the contribution of the incoming resources from international disaster response teams or equipment is no longer needed. During this phase, equipment will be

returned to its home country to the extent that this is possible. If the equipment is left in Norway, the responsible authority or agency must deal with it. This is particularly relevant if the equipment represent a threat to the environment or society (DSB, 2014, p.11-20).

Interview participants from the NCA, Coast Guard and DSB claims that implementing Host Nation Support in Norwegian emergency preparedness plans, aims to contribution of Norwegian emergency preparedness actors increasing their knowledge on how to introduce assistance from other countries. One need to know how to cope with and handle border crossings at land or at sea. It is necessary to have forces that can assist with accommodation and equipment for those who are there to assist during crises situations:
"If the NCA has a large-scale accident requiring assistance from other countries they will ask for it. The personnel arriving to give assistance need to be followed before, under and after the response action" (Bjerkemo, NCA, 2015).

Operators at the NCS identify that there is a need for improvements on how to introduce international support:
"It is always problematic to receive resources and equipment across borders. One must be given clearer guidelines on how to introduce international assistance, in order to know who is responsible for performing different tasks" (Johnsen, Statoil, 2015).

4.4 Operational context in the Barents Sea

The increased activity in the Arctic region increases the vulnerability related to human safety, environmental damages, physical installations and vessels. As the Arctic region has a scarcity of resources it is more vulnerable for critical incidents like blowouts from oil installations. In emergency operations there is a need for critical resources and necessary infrastructure in order to respond and mitigate to the crises situation. The resource challenges in the Arctic region are related to equipment, personnel and organizations (Borch & Andreassen, 2015).

Because of increased oil and gas activity in the Barents Sea, there is a need for developing an understanding of emergency preparedness management in the region. Perceiving knowledge in how to cope with and mitigate consequences of large-scale oil spill incidents is essential. The need for available resources such as well trained and skilled personnel are required in this

region. Development for coordinating local and regional plans with the national plans are required in order to establish a common understanding (DSB, 2013, p.6).

"There are 54 blocks in the Barents Sea, whereas 34 of these are located at the border to Russia in the Northeastern part of the Barents Sea. This triggers logistic challenges related to drilling and exploration in the area because of long distances. Skilled and trained personnel are required in the Barents region to cope with contextual challenges" (Pedersen, DNV GL, 2015).

The Arctic is defined as the area north of the polar circle, where oil and gas activities are challenges by contextual difficulties such as long distances to civilization, limited infrastructure and low temperatures. As such, there is a need for extra competence and new knowledge, as well as creating capabilities of maritime activity in the region. It is important to understand the effects of complexity in offshore commercial operations. There is a need for new knowledge about how to increase safety from operations and efficient exploitation of offshore opportunities in the region (Borch & Andreassen, 2015).

"Contextual challenges in the Barents Sea are related to climate, wind, harsh temperatures (e.g. winters are long and cold with ice covered and dark areas) and infrastructure. Large distances between the installations cause emergency actions to take longer time" (Bjerkemo, NCA, 2015).

Contextual complexity is related to geographical and environmental differences in where the offshore installations are situated. Different location calls for different emergency preparedness plans and organizational structure in how to organize and mobilize resources, and get access to necessary equipment in crises situations. Interview participants from DNV GL, Norwegian Coastguard, NCA and NOFO claim that the climatic conditions are different in the Barents Sea compared to the Norwegian Sea:
"It is colder and harsher climate in the north, which requires improved technology, complex equipment and necessary infrastructure because of longer distances to civilization, as the fields being established further out".

"Because of complex organizational context there is a need for emergency preparedness plans comprising specific actions performed in a certain environment" (Johnsen, Statoil, 2015).

"Uncertainty arises because organization's faces difficulties finding necessary resources and information, and because situations change unpredictably" (Madsen, DSB, 2015).

"Responsibilities and roles need to be the same regardless of which geographical area the installation is located in. But in the Barents Sea one have to think different according to logistics and allocation of resources due to longer distances" (Bjerkemo, NCA, 2015).

4.4.1 Specific challenges of oil recovery operations in the Barents Sea

Oil and gas industry is moving further north as a consequence of the expansion in oil and gas activities in the Arctic. Moving further north requires improvements in research and development of offshore oil and gas activities, equipment and infrastructure. There are challenges related to natural conditions in parts of the year. Challenges are related to the fragile environment in the Arctic region, containing difficult work conditions due to low temperatures, wind, poor visibility, longer periods of darkness, and drifting sea ice. Other challenges are related to long distance from shore, making rescue operations more difficult, as well as logistic challenges connected to transport of personnel and equipment.

Shipping traffic in the waters north of the coast of Finnmark and up to Svalbard is expected to increase in scope during the next five years. As such, there is a need to develop new knowledge and technological and commercial solutions to cope with the challenges that oil spill recovery operations in the Arctic region will meet. Challenges in the north are related to limitation in coverage and capacity in telecommunications, and large distances from shore, resource depots, crew, workshops, service and airports. Varying ice conditions require different preparedness materials and vessels compared to further south on the Norwegian Continental Shelf. Access to efficient logistics solutions will be a major challenge for all types of operations in the northern areas. Personnel and material need to be transported out to the primary area during oil spill response operation. Because of longer distances one need to use helicopter transportation instead of vessels (Regjeringsutvalg, 2015, p.35-36).

"As fields are being established further out in the sea, helicopters will pass a border point, the "Point of no return" where it is not possible to fly back and forth without stopping for refueling. As such, there is a need for establishing refuel-installations between shore and offshore installations. When restrictions state that personnel should be in hospital within four hours, flight time out to installations will be a crucial factor. Transport by helicopter is vulnerable in the Arctic area, due to cold and harsh climate. There is a need for improvements of knowledge in frequency of helicopter accidents" (Pedersen & Persson, DNV GL, 2015).

4.5 Summary of Empirical Chapter

In this chapter I have presented the empirical findings of the thesis. The primary data used in the empirical chapter is collected from interview participants in Norwegian government authorities, agencies, directorates and operators in the oil industry. Secondary data is collected from articles and government documents. This chapter is divided into four parts, first presenting the structure of Norwegian emergency preparedness organization. Secondly, this chapter introduces coordination, control, communication and cooperation as important structure mechanisms for achieving an effective preparedness system. Coordination and control includes allocation of resources and mobilization of tasks in a best possible manner to cope with crisis situation. Cooperation and communication across emergency preparedness institutions is essential for conducting effective response operations. Thirdly, this chapter presents international assistance by looking at the introduction of Host Nation Support in Norwegian contingency planning. Lastly, context is presented

Further, in the analysis chapter, the empirical data will be discussed and linked with the theoretical framework. Here I will look further into the four structure mechanisms, and include the importance of structure mechanisms in relation to managerial roles, Host Nation Support and operational context.

5.0 Analytical chapter

In this chapter I will carry out the analysis of the empirical findings and relate these to the problems presented in the introduction chapter.

5.1 Structure mechanisms of Emergency Preparedness Organizations

Emergency preparedness systems are established to assist oil companies if crises situations occur. Norwegian emergency preparedness system builds on a well-elaborated structure called the Unified Management System "Enhetlig ledelsessystem" (ELS). Norwegian emergency preparedness organization consists of governmental authorities and agencies contributing in the response operations, intended to help operators if blowouts from oil installations occurs. Emergency preparedness organization aims to mobilize and allocate resources, and coordinate information flow across institutions, with the intension to minimize the effects and risks appearing from large-scale accidents such as oil spills.

Daft (2004) claims that organization exists when people interact with one another to perform essential functions that help attain goals. The overall goal for emergency preparedness institutions is reducing environmental impacts of oil spills. Reaching a goal will in the case of emergency preparedness organization implicate using important structure mechanisms such as coordination (e.g. allocation and mobilization of resources), control (e.g. monitoring and measurements of response actions), communication and cooperation, in order to cope with the incident as soon as possible, and thereby prevent harm on the environment.

The theory presented in this thesis claims that structure is about coordinating resources and controlling internal activities in an organization (Anthony & Gales, 2003). Organizational structure is seen as a formal system of tasks and authority relationship with the purpose to control how organizations coordinate their resources to achieve organizational goals. Emergency preparedness organizations coordinate their resources in order to ensure that emergency preparedness actors are familiar with their roles and responsibilities. Coordination of resources may also contribute to solving lack of resources that are essential for response actions. Resources need to be used in a proper way, meaning that different situational aspects create demand for efficient mobilization of resources and equipment.

Mintzberg (2009) claims that organizational structure includes division of the work into units, allocation of resources and responsibilities among actors, and a hierarchy of authorities. Empirical findings correspond with the theory, claiming it is important to have units with the same organizational structure, corresponding with the overall organizational goal. Norwegian emergency preparedness organization is structured in a hierarchy of three different levels; strategic, operational and tactical level. The overall strategic level includes organizational goals, values and strategies to establish an effective emergency response organization. Operational level is responsible for planning, coordination and allocation of resources.

Organizational structure describes the internal relationships, division of labor and coordinating activities within the organization. Structure mechanisms such as coordination, control, communication and cooperation are important for effective management and division of labor across national and private emergency preparedness actors. Adapting and implementing specific structure mechanisms into emergency preparedness organization, is essential in order to gain effective response actions, with the best available resources and equipment. The figure below emphasizes how structure mechanisms together with other factors such as international support, managerial roles and operational context affect the overall organizational goal. The organizational goal refers to accomplish an efficient and elaborated emergency preparedness system, where all emergency institutions follow the same structure, plans and guidelines.

Figure 7: Factors affecting the organizational goal for preparedness institutions

5.1.1 Control

Span of control refers to measure performance and effectiveness of emergency response operations. Control systems may provide necessary information needed to determine whether the overall organizational goal was reached in relation to quality and effectiveness of emergency actions. An essential control mechanism is related to holding frequent status meetings in order to update emergency actors on the situational and operational status. Especially in the first and acute phase of the incident, it is necessary to hold regularly status meetings, as the situation may change rapidly. The Norwegian Coastal Administration elaborates action plans aimed as a steering document for coordinating roles and responsibilities during crises incidents. *"In order to obtain control one should have frequent status meetings, especially in the early phase of the incident, as the situations may change rapidly. This way one may get access to crucial information important for managing response activities"* (Bjerkemo, NCA, 2015). In order to maintain control and measure effectiveness of response actions, empirical results show that Norwegian emergency institutions carry out exercises and training several times a year to practice on real situations. Norwegian emergency organizations are among the best nations in the world conducting exercises that emphasizes being approximately equal to critical incidents that might occur at the NCS. Annual exercises conducted are the Barents Rescue Exercise between Norway and Russia, oil on ice and oil on water exercises where real oil is released into the sea or into the ice in order to get an accurate perception on how these crises situations can be managed across governmental authorities, agencies and private companies. Emergency preparedness institutions prepare reports evaluating the response work, both in relation to the work performed during response work of real situations, and also after conducting exercises and trainings. After the Macondo accident many reports were written in order to learn from mistakes where allocation of resources and division of roles and responsibilities failed.

"We are not good at evaluating response work across institutions. "Lessons learned" and "Lessons Identified" is connected to identifying what to learn from previous accidents. "Lessons Implemented" is related to transferring value from failing and struggling, by creating a learning structure that works across government authorities and agencies" (Madsen, DSB, 2015).

5.1.2 Coordination

Coordination and control of tasks are essential in organizations. Coordination of tasks refers to the relationship between taking decisions regarding resources, and the processes used to achieve a desired outcome (Borch & Andreassen, 2015). Different structures and mechanisms are established to ensure effective coordination of resources. These are international agreements, contingency plans and operational guidelines such as the ICS and ELS. In order to obtain efficient coordination, emergency preparedness activities requires people with specialized skills and experience. It is essential to obtain knowledge regarding which actors that are responsible and able to perform specific activities. Coordination theory is attached to resource allocation, which is needed in order to manage the dependencies among activities (Malone & Crowston, 1994). The aim of coordination theory is to clearly define processes and improve organizational performance, in order for emergency preparedness actors to reach a common goal (Crowston, 1997). Empirical findings show that coordination across emergency preparedness institutions could be better if one had access to the same information system and same physical picture of the situation. Dependencies between activities are important for effective response operations, meaning which activities to be performed first and which activities to be carried further during crises incidents. Through establishing fewer and larger operational centers where national emergency institutions could be located in the same building, one could improve cooperation and communication between institutions. Getting access to the same information is important for receiving a common situational understanding, and for clarifying response activities that need to be performed.

5.1.2.1 Training and exercises

Conducting exercises, training and courses is a very important part of the coordination, capacity building and skills maintenance for emergency preparedness organizations. The NCA conducts annual exercises with neighboring countries. According to the Norway-Russia-Agreement (cf. appendix 2) one has implemented exercise Barents Rescue, which is an annual search and rescue exercise and oil spill exercise between Norway and Russia. These two countries alternate annually to be the host nation of the exercise, and the exercise area is always located at the border area between the two countries.

According to the Copenhagen Agreement (cf. appendix 2) one has implemented regional and annual exercises between Norway, Denmark and Sweden in the Skagerrak Ocean, where the three countries practice on cooperation regarding division of tasks, roles and responsibilities

(Regjeringsutvalg, 2015, p.25). *Norway practice "oil on water" exercises together with Denmark and Sweden according to the Copenhagen Agreement. Norway is the only nation who is allowed to drop real oil on the sea in order to practice "oil on ice". Norwegian development of oil spill response equipment is better than in other countries because they are allowed to drop real oil on the sea and at the ice to try out systems"* (Madsen, DSB, 2015).

Empirical results discover that experiences from practicing and training show that situational awareness and common understanding is important to succeed with cooperation. It is important to possess a common understanding of how to solve tasks. Cultural differences may contribute to differences in the way tasks are solved, which can lead to misunderstandings and failures in communication: *"If a large-scale blowout in the Barents Sea occurs, there is a need for more resources in order to coordinate the rescue and response efforts. We need to constantly test the equipment in order to see if it works well. There is not a question if, but WHEN an accident occurs"* (Kristiansen, Coast Guard, 2015).

"A business with emergency responsibilities should practice regularly and varied to strengthen its ability to deal with extraordinary events. The benefits of performing training and exercises are related to identification and clarification of roles and responsibilities, as well as coordination of resources across institutions, and creating a joint situational picture in crisis communications" (Madsen, DSB, 2015).

Norwegian emergency institutions also practice on real situations by using "Table-top" exercises. Here they discuss real situations over the table, and try to emphasize what tasks to be performed, which roles and responsibilities need to be implemented, and how to cooperate across institutions to achieve a desirable outcome of response actions. "Table-top" exercises are easy to perform, as they are associated with low implementation costs, as well as being effective in order for emergency institutions to cooperate and discuss how activities should be performed. Empirical results shows that both national and private emergency preparedness institutions, find it important to practice on real accident that might occur at the NCS or in the Barents Sea. *"One can also practice on coordination of resources and cooperation through performing "Table-top exercises". This is a paper exercise where governments, agencies and operators go together. One example of a Tabletop exercise was a case where Statoil were responsible for an oil spill where oil drifted towards Russia. Here they discussed "over the table" what to do. Using tabletop exercises is related to low implementation costs, and at the*

same time it is very effective in order to clarify procedures and activities that should be performed" (Bjerkemo, NCA, 2015).

5.1.3 Cooperation and communication

Large-scale environmental crises such as blowouts from offshore installations, requires cooperation and communication between private companies, governmental authorities, local agencies, and volunteers. Cooperation is an effective and efficient way to be more resilient in case of threat from critical environmental incidents such as oil spills. Crises bring an acute demand for resources, as a consequence cooperation and communication between emergency institutions is the way to get access to scarce resources.

Large-scale incidents and catastrophes result in a massive and sudden pressure for information from the media, which affects citizens, politicians, partner organizations and others. Communication becomes a very important task during crises situations. Coordinated crisis communication can help to ensure relevant information about the incident and what response actions that will be done. Viewed from a crisis communication perspective, the goal of crisis management must be that correct communication of a message can help bring the situation under control (DSB, 2013, p.40-41).

Empirical results show that it is important to have dialogues promoting cooperation between government authorities and the industry: "*It is always a challenge to get in contact with the right people that possess the necessary expertise and skills. Exchange of information between institutions is important in order to know who is situated where according to resource capacity"* (Bjerkemo, NCA, 2015). Getting access to the right people, with necessary expertise and skills may be a challenge if cooperation and communication across emergency institutions does not function optimally.

Daft (2004) claims in his theory that organizations should be designed to provide both vertical and horizontal information flow. Vertical information linkages is divided into a hierarchical structure, and used to coordinate activities between the top management and lower level. On the other hand, horizontal information linkages refer to communication across departments, and are based on the organization to routinely exchange information about problems, opportunities, activities and decisions. Empirical results discover that emergency institutions use both vertical and horizontal information linkages when communicating across

departments and organizations. Vertical or hierarchical information flow is when the leader role such as the "scene commander" gives orders of which tasks to be performed by the specific resources. Horizontal linkage is where emergency institutions communicate across departments inside their own organization, but also across other organizations. Empirical results show that it is essential that government institutions obtain a continuously communication and information flow across institutions, in order to achieve the same situational picture of the incident. Establishing a liaison role is necessary for efficient communication and coordination across emergency institutions. Theory claims that the liaison function as a communication center between departments, and is located in one department but responsible for communicating and achieving coordination with another department (Daft, 2004). Establishment of a liaison role in emergency institutions is further indicated in the empirical results: *"We use a Liaison as a communication tool to exchange information, experience and status across institutions and departments. All emergency preparedness authorities and agencies have implemented a liaison. This is a person who acts as a communication center between departments"* (Lysgaard, NOFO, 2015).

Further empirical analysis disclose that in order to improve cooperation and communication between Norwegian emergency institutions, Norwegian emergency organizations may adapt to the Norwegian Public Safety Network "Nødnett", which is built out across the country. The Public Safety Network is not connected to the mobile network. This way all conversations maintains secret for the public. Being connected to the same network will make cooperation and communication across institutions easier. Developing standards with common concepts and expressions need to be implemented, in order to ensure improvements of cooperation, communication and establish a common understanding across institutions. Interview participant from DNV GL state as follows: *"After the "Full City" and "Godafoss" accidents one has experienced that equal concepts and definitions are important to put in place, in order to improve cooperation and communication across emergency preparedness institutions. Therefore one has established a technology group called AF-term (afterm.no), where the Norwegian Coastal Administration (NCA), the Norwegian Clean Sea Association for Operating Companies (NOFO), the Norwegian Directorate for Civil Protection (DSB), the fire department (NBSK) and the Norwegian Language Council (Språkrådet) participates to ensure similar definitions of the different concepts"*.

Summary

This subchapter elaborates on the different structure mechanisms important for emergency preparedness organization. The table below is illustrated to get an overview of the structure mechanisms related to horizontal or vertical level.

Structure mechanisms:	Horizontal linkage:	Vertical linkage:
Coordination: - Resource allocation	Resource allocation across departments and institutions at the same level	Leaders/managers delegates task to employees at lower level
Control: - Status meetings and training	Performing training and exercises across emergency preparedness institutions	Frequent status meetings to exchange information between emergency actors at different levels
Cooperation and Communication: - Information flow	Liaison role	Information flow between lower and higher level

Table 3: Structure mechanisms at horizontal and vertical linkage

Structure mechanisms important to strengthen emergency preparedness organizations are related to coordination, control, cooperation and communication. Coordination refers to allocation and mobilization of resources, control refers to monitoring and measurements of response actions, whilst cooperation and communication refers to information flow and information sharing across emergency preparedness institutions at national and private level. The table above illustrates horizontal and vertical linkages in relation to the different structure mechanisms. Vertical division of roles and responsibilities refers to having leaders that command and delegates tasks and responsibilities downward in a hierarchical system. Horizontal division of roles and responsibilities refers to mobilization and allocation of resources across institutions, in order to maintain that available resources, and skilled personnel are used properly.

Vertical structure of control refers to the importance of having frequent status meetings where information inside and outside the organization is exchanged between actors at top and lower

level, aiming to increase the efficiency of response activities. Horizontal structure on the other hand refers to performing exercises and trainings across emergency institutions, to practice on real situations that may occur.

Cooperation and communication are linked to exchange of information in order to perform response activities the most effective way across institutions. Horizontal linkage of cooperation and communication refers to creating a special liaison role, intended to establish direct contact between emergency actors in different departments. Vertical structuring of cooperation and communication refers to information flow between the top management and lower level in order to reach the same situational picture and understanding of the situation, between different emergency actors.

5.2 The relationship between managerial roles and structuring mechanisms

After the Macondo accident one experienced that there was a potential to exploit the overall oil spill response resources more efficiently by ensuring that they were in the right place at the right time (Regjeringsutvalg, 2015, p. 34). Empirical results uncovers that it is necessary to have clear definitions of roles and responsibilities: *"Establishing an action plan is important in order for human resources to know what responsibilities they are obliged to, and what authority they have to take decisions and acquire key resources"* (Madsen, DSB, 2015). It is important that emergency institutions obtain a clear picture of roles and responsibilities in advance, as it is essential that the right resources are available in the right place and at the right time. People having necessary experience and skills to perform specific tasks need to be involved at the right time. Effective response actions rely on people participating in response activities to be familiar with their roles and responsibilities. One can see that empirical findings agrees with the organization theory, claiming that complicated tasks should be divided between people with different skills, knowledge and education into departments where one can benefit from their knowledge (Anthony & Gales, 2003).

Handling crises incidents requires a leader who plans and conducts the effort, disposes resources, and performs other tasks imposed by the management. The same person may cover several functions, as a result of not using more staff than the situation demands. During long lasting incidents, it is essential that one in an early phase plan for replacement of personnel in order to ensure the organization's endurance over time. Personnel manning the individual

functions must be trained and have the necessary expertise and skills to solve specific tasks. Personnel must be given the necessary authority to perform required tasks, and it is essential that the organization provide responsibility and authority to personnel (DSB, 2011, p.11).

Emergency incidents are associated with undesirable and changing situations and are therefore seen as complex. Complex situations requires the right resources and equipment in order to combat with the accident as soon as possible in order to mitigate harm on people and environment. There are some managerial roles necessary for obtaining effective emergency response operations. Mintzberg (1973) claims that managerial roles within an organization can be classified into whether responsibility is related to interpersonal, decisional and informational roles. Empirical results found that there are different roles emergency preparedness institutions need to possess in order to handle crises situations. The most important interpersonal roles emergency institutions need for effective response actions, are the liaison and the leader role. Liaison is responsible for coordination and communication between different departments, and establishes alliances between organizations in order to obtain efficient resource allocation. The leader is responsible for giving direct commands and orders to their subordinates, and take decisions regarding the use of human resources. One example of a leader role in emergency organizations is the scene commander or "aksjonsleder". This person must maintain an overview of the situation in order to allocate the right resources, and perform and delegate response tasks. There are two roles related to decisional responsibilities among emergency organizations, the disturbance handler and the resource allocator. The disturbance handler role is a person who moves quickly to take corrective action to deal with unexpected problems from the external environment affecting the organization. This is often related to crises situations such as oil spills. Resource allocator is a person who allocates the available resources in the organization among different tasks and departments. Lastly, the most important informational role related to emergency preparedness organizations is the monitor. The monitor's role is to maintain control by evaluating the performance of emergency preparedness activities, and take corrective actions to improve their performance. This person is responsible for information sharing inside organizations and units.

Leaders are responsible for establishing an organization consisting of people with a combination of skills, strength and endurance that are related to risk, complexity and duration. Personnel managing individual functions must be trained and possess the necessary skills in

order to solve different tasks. People working in emergency preparedness organizations must be given the necessary power and authority to take decisions and carry out mandatory tasks. Personnel involved in emergency preparedness organization must be confident in their roles, possessing the ability to cooperate and interact (DSB, 2011, p.11).
"It will make the best out of the response actions if people participating in the response work are familiar with their responsibilities" (Bjerkemo, NCA, 2015).

Division of tasks are structured in two ways: either *division of labor*, referring to structuring of tasks in a way so that non-specialists can perform them. On the other side there is *personal specialization,* which refers to work done by specialists. Emergency preparedness organization is related to personal specialization, which consists of people with knowledge and education, who are trained for difficult and specific tasks with the use of special equipment and techniques (Baccarini, 1996, p.202). *"It is important to gain a clear picture of roles and responsibilities in advance. One must have crucial resources available at the right time and in the right place, meaning people who have the necessary skills and knowledge to perform specific tasks must be in place"* (Kristiansen, Coast Guard, 2015).

5.2.1 Managerial challenges

I wanted to find out what challenges that are related to management and leadership roles during large-scale oil spill operations.

First of all:
"When many actors are involved in response actions, it may create difficulties of coordination. Large-scale accidents are long lasting, demanding continuous and constant work. This makes management difficult, because long lasting and large spills require more recourses and capacity. Human resources participating in the response work will be exhausted over a longer period of time, causing struggle on the organization" (Bjerkemo, NCA, 2015).

Secondly:
"Managerial challenges are related to getting access to qualified personnel who can support the response work" (Lysgaard, NOFO, 2015).

Thirdly:

"There is a challenge to acquiring an accurate picture of the situation at any given time" (Kristiansen, Coast Guard, 2015).

Lastly:

"Managerial challenges are related to lack of splitting up response actions. This means that number of heads, number of tasks and number of functions you should cover must be manageable. One should split up response action in order to build manageable control spans" (Madsen, DSB, 2015).

Empirical results identifies that large-scale and long lasting incidents such as the DwH accident requires more resources and capacity because of continuous and constant response work. After some time the human resources participating in the response work will be exhausted, which may cause struggle on the organization. Hence there is a need to clarify roles and distribute tasks in the beginning of the response work, so one can plan for support of the existing resources. Getting access to experience and qualified personnel to support emergency preparedness actors during long lasting response work may be difficult. Another managerial challenge is related to obtaining an accurate picture of the situation. This may be possible by increasing horizontal and vertical communication across emergency institutions. Managers responsible for managing resources and tasks during emergency response work may have challenges related to control of response actions. Understanding that number of heads, number of tasks and number of functions the leader should cover must be manageable.

The figure below gives an overview of the managerial challenges one may meet during emergency response work.

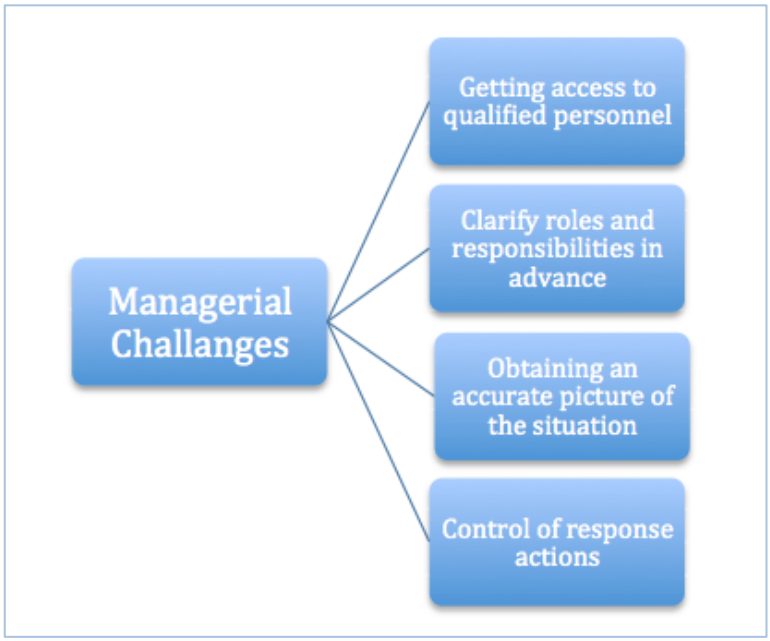


Figure 8: Managerial challenges

Summary

This subchapter looks into the relation between managerial roles and structure mechanisms. Empirical results and theory disclose that complicated tasks should be divided between people that have the necessary experience and skills to perform specific tasks. Roles and responsibilities need to be defined in advance of the response operations, in order to ensure that crucial resources are available at the right time and place. The table below explains the use of managerial roles in relation to structure mechanisms important for effective response actions.

Use of managerial roles:	Limited	Extensive
Coordination (e.g. resource allocation)	High level	Low level
Control – measures (e.g. status meetings, elaborated action plans, trainings)	High level	Low level
Cooperation	Strong	Weak
Communication	Horizontal information flow	Vertical information flow (Hierarchical structure)
Contextual challenges	Small extent	Large extent
International Support	Not implement HNS	Implement HNS

Table 4: The use of managerial roles in relation to structure mechanisms

First, this table explains that high degree of coordination and control requires limited use of managerial roles, whilst low degree of coordination and control requires extensive use of managerial roles. When plans and procedures are well elaborated, where division of tasks and responsibilities are predetermined, emergency actors will be familiar with their responsibilities. As such, there is not an urgent need for managerial roles delegating tasks or coordinating resources. On the other hand, managerial roles are required in emergency preparedness operations where roles, responsibilities and tasks are not clearly organized and predetermined. Control involves measurements and monitoring of response actions by elaborating actions plans, holding status meetings and performing exercises and trainings. The higher level of control inside organizations, the less demand for managerial roles to coordinate tasks and resources.

Strong degree of cooperation and communication across emergency institutions requires limited managerial roles, as information flows easily between emergency actors and across institutions. Weak degree of cooperation and communication will require extensive use of managerial roles because emergency actors will not obtain the same situational picture and understanding due to poor information flow across institutions and units. In order achieve improvements of communication across departments, emergency institutions may establish a liaison role responsible for horizontal communications across institutions. Vertical information requires extensive managerial roles, as there is a need for more managers or leaders commanding or delegating tasks and responsibilities to subunits.

Contextual challenges are related to specific natural conditions such as climate, weather and wind. It is also related to logistic and transportation due to distances from civilization and shore. The Barents Sea holds more contextual challenges in relation to the North Sea further south on the NCS. The larger extent of contextual challenges, the more demand for managerial roles during response actions.

Introducing Host Nation Support will demand greater need for managerial roles, as the resources coming to assist during crisis situations need to be implemented into the Norwegian emergency preparedness organization. The resources coming to give their assistance need to be delegated roles and tasks related to the performing specific response activities, which demands more managerial roles. As such, there is a need to request resources that have necessary knowledge and experience, and are familiar with different types of equipment designed for Norwegian conditions and contexts. On the other hand, if the governmental preparedness system is able to handle the crisis situation without requesting international assistance this may be more beneficial. Implementing Host Nation Support will require energy and effort from the regular emergency organization, as they need to adjust to international emergency actors.

5.3 The relation between Host Nation Support and the structuring mechanisms

Emergency preparedness institutions need to have knowledge about what type of incident it is, and when to request assistance from other countries. Moreover, it is important to get hold of people that are able to handle equipment coming from other countries. Managerial roles that are important for implementing Host nation Support are linked to vertical and horizontal information flow. Empirical results show that introducing Host Nation Support requires resources and equipment that are able to adapt to Norwegian environment and contextual conditions. The way one organizes response actions in Norway is not certain to be efficient in another situational context. Different wave heights, climate or oil type, create different challenges, which requires another type of technology and equipment, and other types of material and personnel. Managerial roles important for implementing Host Nation Support are related to coordinating border crossings at land or at sea. One may establish a liaison who will meet people at the border, and who have necessary knowledge in how to handle situations related to allocation of resources. Receiving resources and equipment across borders may be problematic due to different laws and regulations governing what type of equipment one are able to bring across the border. Accordingly, operators state that there is a need for clearer guidelines on how to introduce international support, in order to know who is in charge and have the authority to allocate resources and make decisions respecting coordination of personnel and equipment. There should be a system with clear definitions of roles and responsibilities when implementing Host Nation Support.

The Norwegian Directorate for Civil Protection (DSB) administers a team of Norwegian EU experts with varied experience from international missions during emergencies and disasters. Some of these experts can be offered as liaisons, with the function to be a link between international actors and Norwegian emergency institutions leading the response efforts. The liaison can perform tasks such as receiving international personnel and provide situation updates. The liaison should simplify communication between actors and contribute to rapid deployment and good integration of international resources in the local rescue coordination centers (DSB, 2014, p.16-17).

Host Nation Support is developed in order to efficiently receive and deploy international assistance from other countries. The key goal of Host Nation Support is to avoid unnecessary delay and complications when receiving international assistance. Before receiving assistance from other countries (e.g. incoming personnel and equipment) there is a range of legal, financial and administrative regulations and requirements that need to be in place. One is to ensure efficient border crossing and provide a contact point (liaison role) between incoming rescue forces and national authorities. It is important to know how one can request international assistance, and how the support system can be organized in order to cooperate with relevant actors (DSB, 2013, p.30).

Empirical findings state that operators at the NCS identify a need for more elaborated guidelines of how to implement international assistance, bringing resources and equipment across the Norwegian border. It is important to plan how one in best possible way can support the incoming personnel providing assistance, so that they can perform their tasks in a best possible manner. Norwegian authorities and agencies state that it is important to establish a liaison role, being responsible for communication between national and international institutions. Empirical findings further identifies that people coming to assist need to possess necessary knowledge and skills for handling different equipment, as different situations and contexts requires different technology and equipment. For example oil spill preparedness during the Deepwater Horizon accident requires different technology and equipment compared to a large-scale blowout from offshore installations in the Barents Sea. From introducing Host Nation Support one can achieve shared situational awareness and conceptual understanding between countries in order to improve communication across borders. One may also achieve better overview of logistics, including what items that are available, and how long it takes to get this going.

Coordination is attached to resource allocation, which is needed in order to manage the interdependencies among activities. A common goal for Norwegian emergency actors is as mentioned to have necessary equipment, as well as experienced and skilled personnel available when crises situations occurs. If a large-scale incident such as a blowout in the Barents Sea occurs, empirical findings reveal that Norwegian preparedness effort will not succeed because there are lack of necessary resources and equipment to combat with the incident alone. As such one need to ask for international support from other nations, carrying skilled personnel and necessary equipment across the Norwegian border. Coordination

mechanisms needed to deal with Host Nation Support are illustrated in the figure below. First and foremost there is a need for introducing a guideline, stating when and how to request international assistance, and how to receive support. Secondly, it is essential being familiar with which managerial roles that are needed to receive international assistance. The liaison is responsible for communication between emergency actors, ensuring good integration of international resources into local emergency preparedness response work, by giving international resources necessary information and status update. The liaison will function as a communication center between national and international emergency institutions. Thirdly, it is essential that international resources coming to assist during large-scale incidents have necessary experience and knowledge on how to handle equipment in relation to specific contextual situations. Lastly, annual exercises and trainings need to be carried out, both between national and international institutions. In recent years one is practicing on introducing Host Nation Support during large-scale accidents. Empirical results disclose that situational factors determine whether there is a need to request international support or not. Norwegian emergency institutions plan for implementing international assistance by performing exercises and trainings practicing on real situations that may require extensive assistance of personnel and equipment. Whether a country should request international support depends on the situation, meaning what type of incident it is, whether it is a large- or small-scale blowout: *"If a large-scale blowout in the Barents Sea occurs, there is a need for more resources in order to coordinate the rescue and response efforts. There is not a question if, but WHEN an accident occurs"* (Kristiansen, Coast Guard, 2015).

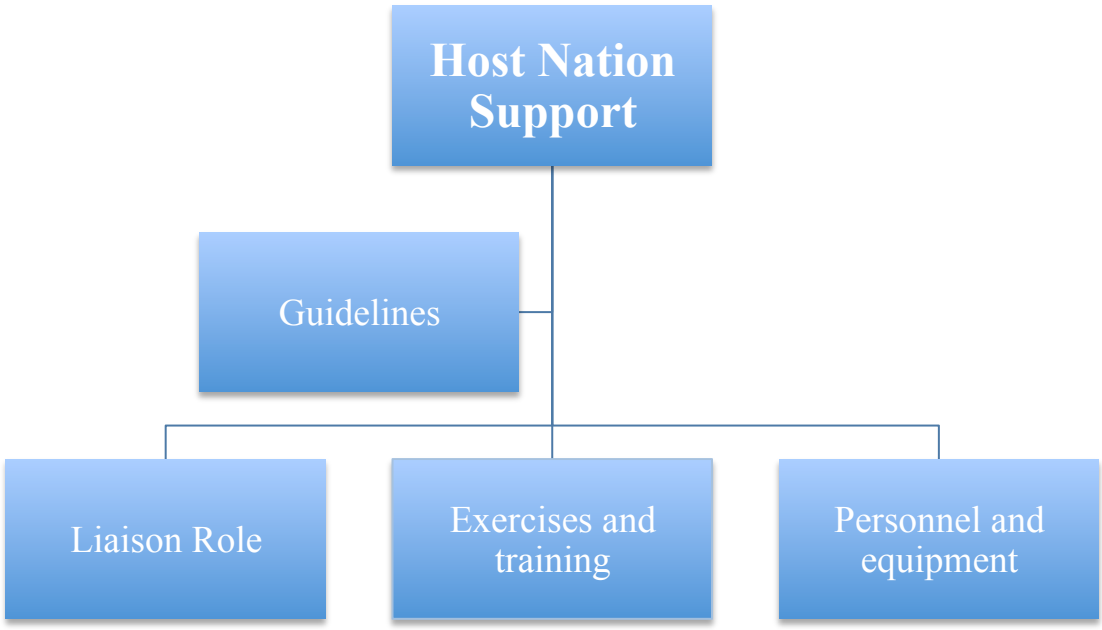


Figure 9: Coordination mechanisms needed to deal with Host Nation Support

Performing exercises such as the Barents Rescue show that there is potential for better coordination between local, regional and national agencies and organizations. The Barents Rescue exercise shows that many resources are available and involvement and effort are strong. After conducting the exercise it was concluded that there are major challenges within the exchange of information and coordination. There is a need for improvement in regard to horizontal and vertical communication at strategic, operative and tactical level (DSB, 2013, p.46).

5.3.1 Coordination problems related to introducing Host Nation Support

Involvement, interaction and coordination between relevant actors across organizations at various stages and at different levels, will always be a challenge in the offshore petroleum industry. Sharing of information is an important factor in order to ensure that personnel are involved at the right time and in the right place. Experiences from the Deepwater Horizon accident shows that experts were not consulted when they should. This proves that one should implement clearer guidelines for when personnel at sea or at land should interact and be involved. In practice the exchange of learning points from relevant incidents and accidents was insufficient during the DwH accident. It also turned out that issues related to weaknesses

in the operations were not adequately communicated between the different actors (Ptil, 2011, p.89).

Lack of resources, lack of coordination and poor communication are recurring problems for organizational performance in disaster operations. Theory claims that a common coordination problem could be that a particular activity requires specialized skills and experience. This may lead to constraints due to which actors that are able to perform the specific activities (Comfort et al., 2004). Coordination problems that may arise when requesting Host Nation Support are related to finding experienced and skilled personnel, possessing necessary knowledge to handle different equipment in specific situational contexts. Allocation of resources across institutions and departments depends on the situation, meaning what resources that are available and needed. In order to use the available resources in a best possible way, one is highly dependent on communication and information flow between oil companies and other emergency preparedness institutions (Njå, 1998).

International assistance that Norwegian authorities request, both personnel or equipment is covered by exemptions from existing legislation, such as visa exemptions and customs rules, in order to make sure that the emergency assistance is efficient and effective. If the situation involves receiving several teams of international disaster response personnel, it is recommended to establish reception centers with a necessary coordination function, or to establish a contact person being responsible for communication between the requisitioning authority and incoming personnel. There are two important functions need to be established when receiving international support. The first is a reception and departure center (RDC) that handles logistics and registers incoming personnel, secondly is a liaison who function as a link between the Norwegian authorities and incoming personnel. The authority that requests emergency assistance from abroad will also be responsible for the safety and security of the personnel and other resources as long as they are on Norwegian territory (DSB, 2014, p.12-16). As the coordination theory claim, it is important to clearly define processes of resource allocation, roles and responsibilities, and who has the authority to perform specific tasks and take decisions. In Norway one have developed a guideline for implementation of Host Nation Support. Elaborating a guideline may secure a mutual understanding, and clarity of roles and responsibilities that all emergency actors are familiar with. Coordination problems may occur if tasks, roles and responsibilities are not clearly defined in advance. Another problem may

arise at the border if the customs services are not alerted of the different exemptions when bringing personnel and equipment across the Norwegian border.

Summary

This subchapter looks into the relation between international support and structure mechanisms. Introducing Host Nation Support may increase the situational awareness and conceptual understanding between countries and improve communication across borders. Requesting Host Nation Support requires resources and equipment that are able to adapt to Norwegian environment and contextual conditions. Hence the incoming personnel need to possess necessary knowledge and skills for handling different technology and equipment, since the way to organize response actions in Norwegian conditions and context is not certain to be effective in other situations.

Use of Host Nation Support in emergency preparedness organizations:	Limited use of HNS	Extensive use of HNS
Available resources: -Resource allocation	Large extent	Less extent
Availability of necessary equipment (e.g. vessels and aircraft)	High	Low
Complex operations	Low degree	High degree
Control - Conducting training and exercises practicing on real situations	Extensive	Limited
Well elaborated emergency preparedness systems and structures	Yes	No

Table 5: The use of Host Nation Support and in relation to structure mechanisms

If there is large extent of available and necessary resources there are limited use for implementing Host Nation Support, as the host nation may combat the crisis situation without requesting international assistance. On the other hand, there is a need to request international support when there are limited or lack of necessary resources in the host nation.

Complex incidents such as an oil recovery operation in the Barents Sea may require international support. Empirical results indicates that there are lack of necessary resources in the Barents Region, and therefore one have to practice on implementing Host Nation Support, in case an accident will occur. A large-scale blowout from offshore installations in the Barents Sea acquires experienced and skilled personnel that are familiar with the contextual challenges one may meet in the region.

Conducting exercises and trainings such as the Barents Rescue exercise between Norway and Russia, and exercise between Nordic countries and the European Union, is essential in order to practice on real situations that may require international assistance. It is fundamental to practice on situations demanding Host Nation Support. Extensive use of control mechanisms is less likely to demand request of Host Nation Support.

Establishing emergency preparedness structures and guidelines such as the ICS is essential for achieving efficient emergency response actions. Elaborating guidelines for coordination and cooperation during emergency response activities is essential for achieving an effective emergency organization. Roles and responsibilities need to be defined in advance so preparedness actors know what authority they have to make decisions. If nations holds well-elaborated and practiced contingency plans, it is less likely that they need to request international support.

5.4 The relation between context and the structuring mechanisms

The Barents Sea is characterized by long distances and relatively limited rescue resources, which makes emergency response actions more difficult (DSB, 2013, p.46). The main challenges in the Barents Region is that communities are relatively small, with long distances and limited available resources, as well as limited experience with handling large and complex incidents. In Norway there is a need for better communication and coordination between local and regional agencies (DSB, 2013, p.6).

A contingency is an event that might occur and must be planned for because of changing environment. Contingency theory suggests that organizations should design and select the most appropriate structure, in order to increase control of its external environment (Anthony & Gales, 2003). Empirical results disclose that one way of increasing control of external environment is adapting to the same emergency preparedness system, so emergency actors have the same conceptual definitions and understanding of roles and responsibilities. As a result Norwegian emergency preparedness authorities and agencies have implemented the ELS structure in their preparedness organization. It is also essential to conduct exercises and training in complex areas. Accordingly, Norwegian authorities perform annual exercises such as the Barents Rescue, practicing on cooperation, coordination and communication with Russian authorities, in relation to real case scenarios that might occur in the Barents Sea.

Anthony and Gales (2003) claims that the relationship between structure, technology and environment are depended on the situation or context. This means that emergency organizations need to adapt an organizational structure adjusted to the external environment or context. The scope of the accident, whether it is a large-scale or small-scale accident is crucial for efficient emergency preparedness organization, as complex and large oil spills require more resources, technology and equipment to combat environmental damages. *"Operating in the Barents Sea requires a different type of technology. One should be prepared on other environmental and contextual conditions to work in".* Anthony and Gales (2003) further explains in their theory that organizations can be effected by external events, where the context of incidents varies depending on geography and climatic conditions. Environmental incidents are unpredictable and uncontrollable, which requires appropriate emergency preparedness plans.

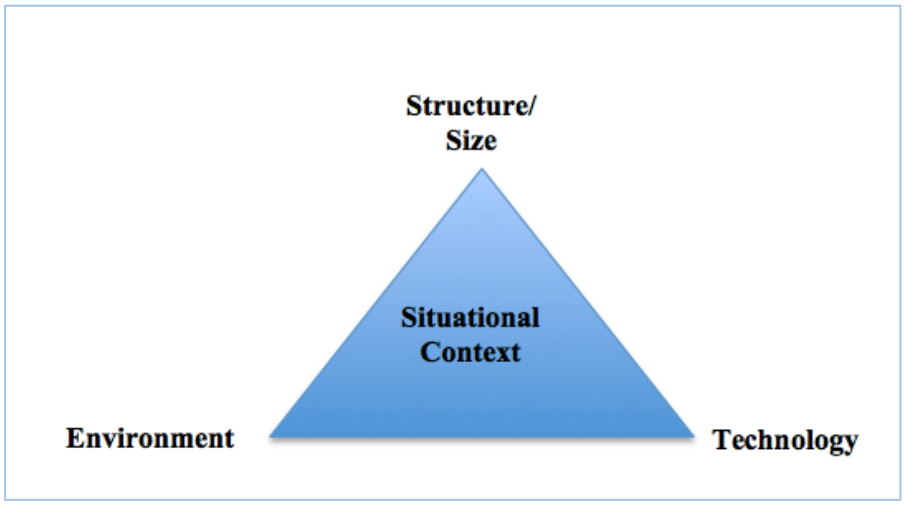


Figure 10: Situational Context

There is no better way to structure or organize an organization, because the structure of the organization depends on the context the organization operates in. The term complexity has been associated with a description of the external environment that an organization operates in. Offshore installations in the Barents Sea meet contextual challenges related to climate, harsh weather conditions and infrastructure, as well as lack of resources. When comparing the Barents Sea with installations further south at the NCS, the biggest challenges are related to lack of resources and logistics because of longer distances to offshore installations in the Barents Sea. Installations established further out will require helicopter transportation of resources and equipment, because transportation by vessel will take too long. *"The challenge is that accesses to resources are limited in the Barents Sea. Comparing a large-scale blowout in the Barents Sea with a blowout in the North Sea, acknowledge that an accident in the Barents Sea require enormous amounts of resources that we do not have available"* (Bjerkemo, NCA, 2015).

Empirical results reveal that Norwegian emergency preparedness authorities and agencies claims that: *"There is not a need for a more complex emergency preparedness organization in the Barents Sea, but a more coordinated system"* (Bjerkemo, NCA, 2015). It is essential that emergency institutions follows the principle of equality, meaning that emergency organization on a daily basis should be similar to the emergency organization introduced during crises situations. The emergency organization one operates with at daily basis is the structure all

emergency actors are familiar with and practice on. Having an organizational structure during sudden and critical accidents that differs from the standard creates uncertainty. *"As far as possible one should think simple and not complex"* (Madsen, DSB, 2015). Per definition this is why empirical results shows that emergency authorities and agencies agrees that one should not implement a more complex emergency structure in the Barents Sea, because it is beneficial to use the structure emergency actors are familiar with. On the other hand operators in the oil industry claim that: *"There is a need for a more coordinated preparedness structure and system in the Barents Sea. It is important that the authorities provide guidelines on how to operate in the Barents Region"* (Johnsen, Statoil, 2015). Based on these assumptions one can see that opinions from the oil industry are inconsistent due to opinions from Norwegian preparedness authorities, as they conclude that there is not a need for a more complex system in the Barents Sea. It is essential that national and private preparedness systems have the same attitude and knowledge regarding structuring of emergency preparedness organization in the Barents Region. This indicates a greater need for cooperation and communication across emergency institutions at national and private level.

Summary

The last subchapter looks into the relation between structure mechanisms and situational and operational context and challenges in the Barents Sea. Emergency preparedness institutions may increase control of external environment by adapting to the same emergency preparedness system. As such, emergency actors may obtain the same conceptual definitions and understanding of roles and responsibilities. Therefore Norwegian emergency preparedness authorities have developed the ELS structure, which is implemented by all Norwegian preparedness institutions except the police- and defense authorities. The implementation of an emergency preparedness system adapted to Norwegian conditions and context are fundamental in reaching effective response operations. Creating a common emergency preparedness system may also improve coordination, cooperation and communication across Norwegian emergency preparedness institutions, making sure that preparedness actors adapts to the same definitions and terminologies.

Less challenging versus demanding context:	North Sea	Barents Sea
Available resources	Many	Few
Geographical area	Small	Large
Distances	Short	Long
Logistics	Transport by vessel	Transport by helicopter
Experience and knowledge within the operational context	High	Low
Contextual challenges: **(e.g. harsh climate and weather, cold temperatures, long distances to shore)**	Few	Many
International Agreements	Copenhagen Agreement Bonn-Agreement	Norway-Russia Agreement
Need for a more complex emergency system	No	No

Table 6: Comparing the operational context in the North Sea and the Barents Sea

The Barents Sea holds limited available resources, which makes emergency response operations more difficult. Norwegian emergency preparedness institutions claims that a large-scale blowout in the Barents Sea requires more resources compared to an accident in the North Sea. This is related to contextual challenges one may meet in the north, such as harsh climate and weather, and longer distances causing logistic problems.

The Barents Sea stretches over a larger geographical area compared to the North Sea and the Norwegian Sea. Longer distances to civilization and shore create challenges related to logistic and transportation of human resources and equipment.

In the Barents Sea there are longer distances from shore to offshore installations. Transporting resources and equipment from shore out to the offshore installations is longer and more complicated in the Barents Sea compared to the North Sea. Petroleum installations further south at the NCS is situated closer to shore. In the North Sea fields are located much closer to each other, making it easier to assist and achieve necessary resources if crises situations occurs.

The Barents Sea holds lack of necessary logistic solutions and infrastructure. Because of longer distances from shore to installations located in the northern part of the Barents Sea, transportation by vessel will take too long, and therefore need to be replaced by helicopters. Use of helicopter as transportation in the Barents Sea meets challenges related to refueling. Helicopters have a certain limited distance for how long they are able to fly without refueling. Today there are no filling stations or fuel depots established in the Barents Sea, which is essential since helicopter will reach their threshold limit flying out to the northern parts of the Barents Sea.

Offshore activities in the Barents Sea are relatively new compared to offshore activities further south at the NCS. Experience and knowledge of operating in the contextual challenges one may meet in Arctic region is limited. There are greater extent of contextual challenges such as colder climate, longer periods of darkness and harsh weather making rescue operations more difficult here. Transport by helicopter may also be difficult in the Arctic region during winter months, as temperatures are falling increasingly.

An emergency incident including acute pollution can be so extensive that it is need for international assistance. Other countries may request Norwegian assistance, or Norway can ask other countries for assistance. Norway has signed several international agreements that contribute to the requests for international assistance to be conducted as quickly as possible (Regjeringsutvalget, 2015, p.14-15). The international agreements related to international assistance in the Arctic region are the Norway-Russia-Agreement and The NORBRIT-plan, whilst international agreements related to requesting international assistance to the North Sea are the Copenhagen Agreement and the Bonn-Agreement (cf. appendix 2).

Lastly, it is important to point out that there is not a need for a more complex emergency preparedness organization in the Barents Sea, but a more coordinated system. As far as possible one should think simple. Hence the principle of equality shall apply, meaning that emergency organization on a daily basis should be similar to the emergency organization introduced during crises situations.

6.0 Conclusion, contributions and future research

6.1. Conclusion

This thesis has studied structure mechanisms important for strengthening the relations between preparedness institutions at strategic and operational level. This thesis looks into three different independent variables that influence on the structure mechanisms of emergency preparedness organization. These variables are related to the integration of oil spill recovery capacities and resources, and examines the implementation of Host Nation Support, as well as the issue of managerial roles and operational context according to structure mechanisms necessary to strengthen the effectiveness of preparedness organization.

Coordination of resources contributes to solving lack of essential resources beneficial for response actions. In emergency response work it is always a challenge to get the right people that possess necessary expertise and experience to contribute during response actions. In accordance cooperation and communication becomes important. A suggestion for how to increase coordination across emergency actors is to establish fewer and larger operational centers where the management of emergency institutions at national level could be located in the same building. This may contribute to improvements in cooperation and communication across institutions, and promote effectiveness of response work, through gaining a common situational awareness by being able to communicate face to face with other authorities, agencies or directorates.

In order to promote coordination and communication across institutions a suggestion would be to evaluate organizational performance. The table below is a good example of how preparedness institutions may evaluate their organizational performance from response actions. First the preparedness organization needs to identify mistakes that were made during response operations. Afterwards one may learn from these mistakes and implement new ways of structuring and managing preparedness activities, promoting coordination and cooperation. Organizational learning takes place all the time and need to be taken into account. Emergency organizations should adapt to and create a learning structure promoting efficiency and improvements of organizational performance. Emergency preparedness organizations should encourage organizational learning by implementing to the same preparedness structures and systems. This may help increase the situational awareness and conceptual understanding, by adapting to the same definitions and terminologies.

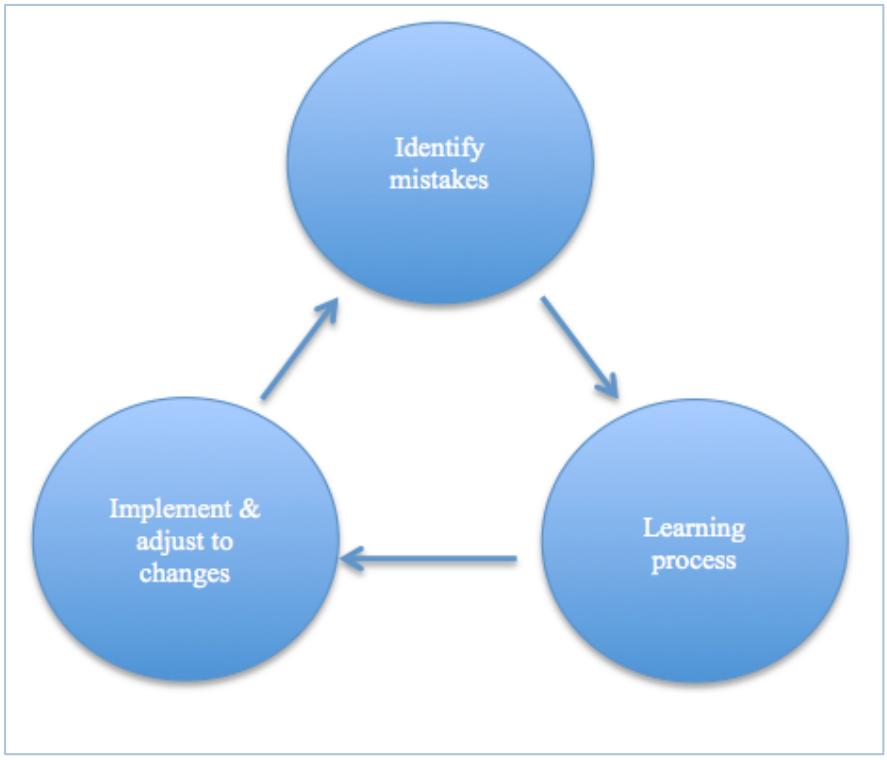


Figure 11: Organizational Performance

The cooperation between private and national preparedness actors works optimally. But a common situational awareness and understanding seems to be lacking. This is related to empirical findings revealing that oil companies in the industry believes that one should adapt complex preparedness structures and systems in the Barents region. Whilst preparedness authorities, agencies and directorates on the other hand announce that there is not a need for implementing a complex preparedness structure in the Barents region. As far as possible one should think simple not complex. This is something that oil companies need to have in mind when expanding their operations in the Arctic. As such it might be appropriate to endorse a less complex structure and rather change their preparedness structure to become more similar to their daily preparedness organization.

Major and large-scale incidents such as the DwH accident, highlight the importance of implementing international assistance bringing crucial resources and equipment across borders. During critical incidents that require enormously amounts of resources, it is essential that preparedness organizations provide guidelines that plan and prepare for how to request international assistance the most effective way. During long lasting and large-scale accidents,

critical resources may become exhausted after continuously and long-term response work. As a consequence one need to elaborate contingency plans that structures how incoming resources may replace and take over the work of the daily preparedness operations. Coordination problems that may arise when requesting Host Nation Support are related to finding experienced and skilled personnel, possessing necessary knowledge to handle different equipment in specific situational contexts.

Notably it is essential to notice that Norwegian emergency preparedness organization is at the forefront of contingency planning and structuring, making other nations following their examples of practicing on real situations by conducting several major and minor exercises annually. Through performing exercises, courses and training one may improve response effort by gaining insight into aspects that already functions very well, and those who need to be broader elaborated. Norwegian preparedness institutions and actors achieve a broader awareness by participating in training and exercises that promotes learning, experience and expertise.

6.2 Contributions

The issue of this thesis has contributed both theoretically and practically to increase the insight and understanding of how the Norwegian preparedness and response system is organized. First, I want to emphasize that the preparedness and disaster field have been closely examined in previous studies, but there are few research projects and thesis looking into Norwegian emergency preparedness organization in relation to essential structure mechanism, promoting fundamental aspects in accordance to achieving improvements of response operations. Furthermore, this study contributes to the question and current interest of introducing international support into Norwegian contingency and response plans, by making it a jurisdiction and legislation.

Organization theory is strongly promoted in structuring of emergency preparedness and crisis management. This shows that the theory of complex organizations and structuring of crisis organization can be applied in emergency preparedness organization, with a special insight into structuring mechanisms.

6.3 Suggestions for further studies

This thesis has examined the Norwegian emergency preparedness organization, in relation to structuring mechanism such as coordination, control, cooperation and communication. The issue of the emergency preparedness organization provides a rich field for academic research. Some of these areas have already been examined in previous thesis. Anyway, some of the aspects in this thesis provides basis for further studies within the preparedness field.

This thesis only examines the emergency preparedness organization for offshore oil recovery operations at the Norwegian Continental Shelf at strategic and operational level. As such one may study the function and organization of the Norwegian preparedness system at tactical level. One may also look further into preparedness organization of other nations in comparison to Norwegian preparedness organization.

Another area that can be further examined is conducting case studies comparing the structures and systems of emergency preparedness organization and response effort across different nations or within different contexts.

There is a need for a broader research looking into how local resources such as the fishing vessels in the Finnmark County may contribute and assist the governmental and private preparedness organization in crisis situations, and assess how local people with experience from operating in the complex context of the Arctic may contribute in preparedness efforts.

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Appendixes

Appendix 1: Interview with emergency preparedness institutions

Intervjuguide

Jeg er student ved Universitetet i Nordland, hvor jeg går siste året på Master of Science in Energy Management. Jeg skal denne våren skrive min masteroppgave innen beredskapshåndtering og organisering i Norge. Jeg skal trekke inn viktige struktureringsmekanismer for norsk beredskapshåndtering og organisering, samt rolle- og ansvarsfordeling, og hvordan det er å drive oljevirksomhet i utfordrende og komplekse omgivelser. Videre ønsker jeg også å trekke inn internasjonal støtte til Norge i forbindelse med en større oljevernaksjon, herunder Host Nation Support. Jeg skal se nærmere på Enhetlig ledelsessystem (ELS) i forhold til andre struktureringsmekanismer.

Om selskapet:

- Hvilket ansvar er deres selskap/myndighet ilagt i henhold til norsk oljevernberedskap?
- Hvordan er beredskapsstrukturen i deres selskap/myndighet bygget opp?

Koordinering og organisering av norsk oljevernberedskap:

- Hvordan kan/bør man koordinere beredskapsarbeidet for å oppnå mest effektivt responsarbeid?
- Hvilke koordinerings- og kontrollmekanismer er nødvendig for optimal beredskapsorganisering?
- Hvilke koordineringsproblemer kan oppstå under beredskapsaksjoner i store miljøvernsaksjoner i Norge?
- Benytter dere enhetlig ledelsessystemer (ELS) som verktøy for beredskapsorganisering?
    - Ser dere noen positive effekter av implementeringen av enhetlige ledelsessystemer (ELS) i norske beredskapsplaner?
- Bør man samsvare beredskapsstrukturen og organiseringen slik at alle beredskapsinstitusjoner i Norge benytter et felles beredskapssystem?
- Hvordan fungerer samarbeidet mellom nasjonale og lokale myndigheter og institusjoner i håndtering av krisesituasjoner?
- Hvilke ressursmessige utfordringer møter en beredskapsaksjon i Barentshavet?

- Er det behov for en mer kompleks beredskapsorganisering i Barentshavet?

Rollefordeling og ansvar:

- Hvilke ledelsesrelaterte utfordringer er knyttet til større oljevernaksjoner?
- Er det nødvendig med klare rolle- og ansvarsfordelinger under beredskapsaksjoner?
    - I såfall hvilke?
- Hvilke lederroller er nødvendig for å håndtere vertsnasjonsstøtte (Host Nation Support) fra flere land i en oljevernaksjon?
- Hvem har ansvar for beslutningstaking, koordinering og kontroll av interne aktiviteter og ressurser under beredskapskapsaksjoner?

Kontekst:

- På hvilken måte kan operasjonelle kontekster ha innflytelse på beredskapsstrukturen?

(Med operasjonell kontekst menes geografiske forskjeller, klima, infrastruktur, logistikk)

- Hvilke kontekstuelle faktorer kan påvirke utfallet og ytelsen av beredskapsaksjoner i Barentshavet?

Internasjonal støtte:

- Hvordan organiseres og ledes oljevernaksjoner med bistand fra flere land?
- Hva er formålet/nytten med å implementere vertsnasjonsstøtte i Norge?
- Er det behov for internasjonal bistand dersom det skulle forekomme et storskala oljeutslipp i Barentshavet, eller har Norge nødvendige ressurser tilgjengelig?
- Hva gjøres dersom et oljeutslipp krysser grensen. Skal operatørene/myndigheten på norsk side gripe inn eller går ansvaret over til det andre landet?
- Hvem er deres viktigste samarbeidspartnere både innenlands og i våre naboland dersom det oppstår en offshore ulykke i Barentshavet?
- Hvilke avtaler er det som regulerer dette i nord?
- Hvilke øvelser gjennomføres?
- Hvilke erfaringer er gjort fra disse øvelsene?

Til slutt:

- Hvilke rapporter eller artikler kan være relevant for oppgaven min?
- Er det noen andre nøkkelpersoner du vil anbefale meg å snakke med i forhold til dette temaet?

Appendix 2: International Agreements

Norway has signed several international agreements that contribute to the requests for international assistance to be conducted as quickly as possible:

***The Copenhagen Agreement*:** An agreement between the Scandinavian countries, hereby Denmark, Finland Norway, Sweden and Iceland on cooperation in combating oil pollution at sea.

The Bonn-Agreement: All countries that borders to the North Sea, the EU and Ireland has signed the agreement on mutual notification, assistance and environmental monitoring.

Norway-Russia-Agreement: is an agreement between Norway and Russia including mutual notification, exercises and combating oil spills in the Barents Sea.

The NORBRIT-plan: Applies to the maritime area 50 nautical mil on each side of the boundary line between the UK and Norway. Arctic Oil Spill Agreement is relates to cooperation, coordination and mutual assistance on combating oil spills to the marine environment in Arctic waters.

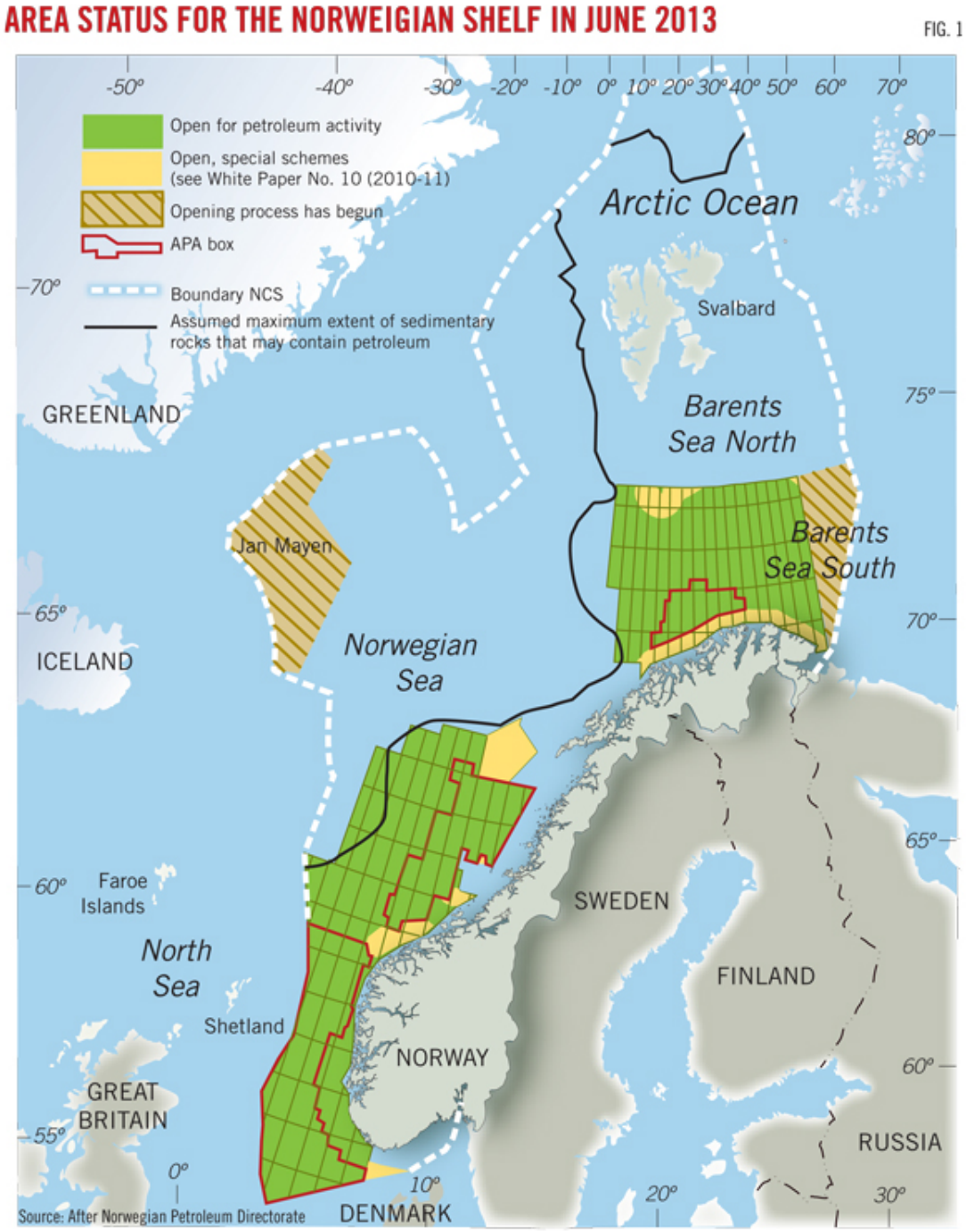
IMO – OPRC: IMO's work in emergency response to acute pollution is carried through the technical group Hazardous Noxious Substances (HNS), which follows up the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC).

EU – EMSA: As a result of the EEA-Agreement, Norway participates in technical group Maritime Pollution Prevention and Response, where cooperation on satellite monitoring are included.

Arctic Council - Emergency, Prevention, Preparedness and Response (EPPR):
EPPR Working Group was established as a result of Arctic Environmental Protection Strategy in 1991.

(Regjeringsutvalget, 2015, p.14-15).

Appendix 3: Picture of the Norwegian Continental Shelf



(Oil & Gas Journal, 08.05.2013)