

Master Thesis

EN310E 003

MSc. Energy Management

Oil-capital of the North

**A case study of Harstad's attractiveness as localization for petroleum
related supplier industries**

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PREFACE

This master thesis is my final assignment in the Energy Management program at Bodø Graduate School of Business. My time as a student in Bodø has been wonderful. The final semester working on my thesis has been rich in challenges and I have therefore learned a lot. It is good to finally be done and this thesis report marks the end of an era for me. My time as a student is over. I hope that the same drive for growth both personal and professional will be with me in my working life as well. If so, then learning has just begun.

I have chosen a topic that I find very interesting and important, and I believe it has helped me in the process of accomplishing this thesis. I find the history of oil and gas development in the North to be very fascinating and talking to Roald Sæter from OD, Edd-Magne Torbergsen from StatoilHydro, and former Statoil employees Ivar Dyreng and Per Kotte have been a very pleasant experience. Their information and knowledge have helped me in developing a lot of perspectives on the situation in the North. I'm very thankful for their contribution and willingness to share their stories with me.

I'm thankful for the guiding that my supervisor Stig O. Johannessen gave me when writing this thesis. Thanks go to Jan-Oddvar Sørnes as well for the work he has done administrating the Energy Management program. I want to thank Bodø Graduate School of Business and MGIMO for enrolling me in this program and also all the business master students there. Finally I want to thank my friends and classmates in the Energy Management program. I hope to see you all in Stavanger.

Last but not least I want to thank my girlfriend Lillian for her patience and support, and my mother which have helped me in so many ways.

Bodø, 20 May 2008.

Øystein Sæverud

ABSTRACT

This master thesis aims to examining the aspects that makes Harstad an attractive location for supplier industries. It is a focused qualitative case study of Harstad which investigates Harstad's potential by examining both the historical development of the NCS and the current situation. The thesis uses three theories; clustering theories, network theories and resource-based perspective, in order to find the important aspects and answering the research question. These final aspects are: 1.) People: access to qualified workers, competence -with regards to existing businesses and educational institutions, industry culture, and finally engaged individuals. 2) Infrastructure: roads, harbors etc. and also established networks. 3) Demand: Spin-off effects, zero discharges and StatoilHydro. 4) Localization: Center of northern Norway, and StatoilHydro.

The most important findings are that Harstad have long industry traditions and a workforce that is well suited for the petroleum industry. They also have engaged people that are working hard to attract other businesses to Harstad. Schools and educational institutions are good and access to qualified worker does not seem to be a problem. StatoilHydro, DetNorske and OD's competence in exploration is substantial and may attract other oil-companies to Harstad Current demand for local and regional spin-off effects are not so significant. StatoilHydro's and DetNorske's presence in Harstad do to a very little degree affect the level of contracts given to suppliers in Harstad. Networks such as PetroArctic and LOL play are more significant role in this respect.

SAMMENDRAG

Harstad ble valgt til å være oljebyen i Nord allerede i 1973. Utbyggingen har derimot latt vente på seg og det er først nå at det er mulig å tenke seg industrivekst i Harstad basert på oljevirkosomhet i Nord. Dette henger sammen med regjeringens og StatoilHydro sitt fornyede fokus på områdene som signaliserer økt aktivitet. I tillegg viser flere utenlandske selskaper og mindre norske oljeselskaper interesse for disse havområdene.

Hensikten med denne oppgaven er å undersøke attraktiviteten til Harstad ovenfor leverandørindustrien. Per i dag har Harstad et lite miljø, med ca 200 personer, innenfor ingeniør virksomhet, mekaniske verksteder og skipsbygging. I tillegg er StatoilHydro og DetNorske lokalisert i byen noe som gir grunn til å tro at byen er attraktiv for relatert industri. Fokuset i oppgave er på et snevert område innenfor leverandørindustrien. I hovedsak er det snakk om ingeniørtjenester, bygging av mindre moduler og sveising. Deler av leverandørkjeden slik som seismikk og lete boring er ikke aktuelt for Harstad og det er lite sannsynlig at slik virksomhet kommer til å etablere seg her.

Denne master oppgaven er en kvalitativ undersøkelse og data er samlet inn ved intervjuer og dokumentanalyser. Bakgrunnsinformasjon er hentet inn for å kunne få en forståelse av utviklingen på norsk sokkel. Historien viser at oppbyggingen av oljeindustrien i Norge har vært sterkt preget av politiske beslutninger, spesielt med hensyn på distrikts- og regionalpolitikk og ringvirkninger av petroleums aktivitet. Åpningen av nå avstengte områder er en diskusjon som det må tas stilling til i 2010. Per i dag ser det ut til at det blir åpning noe som betyr at Harstad er attraktivt også med hensyn på nærhet til funn. Teoriene om klynger, nettverk og ressurs perspektivet er med på å belyse de faktorene som er viktig for attraktiviteten til Harstad. Caset Harstad presenterer så byens historie, rolle i Nordområdene og dagens situasjon før oppgaven tar for seg analysen.

Viktige funn i denne oppgaven er at Harstad kan tilby et spennende industrimiljø hvor det er god tilgang på kvalifisert arbeidskraft. Infrastrukturen er god, men det er spesielt havna som er viktig for Harstad sin vekst. Ikke overraskende er åpningen av i dag stengte områder enormt viktig for Harstads attraktivitet.

TABLE OF CONTENTS

PREFACE	1
ABSTRACT	2
SAMMENDRAG	3
TABLE OF CONTENTS	4
SURVEY OF FIGURES	6
SURVEY OF ILLUSTRATIONS	6
SURVEY OF TABLES:	6
ABBREVIATIONS	7
GLOSSARY	7
1. INTRODUCTION	10
1.1 BACKGROUND	10
1.2 RESEARCH QUESTION	12
1.3 CONTRIBUTION	14
1.4 OUTLINE	14
1.5 LIMITATIONS	16
2. METHODOLOGICAL REFLECTIONS	18
2.1 RESEARCH PARADIGM	18
2.2 RESEARCH METHOD	19
2.2.1 DATA COLLECTION	19
2.2.2 SAMPLING	20
2.2.3 INTERVIEW	21
2.2.4 ANALYSIS	22
2.2.5 VALIDITY AND RELIABILITY	23
2.3 ETHICS	25
2.4 SUMMARY	26
3. FRAME OF REFERENCE	27
3.1 NORWEGIAN PETROLEUM HISTORY	27
3.2 POLITICS, RULES AND REGULATIONS	31
3.2.1 OPENING OF NORDLAND VI -VII AND TROMS II	32
3.3 SUMMARY	34
4. THEORETICAL FRAMEWORK	36

4.1	CLUSTERS	36
4.1.1	CRITIQUE OF CLUSTER THEORIES	41
4.2	NETWORK THEORIES	42
4.2.1	HUBS AND NODES	45
4.2.2	CRITICISM OF NETWORK THEORIES	46
4.3	RECOURSE-BASED VIEW	47
4.3.1	CRITIQUES OF RESOURCE BASED PERSPECTIVE	48
4.4	RESEARCH MODEL	48
4.5	SUMMARY	49
5.	INDUSTRY PERSPECTIVES	50
<hr/>		
5.1	CLUSTERS IN NORWAY	50
5.1.1	THE NORWEGIAN PETROLEUM CLUSTER	52
5.2	NORTHERN REGION	55
5.3	RESOURCES IN THE NORTHERN REGION	57
5.3.1	DISCOVERIES IN THE NORTHERN REGION	59
5.4	DEVELOPMENT OF PETROLEUM INDUSTRIES IN THE NORTHERN REGION	60
5.5	SUMMARY	62
6.	HARSTAD THE OIL-CAPITAL OF THE NORTH	63
<hr/>		
6.1	HISTORY	63
6.2	PETROLEUM RELATED BUSINESSES LOCATED IN HARSTAD	69
6.3	SUMMARY	70
7.	ANALYSIS	71
<hr/>		
7.1	HARSTAD	72
7.1.1	PEOPLE	73
7.1.2	INFRASTRUCTURE	76
7.1.3	DEMAND	78
7.1.4	LOCALIZATION	80
8.	CONCLUSIONS	83
<hr/>		
8.1	RECOMMENDATIONS	85
8.2	FURTHER RESEARCH ISSUES	86
8.3	CRITIQUE	86
LIST OF REFERENCES		88
<hr/>		
APPENDICES		90
<hr/>		

Survey of figures

Figure 1.1 Three layered research pyramid.....	15
Figure 3.1 Oil production on the NCS	30
Figure 3.2 The Stakeholders.....	33
Figure 3.3 Party perspectives	34
Figure 4.1 The Porter Model	39
Figure 4.2 From clusters to nodes	46
Figure 4.3 Research process, describe, categorize, and combine.....	49
Figure 5.1 Share of employment within clusters.....	52

Survey of illustrations

Illustration 1.1 Research process; describe, categorize, combine	14
Illustration 2.1 Analysis of qualitative research as a spiral.....	22
Illustration 5.1 Prospective areas outside Lofoten	58
Illustration 5.2 Prospective areas in the Barents Sea	59

Survey of Tables:

Table 2.1 Case Study Tactics for Four Design Tests	24
Table 3.1 Ten oil commandments	29
Table 4.1 Four main categories	40
Table 4.2 Five important principles for networks	43
Table 5.1 Major clusters in Norway.....	51
Table 5.2 Actual and expected investments on the NCS, in millions of NOK	53

Abbreviations

bbbl.	Barrels of oil
bn	Billions
boe	Barrels of oil equivalents
EOR	Enhanced oil recovery
EPC	Engineering, procurements and construction
IEA	International Energy Association
LNG	Liquefied Natural Gas
LOG	Leverandørnett Ormen Lange
LOL	Leverandørnett Oil and Gas, started as LOG
Mbbl.	Millions of barrels of oil
NCE	Norwegian Centers of Expertise program
NCS	Norwegian Continental Shelf
NGL	Natural Gas Liquid
NOK	Norwegian kroner
NPD	Norwegian Petroleum Directorate
OECD	Organization for Economic Cooperation and Development
PDO	Plan for development and operation of petroleum resources
R&D	Research and Development
SDFI	States direct financial interest

Glossary

Block	A geographical unit of division used in the petroleum activities on the continental shelf. The maritime areas within the outermost limit of the continental shelf are divided into blocks measuring 15 minutes of latitude and 20 minutes of longitude, unless adjacent areas of land, borders with the continental shelves of other nations, or other factors decree otherwise.
Cluster	In this thesis the term cluster refers to an industry cluster. Definition of a cluster is: a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (Porter 1998)
Globalization	Globalization is the increasing interdependence, integration and interaction among people and corporations in disparate locations around the world. It is an umbrella term which refers to a complex of economic, trade, social, technological, cultural and political interrelationships.

Hålogaland	A region consisting of Lofoten, Vesterålen, Ofoten, and South of Troms
Innovation	A new; product, service production method, use, org organization that are introduced in the market or put to use in production in order to create economic value.
Northern region	Referred to as the three northern counties of Norway, Nordland, Troms and Finnmark.
Oil equivalents (o.e.)	Used when oil, gas, condensate and NGL are to be totaled. The term is either linked to the amount of energy liberated by combustion of the various types of petroleum or to the sales values, so that everything can be compared with oil.
Operator	The agent who, on behalf of the licensee, is in charge of the day-to-day management of the petroleum activity.
Petroleum	The term for all liquid and gaseous hydrocarbons found in a natural state in the substrate, and also other substances recovered in connection with such hydrocarbons.
Petroleum activity	All activity linked to subsea petroleum deposits, including investigation, exploratory drilling, recovery, transport, utilization and termination, and also the planning of such activities, but not the bulk transportation of petroleum by ship.
Play	A play is a geographically demarcated area where several geological factors occur together so that producible petroleum can be proven. These factors are: 1) Reservoir rock, which is a porous rock where petroleum can be preserved. Reservoir rocks to a specific play will belong to a given lithostratigraphical level. 2) Trap, which is an impermeable rock or a geological structure enveloping the reservoir rock so that the petroleum is retained and accumulates in the reservoir. The trap must be formed before the petroleum stops entering the reservoir. 3) Source rock, which is shale, limestone or coal containing organic material that can be converted into containing organic material that can be converted into to say the temperature and pressure must be appropriate for petroleum actually to be formed, and there must be a migration path enabling the petroleum to move from the source rock to the reservoir rock. A play is confirmed when producible petroleum is found in it. The production does not necessarily have to be profitable. If no producible petroleum has yet been found in a play, it is unconfirmed.
Ripple effect	A gradually spreading effect or influence: <i>“Those deviations tend to have a ripple effect throughout the economy as a whole”</i> (Tom Clancy)

Seismic surveys	Study of the presence, depth, and configuration of underground formations; a ground-level explosive charge (shot) generates vibratory energy (seismic rays) that strike formation interfaces and are reflected back to ground-level sensors. Also known as seismic survey.
Spin-off effect	Derive or produce from something else, especially a small part from a larger whole. For example, The corporation decided to spin off the automobile parts division, or Her column was spun off from her book on this subject. The expression transfers the throwing off by centrifugal force, as in spinning, to other enterprises. [Mid-1900s]
Supply industry	In this thesis the term supply industry refers to the petroleum related supply industry.
Well	A hole drilled to find or delimit a petroleum deposit and/or produce petroleum or water for injection purposes, inject gas, water or another medium, or map or monitor well parameters. A well may consist of one or more well paths and may have one or more terminal points.
Wildcat well	An exploration well drilled to find out whether petroleum exists in a possible deposit.

1. INTRODUCTION

The title of this thesis is “Oil-Capital of the North” and the reason why I chose the title is because it tells of another time. Historically the expectations associated with petroleum activities have been great, but in the Northern region these expectations have not been met. Harstad is a proof of this. As there is a renewed focus on the Northern region, new expectations may rise to the surface. Some people may argue that the title is a bit too bombastic, but I think it is nostalgic. Nostalgia is something that I have learned to appreciate during my stay in Russia.

1.1 Background

In 2010 the question regarding the opening of Nordland VI-VII and Troms II will once more be considered. Ever since the prospects of petroleum industry first was considered in the mid 70’s developments of petroleum activities in Northern region have been delayed. With the Norne, Snøhvit and Goliat developments a possible adventure may unfold. However many people have questioned whether the Northern region is able to collect the benefit and wealth that the petroleum activities offer.

When the oil-and-gas industry first developed in the seventies politicians focused on that these resources should contribute to growth in the region it was located. One of the results of this policy was that Stavanger became the oil center and preferred location for this industry in Norway. Today the role of the regional politics have changed, but politicians still have the perspective that resources “belong” to the region it is found and should create spin-off effects in the form of jobs and economic growth in its region.

Early in the process Harstad was awarded the title as the Oil-Capital of the North. At the time there were a lot more industry in the region than there is today. In fact the delayed developments get some of the blame for not maintaining the industry here. As the Norwegian government and the oil-companies, StatoilHydro and DetNorske shows a renewed interest in the region and expresses that it is the most significant areas in Norway people in the north once more begin to hope for new opportunities.

Oil and gas development in the High North have been discussed many times, but other issues such as environmental considerations and the need for the industry to utilize existing infrastructure in mature areas have been prioritized. Important political decisions have resulted in an effective policy regarding recovery enhancement at existing fields. However as the portfolio of smaller marginal fields on the NCS increases the vulnerability of a rapid fall in oil prices also increases. One of the biggest challenges is therefore to make new significant discoveries that can help Norway maintain its level of production.

Oil and gas industry in Norway have evolved significantly over the last years and our economy has also become a lot more dependent on this industry. Large projects such as Snøhvit and Ormen Lange have been developed and the challenges they have offered have enabled Norwegian industry to develop radically, in a period where energy prices have increased substantially. Focus on this sector and the competitive advantage these developments have given Norway is a result of the competence and solutions that have been developed in order to deal with the challenges the oil and gas industry have met on the NCS.

New discoveries are an essential factor for continued activity and growth in the oil and gas industry. Historically have challenges and large constructions been the main driver for innovations and the development of global market leading technological solutions that today makes Norwegian oil-and-gas technologies the best in the world. Continued access to new acreage on the NCS is therefore one of the most significant deterrent to decide if there will be a continued growth of this industry in Norway.

In StatoilHydro's sustainable report for 2007 we can read: The big opportunities on the NCS are now considered to lie in the far north. As the industry moves into these waters, it is crucial that we take with us and further develop important experience from the North and Norwegian Seas.

The technological developments this sector has undergone over the last years have made it difficult for industry in the Northern region to compete. The focus and attractiveness of this industry have also been one of the reasons why young and competent workers have moved

south in order to get a good job within the petroleum sector. The northern region has for many years and especially during periods of strong economic growth experienced that more people are moving out (Arena, 2007). Expectations of major oil-and-gas discoveries and developments in this region are therefore great. Some of the hope attached to this development is that it will make the region more attractive and that lost sons and daughters will return with their skills and knowledge. The government demands of local and regional spin-off effects may aid the industry development in this region. Combined with the new information technologies there is a good chance that supply industry quickly can establish and become competitive with industries in the south. Experience from other regions where oil-and-gas activity has been established indicates that existing competence in the region can be adopted in order to fit the needs of the petroleum industry and resulting in new industry growth.

1.2 Research question

Harstad have argued for further establishment of petroleum related industries, ever since government decided that Harstad would be the oil-capital of the northern region in 1973. In this thesis I want to investigate whether or not it is any advantage for the supplier industries to establish here and my research question is therefore as follows:

What aspects influences Harstad's attractiveness as localization for petroleum related supplier industries?

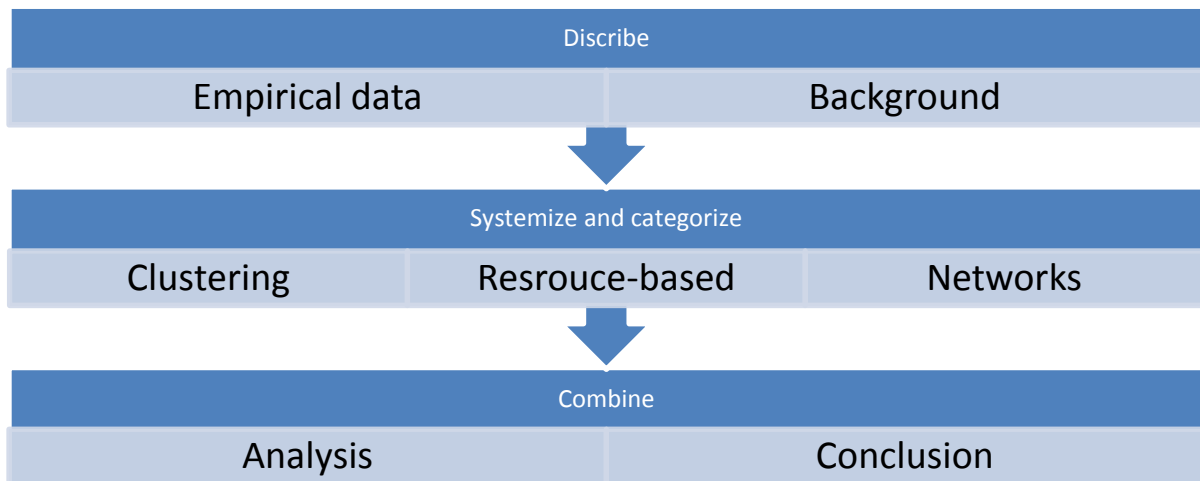
I wanted to write about the popular and much debated High North perspectives on oil and gas developments. This topic appeared to be an easy and actual topic to write a thesis about. As I read many reports I gained more and more knowledge about the intricate situation. When I was on an Easter break in Harstad I read an article in the Harstad Tidene, about the supply industry here. I learned that Harstad have maritime industries based on engineering, industry and a consultant environment that have evolved to become one of the strongest in the northern region. I found this to be interesting since such competence is among the most valuable for the petroleum related industries.

At the time I had to decide for a research question and I decided to investigate the possibility of writing about the petroleum industry in Harstad. I contacted Ivar F Hagenlund, the managing director of Grenland Arctic and also the Norwegian Petroleum Directorate (NPD) that both have departments in Harstad. I asked them if I could get an interview. NPD had time and I got an interview that very same day. During the interview I got a different perspective on the popular high north. I learned that Norwegian government and the oil companies had tried to establish an industry in this region many times before, and that the current situation was not that different from what it was over 20 years ago. It seemed to me that a lot went wrong back in the 80's and I decided to examine the situation today.

In order to describe and analyze the current situation in Harstad I have looked at traditional and modern theories. With the basis in traditional clustering theory the benefits of establishing related industries in a region is highlighted. Cooperation competition and complementary resources are highlighted by the resource-based perspective and network theories. This is done in order to find aspects that speak for a continued development in Harstad. Five interviews of experienced and knowledgeable persons have been conducted. In addition to this have several reports been studied.

The complexity of this research requires a systematic way of organizing data. I have therefore made a research model in order to categorize the data and be able to say something about the research question. This research model is illustrated by the model depicted below. The model is based on the case study approach where the research process is described in three categories: Describe, characterize and combine. See the Methodology chapter for more information. The illustration 1.1 explains the research process.

Illustration 1.1 Research process; describe, categorize, combine



1.3 Contribution

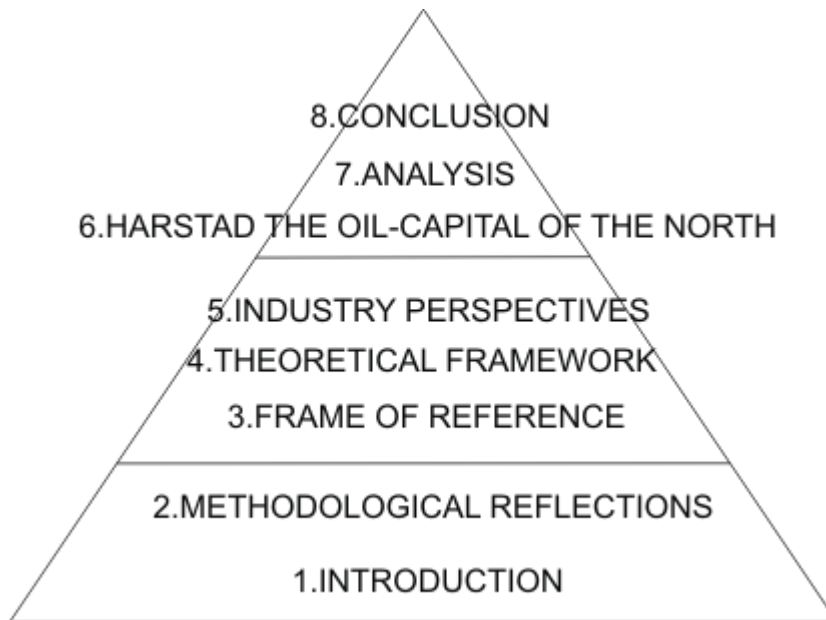
The practical contribution of this thesis is that it will highlight the benefits and disadvantages for existing petroleum supplier industries in Norway to establish in Harstad. I have tried to stay neutral in this research and take the position of an expert. I have looked at this question from an overall point of view where the interests of the whole region, Northern Norway, and the nation is the most important consideration I needed to make. From my perspective I firmly believe that this region has a lot to offer and that it is important to maintain the existing industry in the Northern region. What is clear to me and something that has been pointed out by many is the fact that this regions chance for growth, local and regional spin-off effects significantly increases if this type of industry is concentrated rather than spread out over the whole region. It is therefore clear that it is important to map the present situation in different urban areas in order to see where it is most beneficial for this type of industry to locate. To answer this question I have collected data on the historical development of the NCS and also the political influences that this region has been affected by.

1.4 Outline

My master thesis is built up of three parts, and eight chapters. Part one, setting the scene outlines the background, topic, objectives and approach taken in the research presented in this report. Part two, theoretical and empirical background, outlines aspects within development of

clusters, resource-base perspectives, and network theories as a basis for the development and concepts presented in this thesis. Part three, industry development in Harstad, presents the Harstad case, the analysis and conclusions. Figure 1.2 presents the outline of this report.

Figure 1.1 Three layered research pyramid



✓ Part I Setting the scene

Chapter one has set the scene for the topic of this thesis through outlining different perspectives on the development of NCS and the Northern region. It has also presented the approach to the research question, research model and its practical contribution. Finally the limitations of this thesis are presented.

Chapter two presents the methodological reflections that have covered the entire research process. Here the entire research process is described. Data collection process, selection of respondents, interview method, concerns regarding validity and reliability.

✓ Part II Background

Chapter three is the frame of reference. Here the historical development of the NCS and the politics, rules and regulations governing development of the NCS and the Northern region is presented.

Chapter four presents the actual theories used in to evaluate the important aspects of the development of petroleum supplier industries in Harstad. Theories that are presented in this chapter are: Clustering theories, resource-base perspective, network perspective and diffusion of innovations.

Chapter five named industry perspectives presents the development and current clusters in Norway, the northern region perspective and the resources that is discovered, and the potential resources that is on the NCS outside of this region.

✓ Part III Petroleum related industry development in Harstad

Chapter six named 'Harstad the Oil-capital of the North' presents the historical development of petroleum related industries in Harstad and the Northern region. It also presents the current situation in Harstad and forms the basis for further analysis using the theoretical framework as a lens. The analysis is presented in chapter seven. Finally chapter eight concludes and discusses the work presented. The validity of the result is discussed. Further research issues are suggested and finally, the usefulness of this work is discussed.

1.5 Limitations

This report is a result of a focused case study. One single case has been studied according to related theories. As a result of this a lot of factors have not been considered. The research topic I have selected is complex and I have to limit my research to some aspects that I find important. The aim of this thesis is not to try to quantify the potential development in Harstad only to describe and explain. Supplier industries can be anything from advanced subsea installations to the food served to the construction workers at Melkøya. However in this paper when I talk of supplier industries I mean something that is in relation to the existing industries

in Harstad today. Which consist of welders, small and flexible shipyards, engineer shops and designers. A type of industry that is well suited for maintenance and construction of smaller modules for the construction and operational phase.

There are many factors that could influence the development of petroleum related industries in Harstad. Since oil and gas are global commodities, that pollutes, the development is subjected to changes and decisions on all levels of society and government, local, regional, national and global. In order to get a complete picture of all factors that affects Harstad I would have to discuss all of these, which is impossible to do in a master thesis. The amount of information would be tremendous. Examples of factors that I have excluded are the oil-price and emissions. However the history of petroleum development in Norway will provide some sense of the significance of these factors. It is also clear that there are other factors on a national and international level that would influence development of this industry; examples of such factors are foreign policy and energy security.

There are factors on and regional level that have been excluded as well. Besides equipment, machinery, goods and services that are directly associated with the petroleum industry a lot of sectors and industries have become relevant as suppliers for the oil-companies. Developments such as Snøhvit and Ormen Lange have shown that most of the goods and services going into a development are 'ordinary goods' and services that not necessarily are considered to be petroleum related suppliers, such as leveling, construction, security, housing and supply of groceries. I have however decided not to look at these factors in this thesis. The role of the innovation companies for encouraging new establishments and StatoilHydro's initiatives to support entrants such as LOOP have not been considered either, reason being that the capital available for innovation in this sector is significant and not limited to one region¹. My reasoning for excluding these is a result of the fact that it would require a lot more data. In order to examine them I would have to investigate these innovations and incubators as well as the organizations. Another aspect that has not been examined is jobs that could be created in relation to oil spill protection and local oil spill preparedness. Questions regarding co-existence have not been examined either.

¹ (Create Innovation AS, 2008, p. 43) A report prepared by the Norwegian research council.

2. METHODOLOGICAL REFLECTIONS

It is important to choose the right research method in order to create a link between the problem statement, literature, analysis and conclusion (Hellevik, 1999).

“Methodology is about justifying the decisions researchers make in selecting and using their methods.”

(Cough, 2002)

2.1 Research Paradigm

According to (Easterby-Smith et al, 2002) the social constructivist approach can be seen as an interpretive method. It is important to have an open minded view and engage in extensive conversations with people backed up by observations and access to documents to verify the interpretations made. My position as a researcher in this thesis is that I am social constructivist. My underpinning values for making this conclusion is that I firmly believe that my interaction with the research subjects influences the subject itself. It is important for the readers of this report to know that I have this view, since it will color my research and findings. In the table 2.1 two major research positions is listed. As we can see the choice of research paradigm has a significant effect on the research.

Table 2.1 Contrasting implications of positivism and social constructivism

	Positivism	Social Constructivism
The observer	must be independent	is part of what is being observed
Human interest	should be irrelevant	are the main drivers of science
Explanations	must demonstrate causality	aim to increase general understanding of the situation
Research progress through	hypotheses and deductions	gathering rich data from which ideas are included
Concepts	need to operationalized so that they can be measured	should incorporate stakeholder perspectives
Units of analysis	should be reduced to simplest	may include the complexity of

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

Source: (Easterby-Smith et al, 2002, p. 30)

2.2 Research Method

It is common to classify research methods into two different types, qualitative and quantitative research. Based on my position as a social constructivist researcher I found it to be most beneficial to approach research with a qualitative method. The qualitative research method has often an inductive character where theories are developed by studying the social context. Qualitative research is usually more ground breaking than quantitative, and it is often the qualitative method that develops theories and supplies the quantitative research with research topics that needs to be verified. Qualitative theories are reliant on quantitative research to verify the findings and the two methods can be seen as complementary to each other. Qualitative research approaches research methodology in social sciences. Qualitative research involves an in-depth understanding of human behavior and the reasons that govern human behavior. Unlike quantitative research, qualitative research relies on reasons behind various aspects of behavior. Simply put, it investigates the why and how of decision making, as compared to what, where, and when of quantitative research. Hence, the need is for smaller but focused samples rather than large randomized samples. The research method in this thesis is built on a case study of Harstad.

2.2.1 Data collection

One can distinguish between two main types of data:

- ✓ Primary data is gathered for one specific case by the researcher (Jacobsen, 2000). I have collected data through interviews with knowledgeable and experienced

professionals from different organizations. Primary data have the main advantage that it is collected for the specific research.

- ✓ Secondary data is gathered by someone other than the researcher and is usually gathered for another purpose (Jacobsen, 2000). Secondary data in my research were typically reports by different well established organizations, such as Econ Pöyry, Arena, Norut, Fafo, SNF, Harstad municipality, and others.

In order to get a better understanding of the research subject I used interviews (primary data) as a way to get a general understanding of the situation. In advance I had read reports and newspapers articles (secondary data) that informed me about the situation and enabled me to ask questions. However as I talked to people I got a different perspectives and was directed to other sources of information (secondary) and the search continued. Often I realized that interview objects were uncertain about facts and they often informed me of other people or other secondary sources that better could explain what they were trying to communicate. During the research process I found that interviews often verified information that was written in reports as well. My experience was that reports often had a more detailed explanation of the situations than the interviewees could portray. The secondary information that has been collected verifies or contradicts the statements from the respondents and gives basis for further investigation. It is important for my research to find information that corresponds to my findings. This will give the research internal validity.

2.2.2 Sampling

I have used individual interviews and document studies in this thesis. According to (Jacobsen, 2000) is individual interviews suitable when few units are studied, and when single respondents are interesting to talk to about how they understand a special phenomenon². The short timeframe of this thesis limited my ability to collect data and I decided to use intensive searches with few respondents. Through intensive searches the researcher can get more details about the phenomenon. I decided to seek out people that I wanted to interview in Harstad.

² (Jacobsen, 2000)

After the interviews I have asked the interviewee about other potential candidates and usually I have been directed to other people.

2.2.3 Interview

I decided not to structure my interviews too much, since this is the recommended approach for case study of research³. The open structure enabled the interviews to be informal and helped encouraged the interviewees to talk as much as possible. This approach also made it easier for me to make choices throughout the interview. During interviews appealing and important subjects often came up and the loose structure enabled me to follow interesting information. I did however prepare some questions and topics before the interviews in order to have some help if the conversation ended. Before some of the interviews I also prepared some of the interviewees about the topics that I wanted to discuss. In order to focus on what was said during the conversation I recorded the interviews. As important information came up I wrote down the time of the recording so that the transcribing of the interview became easier afterwards. After the interview I went through the interviews and wrote down information that I found to be important. The original plan was to conduct interviews in person, but after the first interview, and after trying to arrange other interviews, it became apparent to me that the interviewees were used to telephone interviews and that this also was preferred method of conducting interviews by the interviewees.

I have conducted five interviews in order to get a better understanding of the situation in Harstad. Two former Statoil employees, one employee from StatoilHydro, one from NPD ,and one form Grenland Arctic. In addition to these I have been in contact with several people in Harstad and elsewhere in order to get a better understanding of the situation. The interviewees are listed in the appendix.

³ (Easterby-Smith et al, 2002, p. 88)

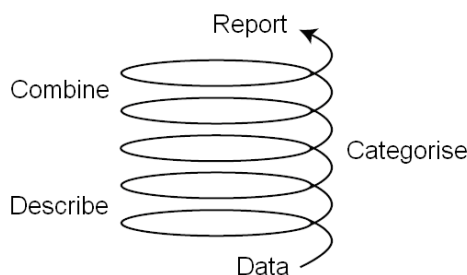
2.2.4 Analysis

The analysis of evidence in a case study is one of the most difficult and least developed parts of the research method (Yin, 2003, p. 109). To help the researcher there has been developed some analytical tools. These are summarized by Miles and Huberman⁴ and includes:

- Sorting information into different arrays.
- Making a matrix of categories and placing the evidence within such categories.
- Creating data displays – flowcharts and other graphics – for examining the data.
- Tabulating the frequency of different events.
- Examining the complexity of such tabulations and their relationships by calculating second-order numbers such as means and variances.
- Sorting information in chronological order or using some other temporal scheme.

Using these approaches can be helpful, but the researcher has to be careful not to manipulate data. For this research I have decided to use the approach presented by Jacobsen⁵. He has divided the analytical process in three steps: describe, categorize and combine. See illustration 2.1. The illustration shows the analytical process as a spiral that starts with the data and ends with a report.

Illustration 2.1 Analysis of qualitative research as a spiral⁶



During the different steps in this process it is important to rework the data from the interviews so that the information from the respondents becomes clear. Then the researcher has to

⁴ (Yin, 2003, p. 111)

⁵ (Jacobsen, 2000)

⁶ (Jacobsen, 2000, p. 174)

systematize and categorize the data. This is done to direct the focus from the single interviews and take a much broader view about the information in the data⁷. It can be easily done by making categories. The pieces of information that contain the same theme or phenomenon can belong to the same category. This work simplifies the analysis and statements from respondents are more easily compared and phenomena are enlightened from different angles. Since a prerequisite to the qualitative analysis is that the researcher has to be open-minded, the categories are not determined in forehand, but are decided from the interviews.

The categories should give relevance and meaning to people outside the research and relevance to how existing theory about the subject has taken care of such categories. This control of categories is important to the validity in the research. Some categories can be sampled directly from the interview guide. Then the researcher combines the different pieces of information and makes connections between the different categories. Terms and categories are connected because the researcher links them together or because data does. They can have a substantial connection that one condition influences another or that one condition is the reason that the other occurs (Jacobsen, 2000). After the data is categorized the researcher must interpret the findings, by looking for meanings and causes for the statements. This is then set up against theories and leads to conclusions.

2.2.5 Validity and Reliability

A research design is supposed to represent a rational set of statements (Yin, 2003). You can judge the quality of any given design according to certain logical tests. Concepts that can be used for these tests are: Trustworthiness, credibility, conformability, and data dependency.

Commonly there have been four tests that have been used to distinguish the quality of any empirical social research. Since case study is one of these four, the tests are also relevant to them.

⁷ (Jacobsen, 2000, p. 185)

Table 2.1 Case Study Tactics for Four Design Tests⁸

Tests	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	<ul style="list-style-type: none"> - Use multiple sources of evidence - Establish chain of evidence - Have key informants review draft case study report 	data collection data collection composition
Internal validity	<ul style="list-style-type: none"> - Do pattern-matching - Do explanation-building - Address rival explanations - Use logic models 	data analyses data analyses data analyses data analyses
External validity	<ul style="list-style-type: none"> - Use theory in single-case studies - Use replication logic in multiple-case studies 	research design research design
Reliability	<ul style="list-style-type: none"> - Use case study protocol - Develop case study database 	data collection data collection

Construct validity is concerned with the establishment of operational measures for the concepts being studied. There are mainly two ways to avoid failing this test: Multiple sources of information verifying each other evidence. In my research I have ensured the construct validity by interviewing people from different organizations that represents different views. In addition I have collected secondary data I have gathered form reliable sources that have confirmed my findings. See references.

Internal validity is a concern for casual (or exploratory) in which an investigator is trying to determine whether event x led to event y. If this is not the case then there must be a factor z that also needs to be taken into consideration.

External validity asks whether or not we can generalize based on the findings in the study. Critics usually mean that the small sample sizes are too small to be able to make general assumptions.

⁸ Yin, R. (2003). Case Study Research

Reliability is the final test. It asks whether or not later research on the same case over again would come to the same findings and conclusions. The goal of reliability is to minimize the errors and biases in a study. A prerequisite for allowing other researchers to repeat an earlier study is to document the procedures used in the research. When conducting case studies it can be useful to imagine that someone is looking over your shoulder at all times. Then it becomes important to document all steps in the procedure.

2.3 Ethics

In a qualitative study the researcher can be influenced, to a greater degree, in the data collection process. Some people may have a strong belief and engagement and the researcher may be influenced by personalities, data, and impressions that he experience during the collection of data process.

The degree of honesty in the interviews and access to information is dependent on the atmosphere that exists between the interviewer and interviewee. It is often the case that the researcher has the most benefit from the research and then it is up to the researcher to create the right atmosphere. The right atmosphere will be dependent on the relation created between the two and whether or not the interviewer manages to build a trusting relationship to the interviewee. This relationship should not be taken advantage of. Establishing a good environment for information sharing is possible if the two parts have mutual respect for each other. The interviewer can communicate respect by being considerate of the interviewee's needs. By this meaning he should be flexible to some degree about scheduling the interview, being on time, give notice about possible changes, and not contact the respondent on his spare time, stay objective and professional, be calm not threatening, be indifferent, not ask threatening or challenging questions, and not put words in the respondent's mouth or treat him in any other way that compromise his autonomy.

Confidentiality can also be an issue since every individual respondent might not be comfortable with giving interviews (Easterby-Smith et al, 2002, p. 95). I had to face in this research my research. Some of my interviewees did not want their statements to be printed

with names in the report. Since the interviews also have been conducted in Norwegian I have refrained from using statements from my interviewees.

2.4 Summary

This thesis uses a qualitative research method with an explorative and descriptive design. The research is based on a case study of Harstad and primary data gathered from some of the organizations that exists there. I have conducted five interviews in order to get a better understanding of the situation. Two former Statoil employees, one employee from StatoilHydro, one from NPD and one from Grenland Arctic. In addition to these I have been in contact with several other people in Harstad and elsewhere in order to get a better understanding of the situation. I have also collected secondary data in order to relate Harstad to the larger context and to supplement the information given during interviews.

3. FRAME OF REFERENCE

In order to understand the situation and the problems at hand I think it is important to inform the reader about the historical background and the important factors that have influenced history. Often history can explain a lot of phenomena in the present world and give some indication on what we can expect in the future. In this part I will therefore present the history of petroleum activities on the NCS. The history presented is significantly influenced by political decisions. In fact questions regarding developments of both oil and gas, and the northern region have historically been influenced by political decisions. I will therefore present some of the important political decisions that have been made regarding development of petroleum resources in this region. Finally I will discuss the current status on the question regarding the opening of Nordland VI-VII and Troms II. Main sources for information in this part are SSB, the Ministry of Local Government and Regional Development and Petoro.

3.1 Norwegian petroleum history

In the 1960s Norway secured the sovereignty of the Norwegian continental shelf. This is an important foundation for the state's petroleum policy. About the same time, the first licenses to explore the Norwegian shelf were provided. Through a survey of the geology in 1963, the announcement of the first licensing round for the survey, drilling and production of oil was made in 1965. The reason why it became commercially interesting to make such explorative surveys was a gas find on the Dutch Continental Shelf in the late 1950s. Drilling started on the Norwegian shelf in 1966, and the first discovery was made in 1968. In 1970, the first discovery that was made commercially viable was found. The field is named Ekofisk. Production started in 1971 and the field is still producing today⁹.

The politicians realized early that petroleum sector had the potential to become an important sector in Norway and not only with regards to exploitation. The first concessions were granted under the condition that exploration activities at sea would have its basis in Norway.

⁹ In this part several sources are combined. Sources are: the Ministry of Local Government and Regional Development, <http://www.regjeringen.no/en/dep/oed/Subject/Oil-and-Gas/Norways-oil-history-in-5-minutes.html?id=440538>, and http://www.petoro.no/petoro_aarsrapport_2007_norsk.pdf p.3

Stavanger was selected as the base of the first operational foreign oil companies and the contractors.

The earliest period were marked by a number of other factors as well. Deepwater drilling required research and development of new technologies. This technology was based on competence from the existing maritime sector and international competence from drilling of onshore oil fields. The high maritime expertise in Norway enabled many tasks on board the drilling rigs and supply vessels to be run by Norwegian seamen. The operational offices and supply bases that were established onshore purchased goods and services from local suppliers. The Norwegian shipyards and workshops also adapted to this new industry and started to design equipment adapted to the new activities at sea.

Petroleum did not have a central place in the Norwegian political debate at this early stage. The risk of exploration for oil was mainly taken by the foreign operators. However more discoveries were made and the political debate intensified. The White Paper. No. 76 (1970-1971) discussed survey for and production of natural resources on the NCS. The subsequent political consideration of the message resulted in the Ten Commandments for a Norwegian petroleum policy. These commandments show that the government had great ambitions for the new industry and that there were many and to some extent contradictory wishes of what society could and should achieve through the petroleum sector.

Table 3.1 Ten oil commandments¹⁰

1. Secure national control
2. National independence in supply of oil
3. Develop a petroleum-based onshore industry
4. Secure the environment and existing industries
5. Flaring of gas on the NCS is not acceptable
6. Petroleum should be transported ashore to Norway from the offshore fields
7. The state should be an active player promoting national interests in resource management
8. A state oil company to take care of the state's business interests and to cooperate with Norwegian and foreign companies
9. Special requirements for petroleum activities in Northern Norway
10. Major petroleum discoveries will introduce new challenges for Norwegian foreign policy

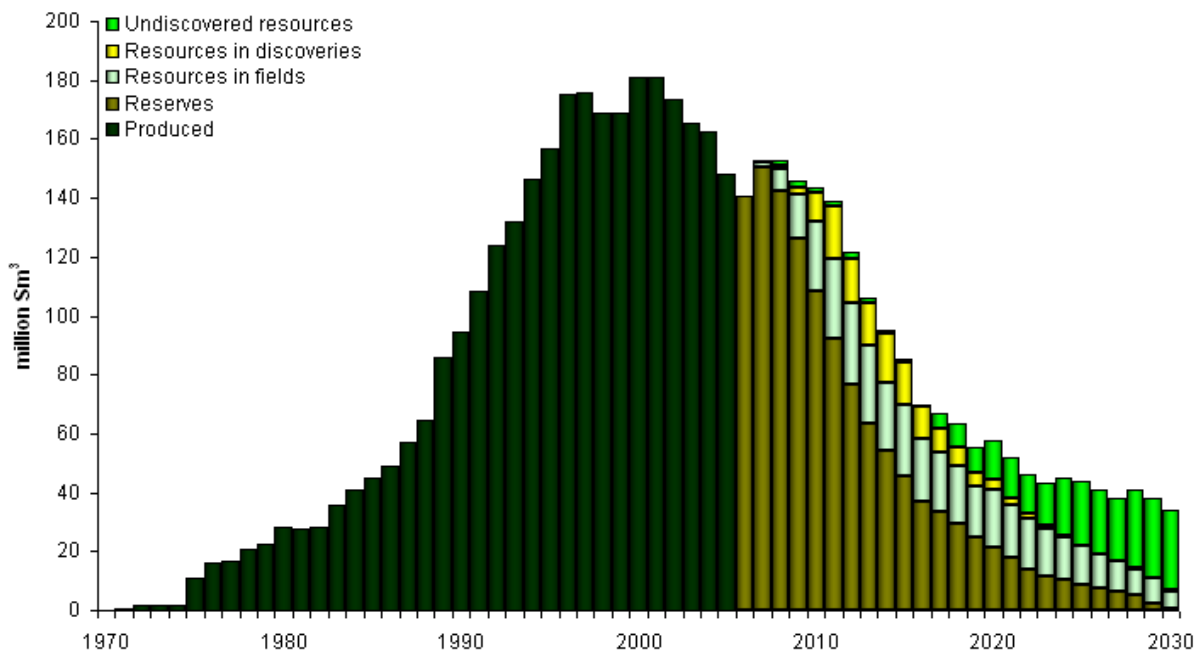
In 1972 the Norwegian government decided to establish The Norwegian Petroleum Directorate and Statoil in order to take more control over Norwegian interests. NPD's role was established to ensure the safety and control functions as well as manage and administer, among other things, geological information on the Norwegian Continental Shelf. Statoil AS was on the other hand established to secure national control over the energy resources and become a fully integrated, commercial and operating oil company. Both of these governmental organizations were established in Stavanger, and they were along with the first base for the offshore industry an important regional function in order to take more control. These two establishments contributed to making Stavanger the oil-capital in Norway. Despite the fact that other players such as Norsk Hydro, Saga, Aker, and Kvaerner was localized in Oslo. Later the so-called Establishment law (1976) was used in an attempt to limit a further centralization of these activities to Stavanger and Oslo.

¹⁰ The White Paper. No. 76 (1970-1971)

Figure 3.1 Oil production on the NCS¹¹

Oil production from the Norwegian continental shelf

All resource categories



During the 1980's the development national governance and control was further strengthened, both through new rules and regulations, and also by a strengthening of the three Norwegian oil companies, Statoil, Hydro and Saga. The first Norwegian operated fields were; Gullfaks (Statoil), then came Oseberg (Hydro) and finally Snorre (Saga). SDFI was established in order for the government to secure a larger share of the profit to the government. However in 1986 the prices fell significantly and the government had to adjust their ownership shares a bit. The multinational oil companies complained a lot, but chose to stay.

During the 90's the NCS entered a mature period. New regions were also made available internationally and the oil price remained at a low level. This provided little incentives for EOR and the attractiveness of the NCS fell. Focus of the oil companies was now on efficiency and cost control, NORSOK and also internationalization of the petroleum cluster, INTSOK. During this period the Norwegian Petroleum fund was established. Even though Norway did not become a member of the EU they had to adjust to EU standards because of the EEA

¹¹ Source: NPD.

membership. This affected the licensing system and procurement policies. During this period one of the three Norwegian companies ceased to exist as Hydro bought Saga Petroleum in 1999 and assets were split with Statoil.

The period from 2000 has so far been influenced by global competition and internationalizing. The result of this is more regulations and standards, but also deregulation of markets. The liberalization of the EU gas markets is one result. Statoil was privatized in 2001 and in this process 21,5 percent of the SDFI was sold, 15 percent to Statoil and the rest to other licensees. Petoro was established in 2001 to manage the SDFI. Gassco was also established in 2001 to take care of the pipeline-network. During this period it also became clear that the NCS was maturing. More effort was put in enhancing recovery from producing fields and the government offered a more attractive investment scheme. The result of this was that the NCS became attractive again and many new participants have shown interest and been through the process of prequalifying as license holders and operatorship holders in this region. Finally Statoil and Hydro Petroleum merged in October 2007. After the merger between Statoil and Hydro, the new company is now operator of 80 percent of the fields on the NCS.

Despite the fact that all the major finds are made the total production of hydrocarbons on the NCS is expected to stay at the same level for some years. The reason for is that the production of gas is increasing.

Even though the production of oil is decreasing, the industry now experience substantial profits as a result of the peak high oil price. However there are some concerns with regards to the increasing costs in this industry.

3.2 Politics, rules and regulations

Unlike many oil producing nations Norway decided to use a licensing system for regulation of the NCS. This regulation was also used actively as a means in regional politics. The order in which the NCS would be developed was originally the following: First the North Sea, secondly the Norwegian Sea and the Barents Sea, except the areas outside Lofoten, Vesterålen and Senja, and finally the Norwegian Sea outside central Norway. Originally the 62 degree

latitude was set as a border. However it despite a high success rate in explorative drilling in the Northern areas, mainly Barents Sea. It turned out that the findings was not commercial. The Snøhvit discovery was one of the first finds.

Landing of resources have also been used as a regional instrument. In the early period it was decided that the continental shelf would be developed in a moderate tempo. This was done so that the Norwegian industry could be able to adapt to this new industry. Investments in oil offshore required, among other things, large platforms installations. It soon became apparent that Norway had to develop competence in construction of such installations. In particular, the large shipyards were important for building up a Norwegian capacity for the development and construction of large integrated production platforms. Several of the shipyards were located in the Western parts of Norway. This was beneficial, since it was important to be able to construct the platforms as close as possible to the oil fields.

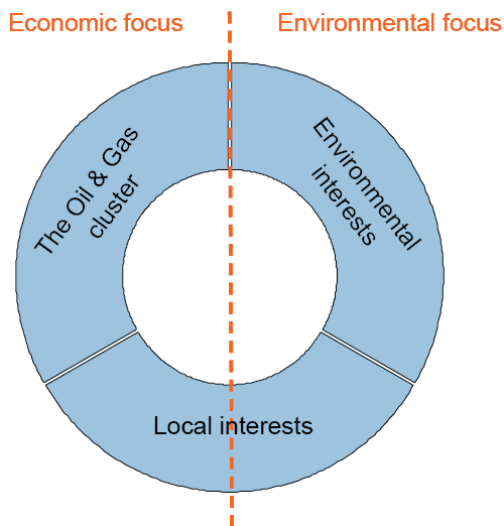
The government intention in the 70's was that they wanted the whole country to benefit from development of resources on the NCS. In order to do this many demands was given the operating companies on the NCS, among them localization of operation departments onshore. Politically it was a requirement that a field developed outside the county coastline should be brought onshore in that same county. The demands from the government decreased during the 80's when prices fell radically, and during the 90's commitments to EEA and WTO resulted in a removal of the protectionist politics that existed within the Norwegian petroleum regulation.

3.2.1 Opening of Nordland VI -VII and Troms II

The supply industry in Norway is situated quite far away from the Barents Sea, and even though the industry located in the south western region currently base a significant amount of their sales to international markets it is clear that they also need new demand from Norwegian field developments. The opening of new areas is therefore seen as is essential for a further growth in this industry. However the most prospective areas in Norway are Nordland VI-VII and Troms II which lie in a rich natural area, with beautiful scenery and a lot of resources, such as fish. Opening these areas therefore result in a lot of discussion as the oil and gas

industry often is characterized as an industry that has the potential to destroy the finishing industry with its activities. In this part I will therefore discuss current status in this matter. In order to examine the possibility for an opening I will present some of the findings in Econ Pöyry's report named Poles Apart¹².

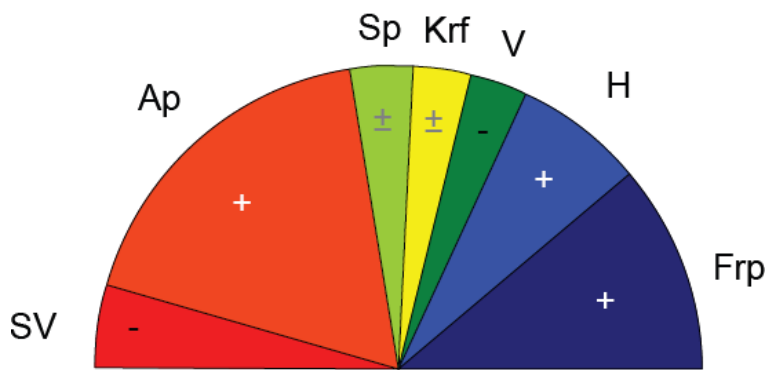
Figure 3.2 The Stakeholders



There are mainly two perspectives in this debate, according to 'Poles Apart'. These are illustrated by the figure 3.2. The two perspectives are: Those who want to open up these areas based on economic factors and those who want to close these areas based on environmental considerations. Important factors in making these decisions have been the risk associated with oil activity in this region. The final decision of whether or not these areas are opened up depends on the politicians and the decision is due to be made in 2010. Currently the parties are divided in their view on this matter. The distribution is illustrated in figure 3.3. Positive to an opening is branded as (+) while those who oppose an opening are branded as (-). Parties that are split in their view on this discussion is branded with both (+) and (-).

¹² Econ Pöyry's Poles Apart can be downloaded at: <http://www.econ.no/?mnusel=a185a190a>

Figure 3.3 Party perspectives



With the current situation there is a majority of politicians that believe that closed areas should be opened, but since Norway has a coalition government it is likely that the government will consist of parties that oppose an opening as well. When the previous decision had to be made, the Socialistic left party opposed an opening and the decision was delayed until 2010. In 2009 there is a new general election in Norway and it is expected that the concern of whether or not the areas will be opened will be a major issue during election campaign next year. Currently the position among the parties is as the figure 3.3 illustrates.

The economic stakeholders, who argue for an opening of these areas, expresses that a continued closing will negatively affect the industry in Norway. According to (Econ Pöyry, 2008, p. 22) are the industry stakeholders concerned trying to avoid a rapid decline of oil and gas activities on the NCS. Opening of Nordland VI-VII and Troms II will be seen as a continuation of a wider status quo. While the effect of a continued closure of areas outside Lofoten will be seen as a break of established practice. This would have a damaging effect on the industry. The author of poles apart discusses the arguments for and against and concludes that the areas are likely to be opened. However, time will show.

3.3 Summary

The importance of the oil industry has grown significantly over the last years and the industry is now a significant part of the Norwegian economy. Politics and regulation have ever since the beginning of the oil adventure in the 1970's had a significant influence on the petroleum

industry. Membership in free trade unions such as EEA has now limited the Norwegian government's chances to force oil companies to award Norwegian suppliers with contracts.

The decision to open closed areas have been delayed until 2010. The political parties are split in their view regarding the opening or closing off of these areas. However there is currently a majority among the parties for an opening.

4. THEORETICAL FRAMEWORK

In this chapter I will address some theories that I find to be important in this context. Even though Harstad is a small city and the petroleum industry only recruits about 500 people, I think that traditional theories regarding clusters have contributions that highlight some important aspects of the development of Harstad. Theories regarding industry development have evolved significantly and more actual theories such as network theories and resource-base perspective therefore emphasize the modern development in a better way.

4.1 Clusters

According to (Normann, 1998, pp. 197-214) almost all economic activity occurs in geographical regions of densely populated areas and cities. We can see many examples of this through history. If you for instance gaze at our own country, Norway, one will notice that most of the people live along the coastline in some smaller geographical areas. This geographical concentration indicates that there is a significant scale of economics in these areas and that localization will be beneficial to those individuals or businesses that are dependent on this input. There are two questions one can ask in this regard. Why do we get such a clusters and why is it localized where it is? There can be many reasons for this. It can be based on historical casualties, access to resources, but also social and political reasons.

The first theories of regional clusters were discussed by Alfred Marshall in his book *Principles of Economics* from 1920 (Jakobsen, 2008). He defined three sources for localization and these are still relevant today.

- Common market of competent personnel
- Goods and services suppliers' ability and chances to specialize.
- Knowledge sharing: "If one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas (Marshall, 1920)

There are two major theoretical perspectives on clusters and cluster formation. The first one is made with regards to Michael Porters theory about comparative advantages. The second

theory within international trade focuses on the interplay between businesses, localization, geographical accumulation and international trade. Paul Krugman is often associated with these theories.

Different scholars have different views on how competitive advantage is created. To summarize:

- Adam Smith: *Absolute advantage*, a country exports those products it produces the cheapest.
- David Ricardo: *Comparative Advantage*, countries allocate resources to those industries that they are most efficient relative to other countries.
- Heckscher-Ohlin: Countries have the same access to technology, but specializes according to their access for input factors, land, labor, etc.
- Porter: *Competitive advantage*, input factors are not given sizes, but rather a continuation of upgrades through innovation and efficiency measures.

The most significant contributors within the subject of economical geography, which also discuss the formation of clusters, are: Paul Krugman, Anthony Venables, Diego Puga, Jean Francios Thisse and M. Fujita. (Jakobsen, 2008, p. 7) All of them points at the same cluster mechanisms as Marshall. Primarily they all argue that the variation and size of the workforce mutually strengthens each other, labor market pooling. Secondly number and variation of suppliers and demanders will strengthen each other, upstream/downstream mechanisms. Finally knowledge transfer between businesses with close relations or close in physical distance will contribute to the formation of clusters and spillover effects. All these scholars meant this final point is important, but it has been very difficult to prove and measure.

Besides these there is an enormous area of literature and theories that the cluster theories discuss: one example of the clustering effects is stores selling antics. If these stores are localized in the same street it gives the customer the advantage that he or she can get a complete overview over the supply of antics in the city in a short time. Something that makes it attractive for other stores selling antics to localize in the same street. These issues can also be relevant to entire industries, where knowledge, technology and innovations push the interaction between the actors. According to Fujita, Krugman and Venables:

“Agglomeration – the clustering of economic activity, created and sustained by some sort of circular logic – occurs at many levels, from the local shopping districts that serve surrounding residential areas within cities to specialized economic regions like Silicon Valley (or the City of London) that serve the world market as a whole.”(Fujita, Krugman et al. 1999)

There is not a precise and exact definition of what a cluster is, but the literature does have a common dominator: The core being a geographical border that results in a higher productivity within this area, compared to the area outside. Businesses located within this area receive a benefit of being in this zone. What this benefit consist of and which mechanisms that create them may however vary between different subjects and theories. The most common definition of an industrial cluster is made by Michael Porter:

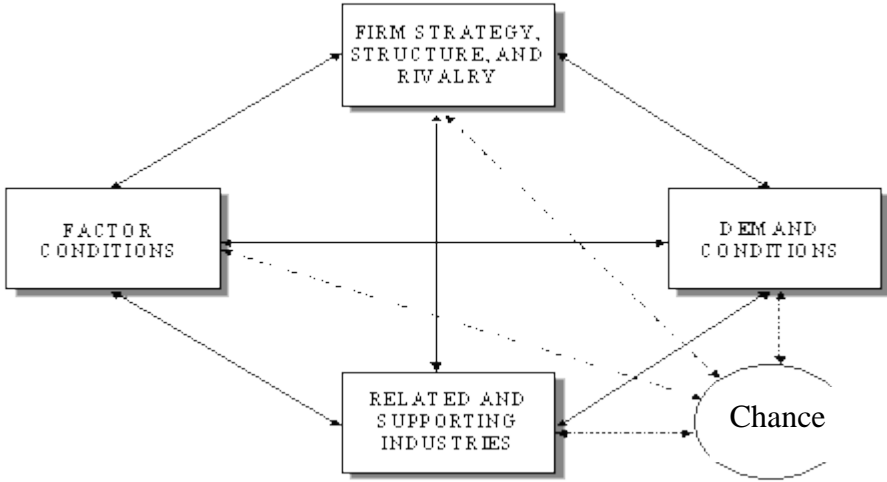
“A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities” (Porter 1998)

In business literature questions regarding cluster formation have not been given much attention. Clusters have been something that regional economists and economical geographers have been occupied with. It has also been something that has been very important to regional politicians. Today there is a different view on this matter. Clusters are now regarded as essential for new business establishments. There are mainly three reasons for this. In Porter’s analysis he has claimed that industrial clusters are a deliberate comparative advantage for a region and country. Therefore should an important part of the governments work be to develop and encourage clusters. Another point is that there is significant uncertainty attached to the fact around economic-geographic consequences of international integration. The third argument is that there has been a focus in economics on economies of scale, imperfect competition and external factors.

Positive or negative externalities between businesses exist when the production from one business influences another. Negative externalities can for instance be pollution. When it comes to positive externalities one example is fishing and maritime industries and petroleum activities. Experience from the NCS has shown that knowledge from the fishing industries can be transferred to petroleum activities. Innovative ship design is one example. It is also likely

that innovation and knowledge between competing businesses influences other actors. One assumption is that the research done by one business will influence other businesses level of research not and only its own. Krugman has in his literature been able to prove that cooperation is beneficial to the actors in a cluster. However his models are very simplified and many argue about their validity. Porter on the other hand focuses more on the human capital and innovative processes. In his view these two factors are the most important ones in order to create growth. His two main contributions in this respect is the diamond and cluster theory. Porter’s theory comes from his work with business strategy. The basis for his theories is four main perspectives which form a diamond. The figure below displays Porters Diamond of national advantage.

Figure 4.1 The Porter Model



The content of these four main categories decide how well a business or a sector will perform. See table 4.1 on the next page.

Table 4.1 Four main categories

Categories	
<u>Firm Strategy, structure and rivalry:</u>	<ul style="list-style-type: none"> - A local context that rules and regulations that encourages investment and sustained upgrading, e.g., intellectual property protection. - A system across institutions that encourages individual need for success. - Open and vigorous competition among locally based rivals.
<u>Demand conditions:</u>	<ul style="list-style-type: none"> - Sophisticated and demanding local customer(s). - Local customer needs that anticipate those elsewhere. - Unusual local demand in specialized segments that can be served regionally and globally.
<u>Related and supporting industries:</u>	<ul style="list-style-type: none"> - Access to capable, locally based suppliers and firms in related fields. - Presence of clusters instead of isolated industries.
<u>Factor conditions:</u>	<ul style="list-style-type: none"> - Presence of high quality specialized inputs available to firms. Such as: Human resources, capital resources, physical infrastructure, administrative infrastructure, information infrastructure, scientific and technological infrastructure, and natural resources.

According to (Normann, 1998) Porters model tries to illustrate what kind of content these four categories need to contain in order to develop the best result. To summarize: it deals with interplay and challenges, and the fact, that it is valuable for businesses to interact and influence each other. It is also important that businesses meet challenges that stimulate innovation and efficiency. This means that demanding customers and competition in all aspects of the business in and around the organization is valuable.

All the main areas will of course be influenced by the government, culture, opinion, and coincidences. These factors are included in the factor called chance. ‘Chance’ can be demanding customers, special governmental regulations (demand for spin-off effects), environmental requirements, or other factors that demands business in this sector to develop. A good example of such “chances” is on the NCS where the petroleum has met many challenges. To mention a few: harsh climate, deepwater drilling, construction, subsea installations, multiphase flow etc. These challenges have given the Norwegian supply industry valuable lessons that have developed them significantly and now they are leaders on development of such technologies. As petroleum activities move north there is even more challenges and therefore also more to be learned. To further develop the competitive advantage they have to move after the challenges.

In the 21st century the world has become globalized and it has had a significant influence on the clusters. Simply put, globalization will result in a merger of earlier separated markets, which in turn will lead to an increased geographical concentration of industries. The most competitive businesses strengthen because the area attracts other related industries and competence (OECD 2007).

The new world now offers new opportunities and ways of establishing businesses. Most significant change from the traditional theories presented in this chapter is that businesses today are not considered to be separate from each other or the society for that matter.

4.1.1 Critique of cluster theories

There is little research on the effectiveness of clusters. According to Rosenfeld¹³ are there several criteria that can be used for evaluating cluster efficiency; the number of new spin-off businesses, the development of new technology and increased R&D capacity, the improvement of labor force skills, and the intensity and quality of firm networks created. The establishment of industry clusters policies have been criticized as a potential adaptation of such policies could result in over specialization of the economy; something that would leave the economy vulnerable to changes in the global economy. If the economies in the clusters then fail then the whole economy will be significantly damaged. Secondly, industry clusters have been considered to be more applicable to small specialized firms, particularly because of the level of trust and cooperation required for a successful cluster. Critics claim that in reality, large multinational companies dominate the world and these companies will undermine the trust that is required in a cluster to be effective. A third critique is that cluster theories only apply to urban areas. Final critique claims that new information technologies and effective delivery services replace the need for clusters.

¹³ Bringing Business Clusters into the Mainstream of Economic Development. (Rosenfeld, 1997)

Further criticism comes from Glasmeier¹⁴ highlights that cluster development is more appropriate in diverse economic areas, which are able to support new markets and innovation. Secondly they claim that clusters are only capable to respond to small incremental changes in technology and market demand. Clusters may be resistant to changes because it may drastically transform the processes used in previous successes.

4.2 Network theories

Information technologies and networks offer businesses new ways of organizing. General idea of the network perspective is that no businesses are a separate unit from others, much like the term “no man is an island”. It is therefore important for businesses to interact with another and share information in order to survive (Johannessen, S. O., Solem, O., 2007, p. 113). The result of this awareness is that businesses now see the importance of cooperation with other businesses. In fact this realization has resulted in a social upheaval of organization theory that shapes businesses and individuals to such a degree that it can be considered to be a revelation. *“The network are emerging as the signature form of organization in the Information Age, just as bureaucracy stamped the Industrial Age, hierarchy controlled the Agricultural age, and the small group roamed the Nomadic Era.”*

(Lipnack, J., & Stams, J. , 1994)

Networks may exist horizontally as well as vertically. The theory builds on the idea that cooperation between businesses can result in a comparative advantage (Johannessen, S. O., Solem, O., 2007, p. 118)

Previous studies have shown that interaction and cooperation between the different actors in the innovation system can result in synergy effects that enable a better utilization of innovation processes in existing and new organizations, and within research and development and the society in general (Koschatzky, 2001). In order to encourage such cooperation

¹⁴ Why Business Alone Won't Redevelop the Inner City: A Friendly Critique of Michael Porter's Approach to Urban Revitalization (Glasmeier, 1997).

between the actors it is important to have an effective infrastructure which organizes and stimulates networking between the participants.

Especially among business-to-business relations networks have become increasingly important. There are several types of network organizations. In general a network consists of nodes that are linked together. In personal networks the nodes represent individuals and in a business network they represent businesses or related organizations. The link is the interaction between the nodes. In order for networks to work it is important that the different actors get a benefit of being a part of the network. According to *The Age of Network*¹⁵ there are five important principles that needs to be exists in order for a network to function properly. These are: Unifying purpose, independent members, voluntary links, multiple leaders and integrated levels. See table 4.2 for more information.

Table 4.2 Five important principles for networks

Principle	
Unifying Purpose	Purpose is the unifying glue. Common views, values, and goals hold a network together. A shared focus on desired results keeps a network in synch and on track.
Independent Members	Independence is a prerequisite for interdependence. Each member of the network can stand on its own while benefiting from being part of a whole.
Voluntary Links	Just add links. As communication pathways increase, people and groups interact more often. As more relationships develop, trust strengthens which reduces the cost of doing business and generates greater opportunities.
Multiple Leaders	Fewer bosses, more leaders. Networks are leaderful not leaderless, each person or group in a network has something unique to contribute at some point in the process.
Integrated Levels	Networks are multilevel, not flat.

¹⁵ (Lipnack, J., & Stams, J. , 1994, s. 18)

In addition these principles, well functioning networks need an infrastructure. Both physical and intangible infrastructure is needed for a network to function properly. The physical infrastructure is in many ways important for the different actors (nodes) to meet and create connections. The intangible networks can then later aid cooperation and innovation between the businesses. One of the greatest advantages of being a member of a network is access to complementary resources that one business may lack (Koschatzky, 2001). One example of such an infrastructure is the supplier network Petro Arctic, which will be presented later.

In relation to the petroleum industries networks are very important. Some of the reason why it has become so important may lie in the interaction and close cooperation between the suppliers and the oil companies. In fact many of the suppliers we see today were started on initiative and help from Statoil. The high demands for Health Environment and Safety that they require innovative solutions and complex developments. It can be difficult for one actor to deliver and the networks are therefore essential for this industry. As more businesses come together they can be able to deliver contract larger or more complex contracts.

According to (Koschatzky, 2001) risk and uncertainty is minimized since it enables the actors to know where and how to get the necessary resources they lack in order to be successful, this can both be financial and human capital. In a world that is increasingly requiring flexibility and ability to change networks can be of important aid. In order to meet the increasing standards from customers businesses need to specialize and cooperate with other specialized business. By utilizing of external capabilities businesses are able to acquire the much needed competence it needs to survive in a highly competitive market.

According to (Johannessen, S. O., Solem, O., 2007) major benefits of business networks are. More effective use of resources, reduced transaction costs, increased control over the surroundings, synergy effects, win-win situations, and more effective innovation. Cons of business networks are reduced flexibility, transparency, differences in interests and conflicts.

Besides networks the increased use of information technologies have also enabled more effective communication within the organization as well. This has enabled businesses to divide their organization in different locations and by this utilizing local advantage to a

greater extent. The next theory I will discuss the new form of organization called Hubs and Nodes.

4.2.1 Hubs and Nodes

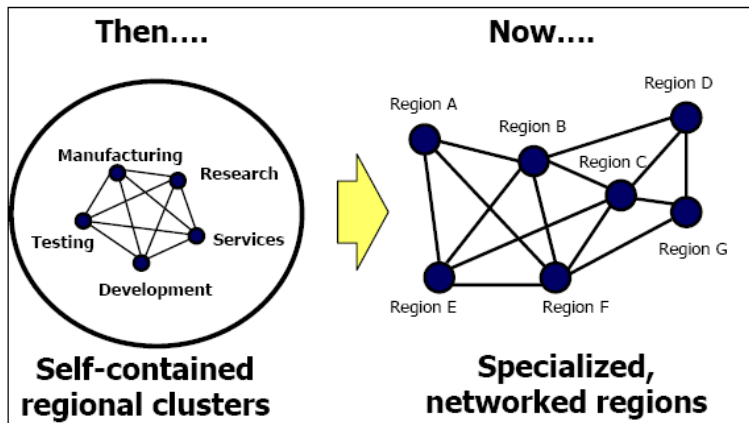
The model of hubs and nodes builds on all the mentioned theories and combines the best from all of them. However it is also affected by the critiques of them as well¹⁶.

The reasoning behind this theory is in a way developed from the network theories where one considers the Headquarter of a company to be the Hub and local branches to be the Node. The model is used to explain some of the reasons why the need for a particular area for production is not so significant today. Previous barriers, such as distance, have become less important as the information technologies have evolved. Internet and delivery services have enabled businesses to locate operations such as research, product development and manufacturing anywhere. One example that illustrates this is the production of cell-phones and electronics. R&D departments are located in Europe and the US, while most of the manufacturing occurs in Asian countries. One example from a specific business is Reinertsen which has established a production facility in Murmansk.

The main advantage of the division of an organization is that one firm is able to utilize local and in-house knowledge with benefits of lower costs and access to personnel in other places. In Harstad's case we may experience such a model being applied as well. Here it is not so much the cost aspect that enables this trend, but rather the fact that the Norwegian government demands local and regional spin-off effects from the increasing petroleum activity in the northern territories (a chance factor in Porter's model).

¹⁶ Based on a white paper on new paradigms in regional development called Global Hubs and Global Nodes, New Economic Strategies, NES. Link: <http://bioeconomy.org/pubs/hubsandnodes.pdf>

Figure 4.2 From clusters to nodes¹⁷



A possible result of such a strategy can have very beneficial effects on the industry development in Harstad and also the degree of innovation. With this theory one can imagine that important supply industries have “hubs” in their present localization, most likely in the south western petroleum cluster. While they establish a smaller branch (node) in Harstad, for instance an engineering office. With effective information technologies, the branch office is successfully involved in the in-house-knowledge and with the local presence they are presented with different challenges. In order to strengthen this effect the node should attract more businesses to its region and the chance for cooperation among the participants in the node could then result in an effective research and development.

4.2.2 Criticism of network theories

According to Strategi og Utvikling¹⁸ is network theory criticized for being too descriptive, without giving much guidance in what the businesses should do. The practical contribution of this theory may therefore be very limited. Despite this there are several authors within this theory that discuss the possibility to make strategic choices based on links to other actors in a network. The most significant problem with the network theory is that it is rational

¹⁷ <http://bioeconomy.org/pubs/hubsandnodes.pdf> p. 3

¹⁸ (Johannessen, S. O., Solem, O., 2007, p. 301)

model trying to describe organizations as rational actors, which they are not. Organizations are run by humans that are irrational and their relationships are not always based on rational decisions.

4.3 Recourse-based view

The fundamental principle of this theory is that a basis for a firms' competitive advantage lies primarily in the application of the bundle of valuable resources at the firm's disposal (Wernerfelt, 1984). A firms' ability to gain a competitive advantage is through the development of their valuable resources. In order to do this the firm needs to identify its potential key resources. Resources are considered to be important if they are: valuable, rare, unique or Non-substitutable. In this perspective knowledge and competence is considered to be an important and valuable resource. According to Strategi og utvikling¹⁹ lie firms resources mainly in the competence of the organizations workers (in-house-knowledge) and the organizations ability to utilize this competence. Competence can then be valuable, rare, and hard to imitate and form a basis for a firms' competitive advantage. It is important to further develop competence in order to maintain the advantage. The main implications this theory gives organizations are that they should focus on their main advantages and to a larger extent specialize. Focus on the important competences will result in higher profitability for the firm. The reason for this being that specialization likely will increase productivity and lower costs because the businesses are more focused. Areas that businesses do not have competence within should be outsourced to other businesses that can do this better than they themselves are able to. One of implications that businesses with this focus are faced with are "make-or-buy" and outsourcing. Make-or-buy is a test that can determine if an activity should be outsourced. If the business can buy a product or service from another firm cheaper or better than it can do itself then it should be bought. One example here is cleaning services. Earlier businesses had own departments and employees that would clean and wash facilities. Today most of such services are outsourced. Especially the car manufacturing industry has adjusted to these theories. Earlier all the different parts for a cars were produced at a specific factory and assembled there. Today many different suppliers produce parts for the cars. These

¹⁹ (Johannessen, S. O., Solem, O., 2007, p. 198)

suppliers have specialized in producing fender bumpers or transmission systems and supply several brands with their products.

More and more activities are outsourced and the interaction between the suppliers and demanding businesses has increased significantly. An example to illustrate this: Raufoss Hydro aluminum is a manufacturer of fender bumpers for the car industry. During strike at this plant, car assembly plants in Germany and Sweden are unable to finish their cars. This dependence could of course be reduced by having storage, but then the productivity would decrease and some of the benefit of outsourcing would also decrease. As a result logistics and the management of the flow of goods and services that goes into a product have been developed. This is called Supply Chain Management are highly relevant for the petroleum industry.

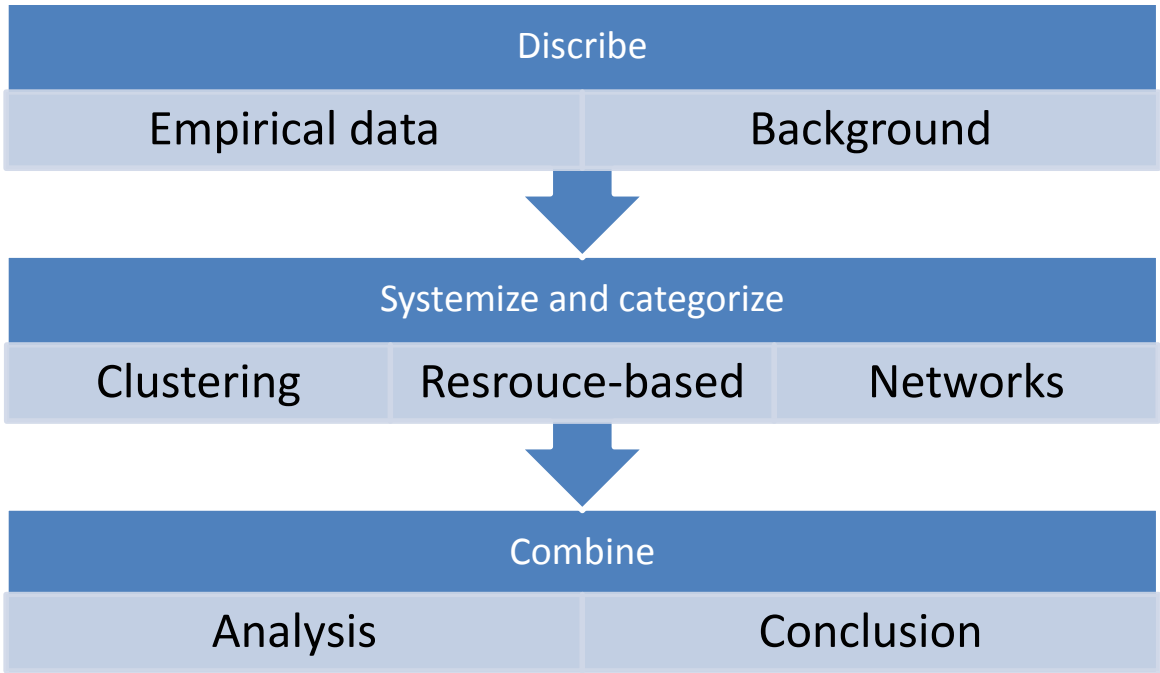
4.3.1 Critiques of resource based perspective

Like many other theories the critique of this theory is that it provides a too simple view of the reality (Johannessen, S. O., Solem, O., 2007, p. 343). The theory also assumes that businesses are reactive and that they have to adjust to changes rather proactively try to influence. The adjustments are based on identification of the valuable resources and at the same time the business needs to innovate. These two goals can be seen as contradictory as innovation most likely will require an organization to do something that is outside of their competence.

4.4 Research model

My research model is according to my method of describing the data, systemize it and categorize and combine it. The selected theory aids me in this process. Theory points out some important aspects that are needed in order to form a desired outcome. The figure 4.3 graphically illustrates the research model.

Figure 4.3 Research process, describe, categorize, and combine.



4.5 Summary

In this part I have presented literature discussing the formation of clusters, network organizing, and resource-based perspective. I have also included the theory regarding the formation of nodes and hubs. The cluster theory discusses the benefit of localizing related industries in a geographical area. Scale of economics can then occur as synergy effects take place. Competition and cooperation in such clusters will aid innovation and with interaction between the actors this effects can be even more significant. Theory regarding cluster have a long history in national and regional planning, and it is an important reason why we have the urban centers we have today. Globalization and information technology have enabled other forms of interaction and cooperation. The traditional cluster theory might not be as relevant today as it once were. A further development of the cluster theory is the Hubs and nodes theory where the clusters are more company specific. However I have argued that both benefits of clustering and also nodes can create positive synergy effects for a company.

5. INDUSTRY PERSPECTIVES

I will present some reports and other secondary data. First I examine the cluster formation in Norway in general and talk about the petroleum cluster in the south western part of Norway. Then I will discuss this type of industry developments in the Northern parts of Norway. Main contributions in this part are the Menon Business Economics report on clusters, Europe Innove/PRO INNO's 2007 report on Innovation clusters in Norway, and the Arena conjuncture barometer for the Northern region from 2007. This final report discusses important measures that need to be taken in order for industry in the Northern region in order to position themselves before increased activity in this region.

5.1 Clusters in Norway

According to Menon Business Economics report on clusters (Jakobsen, 2008) has Norwegian technology probably been most important within radio and telecommunication development, possibly also in combination with nautical science (Fjelstad, et al. 2000; Jakobsen, 2007). Norwegian industry has also contributed significantly in innovation of the developing energy industry, first with the development of hydropower and later with the petroleum industry. Currently Norway is also experiencing a positive growth process within alternative energy sources, such as wind, solar and tidal. Processing industry has traditionally had a strong foothold in Norway, but chemistry, wood processing and explosives has lost ground. A closer look at the Norwegian industry reveals a leading industry in several areas. Some of them are: Subsea production installations, drilling equipments, dynamic positioning, integrated offshore operations, design of specialized offshore ships, fish farming, polar research, sea rights, and maritime research. Common for these subjects is that they are within the petroleum, marine and maritime industries. It is easy to see what we do best in Norway. In fact most of the applicants for the NCE program are from within these three industries. Out of nine areas with NCE-status, five were participants from the oil-and-gas industry, four were from the maritime, two from the seafood industries and six were from other industries. The figure 5.1 shows the current distribution of the workforce in Norway.

Figure 5.1 Employment within sectors in Norway²⁰

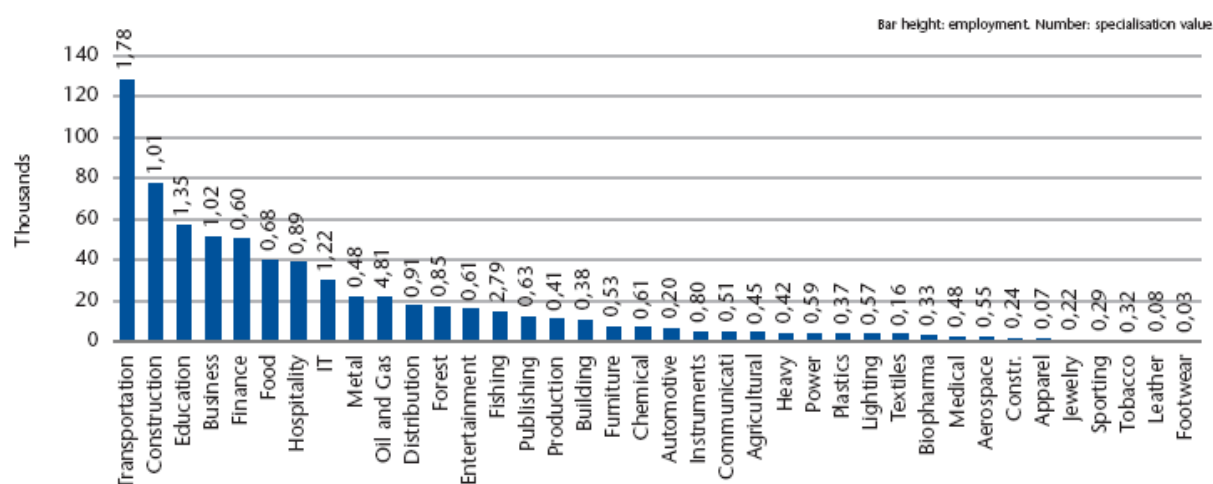


Table 5.1 Major clusters in Norway²¹

Cluster	Region	Employees	Specialisation	Stars
Oil and Gas	Agder og Rogaland	13 572	21.65	★ ★ ★
Fishing	Nord-Norge	5 291	11.37	★ ★ ★
Transportation	Vestlandet	31 598	2.62	★ ★
Transportation	Agder og Rogaland	23 213	2.27	★ ★
IT	Oslo og Akershus	16 256	2.42	★ ★
Education	Trøndelag	10 060	2.87	★ ★
Fishing	Vestlandet	5 275	6.15	★ ★
Oil and Gas	Vestlandet	4 545	6.12	★ ★
Transportation	Oslo og Akershus	37 660	1.88	★
Business Services	Oslo og Akershus	23 326	1.65	★
Finance	Oslo og Akershus	20 883	0.90	★
Education	Oslo og Akershus	20 537	1.77	★
Construction	Sør-Østlandet	15 855	1.21	★
Construction	Vestlandet	13 680	1.06	★
Transportation	Sør-Østlandet	12 834	1.05	★

A successful cluster is characterized, not only by the number of employees but also the level of specialization. Table 5.1 considers the level of specialization as well as the number of employees. As we can see the oil and gas cluster in Norway only employs 13 572 people, but with a high degree of specialization this cluster is the most significant in Norway. Another

²⁰ Source: (Europe Innova/PRO INNO, 2007, p. 57)

²¹ Source: (Europe Innova/PRO INNO, 2007, p. 57)

interesting point illustrated in this table is the fishing cluster located in the North of Norway. As the oil and gas industry have developed hand in hand in southern parts of the NCS it is likely that these two clusters can benefit from a mutual industry development in the Northern region as well.

The next graph shows the total number of stars and share of employment in clusters with stars. Compared with other countries Norway a relatively low rate of total workforce is employed within clusters.

Figure 5.1 Share of employment within clusters

Region	Total number of stars	Share of employment in clusters with stars
Vestlandet	8	51.49%
Trøndelag	6	49.32%
Oslo og Akershus	6	62.61%
Nord-Norge	6	58.66%
Agder og Rogaland	6	45.10%
Sør-Østlandet	3	28.99%
Hedmark og Oppland	3	38.36%

5.1.1 The Norwegian petroleum cluster

The petroleum industry is significant industry in Norway today and according to SSB the investments in this industry is expected to be 130,2 billion NOK this year. In 2007 the total number of investments was 109 billion NOK, which is 14,2 percent higher than in 2006. Most of these investments are associated with upgrading of operating fields, 57, 6 bn. NOK. The investments in field developments account for 38,1 bn. NOK, and exploration investments amount to 29,3 bn. NOK. Investments in onshore facilities and pipeline transport is amounted to, 3,6 and 1,6 bn. NOK.

Table 5.2 Actual and expected investments on the NCS, in millions of NOK²²

Year	2003	2004	2005	2006	2007	2008
Investments	64362	71473	88478	95740	109298	130179

As we can see from the numbers the oil-and-gas industries become increasingly important for the Norwegian economy over the last years. In 2005 this sector accounted for a third of the income to the state.

According to the Treff projects report²³ there are several important segments in the petroleum cluster; oil-, drilling rig-, offshore service-, seismic-, subsea-, engineering-, and, shipbuilding and maintenance- companies. In addition to these, there are the suppliers to these companies as well. The petroleum cluster has grown to become the dominating cluster in Norway.

Norwegian suppliers are active in most links of the value chain, from exploration activities and development to production, processing and transport. Supplier companies are found in all of the country's counties, and some of the petroleum industry's local and regional spin-off effects significantly affect parts of the country not normally associated with this industry. Norwegian technology has a good international reputation, and the large Norwegian suppliers of subsea technology have a leading position in the global market.

In Norway there are 30 oil companies, among them are StatoilHydro, which is the world's largest offshore oil company, and a large number of smaller independents that position themselves in order to utilize existing infrastructure to exploit marginal fields. In total the industry invest for more than 100 billion NOK each year and it is expected to stay at this level for at least 2-3 years. 30 rig companies have invested 100 billion NOK in new drilling vessels that operates on the NCS and internationally. About 40 offshore service companies have invested 70 billion NOK in vessels that operates on the NCS, but mainly internationally.

²² Source: SSB

²³ Information for this part named The Norwegian petroleum cluster, is found in the report named Treff-project see reference: (Create Innovation AS, 2008, p. 41) in the reference list.

These companies have together with shipyards, engineering companies, equipment companies and designers contributed significantly in developing vessels that now are world leading.

Approximately 80 000 people were employed by petroleum-related businesses. In the 2006 national budget, the value of remaining petroleum reserves on the Norwegian continental shelf was estimated to be approximately 4 210 billion NOK. Less than a third of Norway's estimated petroleum reserves have been extracted. Average daily production so far in 2008 have been 2,1 Mbbl. liquids and 301 000 Mboe. of natural gas.

40 years of oil and gas production in seas with harsh climate and weather conditions, have given Norwegian companies the knowledge and expertise needed to extract petroleum resources in an efficient and safe way. Today the Norwegian petroleum cluster is in the world lead when it comes to resources that are located offshore. Norway is to be a world leader in both the technological and environmental fields. It is important to ensure that the petroleum industry does not come into conflict with environmental considerations. The effort to establish a CO₂ value chain is an important step forward in this respect.

Norway does also have world leading companies in subsea technology. Ormen Lange and Snøhvit are among the most innovative offshore developments in the world. The Ormen Lange development illustrated that Norwegian suppliers are competitive. About 75 percent of this development was constructed by Norwegian companies. Aker had the major contract and supplier network, LOL. The Norwegian suppliers that delivered to the Ormen Lange development have confirmed its position as world leading in this niche of subsea technology.

Shipyards, equipment and supplier industries that supply the petroleum industries is important in Norway. Shipyards in Norway do today have orders for approximately 70 billion NOK until 2011. The Norwegian equipment and supplier industry is a significant part of the shipyards value chain, but has in addition significant export internationally.

Recently two major fields came online, Ormen Lange and Snøhvit. These two developments have enabled suppliers as well as the oil companies to develop and further strengthen their position in a global market.

Seismic companies in Norway are world leading and able to deliver specially designed ships and offshore equipment.

The boom in petroleum related industries is a significant reason for the large increase in export of goods. Norway has passed 500 billion in export of goods and services. 300 of these were goods and 200 were services. West Agder, the most significant region in this respect, have a boom in its export of goods. Besides West Agder the most significant counties contributing to this growth are: Rogaland and Møre and Romsdal.

5.2 Northern Region

In order to shed light on the current situation in the Northern Region I have decided to present some of the findings in the Arena conjuncture barometer for the Northern region (Arena, 2007)²⁴. I could have used many other reports, but I find this one to be the best since I think it summarizes several other reports and perspectives on oil and gas activity in the High North. Important focus in the Arena report is the potential spin-off effects the development such industry would have on this region. In the editorial for the Arena report two of the most important factors for industry development in the region are mentioned.

“In order for the Northern region to get considerable and sustainable effects from the establishment of the petroleum industry, the petroleum service- and supply industry has to move north. The other point is that the existing industry in the Northern region, that already has a comparative advantage within the petroleum industry, utilizes these coming years to further develop and win new markets.” Freely translated from (Arena, 2007, p. 3)

The Arena report focuses on two roads to success, which are the two phases in this industry development, the construction and operational phase. For the construction phase it is important that industry clusters and competence is built up at an early point before actual construction begin. If not, this region will experience a boost and boom scenario where

²⁴ Download at: <http://www.kbnn.no/>

modules are constructed elsewhere and put together on location by skilled workers that are flown in. The result of such a construction would result in minimal economic effects for the region. For the operational phase, earlier research have shown that value creation and spin-off effects are more substantial if the resources are brought onshore, e.g. Snøhvit. With onshore facilities existing contractors in this region can be used for, leveling, construction and building. The writers of this report also think that the operational phase is more important than the construction phase. The reason why they make such an assumption is first and foremost because of the long term the operational phase offers. Once a field is developed it will operate for several years. Another point is that all the parts that are made under the initial construction are so advanced that it will be difficult for local and regional industries to get in position to produce such machinery before a possible development start. However, once the operational phase begins the supplier industries can specialize in maintenance and modification of existing infrastructure and have a reliable customer for 20-30 years.

This Arena report also point out some possible challenges for the industry:

- Both competence and industry developments are needed in order to establish a successful supply industry in this region.
- There is uncertainty associated with the reliability of the spin-off calculation models. Expected and anticipated result does not match actual ones.
- There is a lot of uncertainty attached to the resource potential in this region and the opening of previously closed areas, which I will discuss later.
- Final concern is the environmental awareness growing among the public. Chances are that the demand for oil will decrease significantly.

However there are also some opportunities as well:

- The government is interested in maintaining the level of production and income from the activity on the NCS.
- Oil companies are always looking for new fields.
- The supply industry wants a high level of investments and more contracts
- The major oil importing countries desire a stable and reliable supply of oil and gas.
- Norwegian developments in this region can make it easier for Norwegian companies to get in a supply position for Russian developments in the Barents Sea.

The Arena report also points out that the supply industry in the in southern and central parts of Norway has a head start on the development of petroleum technologies and solutions. Over many years they have developed competence, networks, political strength, and economies of scale. All are factors which gives them a major advantage in the competition for new contracts in the North.

Experience from Snøhvit, Ormen Lange and Skarv/Idun indicates that the establishment of supply networks such as Petro Arctic and Leverandørnett Ormen Lange, LOL now LOG²⁵ helps local and regional industry to be awarded contracts.

Finally the report concludes that the Northern region started their oil and gas development too late. This regions chance for developing its own unique competence has passed. Their hope is now attached to a political demand of local spin-off affects that will encourage supply industry to establish in the northern region.

5.3 Resources in the Northern region

According to the NPD²⁶ the continental shelf outside the Barents Sea and the areas outside Lofoten contain two different geological provinces. About 35 percent of the remaining resources on the NCS are expected to lie in these regions.

5.1 Petroleum resources on the NCS measured in scm3 oil equivalents (o.e.)²⁷

Region	Liquid		Gas		Total	
	Basis	High	Basis	High	Basis	High
Barents Sea	400	790	590	1120	990	1700
Norwegian Sea	410	620	810	1050	1220	1770
North Sea	690	850	500	600	1190	1390
Total	1500	1960	1900	2660	3400	4300

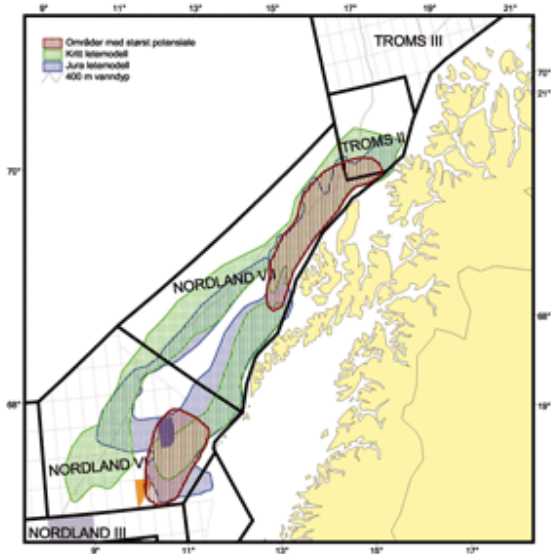
²⁵ Leverandørnett Oil and Gas

²⁶ <http://www.regjeringen.no/nb/dep/md/dok/regpubl/stmeld/20052006/Stmeld-nr-8-2005-2006-/3/4.html?id=199816>

²⁷ NDP, same link as above

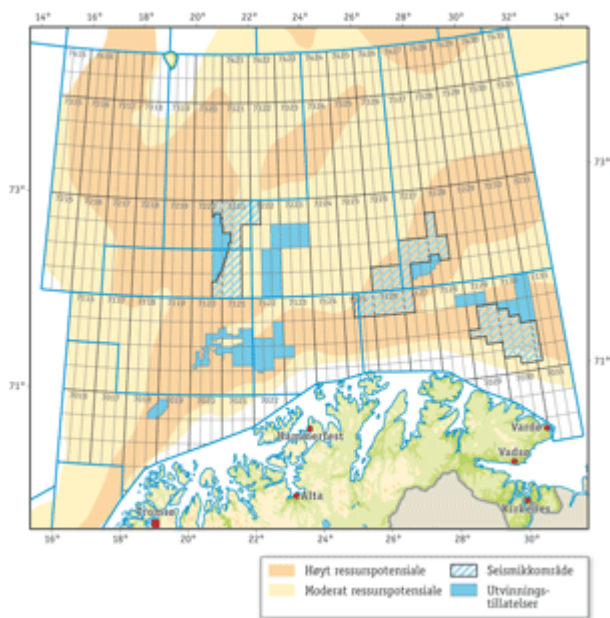
In the Barents Sea there are 6 confirmed plays and 17 unconfirmed plays while the Norwegian Sea contain 9 confirmed plays and 11 unconfirmed plays. Unconfirmed means that experience for other similar geological areas have found oil, but exploratory drilling has not been able to confirm. A significant difference between the Barents Sea and the region outside Lofoten is that there have not been drilled many wildcat wells. The geological structure is however similar to those that can be found in the North Sea and this is mainly the reason why the oil companies are so eager to open these areas. According to NPD the continental shelf outside Lofoten is narrow and it is therefore a limited search region, but despite this it has a high potential. The most prospective areas are the ones scrambled red in the map below.

Illustration 5.1 Prospective areas outside Lofoten



In the Barents Sea the situation is completely different from Lofoten. The area has been open for petroleum activities and seismic and significant number of wells has been drilled. A total of 41 licenses for exploration, drilling and production and 61 exploratory wells have been drilled (1. Quarter 2006) Areas with a high potential for recourses are shown in illustration 5.2.

Illustration 5.2 Prospective areas in the Barents Sea



After ENI's discovery of Goliat, new plays²⁸ needed to be considered and estimates over the potential resources have been increased. The only discovery that have been developed so far is Snøhvit. Recently ENI submitted the PDO for the Goliat development. Production is expected to start in 2010-2011.

5.3.1 Discoveries in the Northern region

Currently there is one field that is operating outside the coast of Nordland, it is the field named Norne and it is operated by StatoilHydro in Harstad. Besides this field, two marginal fields named Sale og Stær are likely to be operated with subsea installations and added to the Norne production ship. There are also other discoveries in this region that have not been developed yet. These are: Skarv (BP) Idun (StatoilHydro), Viktoria (ExxonMobile), and Luva, (BP).

In the Barents Sea the only field that is operating is the Snøhvit field operated by Statoilydro. The only commercial discoveries in the Barents Sea that have not been developed are Goliat (ENI).

²⁸ See glossary.

5.4 Development of petroleum industries in the Northern region

According to Fafo report 462²⁹ are the expectations of the establishment of supplier industry in the northern region moderate. The structure of competence within the industry is set and the Norwegian petroleum clusters is mainly located in these regions: Stavanger, western region of Norway, central Norway and Oslo. The petroleum industry needs to be competitive on a global and specialized market dominated by other well established actors. This makes it hard for new entrants.

Experience from the southern parts of Norway indicates that oil-and-gas developments and operations attract certain associated industries that will establish in close approximation to these resources. Building of a gas-fired-power-plant at Melkøy is one example. Other experiences from field developments show that spin-off effects are dependent on which development solutions that are selected and that the local industry and communities needs to work actively in order to get spin-off effects.

Negative experiences form earlier developments indicates that EPC³⁰ as a way contracting suppliers makes it hard for suppliers in the northern region to compete. The volumes and complexity becomes too significant for them to handle. Another experience from Norne and Snøhvit was that EPC contracts that are given to foreign companies resulted in fewer contracts for Norwegian subcontractors. Some of the reason is that communication between Norwegian firms and the foreign companies are poorer.

EPC is a way of contracting which ties development and contracting into one single contract. These types of contracts favor large businesses and are therefore naturally a hindrance for businesses in the Northern region. The reason why these type of contracts are preferred by the oil companies is that other types of contracts gives companies from a high cost countries a disadvantage. It is also argued that EPC results in more contracts nationally. Reason is that

²⁹ This part is based on information from the FAFO report called Valuecreation, coexistence and environment, Bjørne Grimsrud, Fafo 2004:44

³⁰ Engineering Procurement Construction)

EPC contacts that are given to Norwegian companies, such as Aker Kvaerner, do a better job in awarding contracts to Norwegian suppliers.

Establishing industry association such as Leverandørnettets Ormen Lange (LOL) and Snøhvit industry association (PetroArctic) are supplier networks that decreases the barrier by splitting up contracts in to smaller pieces that the smaller businesses in the Northern region can handle. The main goal for these associations is to achieve as large deliveries of goods and services, to the construction and the operations period, as possible from the members in the association.

From the PetroArctic's website we can read:

Petro Arctic is an organisation representing the interests of companies wishing to position themselves as suppliers to the development and operation of the Snøhvit LNG facility and the future expansion project in North Norway and the Barents Sea.

The main aim of Petro Arctic is to obtain the maximum possible deliveries of goods and services from member companies to Snøhvit and future expansion projects in North Norway and the Barents Sea. This will be achieved by marketing member companies to the developers and by motivating and preparing members through participation in networking and skills development programmes.

Part of the work these networks do is to build a database over the skills and competences of their members and also to provide their members with information of which contracts that are available. This is important work as the contract documents for a development such as Snøhvit are enormous and it is difficult for a small supplier to figure out what they can deliver. These organizations do also function as important links between the contractors and the regional industry.

The Fafo report 462 also highlights some possible areas where synergy effects between the petroleum- and other industries may occur. Several industries such as the finishing and travel industry have a need for a better transport infrastructure. The author suggests in this report that the oil industry may provide the region with enough incentives to upgrade transportation infrastructure, such as good roads, harbours, and flight routes. This effect will not be limited to the petroleum industry, but benefit other industries as well. The oil and gas industry have a

tradition for being a demanding customer that will contribute to an upgrading both the quality and the availability of the services offered. The author thinks that the industry associated with the fishing vessels in the north can adapt to the new customer. One example of industries that have adopted is Hamek in Harstad that traditionally built and maintained fishing vessels, but decided to position themselves for deliveries to the Snøhvit development. The result was that they assembled steel constructions at their shipyard in Harstad and provided the development with welders at Snøhvit. This competence that enabled this firm to deliver to the Snøhvit development is important. Existing competence can enable industries in the northern region to compete for other contracts for steel and engineering shops as well. The competence in Harstad is also strengthened by its close geographical location to the engineering college in Narvik.

5.5 Summary

The Norwegian petroleum cluster is the most significant industry in Norway today and it is world leading in many related technologies. There are many segments in the value chain of offshore oil production and Norwegian industries are represented most, if not, all of them. Petroleum related industry exist in all region of Norway, but is mainly situated in the western coast. The Northern region has been unable to develop a successful petroleum industry and do now seem to be unable to compete when new development will be constructed. However there is some hope that demands of spin-off effects and the long operational phase may enable the new industries to establish or the existing industry in the region to adjust. So far there is only two petroleum developments in the Northern region, Snøhvit and Norne. The most prospective region is now closed off.

6. HARSTAD THE OIL-CAPITAL OF THE NORTH

In this case the city of Harstad is presented; first the story of oil and gas development in Harstad and the Northern region, then the current situation in Harstad. The case will then later be analyzed according to the aspects highlighted by the theoretical framework.

6.1 History

The question regarding oil and gas activities north 62 degrees latitude was first put on the agenda by the Borten government in White paper no. 95 (1969-1970)³¹. The department of industries did at the time suggest that the resources in these areas should be located. During the preparations leading up to the White paper, no considerations regarding the fishing industry, environmental or local interest were taken. The reason for this was that a possible opening of the continental shelf was at the time only considered to be a technical problem and not a political one.

In the following governments Bratteli I (1971-1972), Korvald (1972-1973) and Bratteli II (1973-1976) all agreed to an opening of the area for exploration and research drilling. The determining argument for an opening of the continental shelf north of the 62 latitude was based on a desire for a complete mapping and locations of the reserves that where to be found in these areas, combined with the belief that oil and gas activities could have spin-off effects on the industry in the region. The politicians were well aware that the high activity in the south and central parts could draw important competence and capital away from the region and lead to a negative spiraling effect. The need for oil and gas activities was therefore based on a need for local and regional initiatives in order to maintain the population and industry in the region. This view was, at the time, in harmony with the majority of the elected parties as well.

³¹ According to an internal note from the Norwegian Petroleum Directorate I have managed to get the information to this story. I have also given the interviewees an opportunity to correct some of the faults in this story. Per Kotte has contributed with information which have verified or disconfirmed this story.

In the Bratteli governments white paper No. 25 (1973-1974) was the petroleum industry position in society determined. The role of the petroleum industry was put on the agenda and the industry was reexamined. This resulted in an enhanced focus on different problems and also a politicization of the industry. Expectations of major findings in the Northern region influenced the regional planning and local politics. The government decided that Harstad would become oil center in the north in 1973. They also decided that Statoil and NPD would establish their Northern regional offices there. In 1976 both Statoil and NPD was established. Harstad was given these offices for three main reasons: Harstad central location in the northern region. Harstad had an existing shipbuilding industry, which needed work in a period when they experienced a significant decrease in demand. The final reason was that Tromsø and Bodø had already been given major educational and military institutions and had enough with tackling the growth these establishments provided them.

The industry department suggested a drilling start in the north in 1977, while the political parties now were divided in their view with regard to the need for protection of fisheries, pollution, environmental sensitive areas and also a fear that the oil industry would displace traditional industries in these areas. Oil and gas development was no longer regarded as an optimal solution to the regional and local problems. Drilling could cause unknown problems for the region because of the risk of pollution, damaging of the fisheries and displace of the workforce from traditional occupations to the oil and gas industry. In 1977 the Bratteli II government proposed a new paper, Industrikomiteens Inst. S nr. 293 which recommended to start drilling in 1980 outside the coast of Northern Norway and this paper led to a majority decision in favor of drilling in 1980. In January 1980 during the 5th concession round the first block was allocated. Even the Alexander Kielland accident (123 people died) did not have an impact on this decision, and in July was the drilling of the wildcat well established on Tromsøpatch with the rig Treasure Seeker. The decision processes had until now lasted for ten years. The results of these processes were particularly important for Harstad as it was established as the oil-capital of the north after the opening in 1980. The exploration activities expanded during the half of the 80s, but decreased during the last half.

The first half of the 80s turned into a bonanza for Harstad. It was based on the expectations that were made from the drilling results and increased investments made with regard on the

findings and possible developments. The fifth concession round was announced over a period of three years, and was quickly followed by two new concession rounds in 1984 and 1985. The result of the first round was 11 new wildcat wells, while the two next rounds resulted in 8 wildcat wells. These wells gave successful findings and resulted in feasibility studies. With the findings and plans the public started to believe strongly in the region and potential activities here. Statoil did at the time build up under these expectations of a new region as successful as the North Sea. Statoil published a strategy plan in an article in their magazine (Statoil Magasin, 1983 nr 3) which stated that an development of Troms I would take place if there was made findings during a two year period from 1982. The development of this project would then start in 1986.

The first feasibility study of the Snøhvit and Albatross field was made by Statoil in 1985-86. This study considered the possibility of the extraction of 12 G Sm³ natural gas each year. The concept was built with an offshore platform on Tromsø I with pipeline transport to a processing plant onshore the processed gas, and would then be transported in a pipeline to markets in Finland and Sweden. Statoil did make reservations with regard on the realization of the plan for development. One of the reasons for Statoil's strategy in the Northern region was a result of pressure from members of the parliament, political parties, labor unions, municipal governments and businesses. The expectations about a continued expansion of the oil and gas industry in the north had to be paid attention to. In relation to these expectations Statoil, Hydro and Saga decided to establish administrative branch offices in Harstad. Several other foreign companies followed such as BP, Elf, Esso, Total, and Mobil. Schlumberger established an office and a laboratory for seismic- and core samples analysis. In 1985 a total of 250 people were employed in the industry in Harstad.

The Norwegian petroleum directorate was established in Harstad in 1977 with 1,5 positions. The industry committee in the parliament wanted a fast establishment of the office in Harstad, but at the time there where a shortage of qualified labor; in the area and in Stavanger 50 out of 230 employees quit their jobs in NPD during 1980-81 and 20-30 positions at NPD where at all time available. Because of this of these factors NPD Stavanger was ordered to temporarily manage the responsibilities given to the Harstad office. In 1982 the chairman of ODs board stated that OD Harstad would not be expanded until 1984 because of funding issues. His

opinion was that this should take place one year earlier, in 1983. It was very important for OD to be present in order to follow the expected development north of the 62 latitude. The building of OD Harstad started in 1985 with Svein Bye as director of department. In 1987 it was decided that OD Harstad should have all responsibility for following up the development north of the 69 latitude. OD Harstad did at this time have 14 permanent employees.

An extensive construction of a base in Harstad and Hammerfest were put through in the period 1984-1986 the premises for this construction were based on Statoil's plans for development on Tromsøflaket. In the white paper no 58 (1982-83) the distribution of responsibilities between the base in Harstad and the one in Hammerfest was set. Harstad should not be the main base for the exploration activities in the Barents Sea, but a supply base of advanced technical equipments to the future developments to the field operations on Troms I. In 1985 the Stangenes base was completed at a cost of 128 million NOK. The base was opened in September in 1985 by the crown prince in Norway, Harald V. OD's first geologist in Harstad, Roald Sæther were representing OD during the opening. However, this base has never been used for its intention. The Sørøybase outside Hammerfest was opened in 1986 to a cost of 120 million NOK. This base has later played an important role during the development of Snøhvit and in the support of explorative drilling in the Barents Sea. Exploratory drilling in the north resulted also in substantial establishment of service companies, from a total of two in 1982 to 15 in 1985. The expectations to the petroleum industry in the North did also attract larger banks that partially displaced local banks. More than 20 offshore shipping companies were established in the Northern parts of Norway during this period. In 1983-84 a total of 11 supply-, standby, or survey ships rented or owned by shipping companies in Tromsø. Harstad did already have long traditions of shipbuilding, especially fishing vessels, some of the shipyards were: Kaarbøe Mekaniske verksted A/S, Ibestad Mekaniske Verksted A/S and Einar S. Nilsen A. As the shipyards in the south western region positioned themselves for the new industry, so did the shipyards in Harstad. In order to meet the new industry they developed a competence in maintenance of rigs in addition to production of components and equipment for rigs and supply ships.

In 1986 the oil prices fell drastically and the result was that the plans for development of Troms I was put on hold. The exploration activities were also decreased. The foreign

companies in Harstad reacted quickly to the change and downsized their offices in Harstad rapidly. The same did the supply industry. Even the Norwegian oil companies down-seized their operations in Harstad. This happened despite four new concession rounds in the Barents Sea in the period between 1987 and 1993.

Deliveries from grocers' trade and shipbuilding declined. The brake down in the supply industry resulted in bankruptcies in Harstad. The shipbuilding industry lost orders and the building of fishing vessels had now been taken over by companies in the south west of Norway. Einar S. Nilsen Mekaniske Verksted og Kaabøe Mekaniske went bankrupt in 1986. Their assets were later taken over Norminol and Sparebanken Nord with the name HAV. However HAV was not long lived and went bankrupt the same year it was established, in 1986. Norminol was bought by foreign investors, with a ownership share of 0,3 percent in the Ekofisk field.

The New Kaarbøe A/S rearranged HAV and started up in 1989 with repairs and industry orders. The owners were composed of local businesses and clients. Deliveries and repairs supporting exploratory drilling and equipment for production on the NCS were later done by Mercur Mekaniske A/S in Harstad and SOS (Harstad Ship & Offshore Service). In the beginning of the 1990 Harstad had a small and flexible shipyards and repair shops that were well adjusted to the changes in the industry.

During the Barents Sea round in 1987 new areas were offered where the companies with a deadline of 10 years to do seismic surveys and evaluate the area. If they found an interesting prospect in which they desired to further investigate with an exploratory well, the companies had to apply for a license where the government which also demanded working obligations. This policy was successful and more licenses were given out and well explored. Statoil have shown to be the most stable actor in the Barents Sea. However in the beginning of the 1990's, large oil and gas companies had no belief in large deposits of resources in the Barents Sea and closed down their offices in Harstad. The government tried to stop this development and a new framework was put in place for concession rounds in order to stimulate interest in this region. With the lack of interest shown from the companies in NPD - Harstad had little work to do and from the 1990s and until 2005 the number of employees at NPD's Harstad

office had been reduced to a minimum of two-three employees. A new attempt to reestablish this office started in 2005 and this initiative from the government must be seen in connection with the government's Northern territory strategy and the focus on the Barents Sea, and the closed areas Nordland VI-VII and Troms II. There are now 12 employees in at NPD's Harstad office and they are expanding to 15. In the 20th concessionary round that recently has been announced more blocs than ever have been made available in the Barents Sea.

The development of the Snøhvit field opened the Barents Sea and other companies entered this region as well. The Italian oil and gas company ENI where in 2000 able to discover a new field in the Barents Sea, the Goliat field. This find showed that new exploratory models had to be considered³². Other companies as well have now a new found interest in the Northern Region. The 19th concessions round was promising with regard to the Barents Sea and new operators such as BG, Discover Petroleum, Chevron and RWE-DEA contributed to increase the interest in and diversity of the Barents Sea. Hydro's discovery of the Nucula field west of Goliat did also confirm that new exploration models are successful in the Barents Sea.

Allocation of predefined areas (TFO³³) was established in 2004 and the interest in applying for these TFO acreage was fully established in the TFO in 2006. The TFO area was further extended in 2007 with 7 licenses³⁴.

The management plan of the NCS that was developed and agreed upon by the government in 2006 has given the industry directions. It is now the basis in which the companies organize their concerns with regards to environmental considerations, shipping and industrial development in the further development in the Northern Region.

³² According to geologist the Norwegian region of the Barents Sea was once a rich oil province however it seems that the oil has not been successfully trapped in deposits. However since the Barents Sea contain several layers of trapping rocks, oil can be found on different layers. This was for instance the case with the Goliat field were ENI first made a discovery in one geological structure and then later in another structure that was deeper in the ground. This discovery resulted in a reevaluation of the exploration models.

³³ In Norwegian: Tildeling av forhåndsdefinerte områder

³⁴ <http://www.offshore.no/nyheter/sak.aspx?id=20285>

As of today only two oil companies have offices in Harstad. StatoilHydro has a exploration office with approximately 300 employees and Det norske Oljeselskap with 11 employees³⁵. In addition to these, does Total E&P Norway have one employee located in Harstad. StatoilHydro Medkila is the largest exploration and production office in the region and an expansion of the office is a result of increased activities in the north of the 63nd degree latitude, Eastern Europe, Russia and parts of Asia. In addition to this the Statoil's office in Harstad has responsibility with regards to the running of operations of the Norne field and Snøhvit. The development of Snøhvit phase II is also followed up by their Harstad office.

6.2 Petroleum related businesses located in Harstad

Currently three oil companies are located in Harstad³⁶. These are: StatoilHydro; 300 employees, Detnorske; 11 employees, and Total; 1 employee. Besides these oil companies there are several supplier companies in Harstad. These are: Grenland Arctic, FMC Technologies, Bergen Group, Weatherford, IKM Testing, Ocean Riser Systems, Noweco, Norwegian Petro Services, Seaworks, Mercur Maritime, BMV, Seashore Technologies, USON Marine, Advantex, Vann og Varme Nord, Marcussen Metallstøperi, Hålogaland Industrier, Harstad Skipsindustri, Heliteam and Norbase. The NPD does also have their only regional office in Harstad with 12 employees. NDP's main office is in Stavanger. In order to support this environment and develop synergy effects local groups have been formed. One example is the petro group which is a group developed by the industry association.

Total number of people employed within the supply industry in Harstad is currently about 200. The oil companies and NPD are not included in these numbers. Many of the offices have been less active but as the government and especially StatoilHydro are signaling a higher activity in the region, the industry grows.

³⁵ According to Ingrid Mikkelsen Hokland at DetNorske in Harstad.

³⁶ Based on an article named "Oljeby I beste velgående" in Harstad Tidene, 19th of March 2008.

6.3 Summary

The question of petroleum developments in the Northern region have been a political debate since the first policies regarding petroleum resources on then NCS was made. The debate regarding oil developments in the Northern region have been a debate concerning spin-off effects and environmental considerations. Harstad became the oil-capital in 1976 and it was decided that Statoil and NPD would establish here. The reason why Harstad was selected was threefold:

- central location in the northern region
- Existing shipbuilding industry, which needed work in a period when they experienced a significant decrease in demand.
- Tromsø and Bodø had already been given major educational and military institutions and had enough with tackling the growth these establishments provided them.

The expectations for the future, related to the petroleum developments were considerable, but these expectations were not met by the oil-companies for two reasons; lack of commercial discoveries and a significant drop in the oil price. With the current governments increased focus on the northern region and development of Snøhvit and soon Goliat new expectations raises. Current industry in Harstad has been able to deliver smaller contracts to Snøhvit and hope for more activity and opening of closed areas. StatoilHydro is a major employer in Harstad with its 300 employees.

7. ANALYSIS

In this part I combine the different theories in a resource-based perspective in order to analyze the situation in Harstad. The theories selected have given me a good idea in what I should look for. The aspects I have found important are: people, infrastructure, demand and localization. The selection of these aspects has its basis from the resources-based perspective. Resources that is not valuable, rare or non imitative for the petroleum related industries have not been discussed.

The areas in the southern parts of the NCS are maturing and the industry looks north for more virgin areas. History in Norway has shown that petroleum developments influences local industries and attract related supplier businesses as well. Supplier networks have made it easier for everyone to get a delivery to the developments, and new information and transportations systems have made it easier for businesses to be located anywhere in Norway if not in the whole world. However one of the characteristics of the Norwegian petroleum policy is that the resources found in a region should result in value creation in its region as well. As a result of the demands of local en regional spin-off effects can give local businesses a comparative advantage and the incentives for establishing in the Northern region increases significantly. The question then is where to locate and this part will present and analyze the primary and secondary data I have gathered, in order to determine: **What are the aspects that influence Harstad's attractiveness as localization for petroleum related supplier industry?**

Harstad is the oil-capital of the north and has a long tradition as a central localization in Hålogaland. It is also the largest center in the Hålogaland region. Statoilhydro is established in the city with 300 employees and there is about 200 people working in related industries. People in Harstad have an entrepreneur spirit and there are some engaged and resourceful people here. Harstad has a diverse competence within maritime, engineering, food article industries and others industries. Harstad do also have a University College. Infrastructure in Harstad is good, with a close location to an airport, good catamarans for people transport, and the Hurtigruten. Harstad does also have a very good harbor, which have status as a regional harbor. Potential growth areas are: seafood, energy, engineering, IT, maritime, health and

travel. However there are challenges as well, the county borders split Hålogaland in half and the two centers Bodø and Tromsø have become natural centers in each county. These cities do also want to attract oil related industries.

To form a basis for this research I have presented a broad frame based on petroleum- history, -politics and -regulations in Norway that provides this thesis with a foundation in which I am able to analyze and say something about the further development in Harstad. In this part the

7.1 Harstad

The Hubs and nodes theory offer businesses an interesting perspective. Existing suppliers established elsewhere can establish a branch office in Harstad. Information technologies and a diversified workforce, of experienced workers from the mother organization and competent people from the Harstad region can utilize their in house knowledge while gaining the benefits of the workforce in this region. In order to get the best workers in the region it might be beneficial to position themselves in Harstad at this time. Experience from other parts of the NCS indicates that demand for local and regional spin-off effects will also increase.

Today the small industry node of Harstad is in its birth of becoming something more. Currently this node is too small and narrow, but some important paths have been made in which can enable other established businesses to follow. The industries here have enough work and the networks that have been established do encourage cooperation and knowledge sharing. Finding qualified people for jobs in Harstad does also seem to be unproblematic. However during interviews it has been discussed that this will be difficult if the growth is significant. The first people that are moving back have often been waiting to find an appropriate job in the area while the “second wave” of workers often need confirmation that the area are appropriate before they decide to move there.

According to the development plan for 2005-2008, made by Harstad municipality³⁷, Harstad has a rich variety of industries and jobs. The municipality has over the years had many identities such as, maritime city, cultural-city, military-city, and oil-capital. Harstad has an established food industry and is a center for retail. However, the increasing need for flexibility and change have resulted in major changes also in Harstad. Traditional industries have lost ground and have to a large extent been replaced by service and retail. Harstad has lost competent workers despite the fact that they have proficient businesses. This represents one of the major concerns for the administration in Harstad. The focus is therefore on actions that will encourage innovation and competence building. Interaction between the industry and the municipality is crucial for developing the city. Further development of 'Kunnskapsparken Harstad', now 'Kunnskapsparken Nord' is crucial in order to aid establishments in Harstad. Kunnskapsparken Nord will work as a connecting link between the education institutions and the businesses in Harstad. The hope is that this will encourage research and development in existing organizations and hopefully establishments of new businesses as well (Harstad kommune, 2005, p. 45).

The petroleum businesses are an important part of Harstad's industries and StatoilHydro is the largest private business in Harstad. According to Harstad municipality the challenge is to further develop petroleum related industry in Harstad.

7.1.1 People

Harstad is the most densely populated city in the county of Troms. Harstad has a population of 23 224 inhabitants. From 1995 the number of people moving to Harstad had a steady increase, but now it seems that it have stabilized at approximately 23 000³⁸. Harstad is in the

³⁷ Secondary information in this in this analysis is gathered from three sources: The development plan Harstad, 2002-2006, the halfway evaluation 2005, and the Harstad Municipal plan for 2005-2008. Both reports have been found at <http://www.harstad.kommune.no>. These reports are referred to as (Harstad kommune, 2005), (Harstad kommune, 2005) (Harstad Kommune, 2002)

³⁸ Source: Befolkning at www.harstad.kommune.no

center of the Hålogaland region. This region is the most densely populated area in the Northern region and about 25 to 30 percent the people living in the Northern region lives here (Harstad Kommune, 2002, p. 10).

Harstad have maritime industries based on engineering, industry and a consultant environment that have evolved to become one of the strongest in the northern region. The number of engineers per capita in Harstad is among the highest in the northern region (Harstad Kommune, 2002, p. 9).

At the supplier conference at Bodø Univeristy College the leader for the PetroArctic network, Arvid Jensen, expressed that industry in the northern region was not relevant, but that the development of engineering may play an important role. If this is true then Harstad, with its human capital of engineers should be an attractive region for establishment of engineering departments, such as Grenland Arctic.

Trough interviews it has been expressed that it is not a problem for the industry in Harstad to attract qualified people. However one of the interviewees expressed that he did not consider it to be a problem, but that there are never enough people to recruit form. There are mainly two reasons for this. Experienced personnel that are recruited to Harstad are a combination of people that originally come from the Northen region and that are looking for jobs here and newly educated competence from Narvik University College, Tromsø University College and NTNU. During interviews it has been pointed out that the northern region has exported two goods for a long while: Fish and young competent people. The pool of people that are looking for jobs and want to return to this region is therefore considerable. The fact that they have gained competence elsewhere is only regarded to be positive. In addition have StatoilHydro in Harstad experienced that they are very attractive for foreign workers. Reason for this is the fact that the organization in Harstad is smaller and working here offers more diversity in working tasks. It is also easier to be seen in a smaller organization.

Harstad has one University College and two upper secondary schools, if we look at the entire region Hålogaland, there are a total of two university colleges and 18 upper secondary schools. Put together this represents a considerable educational infrastructure. In addition to

this there are considerable educational processes within the organizations that exist in this region, for instance the petroleum sector and health sector. Challenges in this regard are to utilize these groups and their competence in order to create a future-oriented, attractive and robust region (Harstad kommune, 2005, p. 46). The importance of having educational institutions have also been expressed in interviews as it strengthens the chances for this region to create growth within this sector. Reason for this is because people that have been educated here are more likely to find jobs here, or search for jobs here. The closeness to Narvik, with its engineering is also highlighted as an important factor.

Skilled workers are educated at upper secondary level and these may become important as well. Close cooperation between the academic institutions can be of help in solving complex questions. Harstad University College is therefore very important. Currently they offer one petroleum course that is aimed at helping supply industries to get familiar with the industry. This can be of significant importance for the new establishments of supplier industry in Harstad.

Harstad has also long traditions for being an industrial city. Even though the competence might not be directly relevant this offers an atmosphere and culture that attracts engineering and industry related competence. Interviews have pointed out that this is important for the establishment of new industry as well. This culture was in fact the main reason besides StatoilHydro's office that Grenland Group decided to establish in Harstad. It is also likely that this will be important when other supply firms decide to establish as well.

StatoilHydro's office in Harstad has a large exploration department. There are only two exploration offices in Norway one in Stavanger and one in Harstad. The department in Harstad is the largest when it comes to number of employees, but the department in Stavanger is probably more experienced. However it has been pointed out that the Barents region have a very different geology than what the oil-companies are used to in the south. Especially StatoilHydro learn more about this region every day and they are about to make a breakthrough when it comes to understanding where the resources can be found.

DetNorske have also established an exploration office in Harstad, with 11 employees. This is also the only exploration office they besides their main office in Trondheim.

The Norwegian Petroleum department does also have significant competence on the Northern region. They are now in the preparation process of mapping the different aspects of Nordland VI-VII and Troms II. The last and most exciting part of this preparation that has just begun is the explorative seismic surveys, which started the 18th of May 2008 and will last for four months³⁹. These seismic surveys will be an important part of the complete evaluation of these areas, and it will help the government decide whether or not these areas should be opened in 2010.

The long term perspective is important today and some of the main advantages that Harstad has. For the long term perspective it is important to have jobs for females as well, since the industry is dominated by males. This has been a problem in Hammerfest that only has 9000 inhabitants and not enough jobs for women, something that makes it hard for families to move there and settle. This is not a problem for Harstad which can offer a diverse cultural life, University College, hospitals and more. However Harstad is not the only city that can offer this. Tromsø, Bodø, Alta and Narvik are of such sizes that this would not be a problem.

Finally there is one important aspect to discuss regarding competence. Often some engaged individuals can have a significant effect on the development of one city, region, country or even the whole world. From my perspective it seems that Harstad have individuals that are passionate about their city and development here.

7.1.2 Infrastructure

Construction of new roads has been on the drawing board for a long while and upgrading of roads has been delayed. Statistics show that the number of cars in the region increases and additional capacity is needed in order to avoid problems. However Lofast have recently been

³⁹ <http://www.nrk.no/nyheter/distrikt/nordland/1.5685616>

opened and this road makes it easier for people living in Lofoten to get to Harstad (Harstad kommune, 2005, p. 48).

In this region airports and a sufficient number of flight routes are important in order for businesses and organizations. This is important both for long distance and regional routes. The region's greatest challenge in this respect has been to provide a sufficient amount of routes. It is especially important in order to strengthen the interaction between the different counties and regions within the Northern Region (Harstad kommune, 2005, p. 49). This importance has also been highlighted during interviews. The fact that it is cheaper and easier to get workers at Melkøya from Oslo than it is from Harstad is a problem for the industry located here.

Harstad Harbor KF should be an important asset to the industry. The goal is that activity at this harbor should increase both in transport of goods and people. Harstad has a natural benefit when it comes to transport at sea. These benefits are threefold:

- The favorable geographical localization of Harstad makes Harstad a central hub for the region.
- Harstad's shipping industry and related service industries.
- Fjords that offers a calm waterway in all directions.

Considering the potential in the Hålogaland region, Harstad Harbor may become increasingly important in the future. Interaction and cooperation in the Hålogaland region is considerably increased and potential synergy effects between communities and Harstad can be achieved (Harstad kommune, 2005, p. 49).

In the Northern region there are two important supply networks: PetroArctic and LOG Nord⁴⁰. PetroArctic focuses on the Barents Region while LOG Nord focuses on Helgeland. These Networks have initially been established in order to prepare local suppliers to be able to deliver goods and services to the petroleum industry. This is done by splitting the up large contracts into smaller pieces that they might be able to handle. Cooperation among the

⁴⁰ According to Industry coordinator at StatoilHydro, Svein J Grønhaug.

suppliers is encouraged as larger volumes are considered to be more attractive. Complementary resources and competence among the suppliers are essential. Through cooperation, businesses that usually have not been directed towards this sector can deliver. One good example is of the results that these networks have enabled is cooperation among construction and leveling at Snøhvit. Before the development started economic projections estimated that no contractor would be able to handle the size that was required, but with alliances between several contractors this was made possible.

In such networks the interest of the oil-company is maintained since smaller contracts enable more competition. Also the interviewees have pointed out that networks such as PertoArctic and LOG are important for the local industry. The Petro group in Harstad can also aid local suppliers in finding alliance partners. Participation in such groups can help the industry to locate and know potential partners and it is a good initiative. For now it seems that the industry is in an early phase and that the benefits of the local network are somewhat limited.

In addition to these supply networks there are two more political lobby networks that argues for the opening of closed areas outside Lofoten, Vesterålen and Senja; and Lofoten and Vesterålen, These are: LoVe Petro and Senja Petro. Harstad Industry union does also have an informal group called Petro. This group offers a meeting place for the petroleum related industries in Harstad. Members of this group are represented by different industries and have different competence. From engineering industry to law firms and also the incubator Kunnskapsparcken Nord is represented. Some of these suppliers are more relevant than others and in the group that is considered most relevant there are 18 participants, in the second most relevant group there are 7 participants and the not so relevant group is represented by 2 participants.

7.1.3 Demand

The political framework in Norway encourages spin-off effects in the local and regional area. This gives reason to believe that the industry located in Harstad will have a benefit based on its localization. However from the interviews and secondary reports this benefit can be debated. So far no contracts have been awarded directly from StatoilHydro to local industries

in Harstad. The suppliers in Harstad are too small or unable to compete on price. However from the suppliers' perspective this is only true to some degree. Some companies have been able to deliver smaller contracts for the Snøhvit development through the suppliers network PetroArctic.

According to interviews the main hindrance for local suppliers in Harstad to be awarded contracts is the framework agreements policy that oil companies operate with. These contracts have such a significant volume that local industries are unable to deliver. In this perspective it may be a benefit to be a part of a larger organization. Contracts that is too big for these local departments can be taken up by the mother organization. Local offices can then get as much as possible of the work of this contract while the mother organization deal with the rest.

The climate and regulations of petroleum activity in the northern region offer special demand for equipment and services. Strict environmental considerations and requirements of zero discharges are required in this region, and offers a unique opportunity for industries to specialize⁴¹. It is possible that competence form fishing or other established industries in this region have the knowledge and competence needed in order to further develop these technologies. However from interviews it has been discussed that the special necessity related to icing and waves are not as significant as portrayed by media.

The demands for local spin-off effects are not limited to Harstad. Spin-off effects in Harstad are for instance not considered to be better than spin-off effects in for instance Bodø or Narvik. In addition to this secondary information and interviews has confirmed that spin-off effects are important for both the government and the industry, but at present time indications are that the economic factors are more important. Both the social economic perspective and the business perspective is evaluated by the NPD in their evaluation and they do not force oil-companies to chose solutions that are costly for society as a whole in order to create more spin-off effects.

⁴¹ <http://www.offshore.no/nyheter/sak.aspx?id=19670>

One exception where Harstad were given more work was when the government decided that the operations for Norne should be located in Harstad. A political debate resulted in an operational office of this field in Harstad and this contributed to approximately 50 jobs at the Harstad office. From StatoilHydro's perspective the number of employees is determined by the activity in this region. Since this field is so far south the supply base is located in Sandnessjøen and with a helicopter base in Brønnøysund. The local effect of supplying this field in Harstad is therefore limited to the 50 jobs that are created at StatoilHydro.

The increased activity in the Northern region will result in more employees at StatoilHydro. As mentioned during interviews the operations of one field requires approximately 50 high qualified workers. In 2010 this region can finally start to see what the oil and gas industry has to offer. I think that Harstad has something to offer once the government's demands of spin-off effects is not only stated, but actually made effective as well. In order for this to take place more fields need to be developed.

7.1.4 Localization

Harstad's localization was an important factor when the government decided that it would become the oil-capital of the North. Reasons for this were that it was placed in the center of the region and could serve installations both in the south and the north. Another important factor was that it is situated near to the prospective areas, which are now closed, outside Lofoten, Vesterålen and Senja. Today the view on this "good" localization is different, reasons for this is in how the industry have developed, the lack of infrastructure and the establishment of other bases. These bases, Hammerfest and Sandnessjøen, are located south and north of Harstad and makes Harstad unattractive as a supply base. The favorable localization of being in the center is therefore not as relevant today.

In the perspective of personnel transport the localization benefit of being near is not relevant either, as the northern region is more available from Oslo then from Harstad. Reason for this is the number of flights and destinations that are offered form Oslo airport are significantly better than the flights offered form Harstad airport. During interviews it has been pointed out

that it is a problem for suppliers in Harstad to get to Hammerfest. It is expensive and there are not many flights.

The localization of Harstad can however be beneficial if the new areas are opened as it will be close to the possible installations by the waterway offered. For the existing supply industry it seems that they have found a favorable location and that they have what is needed for run a profitable business. As the globalization of markets opens up possibilities not only for businesses and products to enter this region it will also enable local innovators to access distant markets with their products. The fact that Harstad is located in the south of Troms, in a way inside Nordland, is something that does not speak for Harstad's attractiveness as localization. Harstad is closest to the closed areas, but it is still in a different county and I think that a mindset based on old regulations will encourage Bodø to fight for spin-off effects in her region. Earlier the government demanded that resources located outside the county would be transported ashore there. This would create spin-off effects in the county. Even though this regulation is not effective today I think that it will affect Harstad

The benefit of being close to StatoilHydro's office in Harstad is also limited. This office is mainly an exploration office and only Norne and partly Snøhvit are operated from Harstad. StatoilHydro's way of awarding contracts has changed a lot since the 80's. It is now the suppliers' networks job to collect contracts and they do not give businesses in Harstad an added benefit, so far. However as soon as one supplier get a 'leg in the door', sort of speak, the benefit of being close could increase. During interviews it has been pointed out that the suppliers can stay anywhere they want and that localization near StatoilHydro's office is irrelevant.

According to one of the interviewees one of the benefits of locating in Harstad is lower costs. Yards and facilities are cheaper and a lower pressure in the job market also provides the organization with cheaper labor.

The benefit for other oil companies to establish in Harstad is significant. Since StatoilHydro have such a large exploration office in Harstad that will attract competent people it is easier for other companies to 'steal' knowledgeable workers from StatoilHydro. This have already

happened with the establishment of the independent oil company Norwegian oil company named the DetNorske. According to one of the interviewees DetNorske had required some of its employees from StatoilHydro.

8. CONCLUSIONS

At the current time there are some pros and cons with the regards to an establishment of supply industry in Harstad. Establishment in Harstad might be a good choice for a firm that needs more engineers and qualified people. However nothing is decided with regards to the opening of closed areas and the location might not be that good strategy if the areas on the NCS remain closed. Even if the areas remain closed I think that the renewed focus and interest from the government and StatoilHydro indicates that there will be more activity in the region and therefore more to do for the supplier industries as well. As stated by one of the interviewees the supply industry can be located anywhere they want. In this perspective my impression of Harstad is that it has a good atmosphere for this type of industry and for those companies that want to position themselves for an opening of the closed off areas the strategy of establishing in Harstad might be successful.

Even with an opening of closed of areas it will take some time before this area is developed. In the meantime the suppliers that establish here will need other customers. The increased activity in the Barents Sea can provide the businesses with some work, but I think that this should not be the main objective for the present time. The main objective should be to secure a qualified workforce and position before the opening. In the meantime the branch office can relieve the mother organization. Establishing in Harstad at present time can therefore been seen as was of providing more qualified workforce. A tight job market in other parts of Norway does also make it attractive for supplier industries to establish in Harstad⁴². It seems to me that none of the businesses I have talked to have a significant problem finding enough workers. This is the case in Stavanger or other petroleum regions where there are a very high demand for workers with the relevant education. This fact makes in access to a qualified workforce is something that makes it interesting for firms to establish branch offices in Harstad.

Harstad has an industry culture that is an important factor. In fact some of the main reasons why Harstad is attractive to the supplier industry are because of its long traditions as an

⁴² <http://e24.no/olje/article2083669.ece>

industry community. However, while this might be an advantage it can also end up with the opposite result. According to Lindkvist, 2004 the dominating activities that a local society is dependent on will most likely rely on external markets and competition beyond the borders of the region. Dominating activities often form the region to specialize within a certain area whether it is farming, fishery or industry. Areas that are indentified as industry communities color the local community in many ways and often define norms and what is considered to be appropriate behavior. It also guides new establishments and give basis to new initiatives. Especially regarding what is considered to be alternative options.

The domination industry activity colors local communities' way of thinking and those sources of information that is important and that are made relevant especially regarding commercial nature. (Lindkvist, 2004, p. 71)

Further in his text we can read that the dominating view of a local community can color development in two ways: On one side it can aid the development of specific local competence in a complex interaction between the actors. This competence may be hard to copy and create a form of knowledge based competence that becomes a comparative advantage for this region that further aid development of industry and activity. On the other hand it can also limit and restrain development and contribute to a coagulation of further growth and initiatives. The much needed dynamic and adaptation of the local industry is hampered and the development in the community stagnates. In a world that is dynamic and where ability to change are crucial in order to remain competitive. Skills of unlearning therefore become very important in order to gain new competences. It is therefore a great danger that smaller communities becomes stagnates and becomes to occupied with maintaining existing industries rather than to evolve and develop existing industries to become competitive. These societies will sooner or later face the external world and their cornerstone industry will either disappear or have be transformed.

Establishing a smaller and more compact cluster in Harstad can be extremely beneficial for the suppliers that choose to locate in the same areas as the existing industries here. However supply networks such as Petro Arctic which is open to any supplier in Norway does not make it so that they have to be in close physical distance. However this is probably still an advantage once the suppliers in Harstad get their “foot in the door” at StatoilHydro.

At this time the demands of regional and local spin-off effects do not give sufficient incentives for businesses to establish in Harstad. However the government has created a strategic game for the suppliers and it will become more effective as more suppliers establish in this region. As long as the government demand such an effect it will be an advantage for a business to establish in the region and as long as their product is homogeneous and the price and quality is “right” then the local, regional company will be the preferred one. This will then give this business a competitive advantage.

8.1 Recommendations

With the resource based perspective in mind I think Harstad should focus and promote their most valuable, rare and hard to imitate resources. These are engineering competence, industry culture, competent people, and Harstad’s location as a center in the Hålogaland region.

In order to attract more industry they need to welcome new entrants and provide them with good yards or facilities where they can set up their business. Politicians should work harder to connect the Hålogaland region, both in means of transportation and interaction with the districts in this region. To do this Harstad needs to meet with and connect more with the county centers in Bodø and Tromsø. The links between the city centers would become stronger if the relationship between these centers occurs on several levels. Educational institutions are in this respect very important but also industry should interact with each other across the county borders.

The opening of the areas Nordland VI-VII and Troms II are the most important factor that can strengthen Harstad’s attractiveness as a location. However it is difficult for Harstad to

influence this decision. The work they do with the networks and the incubators are good initiatives, but it is not something rare that speaks for Harstad more than other localizations. It is important for new entrants to have plots and buildings they can move in to. Strengthening communications between the counties is important for Harstad since it is located in the middle of two counties. Politicians in Harstad should work harder to promote Harstad's interest in this respect. Schools and infrastructure should be high priority. The main road going through Harstad should be moved out of the city center and upgraded significantly. Harbor facilities is their main advantage and Harstad should work actively in order to increase transportation at sea.

8.2 Further research issues

A lot of the aspects that speaks for further development in Harstad also speak for further development in the region. More cases looking at the same aspects in other cities in the Northern region would highlight different benefits of localizing in Harstad compared to for instance Bodø or Tromsø. If this is done it would give a lot more information on the issues that speaks for the different cities.

8.3 Critique

Finally I would like to point out some factors that may be relevant for other researchers that want to follow up this research.

My main criticisms of this thesis would be that it offers a simplified view of the reality. The real world is a lot more complex. Secondly this research has been based on one single case and this may not portray a sufficient basis for evaluation. More cases could highlight other cities benefits compared to Harstad and determine which of the cities that offers the best localization. Thirdly, the selected theories are rational theories that try to explain irrational human behavior, and in many cases the decision for one firm to establish in for instance Harstad may not have much to do with the rational explanation. In order to explain such a phenomenon would be very difficult and beyond the scope of this thesis. There are also factors that could have been discussed, and that other researcher finds to be very important.

This thesis is conducted by one person. My capacity is limited and I think that two persons in a group could have highlighted more aspects in a more detailed and better way. The dialogue between two persons is very useful for developing the right reasoning behind statements. I have however discussed some issues with my classmates and I think that the reasoning is adequate.

The interviewees are all working in Harstad and for this reason they may be biased. However I also find it difficult to do something about this as everyone have their views and opinions. The only way to find out if Harstad is the best place for the oil-capital is therefore to conduct further studies of other cities in the northern region.

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APPENDICES

SWOT Harstad

<ul style="list-style-type: none"> -Governments requirement for regional and local spin-off effects. -Presence of StatoilHydro, Detnorske and the oil directorate. -Increased focus in the Northern territories. -Close cooperation with the engineering school in Narvik. -Cheaper real estate prices. -Attractive and urban area. -Traditions as an industrial city. - Oil-capital of the North. -Strategic localization if the closed areas are opened. -More activity in the North expected. -Integrated operations enable remote control centers. Harstad can then become operational center for fields in the North. -Knowledge transfer is made easy today with new technology. -Well established network groups and cooperation between businesses. -Strong and enthusiastic individuals are working for further growth in Harstad. 	<ul style="list-style-type: none"> -Transport infrastructure, few flights and few roads. Harbor facilities needs upgrade. -no opening of new areas outside Lofoten will discourage the supply industry. -StatoilHydro , Detnorske and Oljedirketoratet is mainly conduction explorative activities. - City center is not as attractive as other city centers in the Northern region, Tromsø and Bodø. -Closing of areas Nordland 6-7 and Troms 2 will significantly reduce Harstad's attractiveness for suppliers.
<ul style="list-style-type: none"> -Competitive advantage based on localization. Regional demands makes the specific industry win the bid. - Lower rent, and labor cost. - Easier access of labor. -Traditional industrial environment, spin-off from fishing industry. - Possibility that Harstad has some unique contribution to the supply industry. -Effective use of multimedia tools can enable good internal communication and spreading of in-house knowledge. While at the same time the local suppliers cooperate and develop innovative solutions. -Lower activity in Harstad compared to other cities. Better conditions for new businesses might be offered. -Opening of previously closed areas. -Lot of people from Harstad have acquired education in engineering. Recruitment to Harstad should not be a problem. 	<ul style="list-style-type: none"> - Other industries. -Other cities may fight for the establishment of supply industries as well. -Narvik has a engineering school and deep harbor. -Demands of local spin-off effects pulls rank. An establishment in Harstad is only beneficial if competition does not establish in local areas. –major threat for a cluster in Harstad is spreading of related businesses. -Other city centers in the Northern region.

Interviews

	<u>Position</u>	<u>Organisasjon</u>	<u>Type</u>	<u>Documantation</u>	<u>Date:</u>
Roald Sæter	Senior Geolog	NPD	Face to face	Recorded transcribed	25.03.2008
Ivar F. Hagenlund	General manager	Grenland Arctic	Phone	Recorded transcribed	08.04.2008
Ivar Dyring		Tidl. Statoil	Phone	Recorded transcribed	10.04.2008
Per Kotte	Tidl. Informasjonssjef Statoil Harstad	Tidl. Statoil, Harstad	Phone	Recorded	13.04.2008
Per Kotte	Tidl. Informasjonssjef Statoil Harstad	Tidl. Statoil, Harstad	Phone	Recorded	15.04.2008
Edd-Magne Torbergsen	Informasjonssjef StatoilHydro Harstad	StatoilHydro, avd. Harstad	Phone	Recorded and transcribed	17.04.2008

Supplier industries in Harstad

Seaworks AS

Seaworks AS has comprehensive experience in trading with bulk carriers in Europe generally and especially the Norwegian coast. Hence a solid maritime experience is established. Seaworks is specialised within subsea cables services, offshore, seabed mapping, special waste treatment and transport of bulk and general cargo.



SEAWORKS

In Norway Seaworks is a leader in subsea cable installation in coastal areas. Since 1997 Seaworks has installed more than 500 communication and power cables at sea and in lakes.

Seaworks' mission is to be the preferred partner within our business area through our operational concept.

Company card

Address	P.O. Box 3196 9498 Harstad Norway	Clusters Environmental Logistic & Transportation Operations Subsea Cluster
Telephone	+47 77 00 05 50	
Fax	+47 77 00 05 51	
Email	post@seaworks.no	
Web site	www.seaworks.no	

Source: Intsok

IKM Testing A.S.

IKM Testing, a company in IKM Group, offers testing, cleaning and inspections services. The IKM Group consist of two legal entities - IKM Gruppen AS and IKM Laboratorium AS. Considerable synergies exist between these groups, which have the same main shareholder. Major projects are dealt with through collaboration between the groups. IKM Testing AS. has been as success and has led to strong growth in the IKM Group.



IKM Testing is a part of the IKM Group. IKM Testing is established in UK (Newcastle and Aberdeen), Spain (Cadiz), Singapore and Canada (Newfoundland). IKM Testing employs a staff of 300 and budgeted revenue in 2005 is USD 52 mill.

Company card

Address	Ljosheimveien 3 N-4050 SOLA Norway	Clusters Decommissioning Environmental Fabrication & Package supplier Maintenance & Modifications Subsea Cluster
Telephone	+47 51 64 90 00	
Fax	+47 51 64 90 01	
Email	IKMtesting@IKM.no	
Web site	www.ikm.no	

Source: Intsok

FMC Technologies

FMC Technologies is a world class system provider of Total Subsea Systems with more than 1800 subsea Christmas Trees delivered to major projects all over the world .



In response to the increasing focus on cost efficiencies and life-of-field solutions, FMC Technologies has developed numerous breakthroughs in technology such as:

- High-pressure, high-temperature (HP/HT) subsea systems
- Subsea Processing
- Riserless Light Well Intervention Systems (RLWI)
- Through Tubing Rotary Drilling Systems (TTRD)
- All Electric Subsea Systems
- Floating gas-to-liquids facilities

With Head Offices located in all major geographical areas and more than 6000 employees FMC Technologies offers to the oil & gas market worldwide engineering-, manufacturing- and project execution capabilities from concept development to abandonment of the field.

Company card

Address	P.O. Box 1012 3601 KONGSBERG Norway	Clusters Maintenance & Modifications Subsea Cluster
Telephone	+47 32 28 67 00	
Fax	+47 32 28 79 90	
Email	subsea.systems@fmcti.com	
Web site	www.fmctechnologies.com	

Source: Intsok

Grenland Group ASA

Grenland Group is a full-service engineering, procurement and construction company situated at 14 different locations in Norway with a total of 1050 employees. In addition, the company has engineering subsidiaries in Houston, Kuala Lumpur and Shanghai, as well as a worldwide network of representatives. Grenland Group is the result of a market-driven demand for complex solutions, pertaining fabrication and technology. The company has clients in the global market within the oil and gas industry, as well as within the landbased industry. Grenland Group is stock exchange listed on Oslo Børs and had a turnover of approximately NOK 1.5 billion in 2008.



GRENLAND GROUP

The company's main business areas are as follows:

- Field Development
- Marine & Process Solutions
- Maintenance & Modifications
- Fabrication
- Products

Grenland Group has major capabilities within engineering, procurement and fabrication of production facilities. The company provides seamless project execution from the early phases to project delivery, hook-up and commissioning. A total field development approach ensures efficient and optimal solutions for our clients.

National locations:

- Grenland Offshore AS, Langesund, Tonsberg, Porsgrunn, Notodden
- Grenland Group Technology AS, Sandefjord
- Grenland Group Technology AS, Notodden
- Grenland MMO AS, Stavanger
- Grenland Industri AS, Stathelle, Drammen
- Grenland KSI, Skudeneshavn
- Grenland Group Technology AS, Oslo
- Grenland Arctic AS, Harstad

Representative offices in: Mexico, Brasil, Spain, UK, Qatar, India and Korea.

Company card

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Web site www.grenlandgroup.com

Clusters

[Fabrication & Package supplier](#)
[Maintenance & Modifications](#)
[Subsea Cluster](#)

Subsidiaries

[Grenland AsIs Global AS](#)
[Grenland Offshore A/S](#)
[Grenland Group Technology AS](#)
[Grenland KSI AS](#)



OM BMV

BMV as er en moderne produksjonsbedrift med tilhold på Stangnesterminalen 18 i Harstad kommune. BMV as utvikler og produserer produkter for næringsmiddelindustri, olje- og offshorebransjen og forsvaret. Bedriften med 23 ansatte har nye verksteder, kontorer og en moderne maskinpark for produksjon. Bedriften har nylig bestilt laserskjærer og maskineringsenter som installeres omkring mars 2008.



Vårt nye verksted på Stangnes



Mercur Maritime AS - Offshore engineering og produksjon

Mercur Maritime er en komplett og fleksibel service- og produksjonsbedrift for offshoremarkedet. Vår spesialkompetanse er problemløsning og leveranser til oljerigger og installasjoner

Mercur Maritime har en historikk og erfaringsbase som strekker seg 15 år tilbake i tid. Vi har gjennomført en rekke avanserte og nyskapende leveranser til nær sagt alle større offshore-operatører på norsk sokkel.

Vi gjennomfører:

- Forstudier og analyser
- Problemløsning
- Design og engineering
- Produksjon
- Installasjon
- Vedlikehold og modifikasjon