MASTEROPPGAVE

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Disruptive forces in the Oil and Gas value chain: *an analysis of the upstream oil and gas market from 2014 to 2021.*

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A look at the oil & gas market from 2013 to 2021 - an analysis of the disruptive effects in the O&G value chain.

An extended summary (the main article follows this summary)

Summary content:

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Finally, I would like to thank friends and family for support and encouragement through the duration of the MBS course.

Abbreviations and acronyms

AHT	Anchor Handler Tug
AHTS	Anchor Handler Tug Supply
b/d	Barrels per day
Bcf	Billion Cubic Feet
BOE	Barrels of Oil Equivalent
CAPEX	Capital Expenditure
DP	Dynamic Positioning
EIA	Energy Information Administration
E&P	Exploration and Production
EPC	Engineering, Procurement, Construction
EPIC	Engineering, Procurement, Installation, Commission
FDP	Field Development Plan
FEED	Front End Engineering Design
FID	Final Investment Decision
FLNG	Floating Liquefied Natural Gas
FPSO	Floating Production, Storage and Off loading

FPU	Floating Production Unit
FSO	Floating Storage and Off loading
FSRU	Floating Storage and Regas Unit
FSU	Floating Storage Unit
GoM	Gulf of Mexico
IEA	International Energy Agency
IOC	International Oil Company
mmcf/d	Million Cubic Feet per Day
MOC	Major Oil Company
MOPU	Mobile Offshore Production Unit
Mtpa	Million Tons Per Annum
MOU	Mobile Offshore Unit
NCS	Norwegian Continental shelf
NE	North Europe
NOC	National Oil Company
O&G	Oil and Gas
OPEC	Organization of Petroleum Exporting Countries
OPEX	Operational Expenditure
OSV	Offshore Support Vessel
2P	Proved and Probable Reserves
3P	Proved, Probable and Possible Reserves
PSV	Platform Supply Vessel
SEA	Southeast Asia
Semi	Production Semisubmersible
SAmer	South America
SPAR	Production Spar
SURF	Subsea, Umbilical, Riser and Flowline
SWA/ME	Southwest Asia / Middle East
Tcf	Trillion Cubic Feet
TLP	Tension Leg Platform

Summary

This extended summary has been developed as a supportive document to the article "*A look at the oil & gas market from 2013 to 2020 - an analysis of the disruptive effects on the O&G value chain*". The article follows directly after this summary.

The background is the global decline of the O&G industry following a significant drop in oil prices which started in 2014. I have set out to analyse appurtenant events considering Michael Porter`s theory of the Five Competing Forces. Besides shedding light on the events and changes in the upstream O&G sector, my aim has been to test the applicability of Porter`s theories for said events.

I decided to set up my research as a case study. This seemed to be the type of research approach which lends itself best to the explorative and descriptive nature of this assignment. I initially wanted to conduct this as a single case study. However, with the current disruption in the oil and gas market, caused by both the Corona virus and politically motivated actors, I have continued to examine the ongoing downfall in oil prices throughout Q1 in 2021.

I have found that the upstream sectors are very much interdependent and receptive to changes across and between each other. The fall in oil prices has led to much reduced activity and a lot of change management in the industry. Porter`s forces are relevant and applicable as a tool for analysing these types of events.

The events can be described and understood by applying the Five Forces model.
Hence, it is my belief that this research article has proven both the applicability of the assessment method and the value introduced by the model in making strategic decisions during very large and intrusive changes.

Introduction

This assignment will describe the downfall in global oil price of 2014-2016 and the onward effect it had on the sectors in the Upstream value chain all the way to 2021. I have looked at this through the lens of Michael Porter`s theory of the Five Competing Forces. Beside academic theory, I have applied known market intel, economic figures and reports, and my own experience as a member of this industry, as a foundation for the assignment.

There is some overlap between the article and the extended summary. I have deliberately kept these pieces of information in the summary, despite being included in the article. The reason is to provide a complete link between research method, data collection, and analysis of empiric data by offering a more elaborate description in the summary.

Should this article be published, would **ELSEVIER Energy** be a suitable publication.

Between 2014 and 2016 the oil and gas industry experienced a massive change following a significant drop in oil price. Since the recovery from the global recession in 2008 the oil price had climbed steadily towards USD 120 in 2014 before a collapse in the market drove it down to USD 35 in 2016. This had a significant effect on all sectors of the industry through the whole value chain from seismic, via exploration to production. It also affected engineering designers, yards, and operators.

Much has changed in the whole O&G industry, and in the upstream sector specifically. An increasing focus on cost cuts and financial discipline has led to reduced margins and profitability. Tens of thousands of oil and gas workers were laid off. Despite a rise in the activity level, only a fraction has returned to the industry, and service providers have been forced to operate with reduced staffing. The oil majors are making the rest of the supply chain continue to deliver services under strained conditions. This has kept the pressure on vendors which have seen reduced margins and revenue.

An upturn which started gradually by the end of 2017 grew slowly during 2018 to represent cautious optimism by the end of 2019. Unfortunately, the impact of Covid-19 hit the industry by mid-March 2020 and reduced the raised market trend to another downward spiral.

Scope

The main aim for this assignment is to assess the change in the upstream sectors of the O&G industry and analyse these changes against Michael Porter`s theory of the Five Competitive Forces that shapes strategy. I have defined the upstream value chain as to include seismic, exploration, production, and support sectors for the purpose of this exercise. I will review each sector against all of Porter`s forces and also look at events in light of the additional factors highlighted in Porter`s theory.

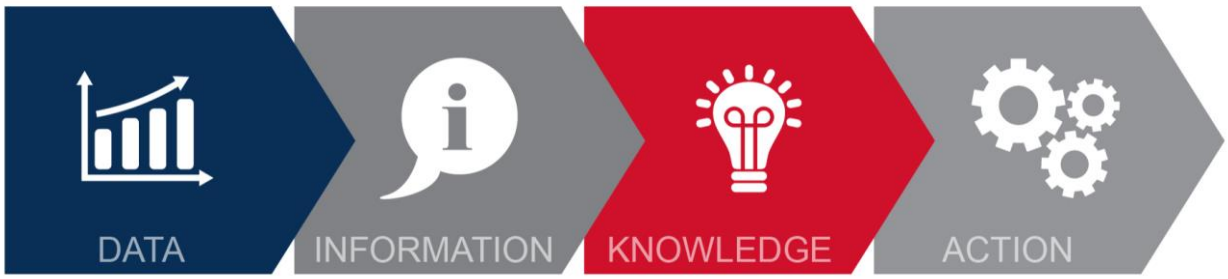
The hypothesis is that Michael Porter`s theory is applicable also for the upstream O&G industry and the event that took place between 2013 and 2021. My analysis will test this hypothesis by analysing historic data to see if it is true.

Theory & Research Design

Data collection

Robert Yin (2018) mentions six sources of case study evidence:

Documentation	Archival Records	Interviews
Direct Observations	Participant-Observation	Physical Artifacts



Data Sources

I will be careful not to pull in too much data. Organizing data in a way that I will be able to absorb and analyse it properly will be key. I need to consider what kind of data I will need, from where I collect it, and how I select data from available sources.

Norman Blaikie (2000) describes three types of data: primary, secondary, and tertiary. Primary data has been generated by the researcher (me). This makes me well positioned to evaluate the quality of the data as well as the production and analysis of same data. Secondary data has been generated by someone else. It is likely that the purpose of collecting this data is different from mine. Since I am further removed from the data it is difficult to evaluate the quality with the same assertiveness. It is common to archive secondary data sets to allow other researchers to analyse them. Tertiary data remove the end user even further from the original data. Often only the results are available, not the raw data as such.

Strategy analysis theory

I have used Michael Porter`s theory on the Five Competitive Forces that Shape Strategy to assess the events across the O&G upstream value chain since 2013. I have analysed the sectors separately and also looked for ties between the sectors. I have found that the sectors in the value chain are interdependent. Particularly the OSV sector is affected by events that spill out in any or all the other sectors. All are mostly affected by the E&P companies spending strategies.

Porter's five forces are: Competitive rivalry, Potential of new entrants into the industry, Power of suppliers, Power of customers, Threat of substitute product.

Competitive rivalry (1)

Competitive rivalry is a significant force. Understanding the competition and being able to counter competitive initiatives is key to be able to differentiate own products in a demanding market. This includes being aware of competing products, technology developments and strategic moves by the competition. Being aware of going rates in your market is also important so you can develop your own pricing strategy which meets the customers expectation.

In the O&G upstream industry this means pushing forward technology development together with the client. Offering digital and remote services to reduce invasive activities which disturb operation, thus supporting uptime and protecting OPEX.

It is also important to demonstrate technical know-how by subject matter experts and to capitalise on existing market share to win over customers from competition through both advertising and real-time support.

Potential of new entrants into the industry (2)

New entrants introduce a shift in the existing market balance. This affect pricing strategies, cost estimates and the rate of growth needed to maintain an existing market share. Barrier to enter or exit a market influences the threat of entries. If the barrier to enter is low, you can expect a continuous stream of new competitors. If the barriers are high, the competition pool will largely remain the same.

The most attractive market is that with high barriers to enter and low barriers to exit. However, as seen in the O&G upstream sectors, if the barrier to enter is high, investments are typically so high that it always makes leaving more painful. Other factors which influence barriers to enter - beside financial demands, are the ability to go large to spread cost across a bigger volume and customer willingness created by angular *momentum stimulated networks (group thinking/behaviour).*

Power of suppliers (3)

The power of suppliers refers to the possibility to influence buyers and market terms and conditions based on the suppliers' unique position. This can influence price, quantity, and quality. As seen in the O&G industry since 2013, a significant oversupply of service providers, a steep fall in commodity prices, combined with deep cuts in E&P spending have left upstream stakeholders with very little bargaining power.

Power of customers (4)

The power of customers (buyers) follows the same mechanisms as described above. Customer's power is high when they have many options and low when there are fewer alternatives. This leverage over suppliers provides an opportunity to dictate terms and conditions for services rendered.

Threat of substitute product (5)

A substitution is another way of solving the same existing need. If the cost of changing if low, and the perceived differentiation is seen to adds value - this will be appealing to customers and the threat of substation is high. If the solution is less than ready, not directly available or if the cost of shifting solution is high, then the threat of substitution if low. These effects have been seen in the upstream value chain, exemplified by MOUs performing rig moves without the assistance of AHTS vessels.

Research method

I have decided to use a Case Study approach. I have found that the applicability of this format is best suited to analyse and describe cause and effect within the context that it occurred. It also suits to determine factors which influenced decisions and actions throughout the crisis.

A Case Study uses a mixture of methods: observations, informants, interviewing, tracing, and studying of relevant documents. As a result, the case study cannot be categorized as a specific technique. It is rather a way of organizing social data (Blaikie 2000).

Three of the most common purposes of research are exploration, description, and explanation. Many seems to believe that the case study can only be used successfully for exploratory studies, but several famous studies have confirmed the applicability of the case study both for explanatory cases (*Allison and Zelikow's Essence of Decision: Explaining the Cuban Missile Crisis, 1999*) and descriptive studies (*Street Corner Society (1943/1993), by William F. Whyte*).

A descriptive case study has narrowed down a phenomenon and endeavours to assess it in detail. This is completed against a descriptive theory. The explanatory case study focuses on an explanation for a question or a phenomenon. The results from this kind of study are clear and not debatable. An exploratory case study often leads up to a formal, large-scale research project. The case study's goal is to demonstrate that further research is required.

This study is both exploratory and descriptive in nature. In my assignment, I have used the COSMOS Corporation guide, as described by Robert Yin (page 39, *Case Study Research and Applications,* 2018) to help determine research method suitability.

Robert Yin (2018) uses a twofold definition to explain what a case study is. The definition describes how a case study research cover a mode of inquiry, including design, data collection techniques, and data analysis.

He explains how a case study is an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clear. It is copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result benefits from the prior development of theoretical propositions to guide design, data collection, and analysis, and as another result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion.

Robert Yin`s definition of a case study fits particularly well as a description of my intentions "*to conduct an empirical enquiry that investigates a contemporary phenomenon within its real-life context; when boundaries between phenomenon and context are not clearly defined and multiple sources are used*.".

My Case

I initially wanted to conduct this as a single case study. However, with the current disruption in the oil and gas market, caused by both the Corona virus and politically motivated actors, it is only natural to reference the ongoing downfall in oil prices throughout Q1 in 2020. I will try to briefly explain any common cases, and effects on stakeholders and markets between 2014-2016 and 2020. Dealing with multiple cases, even though it can be argued that they are interlinked, I will be vigilant to ensure replication to enable valid comparison between 2014-2016 and 2021 data.

Research Design Quality

To establish the research design quality, we typically apply four recognized academic tests. These four tests are applicable throughout the entire research project and has impact on the quality of data, what kind of date is being used, and how data is being gathered and processed. Most of the testing should actually occur during the early phases of data collection, data analysis, or the study design phase of the research. They are:

- Construct validity
- Internal validity
- External validity, and
- Reliability

Validity refers to relevancy of both applied tools as well as the measured items in the data collection. In short, if we are measuring the thing we set out to measure. Reliability refers to consistency of research data and results. High reliability means that the researcher can verify findings and results by conducting the exact same process over again.

Construct Validity

To meet the test of construct validity it is important to develop a practical set of relevant measures and to avoid subjective judgment because of preconceived notions. Measures, like reports and statistics must be up to date and contain current information. Findings must be defined in terms which relates to study objectives. Multiple sources should be applied. Key stakeholders may review the draft report to ensure validity.

Internal Validity

Internal validity may be threatened because of spurious effects. If the researcher erroneously concludes that there is a link between two factors, without knowing there is a third factor influencing the relationship, the research design has problems with internal validity.

This is mainly applicable for explanatory case studies, where the researched is trying to explain why one thing led to another.

This logic is not applicable to descriptive or exploratory research designs. Also, if the researched is assuming something based on a previous occurrence which cannot be directly observed, internal validity may suffer. Robert Yin (2018) suggests the following compensating measures: pattern matching, explanation building, addressing rival explanations, and using logic models.

External Validity

The third test helps determine if the study`s findings can be generalized. The way the research questions are formed can contribute to, or hamper, generalization. The application of “how” and “why” questions can be helpful. The foundation for external validity should be established during the study design phase to ensure applicable theories are included to support the external validity of any case study.

Reliability

The fourth test should demonstrate that the activities of a study can be repeated, with the same results. This means in fact studying the same case over again, not just applying the results for another case. The aim is to reduce residual errors and biases by being able to document which procedures you have followed throughout the case study. Without any reliability, a researcher would not even be able to replicate his own work. Robert Yin (2018) suggest the use of a case study protocol to deal with the documentation and the development of a case study database.

Pitfalls

Beside quality data input with good reliability and validity, and a relevant outcome which adds value, there are several key items to look after in order to ensure a successful research process.

The ability to get relevant respondents is crucial. It is also important that the communication is relaxed and takes place in a comfortable, secure space. A comfortable setting helps create open and honest communication that will provide relevant and valuable data. Information must be relevant and current. Both respondents, market intel, newspaper articles and other sources of information must be assessed for bias and relevancy.

Discussion & Conclusion

The analysis along with the investigation and writing processes have certainly contributed to new knowledge for myself. Mainly by providing new in-depth knowledge about the industry in which I work, but also knowledge about the Five Forces theory and its applicability in strategic assessment for the upstream O&G industry. Hopefully, this summary and the main article will contribute with the same to other readers, both colleagues from this industry and those with limited exposure to oil and gas.

The seismic sector is at the very beginning of the upstream value chain and this sector was hit first by cuts in E&P spending. With expensive vessels, barriers are high both to enter and exit the market. Some technology development has improved service deliveries, like 4D data and permanently placed acoustic transponders on the seabed. Strategic decisions to let vessels operate below capabilities (older 3D vessels doing 2D work) in attempts to differentiate fleets and companies have not been successful. A decline in contract work has led to multi-client work where the seismic company do surveys on their own expense and market data to more than one client.

The exploration segment experienced very favorable new build terms between 2008 and 2014 which led to a lot of new contracts since barriers to entry was relatively low. The fleet was old at the time and the recycle process was much needed. With the sudden drop in oil prices and a halt in exploration work, the mobile offshore unit sector was quickly oversupplied. Competitive rivalry was intense. Units were laid up and several owners delayed or even walked away from undelivered drilling rigs. As time progressed most drilling contractors used this idle period to reconsolidate their fleets. Scraping of units, company mergers and debt negotiations were common occurrences in the exploration sector.
The segment saw little new entries but neither many exits. This can be explained by Porter`s theory about barriers as new rigs at the time cost between 300-500 mill. US dollar, and was quite a commitment, even for mature companies.

Production vessels ranged between new builds and converted oil tankers. Both options are very costly and require a firm long-term contract to be executed. Following the seismic and exploration segments, production was also hit in 2014.

Competitive rivalry led to cost cuts and lower fees. Several projects went ahead because of investment decisions already made. The production sector was the upstream sector least hit by the downfall between 2013 and 2021.

We have seen the threat of substitution play out as FPSOs are increasingly competing against tie-back and pipeline design solutions as infrastructure continue to improve in mature fields. Currently we see a focus on sustainability and green profiling as ways to differentiate themselves among cost conscious clients and competitors. However, the ultimate driver in successful contract negotiations is still cost.

The support sector includes a myriad of companies, with the average owner holding less than 4 vessels in her fleet. The top three companies only own 13% of the total fleet. Barriers to entry has traditionally been low, and as a result the sector is widely oversupplied. The vessel owner is left with little bargaining power and suppressed rates and massive lay-up is the result of buyer dominance, particularly since the impact of Covid-19 wiped out the positive effects of a brief and much-needed market recovery in 2018/2019. Given the small average fleet, scrapping has relatively large impact on fleets and owners have been reluctant to decommission necessary parts of the global fleet. Hence, vessels have operated below capabilities on rates very close to OPEX.

The analysis of the sectors in light of Porter`s theory has demonstrated its applicability for the complex, interdependent upstream value chain. The five forces describe activities and events which has played out across the sectors in the upstream industry with great accuracy. This is backed up by market intelligence and historic statistics from the oil and gas industry. Consequently, this research article has contributed to confirm how can be used to tackle future disruption in the market and help shape strategies and support decision making for in the future.

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A look at the oil & gas market from 2014 to 2021 - an analysis of the disruptive effects in the O&G value chain (main article).

Øystein Bruncell Larsen, Director of Offshore Business Development with the American Bureau of Shipping, and MBA student at the Business School, Nord University, Norway.

Abstract

This assignment will describe the downfall in global oil price between 2014-2016 and the spillover effect it has had on the entire oil and gas industry up till 2021. I will further debate the following change which took place throughout the industry. This change involved all parts of the upstream value chain including company operations, employees, investors, and end users. I will analyze the events in light of Michael Porter`s model of Five Competitive Forces

The question I will try to answer in this assignment is: how the oil & gas industry managed the crisis that followed the slump in global oil price of 2014-2016 onwards to 2021, and how applicable is Porter`s model when it comes to understanding the mechanisms in the oil and gas market sectors.

Introduction

The global oil industry is currently suffering low oil prices and a significantly reduced activity level, compared to the past 8-10 years. The reduced activity has had a spillover effect on the whole industry and both upstream and downstream sectors are affected. Upstream are typically defined as exploration and production, and downstream are seen as transportation, refining and distribution to consumer.

The collapse in oil prices between 2014 and 2016 was driven by a major oversupply and a lack of expected global growth. The oil price drop was a staggering 70 percent during the period (Global Economic Prospects, Jan. 2018).

One other factor contributing the slump in oil prices where increased shale oil production in the U.S. Shale oil is produced by fragmenting the shale to extract the oil in the shale. This is mostly accomplished by above ground mining processes. The U.S production output grew by over 16% in 2014, which was the highest growth rate since 1940 (U.S. Energy Information Administration, 30th of March 2015).

Geopolitical concerns, and Organization of the Petroleum Exporting Countries (OPEC) policies also contributed to reduce the oil prices considerably during the same period. OPEC is an intergovernmental organisation of 13 countries, accounting for approximately 44 percent of the global oil production. OPEC members sit on an estimated 81 percent of the remaining oil reserves of the world. Consequently, they have a lot of influence on the global oil price.

The disruption on the oil industry led to major changes in all levels of the industry. My objectives in this study are to:

- Describe the changes in the Upstream sector of the global oil industry.
- Analyse compiled data against Michael Porter`s theory of the Five Competitive Forces to determine its applicability in the Upstream sector.

I have gathered data from a variety of industry sources, including ClarksonPlatou Offshore Outlook, The International Monetary Fund Working Papers, Upstream Magazine archive, American Bureau of Shipping Offshore Outlook, and Energy Maritime Associates, Floating Production Systems Reports. I have collected information from 2013 up till 2021, and cross-checked output from various sources to confirm data accuracy.

I have analysed the industry sector by sector looking at new-build volumes, acquisitions, mergers, and contracts. I have then discussed these findings across all sectors to establish an overarching picture of industry events overall and the way these events have been managed by stakeholders and decision makers in the industry. Finally, I have looked at the aggregated data against Porter`s theory to analyse the events against the five forces.

By analysing this information through the lens of Michael Porters theory of competitive forces I will be able to contribute to research by shedding light on subsequent processes across the Upstream value chain from 2014 to 2021 occurring because of said market downfall. This knowledge can help shape strategies and support decision making for in the future.

Backdrop

Between 2014 and 2016 the oil and gas industry experienced a massive disruption following a significant drop in oil price. Since the recovery from the global recession in 2008 the oil price had climbed steadily and reached USD 120 per barrel of Brent oil in 2014, before a collapse in the market drove it down to USD 35 in 2016. This had a significant effect on all sectors of the industry through the whole value chain from seismic, via exploration to production. It also affected engineering designers, yards, and operators (EIA, Annual Review 2014).

As the oil and gas industry has partly recovered, much has changed. As of 2021, oil prices remain relatively low compared to previous levels from before 2014. An increasing focus on cost cuts and financial discipline has led to reduced margins and profitability.

According to Norwegian association TEKNA, thousands of oil and gas workers were laid off between 2013 and 2015. Despite a rise in the activity level only a fraction has returned to the industry, and service providers have been forced to operate with reduced staffing. The oil majors are making the rest of the supply chain continue to deliver services under strained conditions. This has kept the pressure on vendors, which have seen reduced margins and revenue.

The oil and gas industry had surfed on a very prosperous financial wave since the end of the 2008 crisis. The oil price kept climbing and the need for oil grew steadily. Emerging markets in countries which experienced a steady growth in the standard of living, such as China, India, Russia, and Brazil brought more and more people out of poverty and they kept asking for oil as an alternative to coal. The demand peak year was only pushed further into the future. OPEC responded by cuts in production which led to pushing oil prices to an even higher level.

Operational costs (OPEX) were high, but client demands continuously brought new projects forward. Vessel and oil facility owners built ships and rigs like never before with a fleet increase on over 30% over the past 10 years. Shipyards had long queues with investors waiting to realize their oil industry investments. Bespoke solutions meant a reduced focus on standardization of equipment and technical solutions. This in turn meant elevated cost for equipment and surging revenues for manufacturers. The high demand for oil to the market kept service suppliers' rates high and all sectors of the industry saw growing activity levels moving from 2008 towards 2014.

In several cases the yards themselves provided finance to progress the construction projects. The pressure on the industry to deliver also drained the resource pool. Getting qualified staff became a problem. Salaries became inflated as result, which only contributed to the high cost. This was a global trend.

Spiralling costs and exhausted resources were a forced, reactive change, and industry stakeholders had little or no power to influence the outcome. This was not a wanted change, and no one gained or benefitted from the change. The spillover effect influenced other sectors and markets which were also forced to deal with this unplanned and unwanted event.

The events taking place during this period have significantly influenced the industry and the aftermath is still noticeable, even four years after the manifestation. The need to reduce cost has brought reduced activity which in turn has led to cancelled projects, drained competency as personnel exit the industry, reduced recruitment, and fewer students in oil related disciplines in Universities. With increased focus on financial discipline, we have seen the scrapping and recycling of relatively new units, including offshore vessels and mobile drilling units.

The downfall in the O&G market from 2013 to 2020

As the oil and gas industry has partly recovered from the 2014-2016 oil price decline, much had changed. Oil prices remain relatively low compared to previous levels. An increasing focus on cost cuts and financial discipline has led to reduced margins and profitability. Thousands of oil and gas workers were laid off (TEKNA, 2015).

Despite a rise in the activity level only a fraction has returned to the industry, and service providers have been forced to operate with reduced staffing. The oil majors are making the rest of the supply chain continue to deliver services under strained conditions. This has kept the pressure on vendors which have seen reduced margins and revenue.

It is important to debate this new reality to shed light on how the change has been managed and understand how the industry is operating in the current conditions. To make the industry grow, all levels of the value chain need viable circumstances. There has been an ongoing debate about the effect of the slump in prices in the industry and how the aftermath of the 2014-2016 crisis still influences the oil and gas sector. The immediate response was a reduction in staff and activity, followed by cost saving initiatives such as standardization as well as a search for synergies and consolidations. I will elaborate more on this later in the assignment. Now, as the industry moves towards a greener future with renewed focus on sustainable operations, new technologies lead the way and take up most of the discussion space among stakeholders.

Fig. 1 Brent Oil prices 2014 – 2020. Source: US. Energy Information Administration (EIA)

Figure 1 (EIA – crude oil price) describes the slump in oil price from a high level in 2014. The price reaches a low in 2016, before starting a slow climb. In 2017 there were cautious optimism in the industry, which continued into 2019 and early 2020, before Covid-19 hit the world.

There have been a series of changes in the market and the industry, that have led up to the drop in oil process and the continuous lower level of price per barrel to this day.

Mid 2014, the shale oil production started to gain traction with low break-even prices which changed the U.S. from a net oil importer to a net oil exporting country (IMF Working Paper No. 16/131July 6, 2016). At the same time, Canada began to extract a significant level of oil sand which also had a great influence on the global oil supply and demand balance. This in turn affected the prices.

Simultaneously, China and India saw a reduced need for oil because of stagnation in economic development. The same happened in Russia. Saudi Arabia countered this fall in oil prices with an increased production output to conquer market share and to compensate for the fall in revenue. With the world's largest reservoirs, Saudi could afford to keep oil prices low, so long this was balanced by larger volume. This increased the downward pressure on prices. In sum, all this kept oil prices depressed, and the industry locked in a reduced state of activity.

The industry is still experiencing a reduced activity level. In the North Sea, levels have been kept up by field development projects already sanctioned before the crisis hit. However, new projects are few and far between and seismic data gathering, and exploration drilling levels continues to stay low.

In the rest of the world, activity levels have steadily begun to rise. However, contract rates are still very low and the service industry struggles to recover. The constant focus on cost saving and low rates combined with only marginal increases in the oil price has improved margins for the oil companies. This has still not filtered down through the chain and full industry recovery has still not been achieved.

Research method

Case Study

This article aims to describe the slump in the oil and gas market from 2013 to 2020 with an in-depth analysis of the follow-on effects and how these were managed by industry stakeholders. I am taking a descriptive approach, using a mixture of methods like observations, informants, tracing, and studying of relevant documents. As a result, the case study cannot be categorized as a specific technique. It is rather a way of organizing social data (Blaikie 2000). The descriptive case study is well suited to determine factors which influenced decisions and actions throughout the crisis. Several famous studies have confirmed the applicability of the case study both for explanatory cases (*Allison and Zelikow's Essence of Decision: Explaining the Cuban Missile Crisis, 1999*) and descriptive studies (*Street Corner Society (1943/1993), by William F. Whyte*).

With the current disruption in the oil and gas market, caused by both COVID-19 and politically motivated actors, it has been natural to reference the ongoing decline in oil prices from 2014 throughout Q1 in 2021. I will try to briefly explain any common cases and effects on stakeholders and markets between 2014-2016 and 2021. Dealing with multiple cases, even though it can be argued that they are interlinked, I will be vigilant to ensure replication to enable valid comparison between 2014-2016 and 2021 data.

I am building my case on existing market reports and published statistics. I have gathered data from a variety of industry sources, including ClarksonPlatou Offshore Outlook, Upstream Magazine archive, American Bureau of Shipping Offshore Outlook, and Energy Maritime Associates, Floating Production systems Reports. I have collected information from 2013 up till 2021, and cross-checked output from various sources to confirm data accuracy.

A descriptive case study has narrowed down a phenomenon and endeavours to assess it in detail. This is completed against a descriptive theory. The explanatory case study focuses on an explanation for a question or a phenomenon (Robert Yin, *Case Study Research and Applications,* 2018).

I have analysed the industry sector by sector looking at new-build volumes, acquisitions, mergers, and contracts. I started by separating my data collection in sectors; seismic, exploration, production, and support. The sectors will be further explained in detail in the next chapter of the article.

I then identified sector fleet sizes, changes in fleet volume from year to year, number of new charter contracts, and industry outlook. The yearly outlook gave a picture of the sentiment in the industry, which I gauged against facts from next year's data collection. This provided an understanding of how the sector fleets changed from year to year because of the number of new deliveries or decommissioning. Mergers and acquisitions have also affected the supply-demand ratio in the industry. Hence, I have also gathered and analysed data to identify effects on sector fleets and service deliverables from mergers and/or acquisitions.

I have then discussed these findings across all sectors to establish an overarching picture of industry events overall and the way these events have been managed by stakeholders and decision makers in the industry.

This provides an understanding of how the downfall has affected both the individual sectors but also the industry across the board. Further it provides insight into how the crisis has been managed and how actions by decision makers have led to some actors disappearing while others have been strengthened by the past 9 years.

Porter`s Five Forces

By analysing this information through the lens of Michael Porters theory of competitive forces I will be able to contribute to research by shedding light on subsequent processes in the oil and gas industry occurring because of said market downfall. After this analysis I will be able to comment on the applicability of Porter`s theory as a tool to understand this kind of research question, and the mechanisms that tie to the events in the O&G Upstream market as they have played out since 2013.

I have analysed the sectors separately and also looked for ties between the sectors. I have found that the sectors in the value chain are interdependent. Particularly the OSV sector is affected by events that spill out in any or all the other sectors. All are mostly affected by the E&P companies spending strategies.

Porter's five forces are: Competitive rivalry, Potential of new entrants into the industry, Power of suppliers, Power of customers, and Threat of substitute product (The Five Competitive Forces That Shape Strategy, Michael Porter, 2008)

Competitive rivalry (1)

Competitive rivalry is a significant force. Understanding the competition and being able to counter competitive initiatives is key to be able to differentiate own products in a demanding market. This includes being aware of competing products, technology developments and strategic moves by the competition. Being aware of going rates in your market is also important so you can develop your own pricing strategy which meets the customers expectation.

In the O&G upstream industry this means pushing forward technology development together with the client. Offering digital and remote services to reduce invasive activities which disturb operation, thus supporting uptime and protecting OPEX. It is also important to demonstrate technical know-how by subject matter experts and to capitalise on existing market share to win over customers from competition through both advertising and real-time support.

Potential of new entrants into the industry (2)

New entrants introduce a shift in the existing market balance. This affect pricing strategies, cost estimates and the rate of growth needed to maintain an existing market share. Barrier to enter or exit a market influences the threat of entries. If the barrier to enter is low, you can expect a continuous stream of new competitors. If the barriers are high, the competition pool will largely remain the same.

The most attractive market is that with high barriers to enter and low barriers to exit. However, as seen in the O&G upstream sectors, if the barrier to enter is high, investments are typically so high that it always makes leaving more painful. Other factors which influence barriers to enter - beside financial demands, are the ability to go large to spread cost across a bigger volume and customer willingness created by angular momentum stimulated networks *(group thinking/behaviour).*

Power of suppliers (3)

The power of suppliers refers to the possibility to influence buyers and market terms and conditions based on the suppliers' unique position. This can influence price, quantity, and quality. As seen in the O&G industry since 2013, a significant oversupply of service providers, a steep fall in commodity prices, combined with deep cuts in E&P spending have left upstream stakeholders with very little bargaining power.

Power of customers (4)

The power of customers (buyers) follows the same mechanisms as described above. Customer's power is high when they have many options and low when there are fewer alternatives. This leverage over suppliers provides an opportunity to dictate terms and conditions for services rendered.

Threat of substitute product (5)

A substitution is another way of solving the same existing need. If the cost of changing if low, and the perceived differentiation is seen to adds value - this will be appealing to customers and the threat of substation is high. If the solution is less than ready, not directly available or if the cost of shifting solution is high, then the threat of substitution if low. These effects have been seen in the upstream value chain, exemplified by MOUs performing rig moves without the assistance of AHTS vessels.

Fig. 2 - Michael Porter`s Five Forces Model

Figure 2 illustrates Michael Porter`s Five Competitive Forces. They are Competitive rivalry, Potential of new entrants into the industry, Power of suppliers, Power of customers, Threat of substitute product.

The Upstream Value Chain

The term "*upstream"* as it is used in the oil and gas industry refers to identification, exploration, and production of material. The upstream oil sector is also known as the exploration and production (E&P) sector, but I will also focus on the *identification* part in this article by including the seismic sector in my analysis. Additionally, I have included the support sector, as this is a service that is provided throughout the entire upstream value chain (specialised offshore vessels).

"*Downstream*" are closer to the customer in the value chain and deals with transportation, refining and distribution of the final product to the end user. This article will only address the upstream part of the value chain.

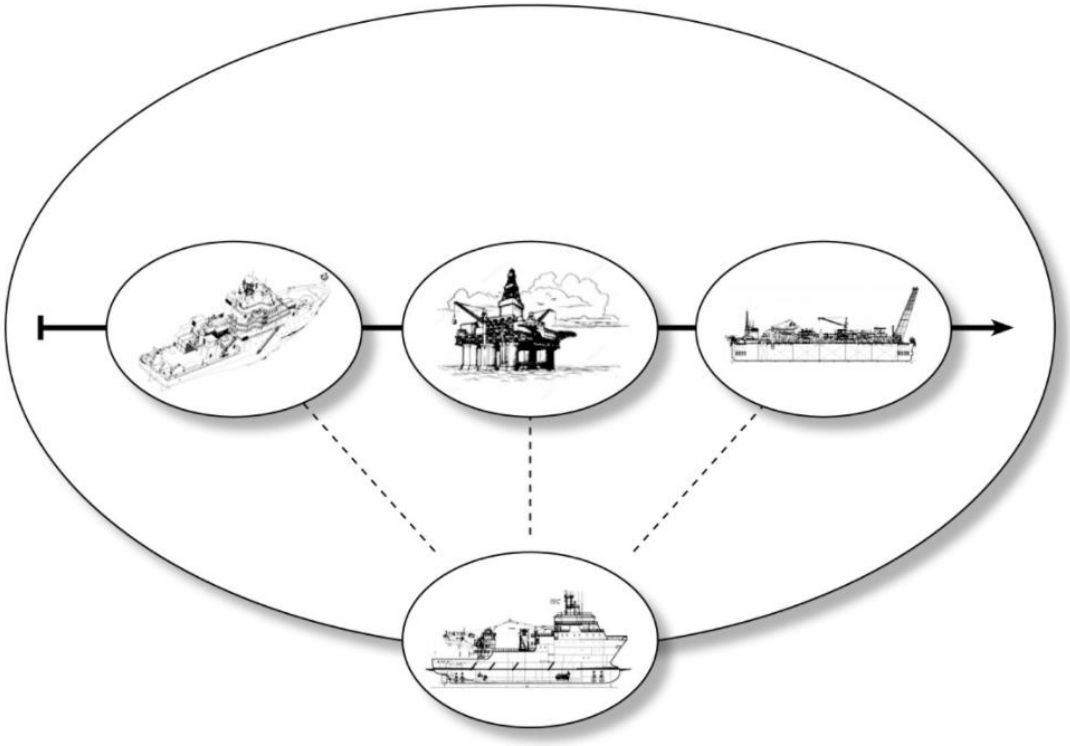


Fig. 3 – The Upstream value chain

Figure 3 pictures how the upstream process starts with the search for profitable areas, rich in hydrocarbons, through **seismic search** and geophysical evaluations. This is done offshore using highly specialised seismic vessels. These ships are solely used for seismic surveys to identify the best areas on the seabed to drill for oil and gas. Minimising the environmental impact is also a core part of the scope during this phase. A seismic detector on board the vessel shoots seismic waves to an underwater point. The measured time for the waves to refract back to the vessel determine the subsea composition and the extent of the subsea reservoir.

The second circle in figure 3 pictures a drilling rig, or a Mobile Offshore Unit (MOU). **Offshore exploration** is mostly performed with mobile offshore units. On mature fields in operation, the existing infrastructure may include drilling facilities. MOUs include drillships, semi-submersible units and self-elevating units (jack-ups). They drill through the seabed down to the reservoir and construct a well with pipelines to the surface (risers) which will later be used to extract the hydrocarbons from the reservoir.

The third circle in figure 3 shows a Floating Production and Storage Unit (FPSO). **Production facility** design varies based on the location and the sea depth. In shallow water and mature areas, it is most common to erect fixed installations. At greater depths, or areas of the world with limited infrastructure, the operators usually go for a floating production and storage unit (FPSO). The FPSO may have different designs, but a ship shaped design is most used. The production facility receives the hydrocarbons from a nearby platform or a subsea well, processes it and stores it before it is offloaded onto a tanker, or in some cases through a pipeline to shore.

The **support sector** provides logistical and operational support to other stakeholders across the value chain. This is shown in figure 3 by illustrating how the Offshore Support Vessel (OSV) ties in by service deliveries to all phases in the upstream value chain. These services are typically delivered from offshore support and supply vessels, firefighting units, well intervention vessels or stand-by vessels. These are specialised ship-shaped vessels circling the offshore facility, on transport routes between offshore locations and the beach, or ships arriving at the offshore location to perform a designated specialised activity.

Analysis of the sectors in the upstream value chain (empiric data and analysis)

The seismic sector

In 2013, the seismic sector counted 234 vessels (ClarksonPlatou, Offshore Outlook, Aug 2013). This was the result of a steady growth over the past 10 years of almost 30% across the sector fleet. Vessels are divided between 2D and 3D capabilities, where 2D vessels use a single seismic streamer towed behind the vessel. 2D vessels are typically used for frontier exploration to identify areas of interest. 3D vessels use multiple seismic streamers which produce a more detailed result. Survey work was performed in Brazil, the Eastern Mediterranean and Nova Scotia, and an average of nine new vessels per year were expected into the existing seismic vessel fleet.

In 2014, oil companies started to reduce their budgets as a result of the downfall in the oil prices and subsequent cash flow issues. Being at the very front of the upstream value chain, this reduction directly impacted the seismic sector immediately.

Oil companies involved in exploration & production (E&P) were able to pick the most advanced vessels for their seismic projects. This in turn lead to vessel owners downgrading mid-range 3D vessels into 2D vessels to protect the remaining 3D pool and to preserve higher rates for the remaining 3D vessels (ClarksonPlatou, Offshore Outlook, Aug 2015).

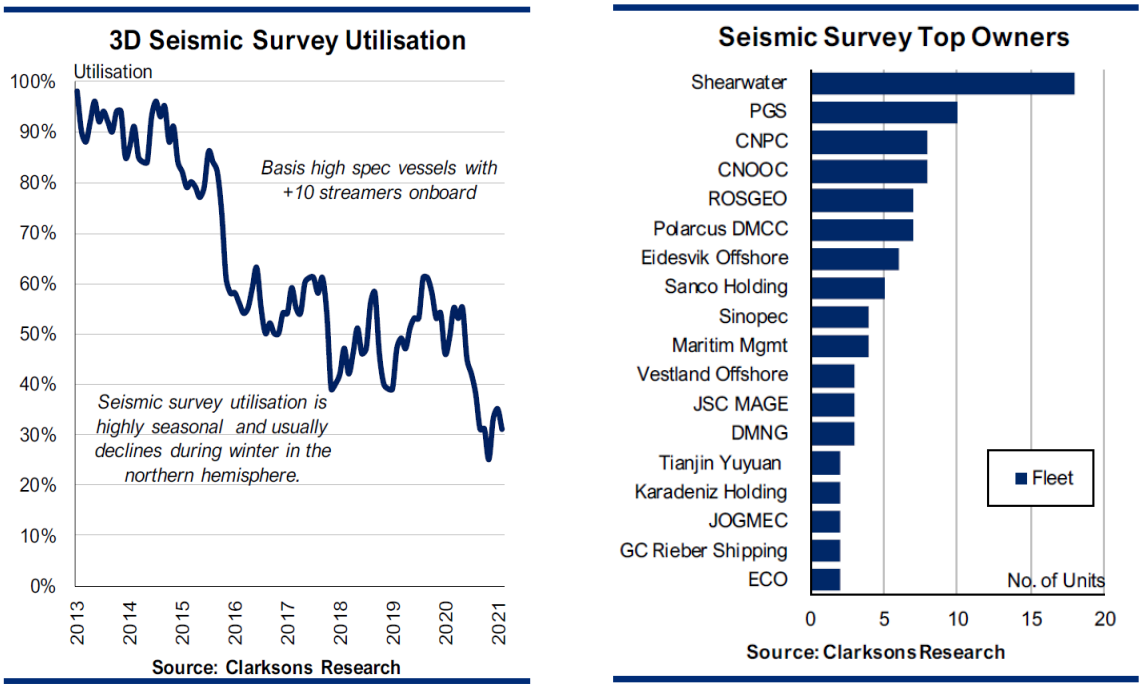
Moving into 2015, the sector saw a large vessel oversupply, which influenced orderbook figures and vessel scrapings (ABS Fleet & Orderbook Activity, 2015). Owners stopped ordering new units, they scrapped older vessels and by the end of the year, 15% of the active fleet was laid-up. 2016 continued along the same track with few new contracts and overall fleet consolidations, including selling and scrapping of older units. During 2016, the seismic companies started to explore new business strategies. Up until now, the most common way to operate had been under contract with a single client. Now, the seismic companies started doing surveys on their own to build up a multi-client database containing information which could be sold to multiple clients (ClarksonPlatou, Offshore Outlook, 2015).

The development of 4D capabilities had also grown over time, a technique with repeated 3D shoots over a set location to develop time lapsed 3D data. This information was used to visualize reservoir development over time (the fourth dimension). New acquisition techniques included permanent deployment on the seabed, and a source vessel that could capture data without towed streamers.

In 2018 market conditions started to ease. E&P companies were more active, and the licensing activity had picked up (EIA, Year in Review, 2018). As of start of August 2018, the seismic fleet counted 218 vessels. One third of these vessels were laid up. The global seismic fleet was relatively unconsolidated with an average of 2.4 vessels per owner. The E&P companies did not prefer high specification vessels, which constrained owners with a modern fleet's ability to diversify and promote higher rates. ExxonMobil`s Liza project in Guyana was one of few contributors to the seismic backlog (Upstream Online, 13. December 2018).

The weak market situation continued through 2019, 2020 and into 2021. When other sectors got hit by the impact of Covid-19, the seismic sector was already on its knees with 65% of the total of 200 vessels in lay-up as of February 2021.

The size of the market had shrunk considerably since its peak in 2013, and there has been a general shift away from contract seismic work towards most of the business being multiclient seismic with the seismic company performing their own surveys and markets the results to multiple clients. As a result, many stakeholders left the sector.



Figures 4 & 5 - Seismic 3D vessel utilasation and top owners. Source: ClarksonPlatou research, Offshore Outlook.

Figures 4 and 5 describes the seismic sector. Figure 3 shows how the utilisation rate for 3D vessels dropped significantly from 2013 all the way till 2021. Only about 30 % of the total fleet was working in 2021. Figure 4 list the 18 largest seismic companies in the world. The largest company by far, is the Norwegian company Shearwater GeoServices, based in Bergen.

Analysing the seismic sector from 2013 to 2021 considering Michael Porter's theory of five forces there are several events over time which fit with Porter`s framework.

The seismic sector was peaking in 2013 and the threat of new entries was definitively present. With available financing and beneficial down payment terms from the shipyards, barriers to entry were few. New orderbook figures were high as fleet owners scaled up. E&P companies depend on reliable reservoir information and with no substitute product or alternative process in the market, the seismic sector was the only channel for data distribution.

With decline in the oil price came cancellations of projects and E&P investments. This hit the seismic sector first, and as a result the customer got the upper hand in contract negotiations. Rather than a force, technology innovation was a factor leading to development of new services and the sector saw multiclient seismic as an alternative to single client contracts. Another technology factor which had developed over time was 4D data, with the time element as the fourth factor to enhance reservoir assessments.

Competitive rivalry sharpened further following the new market reality after 2013. Several 3D vessels were downgraded to 2D vessels. However, with an unconsolidated global fleet and clients with no preference for high tech. vessels, owners had few opportunities to differentiate themselves to promote higher rates.

The Exploration and Drilling sector

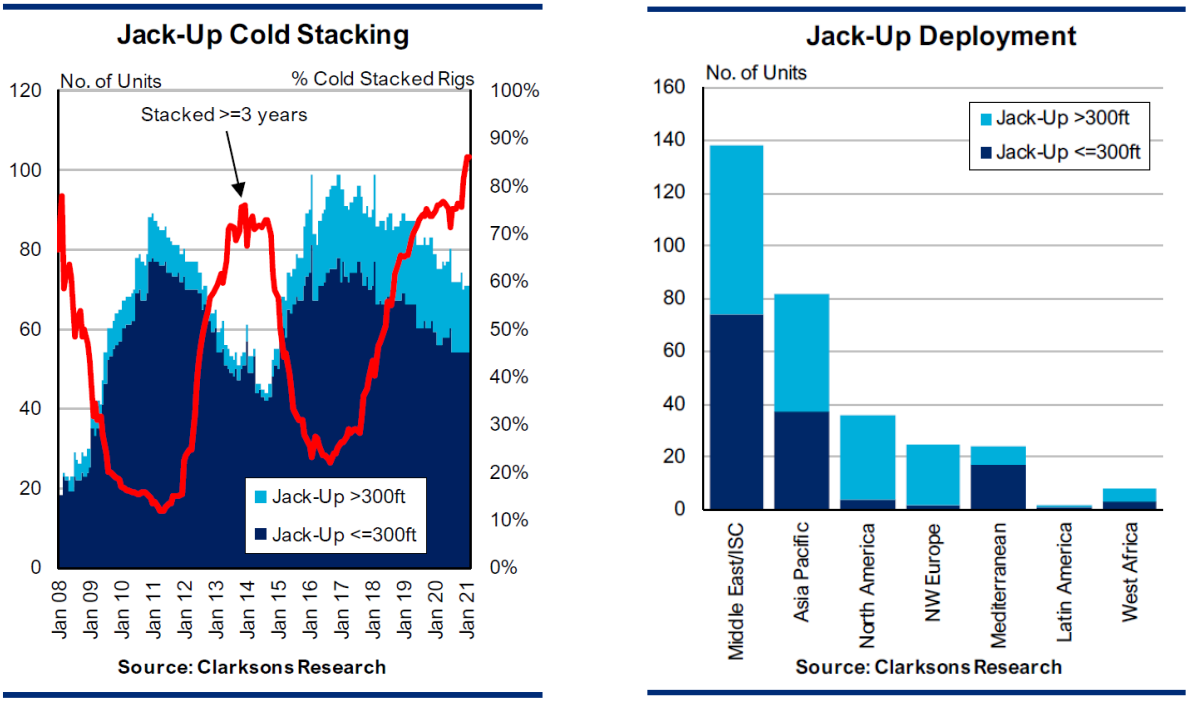
The mobile-offshore-unit (MOU) sector is mainly made up of self-elevating (jack-up) and column stabilised semi-submersible (semis) units. Consequently, this analysis will only look at data from jack-ups and semis. In 2013, the MOU fleet had seen a fantastic growth over the past 10 years with a more than 30 % increase since the beginning of 2004 (ClarksonPlatou, Offshore Outlook, 2013).

The largest growth came in the deepwater segment A very large portion of the fleet was 30 years or older, so the ongoing replacement cycle was very needed. Most of the new projects surfaced in Brazil, West Africa, and the Gulf of Mexico (Upstream Online, 20th June, 2014). Norway and the Russian arctic sectors also represented a great deal of promise at this time.

As the oil price started to fall, the oversupply became a real problem. Day-rates fell, something that affected the jack-up segment first (ABS Fleet & Orderbook Activity, 2014).

Newbuild orders slowed down. The low down-payments on these units meant that many speculators walked away from projects before the units were delivered from the yard.

Other new builds were delayed at the yard. Moving into 2015, oversupply continued to be the biggest issue and owners were reluctant to take delivery of new units from yards.



Figures 6 & 7 Jack-up activity levels. Source: ClarksonPlatou research, Offshore Outlook.

Figures 6 & 7 details the activity level in the jack-up sector. Figure 5 shows how reactivation took the rigs out of lay-up from 2008 till 2011 (curve dropping) before a climb in stacking indicates a drop in activity, peaking in 2014. When a rig is cold stacked it means that it is preserved, shut down and abandoned, and not marketed for drilling campaigns. From 2014 we see a drop in cold stack, which again reflects the cautious optimism in the industry.

However, Covid-19 put a stop to the activity, and we can see that more and more units were cold stacked, reaching almost 90% of the global fleet by January 2021. **Figure 7** shows how activity in the Middle East and Asia is driving the jack-up sector. A large portion of the existing fleet got stacked or scrapped. Given the limited value of scrapping, many owners decided to stack the units as an alternative.

Many companies had also used the MOUs as collateral for loans and were hence unable to scrap them without disturbing the balance with their financial partners. Deep-water and Ultra-Deep-water units were working below their capabilities, pushing lower specification units out of the market.

More projects were being cancelled and rig owners continued to remove old tonnage from the market. In 2017, the first signs of a recovered MOU market started to emerge, with projects in the Middle East, and Gulf of Mexico. There was still a massive oversupply and rates were low. Total fleet utilization remained at around 60%. With increased activity in Brazil, the deepwater segment was seen as the future.

With a new desire for lower carbon energy, gas fields off the coast of Mozambique also attracted a lot of interest (Upstream Online, 29th November 2018). Through 2018 and into 2019, a steady rise in demand gave hope to the MOU sector. Fleet consolidation and scrapping of older low-tech units helped to balance to supply-demand ratio.

Following the Covid-19 outbreak, the demand for MOUs fell dramatically in 2020 and remains low to this date. Utilization fell back to 63% of August 2020 and the entire sector has deteriorated notably (ClarksonPlatou, Offshore Outlook, Aug. 2020). One third of the entire industry recovery taking place between 2018 and 2018 vaporized. Several of the largest drilling contractors have sought bankruptcy protection and entered Chapter 11 negotiations. It is expected that new build deliveries will be non-existent in the foreseeable future and the continuous scrapping activity high.

Considering Porter`s framework and its applicability in the MOU segment from 2013 until 2021, there are several notable relevancies. Barriers to entry were virtually non-existent in 2013. As a result, several investors and small companies entered the drilling contractor market.

Yards welcomed the new stakeholders and sometimes offered a 90-10 down payment scheme to stimulate new contracts, where the drilling contractor only had to pay 10% of the total cost up front and the rest on delivery.

The ease of substitution has not been a threat to market stakeholders as MOUs have maintained their place in the value chain as the only suitable alternative for offshore drilling. Drillships have never been established as a competitive alternative in shallow- or mid-level water depths.

Since 2013 the bargaining power of the drilling contractors has been limited due to the massive oversupply in the market. It has been the customers' prerogative to pick and choose. This has led to lower day rates (close to OPEX), and sometimes a shift of cost centre for variable expenses, i.e., fuel, on board facility services etc, from the client to the drilling contractor.

Competitive rivalry has been fierce over time since 2013 with lowered day rates leading into a unsustainable downwards spiral. With increasing numbers of units going into lay-up or decommissioning, companies have had to let go a large number of employees. Several drilling contractors have entered Chapter 11 debt negotiations, some companies have even done this more than once since 2013. Others have consolidated fleet and operations by merging with competitors. Transocean`s take-over of Ocean Rig and Songa Offshore is one example. The merger between Rowan and Ensco into the new company Valaris, is another.

This consolidation has also opened the door to new entries; Borr Drilling was established in 2016 and quickly acquired most of Transocean`s jack-ups along with some still undelivered new builds at Keppel in Singapore.

Other factors which have influenced the market since 2013 are the development of improved BOP subsea pressure control systems, along with other managed pressure drilling equipment types and processes. This has been a way for drilling contractors to differentiate themselves and access niche jobs. We have also seen drilling rigs being utilised as offshore accommodation units whilst completing drilling campaigns, as a way for the rig owner to provide complementary services.

The Floating Production sector

The Floating Production Storage and Offloading (FPSO) fleet was at its largest in 2013, counting 187 units (EMA, Floating Production Systems Quarterly Reports, 2013). A steady growth of new vessels continued to complement the fleet and an average of 20 FPSO orders each year were expected at the time. The sector remained relatively strong until mid-2015 when the entire upstream market was hit hard by the fall in commodity prices.

The ongoing investigation into Operation Car Wash in Brazil also added a heightened risk to the FPSO outlook. Operation Car Wash was a huge corruption scandal in Brazil, involving Petrobras executives (Upstream Online, 4th December 2015). However, the Asian demand for oil gave hope to further expansion of the FPSO segment.

Moving into 2016, the sector experienced cuts in E&P spending because of reduced revenue, leading to delayed, suspended, and cancelled projects. By August of 2016, only 173 of the FPSO fleet`s 195 units where actively producing (ClarksonPlatou, Offshore Outlook, 2016).

Cost cutting (scaling back) in several projects and a period of stable higher oil prices aided the FPSO sector through 2017 and 2018 with 13 new orders in total, along with increased activity. The fleet now counted 211 units, of which 190 were working. Projects on hold since 2014 were sanctioned, supporting signs of improvement as a result of a more sustainable oil price. The optimism continued into 2019, with six new tenders launched by Petrobras.

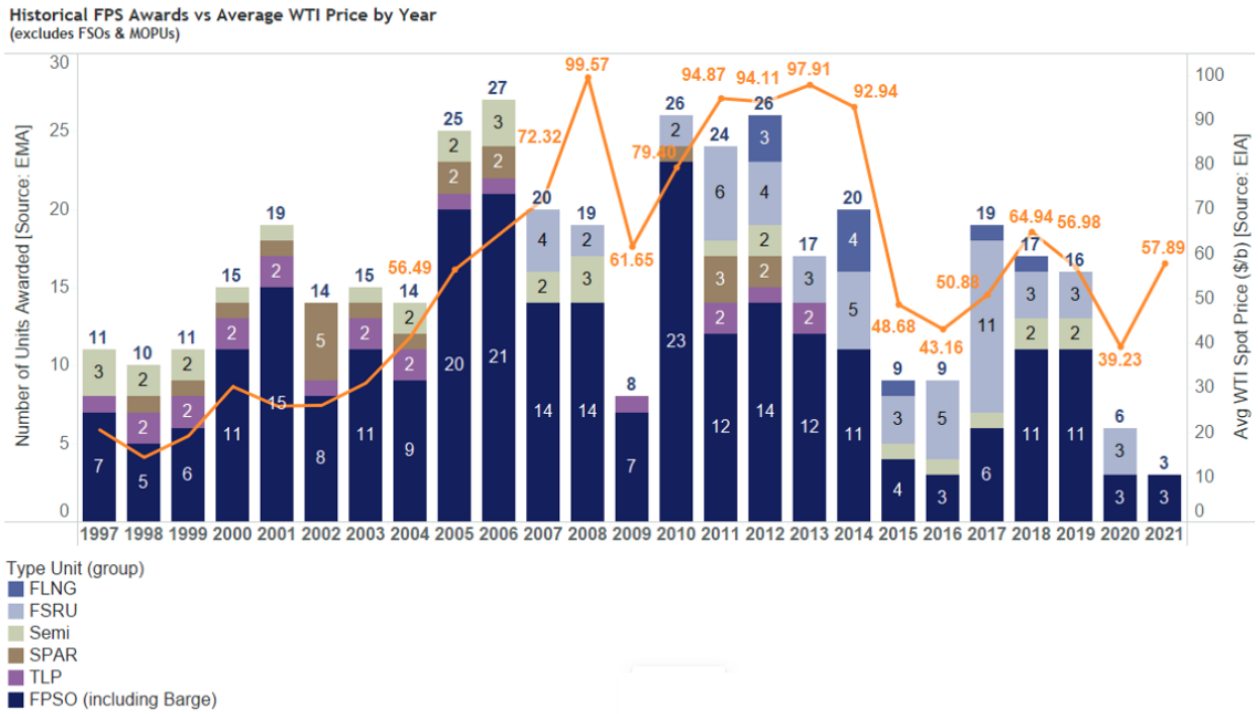


Fig. 8, Floating Production Awards in Relation to Oil Price. Source: EMA, 2021 quarterly report (Apr.)

Figure 8 include data references from both EMA and EIA. Energy Maritime Associates (EMA) provides market research to the offshore energy sector and releases a quarterly Floating Production Systems Report. EIA is the U.S Energy Information Administration. Prices are shown in US dollars per barrel of West Texas Intermediate (WTI) which is a US preference for a certain measure and pricing model against a Texan type of oil quality. The oil quality differs a bit from North Sea Brent, which is the standard oil type for global price statistic. WTI is also slightly lower in price. The other axis details number of production units which have been contracted for work. Despite a visible decline in activity between 2014 and 2017, the production sector is the O&G upstream sector with the most stable activity levels during the time period of this analysis.

Even as the impact of Covid-19 took effect in 2020, Petrobras continued to progress some large FPSO developments. Smaller operators struggled more, and, on the whole, contracts were few and far between. As the oil price crashed again in March of 2020, investment decisions and tenders were postponed protecting E&P CAPEX commitments.

Lockdown restrictions and supply chain disruption also hampered projects, and only five FPSO projects with investment decisions made early in 2020 progressed. However, 10 new FPSO projects are expected to materialize during 2021, mainly in Brazil. Other regions will likely still have to wait for a more enduring improvement in oil prices (EMA, Floating Production Systems Quarterly Reports, 2021).

The threat of substitutes, as described by Michael Porter, is applicable in the FPSO sector with sub sea tie-back and pipelines to shore as viable alternatives to the FPSO. The concept design solution depends on several factors like water depth, existing infrastructure, distance to shore, and more. The FPSO alternative typically lends itself well to projects in South America, West Africa, and Asia, and is the prevailing options for most E&P companies in these regions.

Entering the FPSO sector is financially demanding, as the cost of project execution is very high. As a result, the current stakeholders have existed in the segment over time. Despite continuous competition, the number of major FPSO owners remain relatively stable. A new development has been EPC companies and yards taking a larger role in projects. We have also seen collaborations between FPSO companies where a divided scope has involved different stakeholders in preparations of hull and topside.

The bargaining power sits exclusively with the client, and FPSO owners compete over contracts with terms dictated by the oil companies. This leads to extensive competitive rivalry between FPSO owners to differentiate themselves with robust engineering solutions, environmentally sound concepts, and a sustainable emissions profile. However, cost is the main driver for any FPSO project and the tenderer with the lowest bid usually wins the contract.

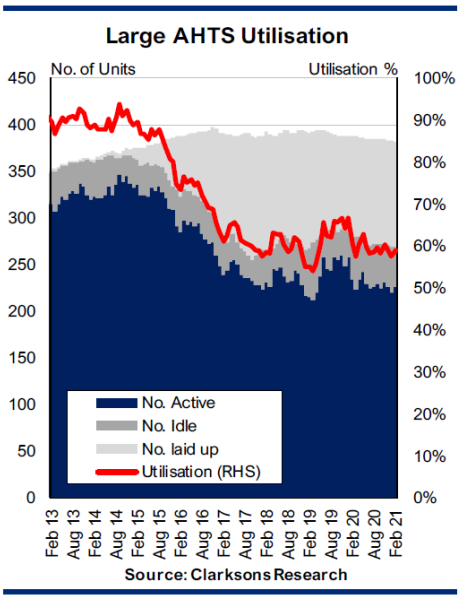
Other factors which have had influence on the sector include technological innovation, mainly on the environmental side. We see a growing focus on sustainability, both from oil majors but also from banks and other financing partners. FPSO companies and their vessels need a green profile to secure finances for projects, as well as to be selected by the client. Remote digital solutions have also introduced improved safety, more efficient operations, and a significant cost saving for operators and clients.

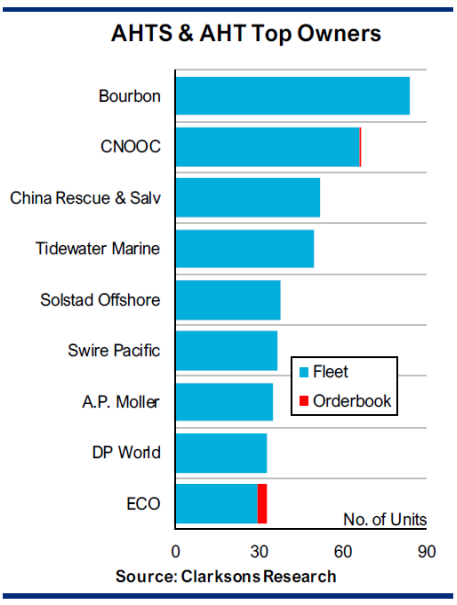
The Offshore Support Vessel sector

I have defined the support sector as offshore support vessels in this article; anchor handlers tug supply (AHT/AHTS) and platform supply vessels (PSV). This fleet had almost doubled between 2003 and 2013 and continued to grow. As a result of the fall in oil prices, the market was fragile, and demand shifted towards larger vessels with multipurpose capabilities. Clients sought more deck space and higher supply capacity.

The greatest demand for anchor handlers come from MOUs, and with reduced drilling activity from 2014 onwards came a reduced need for AHT/AHTS vessels. Also, the newer generations of MOU had the ability to relocate and operate without assistance of support vessels (ClarksonPlatou, Offshore Outlook, 2014). With a huge market oversupply, new orders dried out. This continued into 2015 with a further reduction in ultra-deep projects, which affected both AHTS and PSVs (ABS Fleet & Orderbook Activity, 2015). This led to an increasing number of laid up vessels. 2016 charter rates were the lowest over the last decade.

The situation has remained more or less the same until today. The current support vessel fleet is much larger than demand dictates and as a result the utilisation rate remains just above 50%. With relatively affordable prices and welcoming yards, barriers to entry for new stakeholders were traditionally few. As a result, the offshore support vessel sector is diverse in ownership.





Figures 9 & 10 - AHTS top owners and vessel utalisation. Source: ClarksonPlatou research, Offshore Outlook.

Figures 9 shows a steady decline in Anchor Handling Tug Supply (AHTS) activity from 2013 and into 2021. The increase in oil price and exploration and production (E&P) activity in 2018 and 2019 helped the sector some. However, the impact of Covid-19 drove the utilisation rate down to approx. 60% by February of 2021. **Figure 10** details the largest vessel owners. The global offshore support vessel fleet consists of a lot of small companies, which is reflected by the fact that the top three AHTS owners only represent 13% of the total number of vessels.

The average 2021 fleet size is only four units, indicating the vast number of OSV companies and owners across the global market. This constellation also affects the lack of willingness to scrap vessels to counter oversupply.

Scrapping vessels from a small fleet makes a relatively deep cut on the total. Also, the investments from owners into these smaller companies creates a personal bond to the assets that differs from larger, more distanced companies.

Some of the larger stakeholders used the downfall to merge with competitors to consolidate fleets and operation. Tidewater and GulfMark completed a merger in 2018, making them the largest OSV company in the world. Also, Norwegian companies Rem Offshore, Farstad Shipping ASA and Deep-Sea Supply Plc. merged with Solstad Offshore during the same period.

The oversupply puts the bargaining power with the client. As a result, the charter day rate has continued shrinking from 2013 until today. The threat of substitutes is real, with newer MOUs capable of managing rig moves and ongoing operations without the support of OSVs.

Also, with significantly reduced E&P activity, PSV demand has shrunk considerably. A young, large fleet with a lot of available assets, leaves the PSV owner very limited bargaining power. Consequently, clients have contracted vessels which operate below their capabilities, further hindering lower specification vessels from entering the market.

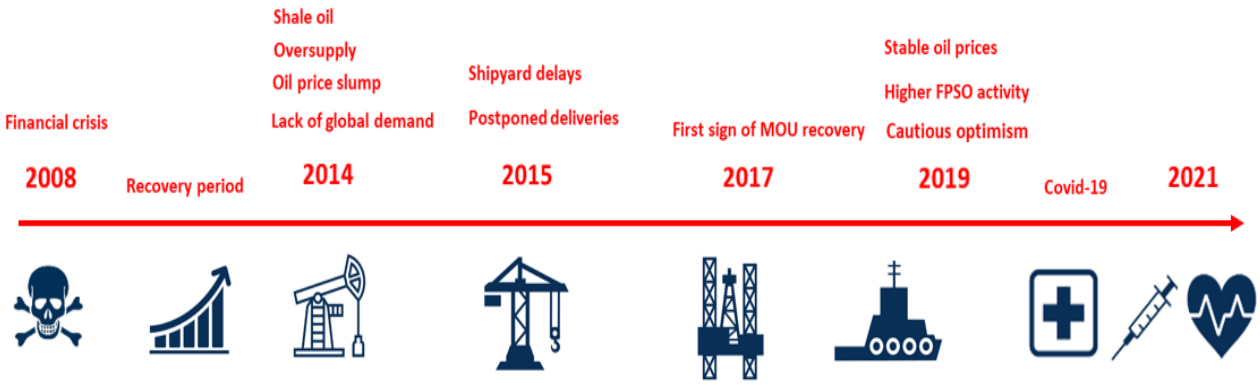


Figure 11, Upstream sectors timeline.

The upstream sectors timeline in **Figure 11** shows an extract of my data and analysis. In 2014, which is the time for when my analysis begins, the industry had seen six good years during a stable recovery period since the financial crisis in 2008.

A combination of oversupply, lack of global demand, geopolitical events and a growing exploration and production of shale oil, took the oil price into a slump in 2014 which lasted several years. As a result, activity levels dropped, and vessels and mobile units lost contracts. Units under construction where delayed or delivery were postponed. Some signs of recovery at the end of 2017 / beginning of 2018 brough some relief and heightened oil prices.

The activity grew slowly but steadily until Covid-19 hit the oil and gas market with full force in March 2020, wiping out the result of the small recovery and bringing oil prices down below USD 40 per barrel of Brent oil.

Summary and Discussion

The seismic sector is at the very beginning of the upstream value chain and this sector was hit first by cuts in E&P spending. With expensive vessels, barriers are high both to enter and exit the market. Some technology development has improved service deliveries, like 4D data and permanently placed acoustic transponders on the seabed. Strategic decisions to let vessels operate below capabilities (older 3D vessels doing 2D work) in attempts to differentiate fleets and companies have not been successful.

A decline in contract work has led to multi-client work where the seismic company do surveys on their own expense and market data to more than one client.

The exploration segment experienced very favorable new build terms between 2008 and 2014 which led to a lot of new contracts since barriers to entry was relatively low. The fleet was old at the time and the recycle process was much needed.

With the sudden drop in oil prices and a halt in exploration work, the mobile offshore unit sector was quickly oversupplied. Competitive rivalry was intense. Units were laid up and several owners delayed or even walked away from undelivered drilling rigs. As time progressed most drilling contractors used this idle period to reconsolidate their fleets. Scraping of units, company mergers and debt negotiations were common occurrences in the exploration sector.

The segment saw little new entries but neither many exits. This can be explained by Porter`s theory about barriers as new rigs at the time cost between 300-500 mill. US dollar, and was quite a commitment, even for mature companies.

Production vessels ranged between new builds and converted oil tankers. Both options are very costly and require a firm long-term contract to be executed. Following the seismic and exploration segments, production was also hit in 2014. Competitive rivalry led to cost cuts and lower fees. Several projects went ahead because of investment decisions already made. The production sector was the upstream sector least hit by the downfall between 2013 and 2021.

We have seen the threat of substitution play out as FPSOs are increasingly competing against tie-back and pipeline design solutions as infrastructure continue to improve in mature fields. Currently we see a focus on sustainability and green profiling as ways to differentiate themselves among cost conscious clients and competitors. However, the ultimate driver in successful contract negotiations is still cost.

The support sector includes a myriad of companies, with the average owner holding less than 4 vessels in her fleet. The top three companies only own 13% of the total fleet. Barriers to entry has traditionally been low, and as a result the sector is widely oversupplied. The vessel owner is left with little bargaining power and suppressed rates and massive lay-up is the result of buyer dominance, particularly since the impact of Covid-19 wiped out the positive effects of a brief and much-needed market recovery in 2018/2019.

Given the small average fleet, scrapping has relatively large impact on fleets and owners have been reluctant to decommission necessary parts of the global fleet. Hence, vessels have operated below capabilities on rates very close to OPEX.

The analysis of the sectors in light of Porter`s theory has demonstrated its applicability for the complex, interdependent upstream value chain. The five forces describe activities and events which has played out across the sectors in the upstream industry with great accuracy. This is backed up by market intelligence and historic statistics from the oil and gas industry. My two objectives at the start of the article were to describe the changes in the Upstream sector of the global oil industry between 2014 and 2021.

The article has provided this description and empiric data has been analysed, using Porter's Five Competitive Forces. The analysis has confirmed the theory`s applicability for the O&G upstream sector and as a result, both my objectives for this study have been met. This confirmation and validated knowledge can help support strategies and decision making for upstream stakeholders in the future.

Conclusion

Analysing the sectors in the O&G Upstream value chain has highlighted their interdependencies and the common effects across sectors from a market influenced by fluctuations in commodity prices. Some sectors have enjoyed relatively low barriers to entry as a result of a willingness in the finance sector to support the O&G industry.

This has fueled an oversupply, both in the MOU and OSV markets. Only the MOU owners have taken sufficient necessary steps to remove units from the global fleet in an effort to balance the demand-supply ratio. Barriers to leaving the sector have mostly been high, given the significant investment needed to get in. However, in some cases we have seen speculative investors walking away from units prior to delivery because of very low down-payment arrangements up front.

With OSV owners we have seen a reluctance to scrap or reconsolidate because of the relatively large impact this would have on smaller fleets. The production sector has seen the most stable period with high barriers to entry, which has supported a stable market with mostly known stakeholders.

We have seen some form of substitutes, either as a force or a factor, across all sectors. Seismic companies have moved from single client contacts to multi-client work, new generations of MOUs can perform rig moves without support of AHTSs, and FPSOs are competing against tie-back and pipeline design solutions as infrastructure continue to improve in mature fields.

Since 2013, the bargaining power has mostly sat with the customer, given the drop in oil prices, a general oversupply in the market, and the impact of Covid-19 following shortly after a brief market recovery in 2018/2019.

Competitive rivalry is quite possibly the strongest force in the O&G Upstream markets. Sector stakeholders try to differentiate themselves by technology development and innovation, fleet consolidation, and focus on a green company profile with sustainable operations. However, the ultimate driver in successful contract negotiations is still cost.

I have not analysed the downstream sector, oil majors activity, or the O&G industry overall. However, I notice that other scientists have successfully applied Porter`s Five Competitive forces to analyse said sector in the past. Based on published analysis and reports it can be assumed that Porter`s theory also is applicable in other O&G sectors as well as to analyse the overarching activities across the O&G industry.

My analysis of the sectors in the O&G Upstream value chain has demonstrated the applicability of Porter`s Five Force model for this segment. The five forces have played out as described by Porter, and the events that have taken place across the Upstream value chain can easily be analysed and understood in light of Porter`s model.

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