

# **Strategic solutions for cyclical industries to reduce the risks of industrial downturns**

Case of the oil service industry in Southern Norway

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*This master's thesis is carried out as part of the education at the University of Agder and is therefore approved as part of this education. However, this does not imply that the University is responsible for the methods that are used or the conclusions that are drawn.*

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## Foreword

This thesis has been written with the intention to finalize the Master's Degree in International Management at the School of Business and Law at the University of Agder. The study has been conducted individually.

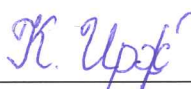
The research has been implemented as a qualitative case study, limited to the specific industry and geographical area. The research aims to analyze the strategic solutions on a firm level of the companies involved in cyclical industries on the example of the oil service industry based upon relevant literature and the number of interviews conducted with the oil service companies in Southern Norway. The research question this study is concerned with is: "How can companies working in cyclical industries reduce the risks of industrial downturns?"

My interest for this topic has developed over time during a case project within the elective Internationalization Laboratory course, during which I worked with the industrial representatives in the mentioned region. I have found the topic and the process of working and collecting data for this research to be very interesting, but also demanding. A reflection note is attached, including more details of the learning journey and a discussion of the thesis relevance to internationalization, innovation, and responsibility.

I would like to express my gratitude to the people that have contributed to this thesis. First, I am deeply grateful to my supervisor, Andreas Wald, for his close guidance and support. Professor Wald gave me the confidence that what I did was academically appropriate and relevant. I would also like to thank all the companies and industry experts who found time in this moment, which is difficult for the industry, to provide me with the information to conduct this study.

Whether you are a student, business professional, or researcher, I hope you will find this research interesting and helpful.

Kristiansand, 01.06.2017



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Kateryna Irzhavtseva

## **Summary**

Cyclical industries are exposed to unpredictable industrial downturns caused by fluctuations in market conditions. Changing prices for natural resources used for industrial production are among the driving forces that can lead to industrial cyclicity. This was the case of the oil prices decrease three years ago, which led to an industrial downturn in the oil and gas, and consequently, the oil service industries worldwide. A vital industry for many countries, which is unprotected from the industrial cyclicity, the oil service industry has been selected as the case for this research. Due to time and resources limitations, the geographical area for this research has been limited to the Southern Norway.

Industrial cycles directly affect firms' behavior and strategy development processes. During industrial downturns, a lot of pressure lays on the shoulders of the managers of companies involved in cyclical industries. The appropriate strategic solutions to mitigate the negative effect of such downturns and strategically prepare for other similar downturns in the future are crucial for companies working in cyclical industries. The right resources and competences on the management level are essential for appropriate strategy development and execution.

Based on a theoretical and conceptual framework of the field of corporate strategy, this research has explored how companies from the oil service industry react to the industrial downturn. The Ansoff Matrix, complemented by the strategic alliance option, was empirically applied to find optimal strategies. The main findings are that product development and market development strategies are the most feasible strategic directions for oil service companies. Strategic alliances can be used to facilitate the implementation of the mentioned directions, but are limited to the knowledge-sharing capacity of the companies involved.

Generally, the main conclusion is that, due to technological evolution of cyclical industries and the increased role of digitalization in their business processes, the further strategic development of such industries should adopt cyclic business models and innovation models instead of the outdated linear models. The strategy development and implementation process itself is suggested to be cyclic, involving managers, engineers, academia, and customers in strategy making, to achieve the best strategic solutions to reduce the risks of industrial cyclicity.

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# 1 Introduction

Cyclical behavior in the economic system is an important topic in economic forecasting. In industries where sales, price, demand, supply, investment, and capacity are subject to strong cyclicity, these industry cycles involve market structure and affect firms' behavior (Mathews and Tan, 2010a). Ever since Schumpeter (1939, p. 18) identified industry cycles with upturn periods as providing opportunities for high profits and downturn periods as providing frameworks for restructuring, the topic of industrial dynamics has been widely studied in business literature. Aaker and Mascarenhas (1989) observed that firms systematically adjust their strategies throughout cycle stages as shown in the oil-drilling industry. Mathews and Tan (2010b) found that the capital investment in the semiconductor industry has a 'pro-cyclical pattern'. Di Minin, Frattini and Piccaluga (2010) concluded that the innovation strategy of firms tends to move towards the open innovation model during downturns.

A lot of research focused on identifying marketing (Bennett, 2005) and innovation strategies (Geroski & Walters, 1995); however, a clear overview of the influence of industry cycles on firms' strategy is still missing. A key concern of this research is to study the potential strategies for oil service companies in times of industrial downturns, using the example of the oil service industry in Southern Norway. A field of the corporate strategy has been selected to find strategic solutions. Market development, product development, related diversification, and strategic alliances are possible strategic options for oil service companies. By studying this topic, I hope to contribute to a better understanding of cyclical industries, thereby helping to reduce the risks of industrial downturns.

## 1.1 Research topic

Several cyclical industries such as flat panel (Mathews, 2005), semiconductor (Mathews & Tan, 2010b), and construction (Bennett, 2005) have been subject to research of industrial dynamics. The complications caused by business cycles affect industries' development and call for appropriate strategies (Aaker & Mascarenhas, 1995). However, cyclical behavior of certain industries is one of the topics unexplored in existing literature. Industrial downturns present challenges for incumbent firms working in cyclical industries, who have to respond quickly to changing environments to stay in the industry. In the same time, downturns provide opportunities for new players to enter cyclical industries (Mathews, 2005).

The purpose of this research is to find out, using the example of the oil service industry, how firms can anticipate and strategically prepare for challenging times. Companies that provide

equipment, technology, and manpower to the oil and gas industry have been facing serious downturn conditions due to low oil prices (Ambrose, 2016). The oil service industry is very sensitive to fluctuations in oil and gas markets, being even more vulnerable to industrial downturns. While the oil and gas sector was expanding, the demand for the innovation and expertise of the oil service industry was high.

The dramatic drop of oil prices had a fundamental effect on the oil service industry, due to the sharp reduction of oil and gas production. Oil service companies have to seek better strategic choices to survive the current downturn (Doshi, Corrigan, Maxson, & del Maestro, 2015). This study aims to reveal which strategic solutions on a firm level are best suited to mitigate the current downturn and to better prepare for future industry cycles. The scope of this research has been limited to the oil service companies in Southern Norway. The research topic has thus been formulated as:

*Strategic solutions for cyclical industries to reduce the risks of industrial downturns. The case of the oil service industry in Southern Norway*

## **1.2 Actualization and relevance**

The oil service industry is crucial for oil and gas extraction and the production processes. Oil service companies provide the necessary equipment for the upstream oil industry, the vital expertise in maintenance of constructing and operating rigs, and the essential knowledge for producing oil and gas wells. The oil service industry manages innovation, technological, and cost-reduction solutions for the oil industry. Basically, oil service companies can do everything that is specified on the contract for oil and gas companies (Kennedy, Marcel & Thompson, 2016).

Oil prices have been changing over time, creating upturns and downturns for the oil service industry (Hamilton, 2011). Strategic management is crucial for oil service companies to remain competitive in crisis times. Studying which solutions managers of oil service companies should seek is a well-timed issue considering the current downturn in both the oil and gas and oil service industries.

Norway is a good example of a country with a developed ecosystem for the oil service industry, especially in Southern Norway (Norwegian Petroleum, 2017a). This part of Norway was hit hard by oil price decline (Berglund, 2016). Reducing the dependency on the oil industry in this region is becoming a timely question for many companies. The following questions are currently being debated among the industry players:

- How can oil service companies reduce dependency on the oil and gas industry?
- How do oil service companies prepare for industrial downturns?
- How can oil service companies use their available technologies and expertise?
- What are the consequences of the downturn for the oil service industry?

The purpose of this research is to discuss all these questions and to attempt to provide answers. The focus of the research lays rather on the strategic perspective of industrial development than on its financial value. Both oil and gas and oil service industries have been widely analyzed from the financial perspective in the available literature (Brammer & Millington, 2008; Arouri & Rault, 2011). The corporate strategy of oil service companies is the core field of analysis for this research. “Which strategic decisions should managers implement to reduce the negative effect of the current industrial downturn?” and “How can oil service companies prepare for future downturns?” are the key concerns of this master’s thesis.

In order to provide answers for the above-mentioned questions, a series of interviews will be conducted with representatives from several oil industry companies and industry experts based in Southern Norway. This thesis is aimed at researchers, policy makers, strategy developers, consultancy companies, and managers of oil service companies or other companies that are part of cyclical industries with similar problems. This research might be as well useful for students of business administration and political sciences because of the high importance the oil service industry has in Norway and other countries.

### **1.3 Why oil service industry?**

The oil service industry is an excellent example of a highly cyclical industry (Bertelsen & Sedlacek, 2014). Knowledge gained through studying this industry is transferrable to other cyclical industries experiencing similar downturns. The oil service industry is highly cyclical and exposed to profits from the oil and gas sector. When oil and gas companies experience lower profits, it affects their demand for oil service products and services. For example, Norway has specialized in oil and gas production since the oil discovery in the late 1960s. The country has developed one of the most cutting-edge oil service industries in the world in terms of equipment quality and services quality.

The oil service industry flourished in Norway due to the constantly growing demand for Norwegian oil and the consequently growing demand from oil and gas exploration and production companies for oil service products and services (Norwegian Petroleum, 2017a). But things changed when the oil prices dropped. When production amounts were no longer certain,

many oil and gas companies started to cut investment in supporting industries, which immediately reflected on the oil service industry (Ambrose, 2016). That is why it is important and relevant to study the possible strategic solutions for this industry, which has been suffering a downturn period for the last three years.

#### **1.4 Why oil service companies in Southern Norway?**

This region has developed an advanced infrastructure and established business environment for the oil service industry (Norwegian Petroleum, 2017a). The area benefitted from high oil production levels in the entire country up until 2014, hiring thousands of employees and investing millions of Norwegian kroner into the development of new businesses and competences. The drop of oil prices and the consequent decline of oil production resulted in higher unemployment rates in Aust Agder and Vest Agder compared to other counties in Norway, following oil production hubs Rogaland and Hordaland (Statistics Norway, 2017). It is essential to study how Southern Norway can keep the image of a technologically advanced region.

There is a developed cluster, GCE NODE, in this region, which consists of 72 companies working in the oil service, energy, and maritime industries (GCE NODE, 2017a). The organizations and companies that form a part of this cluster want to strengthen their competitiveness and improve their technological advantages. The entire region has suffered the effect of the industrial downturn, so the main challenge for oil service companies based there is to overcome the current downturn with the lowest possible losses.

Networking provides opportunities for possible collaborations in the industry (Di Minin et al., 2010). It is important for most of the regional companies to benefit from synergy of resources, competences, value chains, research, and development through such collaborations. Being a member of a technological cluster can result in forming strategic alliances within a certain industry if the combined efforts of such alliance would lead to greater results than the member companies would achieve on their own (Mirani, 2009).

Alternatively, some of the companies have already been thinking about diversifying into related industries such as offshore wind (GCE NODE, 2017b). Many of these companies possess the necessary expertise and knowledge for entering the offshore wind sector. However, entering this industry requires considerable investments, which may prevent some companies from choosing this diversification strategy (Export Credit Norway, 2016). But there are other industries with lower entrance barriers compared to offshore wind. While the overall need for



diversification is increasing among oil service companies globally, Southern Norway is an opportune region to study this phenomenon.

Chapter 2 will provide the theoretical and conceptual framework for studying industrial dynamics. Chapter 3 will familiarize readers with the context of the oil service industry. Chapter 4 will explain the methodology utilized for studying which strategic solutions oil service companies should pursue. Chapter 5 will provide the empirical findings and discuss the results of the collected data. Finally, brief conclusions and suggestions for cyclical industries to reduce the risks of industrial downturns will be summarized in Chapter 6.

## **2 Theoretical and conceptual foundation**

This chapter examines the existing problem of industrial cyclicity and aims to provide possible strategic solutions from a corporate strategy perspective to reduce the negative effects of industrial downturns. First, the existing literature review on industrial cyclicity issue will briefly be provided. Then, theoretical and conceptual bases for the possible strategic solutions to reduce the risks of industrial downturns will be given. The role of corporate strategy is vital in establishing the corporate framework before proceeding to implications for marketing, business, and competitive strategies on a single business unit level. Corporate strategy designs the general scope of a company's optimal strategic direction, which is the core area of study for this research (Johnson, Scholes & Whittington, 2011, p. 134).

### **2.1 Cyclical theory and cyclical industries**

Schumpeter argued that the process of economic evolution is cyclical and is characterized by the shift from periods of prosperity to periods of recession (Schumpeter, 1939, p. 18). The phase of recession can be characterized by a relative surplus of goods and services, when supply exceeds the demand. It happens because of the limited purchasing capacity of the population and leads to decrease in production, followed by unemployment, bankruptcies, etc.

On the macroeconomic level, a downturn of an economic cycle results in a lower GDP, lower income among the population, inflation, and a decrease in employment and industrial production. When a crisis occurs, several measures should be taken by governments in order to stimulate another growth and prosperity period. Some economists, like Keynes, however, believed that the market itself is capable to mitigate a crisis without a governmental intervention (Haralambie, 2011). Following Keynes, many researchers studied cyclical dynamics on the macroeconomic level, focusing on finding a policy to mitigate business cycles.

Since an industry is a part of the economy, industrial cycles were often perceived to have the same duration and magnitude as business cycles. There is a certain correlation indeed, but some industries are more sensitive to business cycles than others, and thus the industrial cycles in such industries would have a different scope and magnitude than business cycles. Schumpeter (1939, p. 165) called such industries cyclical and mentioned the industries producing industrial equipment or materials as an example. The oil industry produces the material, oil. The oil service industry produces equipment for the oil industry. Thus, based on the Schumpeterian definition, both the oil and oil service industries are cyclical industries.

Industrial cycles follow the pattern established by Schumpeter with upturn periods providing companies with opportunities for reaping profits and downturn periods providing opportunities for restructuring and technological innovation (Mathews & Tan, 2010a). Industrial cycles are rather caused by fluctuations within an industry, for example in prices, investment, research, and development spending (Mathews & Tan, 2010b). Schumpeter even outlined that the macroeconomic fluctuations result from the outcome of several industrial cycles (1939, p. 169). There are many examples of cyclical industries – those that produce commodities, raw materials, services, etc. (Aaker & Mascarenhas, 1989).

Geroski and Walters (1995) studied the relation between R&D spending and industrial cycles in the United Kingdom from 1948 to 1983 and concluded that major innovations and patents were pro-cyclical. This means that most of spending for research and development in the UK industry in the mentioned period of time was made during industrial upturns. Dugal and Morbey (1995) however argued that R&D spending appears to be more effective when the market is in downturn, thus suggesting a counter-cyclical innovation approach. They compared two recessions in 1982 and 1990-1991 in the United States and found that the companies that invested in R&D during a period of decline stayed competitive and performed better than the companies that held back.

Roger Bennett (2005) analyzed the cyclicity of the construction industry in the United Kingdom and argued that cyclical industries experience fluctuations in sales, output, and employment. This statement is quite accurate for the oil service industry in Norway. Bennett (2005) concluded that the construction enterprises failed to include marketing in corporate strategies, pointing the importance of corporate strategy for overcoming industrial downturns. Mathews (2005), using the example of flat panel industry, deduced that mismatches between financial investments and production dynamics combined with market supply and demand fluctuations can easily result in cyclical behavior. However, industrial downturns provided opportunities for new entrants in both semiconductor and flat panel display industries

(Mathews, 2005). This means that industrial downturns bring another challenge for incumbents in an industry – an increased number of new market entrants and possible tougher competition. Technological changes were also defined as significant factors for causing cyclicity in the semiconductor industry cycle (Mathews & Tan, 2010b). Similar to semiconductors, technology and innovation industries are more sensitive to cyclicity.

However, there is still a gap between the theoretical approach to the industrial cyclicity and the real cycles across the literature. Some researchers like Greer, Ireland, and Wingender (2001) and Aaker and Mascarenhas (1989) based their approach on the judgment of participants in surveys from a small sample basis, leading to difficulties in the definition of industry cycles. This means that, despite several common strategic directions for cyclical industries to overcome industrial downturns, the real actions may still differ from one industry to another, depending on the industry's internal factors. Identification of industry cycles helps to better understand which strategies the companies working in cyclical industries need to follow in order to overcome downturns.

Some companies, however, will take more advantages of downturns than others by breaking into new markets, developing new products, or restructuring their business units. In some cases, the core business may even shift to other industries or segments. This research focuses primarily on the effect of the current industrial downturn on the corporate side of strategy, because downturns play an important role for the strategic positioning on the firm level (Mathews & Tan, 2010a).

## **2.2 Corporate strategy**

Strategy is a significant field for both researchers and practitioners. It is important for researchers to step out of the theoretical field and into the business environment to verify the relevance of their topic and its practical usage (Bosch, de Man, & Elfring, 1997). That is why this thesis is structured in a way that the theoretical foundation for strategy development is provided first and then compared to its practical implication from the business sector.

De Wit & Meyer (1994) classified the field of strategy in general using three dimensions: context strategy, content strategy, and process strategy. The context strategy analyses the effect of the environment on strategy development and thus focuses primarily on competitive and business strategies. The content strategy focuses on processes within the company. It uses the context environment as the input for elaborating the content dimension of strategy. The content dimension focuses on the value chain inside the company and the corporate managerial level within the company. The process dimension of the strategy targets appropriate and relevant

strategy execution and management control (Bosch et al., 1997). For the purpose of this research the content strategy plays the central role.

According to Porter (1987), corporate strategy is an overall plan for diversified companies that answers two main questions: what businesses the corporation should be in and how to manage these businesses from the corporate office. These questions generally relate to whether the companies should become diversified by adding new business units to their corporate whole. Porter argued that there was no consensus in formulating a corporate strategy and that in general it was quite difficult to measure whether the strategy was successful or not. He used a sample of 33 diversified companies during the period of 1960-1986 and found that the corporate strategies of most companies failed to create shareholder value (Porter, 1987).

Porter's main argument was that companies do not compete, but their business units do. Thus a successful corporate strategy should focus on each business unit's success and grow from competitive strategies in such units. The other argument appointed by Porter was that diversification added costs and constraints to business units. And finally, Porter argued that shareholders could diversify their own portfolios more efficiently than companies did. This contradicts the previously widely used portfolio management theory.

According to the portfolio management theory, companies, using their expertise and analytical resources, are better positioned to spot attractive acquisitions than individual shareholders (Meyer & Volberda, 1997). However, Porter argued that this theory was already outdated back then, and simply providing capital to newly acquired business units was not sufficient for their future success. But such strategic directions as restructuring companies and business units, transferring skills between business units, and sharing activities in the value chain among the business units could bring positive results (Porter, 1987). Highly technological industries could benefit from such strategies. The operational costs are quite high in these industries and sharing skills and activities among various business units can help companies reduce costs and result in greater innovation (Ramsøy, 2016).

Porter analyzed the mentioned strategic activities through a prism of competitive advantage, referring to a corporate parent as the coordinating unit of separated business units, which, at best, should share activities among their value chains. A corporate strategy was viewed as the sum of competitive strategies of business units that was supposed to have a greater synergy effect than the units would have on their own. If this is not happening, the company should not diversify at all.

Contrary to Porter, Meyer & Volberda (1997) argued that portfolio management can be a great tool for having better risk diversification. Having a corporate parent does not necessarily bring

additional costs, but can actually add value by providing tougher financial control among companies' business units. A corporate parent can efficiently allocate financial resources among business units, and divest from the high in return on investment segments to growing segments, which require large investments. Porter focused on transferring skills and sharing activities as two optimal directions for diversified companies, however he primarily discussed *why* rather than *how* to achieve this. Companies should focus on *better off* businesses to add to their corporate composition according to Porter, but in reality it is quite difficult to measure which businesses are *better off* and which industries are *attractive*.

Finally, Porter did not define the concept of *corporate theme* clearly. He omitted that the corporate theme should be based on core competences and capabilities that do not necessarily stem from *better off* acquired business units. Instead, core competences, capabilities, and values of the parent company can be applied to the business units (Meyer & Volberda, 1997). A corporation should not be viewed as the combination of value chains of its business units, but rather as a tree with the core base for all of them (Stalk, Evans, & Shulman, 1992). If diversified companies are viewed in this way, it is difficult to agree with Porter that only businesses compete, but not corporations.

Harry Igor Ansoff developed the strategic directions matrix (exhibited in Figure 2.2.1), describing four possible strategies for organizations to enter or to exit the market. These directions are linked to the corporate strategy field because when organizations add new business units, their choices and strategies are no longer concerned solely at the business level, but also at the corporate level (Johnson et al., 2011, p. 135). Compared to Porter, Ansoff looked not only into the strategy of penetrating new industries and businesses, but also at penetrating existing markets and developing both new markets and/or new products and services. This tool appears to provide a solid starting point for the development of strategy and therefore will be applied in the empirical part of this research.

**Figure 2.2.1: The Ansoff matrix**



Source: Ansoff & McDonnell, 1988, p. 109

There are several factors that can affect a company's need to modify its corporate strategy, for example when companies want to grow into new businesses or new markets. A necessity to adjust a corporate strategy can arise from the competence in the market when the local markets are already exhausted, or when the industry in which a company is operating is hit by downturn. The effect of the current industrial downturn on the corporate strategy of oil service companies is the case for this study.

There has been a lack of research on the relationship between industrial cycles and corporate strategy of affected companies. Most of the researchers who studied this topic, like Stewart (1986), Aaker and Mascarenhas (2009), Geroski and Walters (1995), focused on examining strategy over the business cycle. They applied strategy theories to different industries like oil drilling, construction, textile, etc., but the analysis of the direct effect of industrial downturns on the corporate strategy at a firm level is still missing. The main conclusion was that the strategies differ among the different stages of business cycles and that the industries were not homogeneous any longer like it was traditionally assumed by the field of industrial economics (Stewart, 1986).

Several more recent case studies on the industry level were conducted by Filatotchev and Toms (2003) of the UK textile industry; Carral and Kajanto (2008) of the mobile and telecommunications industry using the example of Nokia; and Vianello and Ahmed (2011) of the offshore drilling industry. These studies focused on the industrial cycles, but the strategic focus still lied on the business strategy, rather than on the corporate strategy.

Mathews and Tan produced the studies perhaps most relevant to the research topic of this study. They conducted case studies of industrial dynamics of the flat panel display industry (2005), industrial cycles in general (2010a) and the semiconductor industry (2010b). The importance of time was brought to the analysis of the industrial dynamics. The industries can not continue to follow the common pattern of adjusting their strategies to the different stages of business cycles. Industrial cycles differ from business cycles and further differ for each particular industry. It may also not be completely correct to use the term to *adjust the strategy* to an industry's downturn. Mathews and Tan (2010a) viewed industrial downturns as a *cleansing mechanism* for generating new technological breakthroughs, innovation, and new managerial approaches for changing the corporate strategy in order to not only overcome a downturn, but to benefit from it. The importance of developing appropriate strategies for oil service companies as well could not be more pressing.

### **2.2.1 Market penetration**

Market penetration strategy means that a company aims to increase its share within its current markets with its current products. It can work well for the undiversified businesses to increase its market share through a higher number of customers or through larger amount of total sales among existing customers. Market penetration strategy would also work for less differentiated markets or markets of products with less technological upgrades where it is possible to compete on price rather than on product quality (Chen & Rizzo, 2010).

For the companies that position themselves as the leaders in product quality on homogeneous markets, pursuing the market penetration strategy can also bring positive results, unless a number of competitors with similar product quality enter the market; then, eventually, competition returns on the price level. Product price and product differentiation are thus the two main factors for deciding whether to use market penetration strategy within a certain market. The choices of market strategies may differ, depending on the industry and its ability to adjust to local consumer preferences and legal regulations. Not only industries, but also markets are becoming more international and global. The degree of internationalization can have a direct effect on the corporate strategy of a company which may have a common core, but is probably adjusting business strategies to fit each particular segment for each particular market (Lüring, Staudt, & Schydlo, 2015). In this case, even highly diversified industries and businesses can still use market penetration strategy if the market for the offered products and services is stable or growing.

There are several constraints that can prevent companies from trying to increase their market share on certain markets. These are: retaliation from competitors, legal constraints from regulating authorities, and economic constraints. Market downturn is an example of such economic constraint (Johnson et al., 2011, p. 137). A market downturn creates lower demand for the offered goods and services compared to its supply, resulting in oversupply of such goods and services on the market. When a market is suffering from a downturn, trying to penetrate this market does not appear to be an ideal strategy. Moreover, if a market's downturn correlates with a downturn within the industry the company is part of, the odds of successful implementation of the market penetrations strategy are very low.

The oil service industry primarily serves the oil and gas industry, specifically its offshore markets. The oil market is a global market, because there is a demand for petroleum and fuel products all over the world. There has been a decline of the size of this market caused by the falling oil prices, which resulted in lower development of new oilfields and lower oil production (Snyder, 2016). This means that the demand for the oil service products and services has been

consequently falling on all international markets. Considering the globalization level of the oil service markets, pursuing the market penetration strategy on any of these markets would not likely be an appropriate strategic choice. The entry barriers to emerging or vulnerable markets can however weaken due to downturn conditions on the main markets, pushing companies to take higher risks in challenging environments. In this case, even for such a cyclical industry as the oil service industry, seeking new market opportunities instead of penetrating saturated markets can be a good alternative strategic direction in times of downturns.

### **2.2.2 Market development and internationalization strategy**

Market development strategy for a firm includes offering its existing products and services to new markets. Current products and services can be adjusted to the customer needs in new markets, but only in terms of packaging and services. Market development is achieved through two plausible options: new users or new geographies. It means that new users could be from a different industry on the same geographical market, sitting a form of related diversification strategy (Johnson et al., 2011, p. 138). Coal, for example, was originally sourced mainly for use in heavy industries, machinery, and metal production, but is now used in silicone and cosmetics production, among others.

New geographies strategy basically means internationalization. Before attempting to enter a new market, companies should thoroughly analyze entry barriers and political, economic, social, technological, environmental and legal factors. Marketing and management challenges are equally important while deciding whether to enter new markets or refrain. From a marketing perspective, it is essential to use the right tools, skills, and brand to enter markets with unfamiliar customers. Building trust and reputation on such markets can take longer compared to the existing markets. On the management side, it is indispensable to strategically plan how new markets will be coordinated and whether new offices and business units will be added to the corporate structure (Johnson et al., 2011, p. 139).

Internationalization activities vary among the industries. For example, most of internationalization activities for such industries as global building and construction, international coatings, automotive, shipbuilding, wood manufacturing (Lüring et al., 2015), marine energy industry (Løvdal & Neumann, 2010), and outsourcing activities for hi-tech industries are associated with developing countries (Mathews, 2005). Companies from developed markets are increasingly venturing into markets such as China, India, Brazil, and emerging markets of Middle East, Eastern Europe, Africa, and the Asia Pacific regions. Both



the onshore and offshore oil service industry is highly international in terms of market segmentation (Norwegian Petroleum, 2017a). The current industrial downturn may push the internationalization process in this industry even further if companies from developed markets seek business opportunities in new markets.

The internationalization process should be approached wisely and considered from a strategic perspective (Aaker & Mascarenhas, 1989). Some companies tend to internationalize too quickly and may fail due to a lack of a proper market research. It is vital for companies to identify not only potential markets but also the target customers on these markets in order to internationalize successfully. Lüring et al. (2015) identified six steps for the successful internationalization model:

1. Identification and operationalization of the right target markets;
2. Conduction of a market and customer interview;
3. Determination of targets and mission;
4. Identification of anchor customers and collection of experiences;
5. Execution of strategy checks;
6. Sustainable implementation.

Companies extend into new markets due to demand opportunities, favorable competitive environments, and attractive investment conditions. Nevertheless, they may face a lot of risks such as increasing complexity, risks of dissipation, success measurement problems, and overestimated profitability (Lüring et al., 2015). The corporate strategy of companies wanting to internationalize should consider these risks and include a clear action plan in order to overcome potential challenges within the markets that they consider to be profitable and worth entering.

Firms in certain industries, like the marine energy industry, use internationalization in order to overcome industry barriers. Løvdal and Neumann (2010) identified the two most challenging barriers for this industry: need for capital and need for supportive political schemes. Similar to the marine energy industry, the oil service industry, being highly international and technological, may face the same challenges. Political involvement is substantial in order to facilitate new technological developments and markets for them. Commercial investment is also crucial to improve and promote technology. This can be achieved through international cooperation, as for example in the wind industry in Denmark and Germany. Internationalization of technological industries can be hampered if actors are not willing to share their expertise and know-how with less developed markets (Løvdal & Neumann, 2010).

Under downturn conditions in local markets, firms may seek international investment

opportunities through foreign direct investments or export-related international investments. Some companies may acquire business segments of international companies in order to enter these markets. Some firms may, in contrary, sell some of their business segments to foreign companies to get financial resources to support their main business segments. Once again, these decisions might be taken on the corporate level and be included within the corporate strategy of firms. Managerial choices related to a firm's internationalization directions through international investment possibilities influence a firm's performance during downturn periods. International investment decisions are the drivers of a firm's strategic flexibility to overcome industrial downturns and prepare for upturns with better resources and capabilities (Lee & Makhija, 2006).

### **2.2.3 Product development and innovation strategy**

Product development is a strategic direction for companies willing to remain in existing markets by delivering new products and services. According to the Ansoff Matrix, the product development strategy involves higher degree of diversification moving along the rightward axis. Major companies like Sony, Kodak (Chitkara & Eppinger, 2006), Axel Springer, and many others constantly choose this strategic direction to develop their business. This form of product development is described as related diversification. Despite a certain degree of relatedness, developing new modified products for existing markets can encounter financial, managerial, and technological challenges (Johnson et al., 2011, p. 137).

There is an inevitable need for financial resources for product modification and those companies that lack funds and financial support systems from banks or private investors can fail in implementing this strategy. Even if companies possess the necessary resources to develop new products, there are significant risks related to project management due to increasing complexity of product development, even on the same markets. Finally, high tech industries are subject to radical project changes and substitution of existing products due to the high level of innovation required to develop such industries (Johnson et al., 2011, p. 137).

Schumpeter identified the concept of innovation as new combinations that are economically more feasible than the old ways of doing things. The Schumpeterian notion of innovation was closely related to economic development and thus is primarily implied for the economic innovation concept. This concept covers five areas (Drejer, 2003):

1. Product innovation – the introduction of a new good or a new quality of a good;

2. Process innovation – the introduction of a new method of production, including its commercialization part;
3. Market innovation – the entering a new market or opening a new market;
4. Input innovation – the introduction of new sources of supply of raw materials or intermediate input;
5. Organization innovation – the reorganization of the industry in new way.

Economic and industrial dynamics have been changing in structure overtime. The industrial revolution led to changes in process and technological knowledge, bringing new capabilities and incentives to the actors involved. The market structure has been evolving as well, resulting in new terms structure and structural changes in several industries. Market innovation does not only include entering new markets, but entering new industries with modified or related products. All those elements and a stronger interdependence among actors drive innovative activities affecting industries' performance. Industrial innovation is no longer driven only by the technological growth of an industry as such, but also by consumer demands and the networks on the competitors' side. Demand and knowledge are playing a more important role in industrial dynamics than they did before, in Schumpeterian times. The role of knowledge transfer and development of innovation networks are also equally important for industrial growth (Cantner & Malerba, 2006).

The concept of innovation has thus changed. Modern innovation activities include both research and development (R&D), showing the shift from the industrial innovation towards the knowledge innovation. Howells (2008) identified the following changing key development in the field of innovation:

1. The distributed and open nature of networked research and innovation;
2. The growth of externally sourced R&D, meaning that there is less internally generated R&D within firms;
3. Overcoming barriers towards the increased productivity of R&D;
4. The continued globalization of R&D;
5. The relative shift from manufacturing-centered R&D towards more service-orientated R&D.

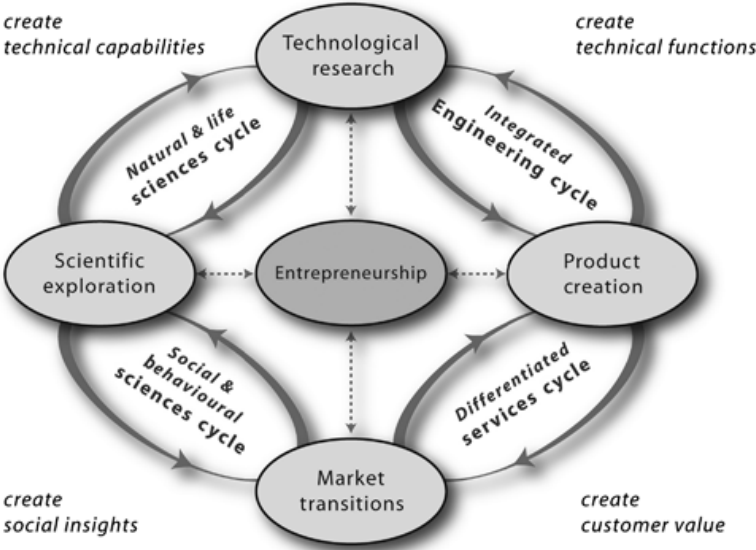
The implications of investment in innovation would undoubtedly differ among various countries within the context that advanced economies are becoming more service-oriented in nature. Despite the heavy investments in many sectors of these economies, the results have not been as satisfactory as the R&D activities have led to expect. There is a continuing R&D crisis resulting in less valuable new products, services, and processes (Howells, 2008). Berkhout,

Hartmann, and Trott (2010) argue that this is due to the fact that the linear model of innovation from scientific discovery to commercialization still dominates the market thinking. Moreover, there is a common misunderstanding about innovation being fuelled by serendipity and creative disorder.

In contrary, in large industrialized firms with institutionalized R&D activities it is recognized that innovation emerges from the routine in R&D and follows managerial instructions and control (Pearson, 1983). Pearson argued that R&D activities should be perceived as any other business activities, bringing decent returns on R&D. This contradicts the Schumpeterian view that innovation should necessary have a high level of uncertainty. The modern model of innovation and product creation should be rather cyclical instead of linear in order to overcome the lapse between current theoretical models and innovation practice, as suggested in Figure 2.2.2 (Berkhout et al., 2010). Figure 2.2.2 demonstrates the need of bridging research and development and marketing strategies together to help firms better capture the nature of the innovation process.

Innovation activities are not represented in the strategic issues of a company’s board. Especially the activity of entrepreneurship, being a key factor in innovation management of a firm, is not captured in corporate strategies of modern companies. Innovation is not a one-time action, but a series of activities that are linked to the others and should be embedded into corporate policy, especially for highly technological industries (Berkhout et al., 2010).

**Figure 2.2.2: Cyclic innovation model**



Source: Berkhout et al., 2010, p. 485

The oil service industry is a combination of a traditional technological industry, since it produces machinery and equipment for the oil industry, as well as a service industry, since it also supplies maintenance, expertise, and a range of services required for operating oil drilling and production activities. Both the oil and gas and the oil service industry sectors have been steadily redefining production possibilities. The innovation in oil and gas industry is not only related to the production methods, but also to increasing safety and efficiency of the industry. Finding new ways to monitor activities in changing environments, creating new systems for inspection, preventive maintenance, as well as more efficient and affordable repair are among other activities required for the industry's development (Hunter & Hurley, 2013).

Process innovation has a significant impact on the company level, industry level, and on a national level. Most of the mentioned activities are already operated by the oil service industry. Improving these activities and including innovation as a strategic direction in their corporate strategy should be of utmost importance to oil service companies in order to overcome the current industrial downturn. The most innovative companies have a better performance and growth rate than the least innovative (Dugal & Morbey, 1995). However, innovation strategy should have solid grounds and must be managed by competent leaders and talents with healthy risk tolerance. It is important to carefully measure success and collaborate with the right partners, both within and across industries. For example, the open innovation model is important to reach a breakthrough in both oil and gas and oil service industries (Hunter & Hurley, 2013).

#### **2.2.4 Conglomerate diversification**

Conglomerate diversification strategy takes organizations to a new level both in terms of existing markets and existing products. It can bring organizations to get involved with radically new businesses, industries, or products not related to their existing product lines or markets. There are a lot of opponents to this type of strategy who argue that adding a completely new type of business to a firm's existing portfolio is not resulting in any synergy effect or cost savings through economies of scale in the value chain. In contrary, conglomerate diversification results in higher control and managerial costs with no obvious ways that the businesses are *better off* from being bound together. Conglomerate companies can suffer from a 'conglomerate discount' phenomenon, when a company's shares are traded undervalued compared to the share price of separate businesses within a conglomerate, if these businesses were to stand alone (Johnson et al., 2011, p. 139).

However, from a financial perspective, conglomerate diversification is not necessarily a failure. By having different businesses under the same corporate parent, firm conglomerates across different industries can benefit from internal capital markets and allocate financial resources within the portfolio without the need for external investment. Besides, conglomerates have a better ability to diversify at both the firm level and group level than individual firms. It is still possible to reach economies of scope, economies of scale, and financial synergies if a conglomerate is managed with the least possible drawbacks, such as agency costs and cross-subsidization of less profitable product lines (Cole & Karl, 2016). Besides, brand value is a strong tool for operating a prosperous conglomerate.

LVMH is the successful example of a conglomerate that combines luxurious brands through a shared corporate culture, brand values, and goods quality. This French conglomerate has wine and spirits, fashion and leather goods, perfumes and cosmetics, watches and jewelry, selective retailing, media, as well as other businesses in its business portfolio and most of its business segments have completely different value chains. LVMH has been working in six non-related industries for over 30 years now (LVMH, 2017). However, the luxury industry is a non-cyclical industry and demand for luxury goods is not affected by industry cycles. Thus the conglomerate diversification strategy of LVMH may not work for companies working in other industries with a traditional price competition, stronger supplier power, and lower buyer power.

Conglomerate diversification, as it was statistically tested on the case of Tunisian non-banking companies, can however reduce the board effectiveness and firm performance (Mensi, Boubaker, & Aloui, 2013). Conglomerates working in the health insurance segment, in contrast, can benefit in terms of financial performance if individual affiliates of such conglomerates also have a product diversification strategy within their business segment (Cole & Karl, 2016). Health insurance is a service sector and the conglomerate strategy that works for this sector may not necessarily succeed in other sectors, especially in highly technological cyclical industries. Firms working in high-tech industries need to manage the increasing capacity of their know-how bases. If such corporations manage to consolidate coherent knowledge or manage different technologies as assets within their portfolio, then conglomerate strategy can work well for them. So if a company wants to diversify into a conglomerate business, the optimal decision would be to seek industries with at least a shared knowledge base and coherent strategies. However, for some industries, for example pharmaceutical, which does not share a knowledge base with any other industry, selecting conglomerate diversification as a strategic option will most likely be a failure (Lavarello, 2016).

### **2.3 Strategic alliances and integration**

Sometimes companies have to cooperate with other firms in order to implement the chosen strategic decisions. Strategic alliance is a form of competitive strategy. Companies form a strategic alliance with other actors in order to gain a competitive advantage (Mirani, 2009) and extract or gain knowledge (Søndergaard, Oehmen, & Ahmed-Kristensen, 2016). However, strategic alliance strategy can also be used on the corporate level when a company decides to enter a new market, for example pursuing internationalization strategy, and achieves it through forming a strategic alliance with local companies. Western firms form alliances with Chinese or other Asian firms in order to access new markets and to reduce their production costs through deeper production knowledge. Chinese and Asian firms benefit from forming strategic alliances with Western companies through gaining technology and expertise, both domestically and internationally (Søndergaard et al., 2016). Strategic alliance strategy can be used for better market penetration, internationalization, product development, and especially for innovation. Outsourcing is often implemented through strategic alliances, and, companies in different sectors are increasingly using this option in order to reduce costs.

Moreover, for some industries strategic alliances are necessary in order to gain access to natural resources. The oil, mining, and chemical industries are possible examples. Thus alliances often derive in order to complement scopes of the companies involved. An alliance of an international oil company and a national oil company is quite a common strategy in the global oil industry. An international oil company gets access to reserves and human resources while a national oil company receives the expertise and international positioning, increasing its scope (Mirani, 2009).

Strategic alliances are also formed to increase efficiency, product and expertise quality, reduce costs and risks, share knowledge and resources. Industrial downturns bring more uncertainty and risks associated with industry's restructuring, markets, technologies, and demand for existing products and services. Strategic alliances are beneficial tools even in upturns, so in downturns they can be even more desired. Under unstable downturn conditions, companies working in cyclical industries may seek partners to share financial and operational risks. Companies hit by a downturn often suffer from dramatic profits' reduction and thus need external investments to stay profitable. Such firms can form alliances for investments purposes throughout the value chain based on vertical or horizontal integration (De Avila Arroyo, Yago, Ali Nasir, & Wu, 2014).

Compared to mergers and acquisitions, strategic alliance is the most flexible form of cooperation since it does not require significant changes in companies' organizational structure,

or change of companies' legal identities and corporate culture. Due to their flexibility, strategic alliances allow the involved firms to adjust more quickly to unpredictable and changing environments and market modifications. That is exactly the environment which industrial downturns present for industry incumbents. So strategic alliance can help firms to overcome an industrial downturn and come out stronger during a following upturn. Moreover, strategic alliances extend the existing network for firms forming them, which can eventually result in new business opportunities and innovation in the future. Lastly, forming an alliance with one company does not prohibit forming an alliance with other companies. This provides more freedom and flexibility to firms (Mirani, 2009).

### **2.3.1 Horizontal integration**

Despite the obvious advantages of forming a strategic alliance, sometimes companies prefer to merge with or acquire other firms in order to achieve the planned strategy, or simply because a business opportunity presents itself. Strategic alliance is not the best option if one company wants to control the entire business operations of the possible alliance, or if both companies are willing to change their organizational structure to create a new market player. Mergers and acquisitions (M&A) are better strategic options in such case. Takeover is a type of acquisition of a company that does not want to be acquired, thus realized in a hostile way (Jurevicius, 2013a).

Companies decide to pursue horizontal integration strategy in order to strengthen their position in an industry, grow in size, develop new products and product portfolios, achieve better economies of scale, reduce competition, access new markets, benefit from shared knowledge, etc. This strategy can be effective for growing industries when competitors lack some capabilities, skills, and resources and can achieve better synergy and economies of scale through proper management of mergers and acquisitions (Yeaple, 2003).

However, there are pitfalls of horizontal integration. There is no guarantee that merger and acquisition will add value to the companies. The synergies effect can be highly overestimated and, in reality, the M&A may destroy the value of the companies involved in it. Another pitfall is a possible monopoly creation if the strongest competitors in an industry decide to merge. In such cases, governments have to approve larger M&A before they can happen. Finally, larger firms lose certain flexibility and require stronger effort to manage them from the organizational perspective. This can lead to longer time for decision making within such firms and reduce innovation or profitable investment allocation in such firms (Jurevicius, 2013a).



Horizontal integration happens in the same scope of operations. For example, when two competitors in car manufacturing merge, like Fiat and Chrysler did. It was a strategic decision to form a partnership between the two companies that could save tens of thousands of jobs at suppliers, dealers, and other businesses that relied on them. And this merger happened in March 2009 under conditions of a worse-than-expected economic downturn. An open innovation model and strong commitment of the both parties made this merger successful (Di Minin et al., 2010). Downturns in cyclical industries often offer possibilities of industry consolidation and can result in many mergers and acquisitions. Several suppliers in the oil service industry could also benefit from forming a stronger company with larger product portfolio in order to overcome the current industrial downturn.

### **2.3.2 Vertical integration**

Vertical integration is another direction for corporate strategy. It is a strategy used by a firm to have tighter control over the supply and value chains of the production of its goods or services. Vertical integration means that an organization acquires its supplier or distributor in order to increase its market power, reduce transaction costs, and secure supply or distribution. When a firm acquires its supplier it is a backward integration. When a firm acquires its distributor or retailer it is a forward integration (Jurevicius, 2013b). A car manufacturer acquiring a retail store is an example of a forward integration. An oil production company acquiring an oil drilling company is an example of a backward integration. An oil drilling company acquiring an engineering company designing and producing oil drilling equipment is another example of a backward integration, moving one step back in the oil service industry value chain.

Vertical integration is preferred in some industries compared to horizontal integration. In the case of horizontal integration, companies seek benefits through economies of scale and scope. For large scale production this direction would be optimal. Companies working in the automotive, construction, manufacturing, or media industry, for example, can benefit from horizontal integration. The main concern for vertical integration strategy is to increase efficiency and control over the value chain, decrease a power of buyers or suppliers, depending on the type of vertical integration. For example, the maritime and port industry has a variety of forms of vertical cooperation and integration. A shipping company can gain control over the container terminal through vertical integration. Then this company can control loading and offloading of its vessels, producing greater cost savings. It can also distribute resources more

efficiently through the value chain and reach a higher productivity level (Van de Voorde & Vaneslander, 2008).

Vertical integration can be successful when the costs of producing goods within the company are lower than the costs of buying these products in the market. Besides, vertical integration direction should not dilute a firm's current competencies and consider possible increased costs to manage and control the added business unit in a firm's value chain (Jurevicius, 2013b). When markets are risky or young, companies can exploit market power and develop a market through a vertical integration model. Under the declining market and industrial downturn conditions, some companies have to forward integrate because some of industry players can pull out of adjacent stages (Stuckey & White, 1993).

BP is an example of an oil company that has integrated forward from exploration and production of oil to downstream activities. According to the BP's chief executive, Bob Dudley, the current downturn has vindicated the business model of the 'vertically integrated' oil groups (Stacey & Crooks, 2016). Vertically integrated companies can benefit from lower costs due to reduced or eliminated market transaction costs, improve quality of supplies, acquire critical resources, improve supply chain coordination, secure distribution channels, increase market share and market power, acquire new competences, and facilitate investment in specialized assets (Jurevicius, 2013b). Exxon Mobil, for example, can control and adjust its production to serve the most profitable markets through the vertical integration model, thus capturing the highest value of its every facility. Oil business is highly cyclical and the companies that have integrated in both upstream and downstream activities are more resistant to economic and industrial downturns, because if the profits are low in upstream sector they can be high or at least stable in the downstream sector. This is the case for Royal Dutch Shell, for example (Stacey & Crooks, 2016).

However, vertical integration strategy has its pitfalls and disadvantages. If poorly managed, acquiring a new business unit can bring higher costs and increased bureaucracy, lower quality of production, and reduced efficiency and flexibility to a corporation. New competences can overlap or clash with old ones, resulting in competitive disadvantage. Uncertainty, bounded rationality, and opportunism are other pitfalls of vertical integration strategy. In order to be successful, this strategy has to be carefully defended and executed when the decisions to vertically integrate are taken under strong valid reasons rather than spurious reasons (Stuckey & White, 1993).

## **2.4 The chosen theories and models**

Cyclical industries are vulnerable to industrial downturns. The latter are difficult to predict and thus companies working in cyclical industries have to react quickly and think strategically to overcome industrial downturns and to accumulate strength for upcoming upturn. Being hit by a downturn, firms working in cyclical industries encounter the following main problems:

- Surplus of goods, services, and personnel;
- Reduced purchasing capacity of buyers;
- Lack of financial resources;
- Mismatches between investments and production;
- Risk of bankruptcy on a firm-level;
- Stronger competitiveness among industry players.

However, industrial downturns bring the following opportunities on the industry-level:

- Industry restructuring;
- Technological innovation;
- New markets;
- New entrants;
- New organizational models;
- New business models;
- Mergers and acquisitions;
- Changing customer relationship.

The strategic directions to overcome the problems and embrace the mentioned opportunities should be carefully analyzed and executed by companies' managers and boards. The theoretical and conceptual framework has explained the four possible directions for the corporate strategy according to the Ansoff Matrix, as well as the option of strategic alliances and integration. The market development and the product development strategic directions are believed to be the best fit for the oil service industry to overcome the current downturn. The open innovation model is considered to be particularly suitable for the oil service industry's further development.

The market penetration strategy better suits stable markets and has a low chance to work under the downturn conditions. This direction is thus not suggested for the oil service industry and generally cyclical industries going through downturns. Conglomerate diversification is generally believed to be too complex and risky for companies working cyclical industries because of specific factors and technology types in such industries that are difficult to share

within value chains with other industries. Thus it would be troublesome to achieve the economies of scale or scope by choosing this strategic direction.

The strategic alliance model is highly recommended for the oil service industry because of its flexibility and lack of legal and organizational constraints. The strategic alliance model would best fit the horizontal integration direction. For the vertical integration direction, mergers and acquisitions would be more feasible in order to truly exploit the benefits of controlling backward or forward integration model.

The next section will provide the insights and structure of the oil service industry. It is important to become familiar with the industry's specifics before proceeding to the empirical implication of the suggested theoretical and conceptual models.

### **3 Context: The oil service industry**

The Norwegian economy relies heavily on the export of oil and gas. These commodities played a crucial role in developing the Norwegian economy and society into the welfare state that Norway is today. Since the decline of oil prices in the summer 2014, the Norwegian oil export value has consequently been decreasing (Norwegian Petroleum, 2017b). The investments in the oil industry in Norway are expected to drop by almost one third during this year since the oil price drop in mid-2014 (Holter, 2016). Norwegian economy has been affected more by the oil price drop than by the financial crisis in 2008, because the country is strongly dependent on oil export. Thus, Norway is experiencing the worst downturn in its offshore industry ever (Holter, 2016). This downturn has resulted in weakening of the Norwegian crone, higher unemployment level, and a downturn of the oil service industry (Mohsin & Holter, 2016).

#### **3.1 Definition of the oil service industry**

Before petroleum can be used, it needs to be extracted, refined, and converted into finished products. There are two main segments within the oil and gas industry – upstream and downstream. The upstream segment includes exploration, production, and processing of oil and gas or other raw natural resources. The downstream segment includes refining of oil and gas into products and distributing them to the customers (Modalsli & Ringstad, 2014).

According to Rystad Energy (2016), the oil service industry is the industry that provides oil or gas related products or services to the upstream oil and gas industry. KPMG International (Marcel et al., 2016) refers to the oil service industry as the crucial industry for the oil and gas exploration, development, and production. The role of the oil service industry has been growing

since oil companies started to use outsourcing models for their drilling projects. The oil service industry is the technological industry that aims at finding the best cost-efficient solutions for oil and gas extraction and production.

Due to innovation in the oil service industry, the oil and gas companies became enabled to conduct more complex and technologically advanced operations. Without the necessary technology and services, complex oil and gas projects would not have come to be realized. Oil service companies are aiming at offering a higher range of services across the value chains of oil companies. This means that the share of oil service operations is becoming higher in the realization of the oil and gas projects and is predicted to continue growing (Marcel et al., 2016). The current low oil prices have caused a cyclical downturn for the oil service industry. However, oil companies will still need the oil service industry to optimize technology and to reduce the costs. This means that the oil service industry will continue to play a critical role for the oil and gas industry globally and will eventually overcome the current industrial downturn. EY reviews the oilfield service industry by country annually. In their reports, EY (2016) analyze the size and the development of the industry and its dynamics across the value chain. There are the following value segments:

1. Reservoir/ seismic;
2. Exploration and production drilling;
3. Engineering, fabrication, and installation;
4. Operations;
5. Decommissioning.

### **3.2 The segments within the oil service industry**

Rystad Energy (2016) divides the oil service sector in 11 segments on the highest level, 1, which are then further divided into 52 segments on level 2, and further into 151 segments on level 3. The main segments on the first level are:

1. Seismic and geological and geophysical (G&G) surveys;
2. Transportation and logistics;
3. Rig and drill services;
4. Well services;
5. Engineering;
6. Engineering, procurement, and construction (EPC);
7. Topside and processing equipment;

8. Subsea equipment and subsea installation services;
9. Well intervention;
10. Maintenance and modification services;
11. Operational and professional services.

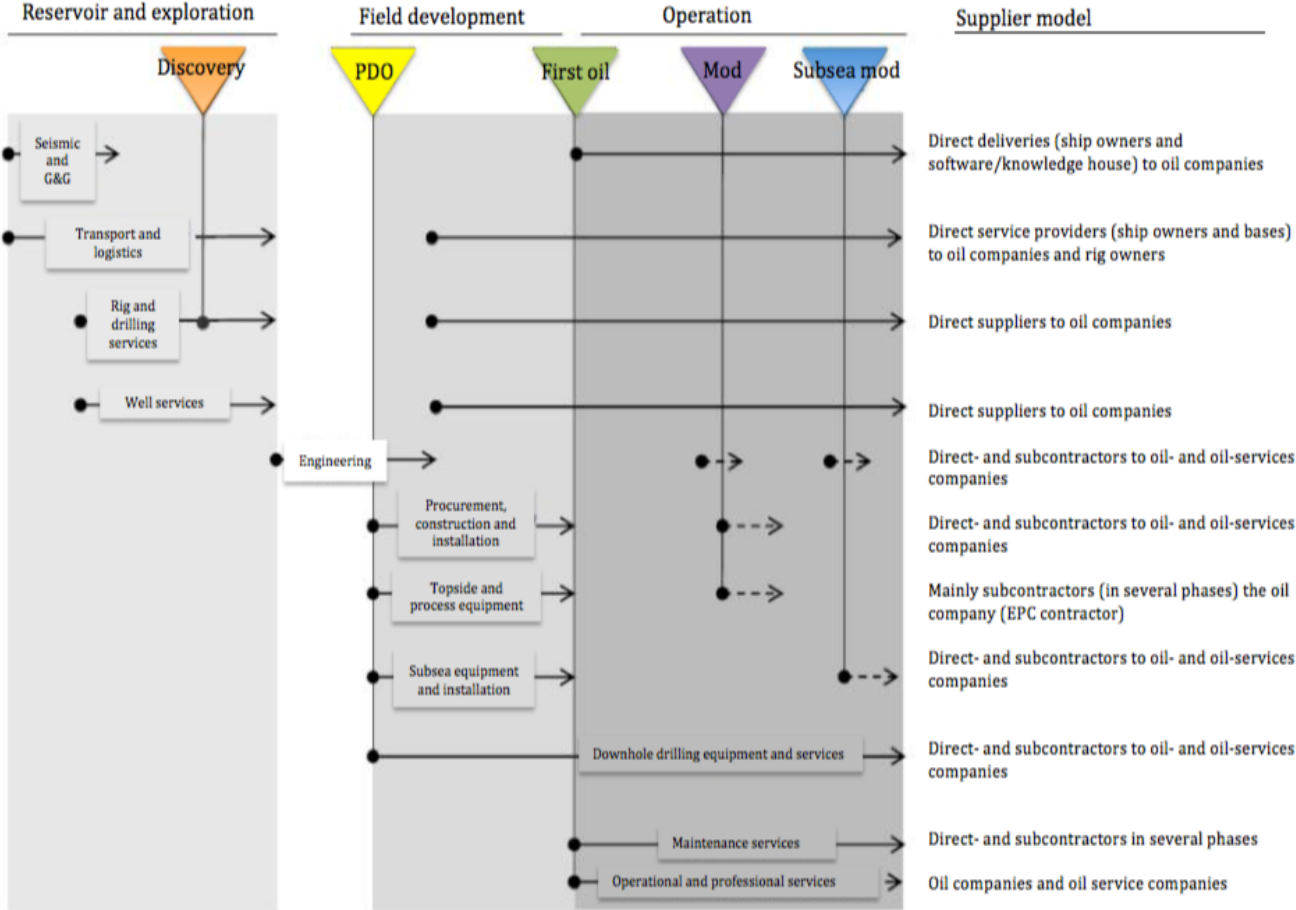
Such division illustrates the complexity of the industry and the interdependence of the companies. Some companies work only with components sale, situated on level 3, for example. Bigger companies can operate in several segments, on different levels. For example, one of the major operators, Aker Solutions, operates within almost all cycles of the industry, being involved in exploration, development, production and decommissioning segments (Aker Solutions, 2017). It is important to understand the sequence of segments within the oil service industry's value chain in order to get an overview of the industry.

Seismic and geophysical companies are operating in the exploration phase. There are rig services, drilling services, and well establishing companies operating on this phase, supported by transportation and logistics companies. Aker Solutions (2017), for example, provides field planning, feasibility and concept studies, floater designs, design and delivery of deep water risers, etc. After the exploration phase comes the most capital-intensive segment of the oilfield service value chain – the engineering, fabrication, and installation segment. A heavy infrastructure is required in this phase in order to produce and transport oil and gas. Oil service companies involved in procurement, construction and installation, process equipment; subsea equipment and installation, etc. are operating on this level. Rotating equipment, compressors, and subsea equipment are the big part of this segment. Aker Solutions, for example, provides subsea production systems, subsea trees, subsea compression systems, subsea pump systems, and so on in this phase. There are also many companies providing engineering services to design and development within this segment (Rystad Energy, 2016).

The operations segment follows the engineering part. This part of the oilfield service value chain includes offshore drilling and drilling materials like drill string and drill cuttings; maintenance services like control systems maintenance; operational and professional services like metal coating, accommodation, catering etc. The workforce needed for these operations is normally based close to the operations. The companies that offer such services and products can however be based elsewhere and can be grouped in clusters like for example the GCE NODE in Southern Norway (GCE NODE, 2017a). Finally, the same companies that are involved in the operations phase can offer decommissioning services and lifecycle solutions, like Aker Solutions does (2017). However, not always does the same company serve all the stages of the oilfield service activities. Third parties can be engaged at any stage of the oilfield

service value chain. The figure below summarizes the overview of the oilfield service value chain.

**Figure 3.3.1: Oil service segment value chain**



Source: Modalsli & Ringstad, 2014, p. 9

**3.3 The oil service industry in Norway**

Petroleum in Norway was discovered in 1969 in the Ekofisk field, and production began in 1971 (Government, 2013). After almost 50 years of petroleum activities, both oil and oil service industries in Norway developed cutting-edge expertise and became internationally competitive (Norwegian Petroleum, 2017a).

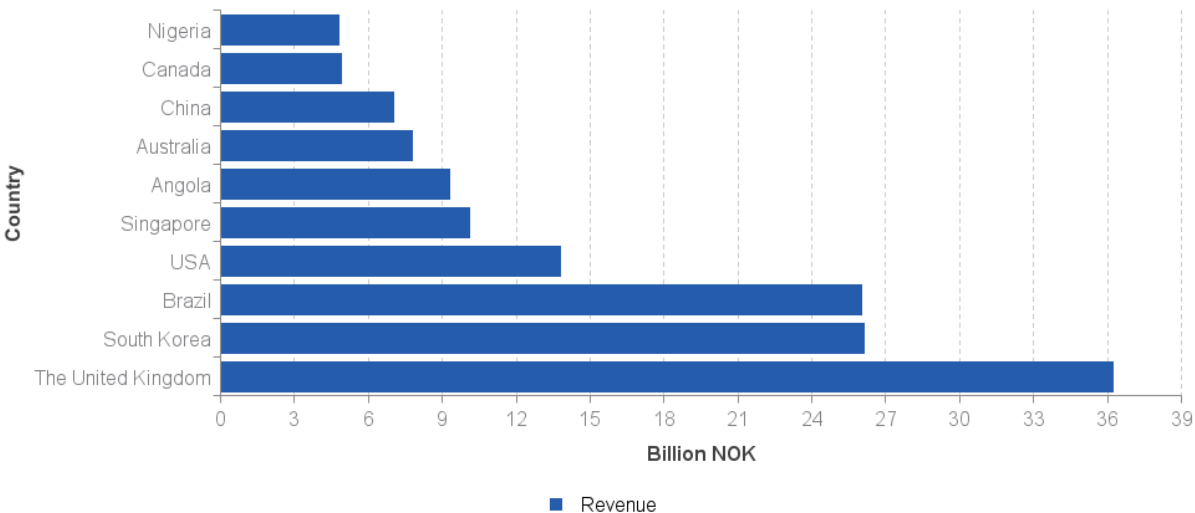
Norway established itself as an industrial and shipping nation from the very beginning. This factor helped the country to develop a highly technological supply industry. Moreover, severe weather conditions, strict national legislation, and the high standards required by the operators helped the industry to become a world leader. The Norwegian shelf has functioned as a laboratory where companies serving the oil industry had to find technological solutions for problems related to the oil and gas production. Simultaneously, the Norwegian shelf became

one of the largest offshore markets, providing a profitable domestic market for the oil service industry (Rystad Energy, 2016).

The oil service and supply industry is nowadays the second largest industry in Norway in terms of turnover after the oil and gas industry (Norwegian Petroleum, 2017a). There are over 1100 companies serving the industry. According to EY (2016), a company can be defined as the Norwegian oil service company if at least 50% of its turnover is generated in the oil and gas industry and if the company is registered as the Norwegian legal entity. About 117 000 people were directly employed in petroleum-related service and supply industry in 2016 (Norwegian Petroleum, 2017a).

The Norwegian oil service industry was hit by the low oil prices, resulting in a decline of the Norwegian oil service turnover by 10% in 2015 compared to 2014. The total turnover of the industry in 2015 was 474 billion NOK, while the international turnover was 190 billion NOK or 40% of the total turnover. The high share of export of oil services helped Norway to reduce the negative effect of the current downturn. Norwegian oil service companies operate in about 100 countries (Rystad Energy, 2016). The main markets for the Norwegian oil service and supply industry in terms of revenues are illustrated on the figure 3.3.2.

**Figure 3.3.2 International revenues in the Norwegian service and supply industry 2015, 10 largest countries**



Source: Rystad Energy, 2016

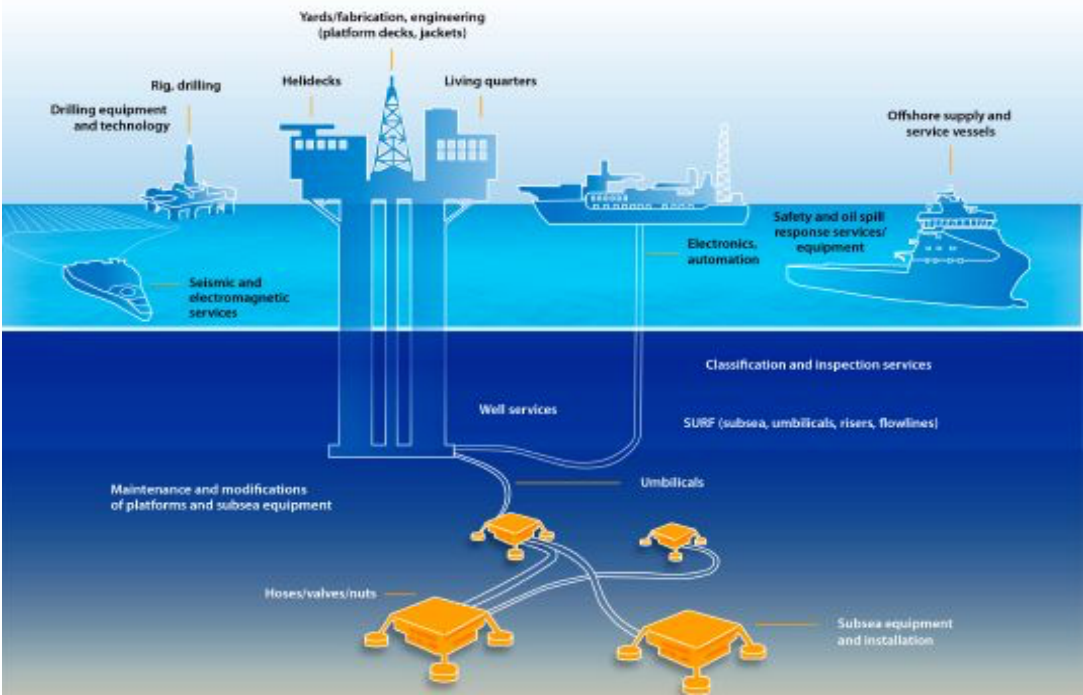
In Norway, oil service companies are operating throughout the entire country, mostly clustered by regions. In Stavanger, oil service companies offer a wide range of goods and services and



offshore activities. The Oslo region has a cluster of seismic companies and well-established engineering expertise. Research and education serving the industry is strong in Trondheim. The Bergen area became a centre for subsea equipment and platform maintenance. Kongsberg has a strong cluster of companies related to subsea technology, automation and dynamic positioning equipment. Southern Norway is home to world-leading companies in drilling technology. The oil service cluster in the Ålesund region provides a complete range of shipbuilding and outfitting services. The Norwegian service and supply industry is very diversified, which is shown on the figure 3.3.3.

Norwegian oil service companies provide goods and services through all the stages of the value chain, including seismic and engineering services, drilling rig equipment, advanced offshore supply and service vessels, subsea technology, etc. The industry has developed a knowledge and expertise that can also be useful for other sectors. The current downsizing in the Norwegian shelf activities and in international markets in general adduces a significant challenge for service and supply companies. However, the oil service industry in Norway has demonstrated its adaptability to the unstable environment by increasing productivity and reducing costs. This means that the industry has shown its competitiveness and has a good chance to overcome the current downturn, while however experiencing several losses and restructurings on the firm level (Norwegian Petroleum, 2017a).

**Figure 3.3.3: The diversity of the Norwegian service and supply industry**



Source: Norwegian Petroleum, 2017a

### **3.4 Strengths and opportunities for the oil service industry in Southern Norway**

Oil drilling and oil production projects are complex and require a wide range of services. The oil service companies based in Southern Norway (SN) are very competent in handling complex projects that require multiple participants to complete a certain operation, for example the construction of an oilrig. There are countless components, integration, and equipment required in order to operate such a project. The oil service companies in SN provide a full range of products and services through the entire value chain.

Besides, the companies in SN are becoming leading edge in the digital transformation process and are already taking steps in performing pilot tests for changing the current operational process. This region has demonstrated strong know-how, expertise, and innovation capacities. This is achieved by the development of new technologies, business models, and a high degree of collaboration within the industry. The oil service industry is a condition-based industry. The SN region provides all the necessary condition, environment, and infrastructure for testing oil service products, equipment, and services. Besides, the geographical proximity to the oilfields, located mostly outside of Western Norway, provides the strength of cost reduction and process optimization for Southern Norwegian oil service companies (Industry expert 1, 2017).

One major strength of the SN oil service industry is that it has a complementary ecosystem. The University of Agder, based in this region, is a key partner for data collection. The University is engaging in tighter cooperation with the industry through business and technological projects. One of such projects is the Mechatronics Innovation Lab, MIL, which is expected to become a world-leading center for innovation, pilot testing, and technology qualification within mechatronics and related fields. The lab will offer testing related to implementation of new production methods, primarily within robotics and automation. It will provide a highly sophisticated environment, including one of the most advanced robots and cobots – robots that can collaborate with humans – in the world. This Lab is particularly related to the offshore industry, but also to manufacturing and material process industries. MIL aims to offer a range of test services currently not available in Norway in order to strengthen the industry's ability to innovate. Such testing can shorten time-to-market for new products and technologies, making the entire industry more competitive (University of Agder, 2016).

Besides the University of Agder and MIL, there is the GCE NODE cluster based in the region, which combines energy, oil service, maritime, IT, and consultancy companies focused on offshore opportunities. There are several opportunities for these companies to use their technologies to prevail in for example sea mining, algae fuel, and deep sea mining and exploiting. The proximity of the process industry provides opportunities for cooperation and

purchasing of goods, such as metal, for a better price. Moreover, innovation and technology research centers such as Teknova, IRIS, and EYDE are located in the region as well. They provide ongoing research and coordinate innovation projects in the industry, bringing a huge advantage and innovation opportunities for the oil service companies. Such institutions can coordinate and test how efficiently new technologies are applied in real environment through their labs and project hubs. Combining this with a high number of SMEs working in the oil service industry in the region providing equipment and products for testing, there are strong opportunities for cutting-edge innovation and technological growth in the region (Industry expert 1, 2017).

### **3.5 Weaknesses and threats of the oil service industry in Southern Norway**

Cyclical nature is a substantial weakness of both oil and gas and oil service industries. Cyclical nature presents a threat to the companies working in such industries to be hit hard by a downturn and to lose profits. The challenge for companies working globally in cyclical industries, and particularly in the oil service industry in Southern Norway, is to smartly deal with the industry's cyclical nature to overcome industrial downturns.

Industrial cyclical nature creates fluctuations in sales, profits, margins, and shareholder value. The current downturn in the industry has resulted in the dramatic decrease of these indicators, adding a significant amount of highly qualified personnel leaving the industry. Lack of qualified personnel poses the threat of decreasing know-how and technological capacities on the industry level. Many companies on the firm level encounter a direct financial threat of bankruptcy and cash availability for reinvestment. Such companies are becoming more vulnerable to be taken over by the stronger players in the industry. Downturns open possibilities for new entrants in the industry. New entrants can potentially increase competitiveness within the industry, threatening the incumbents (Industry expert 1, 2017).

One of the main concerns for the oil service industry in SN, and probably globally, is efficient resource utilization in the future, in case the oil and gas industry will continue to downsize. The companies working in this industry have to think about their ability to reinvent themselves to utilize resources and skills in order to establish next generation organizations. So the threat for the industry is to constantly utilize its capabilities for the possible future changes. The strategic capabilities of the industry on a firm level play a significant role for a company's resistance to downturns. The companies capable of fast transformation of their organization and businesses will most likely overcome the current downturn with the least losses. Those companies who

lack such capabilities on technological, managerial, knowledge, skills, or resources levels are threatened to not survive the downturn.

However, weaknesses can be turned into strengths and threats can be converted into opportunities if managed strategically. Many companies would not be able to survive the downturn on their own, becoming more open to share knowledge and resources with other industry actors. Eventually, the collaboration among such companies with a surplus of skills and resources suitable for one industry can result in product innovation and penetration of new industries. The closed-minded culture of an industry that used to work in compliance with certain patterns and rules can become a threat for the industry's future development. Technological industries are subject to rapid changes. Companies working in such industries should be prepared to adapt urgently to the changing environment on business, technological, organizational, operational, and strategic levels (Industry expert 1, 2017).

## **4 Methods**

This chapter provides a description of how the survey has been conducted, and the assessments made regarding method selection, data collection method, and data processing. A brief assessment of the survey's reliability and validity is also given.

### **4.1 Qualitative data collection**

A qualitative method is suitable when the focus of research lies on the exploration and understanding of a topic (Myers, 2009, p. 9). Quantitative methods focus on measurement, preferably numerical sizes, but at least concrete words that can be measured more directly (Zikmund, Babin, Carr, & Griffin, 2010, p. 134). For this survey, I have chosen a qualitative approach, since the research question implies studying strategic solutions to reduce the risks of industrial downturns in oil service companies. The research question is the basis for choosing the optimal data collection method and method of analysis. The questions given to the respondents are open-ended and attempt to convey them into quantitative measures that are not considered to be expedient.

The main problem has been the guiding principle for the selection of methods, so the method is chosen to best describe the problem, in addition to taking into account the constraints of time, resources, and availability. The qualitative approach focusing on description and understanding implies an inductive approach by developing and concluding the issue during the process of data collection and analysis (Bryman & Bell, 2011, p. 469).

## **4.2 Data collection method**

The chosen method of data acquisition uses semi-structured in-depth interviews. Such interviews imply that the topics and questions raised are determined in advance and noted in an interview guide, but respondents are given a relatively high degree of freedom to speak as they wish. The interviewer asks follow-up questions where deemed necessary. This provides a great deal of flexibility, but at the same time such structure helps to ensure that desired questions are covered (Bryman & Bell, 2011, p. 467). The background for choosing this method is that it is thought to illuminate the issue in the best possible manner, given practical considerations that might be taken. In this survey, it was desirable to get a good understanding of the respondents' and their companies' strategic choices, but at the same time also quite concrete answers to some questions.

There are several benefits of personal in-depth interviews. It provides the opportunity to question the respondents in a way that is adapted to respondents' answers to previous questions, ask to elaborate on answers given, and ask additional questions (Bryman & Bell, 2011, p. 467). An interviewer can observe the respondents' body language and facial expressions, thus gaining a better understanding of what they really are trying to explain.

Unfortunately, these benefits also have downside, which is often called the interview effect. It is a dialogue structure that is influenced by the interviewer. Both interviewer and interviewees are influenced by each other. The words used by one of the parties, their facial expression, and body language are interpreted by the other, and thus both questions and answers can get affected by this. The order of the questions can also have an effect on the answers that are given. In fact, I have changed the order of questions after first half of interviews because changing the order helped to get a better flow of the interviewees' answers. In-depth interviews are a time-consuming method of data collection. This applies to both recruitment, interviews and transcripts, as well as systematization, interpretation, and analysis of information that is collected.

Alternative methods of data collection have been considered. Using questionnaires is in many cases an effective way of collecting data (Bryman & Bell, 2011, pp. 232-233). It is plausible to increase a number of respondents, because the method is less time consuming, both for the researcher and for the respondents, and because it would probably be easier to get more people to participate. But the quality of answers could be affected since the interviewees would be less engaged in the interview process. The analysis of the material could also be easier, as some of the questions could have predefined response options, where respondents only ticked for the most appropriate. Another positive effect of personal in-depth interviews is related to increased

privacy. The questionnaire could have anonymous submission over the internet so that even the investigator would not know who answered what.

There are several reasons for why the questionnaire method was not selected as the appropriate method of data collection. The first is the desire to have an exploratory setting, meaning that the research question might develop as one gets more information. It was also desirable to ask the respondents to elaborate their answers, if anything was unclear, in addition to keeping the opportunity open to ask follow-up questions if considered necessary (Bryman & Bell, 2011, p. 467).

### **4.3 Population and sampling**

The research question implies that the population of research is the oil service companies located in the Southern part of Norway. For practical reasons, the sample was taken in a limited geographical area. There was a desire for a good spread in terms of size of the companies and the segments of the oil service industry they mostly work in, and also to get the views of some industry experts that might have a good overview of the industry as a whole.

In-depth interviews are, as previously mentioned, a time-consuming data collection method. This means that, for such a time-limited project as a master's thesis, the sample must be limited to what is practically possible in a relatively short period of time. A goal was set to carry out eight to ten interviews based on available time and assumptions about how many could be willing to contribute. There are two industry experts and seven companies that were interviewed.

With such a small sample, it is important to be careful to generalize the findings that have been made. The selection method is subjective and subject to practical adjustments. It is relatively difficult to get enough participants for such a survey, so it is difficult to achieve an almost representative selection. Nevertheless, a distribution has been achieved that should give a relatively good picture, as the companies included are of different size and in different sub-segments.

### **4.4 Recruitment**

An overview of potential companies in the relevant geographical area was found in an online phone directory and is also based the interviewer's knowledge of the industry. Most of the respondents belong to the energy, oil, and maritime cluster in the selected region. However, not all of them. Potential respondents were first contacted by e-mail, and then received a phone call

a few days later asking if they would be willing to attend. Several respondents agreed very quickly to participate in the interviews. Other potential respondents were contacted again both by e-mail and phone. Information about the main theme, the expected duration of the interview, and number of questions were given in advance. Several companies wanted to familiarize themselves with the interview questions before agreeing to participate.

Some of the potential respondents did not want to or did not have the opportunity to contribute, but agreements were reached with nine respondents from different companies and organizations. All of these respondents had executive management or project management positions, most of them directly involved with the strategy development and execution in the companies they represented. Also, I was able to interview two industry experts.

The companies interviewed for the research operate in the following segments of the oil service industry: drilling and offshore engineering; oil and maritime cluster; offshore drilling; offshore shipping; offshore and industry machinery supplier; offshore and marine engineering solutions and services; mooring and loading systems; marine services; drilling and production. Among the 11 main segments of the oil service industry, only seismic and geological segment companies were not represented in the research due to the limited geographical location. Most of such companies are located in Oslo, Bergen, or Northern Norway that is not representative for this research, which focuses on the limited regional area. Software and ICT companies were not selected for the interviews either, because of their indirect involvement with the oil service industry.

#### **4.5 Privacy and anonymity**

Respondents' privacy was safeguarded in the best possible way by asking for consent of using a voice recorder during the interviews. The audio recordings were then kept safe, used only for intended purposes and deleted after transcribing. Two out of nine respondents disabled the usage of the audio recorder. In that case, notes were taken during the interview process.

The interview guide and the data management method were designed to meet the requirements for not having to report the project and applying for approval from the Norwegian Center for Research data (2017). Audio recordings were not stored on a PC. The interview questions did not include any personal identifiable information, such as name, workplace or position of an interviewee.

Some of the information in these transcribed interviews may however be indirectly identifiable. This means that by compiling information about, for example, company size, sub-segments, and strategic solutions that may be known to others, and the fact that others have been informed

that the person was participating in this survey can make them recognizable, for example, for colleagues or even competitors. I have not informed anyone about specific individuals or companies that have participated in interviews for this research. It is possible that the respondents themselves have informed others about the participation, and it is possible that they are recognized. This is beyond the control of the interviewer. As long as no direct person-identifying information is stored and no information is provided in the assignment or elsewhere, the respondents' privacy requirements are respected, provided they have been given information and have given their consent.

#### **4.6 Data analysis**

Transcoding of audio recordings was done close to word-by-word. Information that was not considered relevant was omitted, as well as identifying information that was not required for the research. Examples of the latter are the names of the companies, names of any of their customers, and other information that could be identifiable without giving particular value to the research. Such an extensive way of registering data provides comprehensive information. Already at the time of transcripts, some form of irrelevant information was excluded. When reducing the content, there is always a risk to miss information that is still relevant.

The content was interpreted, condensed, and reduced several times. First at the time of transcription. Then on further interpretation and when presenting the findings. Finally, it has been attempted to interpret the answers into very specific categories in response to, among other things, whether the respondents' understanding of and their chosen strategic solutions fit into the theory. Here are several critical points where important information may be misinterpreted or overlooked. However, the method was considered to be the most suitable for presenting the findings in a clear and comprehensible manner, in addition to being able to reach a very specific level for the results of the survey.

#### **4.7 Reliability and validity**

Reliability is about the extent to which data collected is reliable and can potentially be tested by conducting the survey again or by researching the same subject. Corresponding results will then indicate high reliability (Johannessen, Kristoffersen, & Tufte, 2005, p. 46). A qualitative survey like this will necessarily have relatively low reliability of the meaning of the term.

Qualitative surveys are largely influenced by the investigator's subjective way of thinking about how to respond to the respondents and how to interpret the answers. Reliability can be



strengthened by giving a thorough description of how the survey has been conducted and what assessments have been made, both in planning, implementation, interpretation and conclusion (Johannessen et al., 2005, pp. 227-228). An investigation's validity is based on whether collected data actually represents and measures what one wishes to investigate (Johannessen et al., 2005, p. 71). Again, qualitative surveys often have low validity, as the focus is rarely on concrete measurement.

Here, the focus has been to gain an understanding of, and to explore, the subject of strategic solutions for highly cyclical industries, and more specifically the oil service industry, to reduce the risks of industrial downturns. The goal has not been to be able to generalize for the entire population, but rather to present some qualified assumptions about the subject. It may therefore be more useful to talk about the survey's transferability, rather than reliability and validity. Transferability is more about transferring knowledge and establishing descriptions that may be useful to the reader (Johannessen et al., 2005, pp. 229).

## **5 Empirical findings and discussion**

The Norwegian oil service industry is rather complex and highly reliant on the oil and gas industry, which provided lucrative profits to the oil service companies for many years. Previous oil price reductions in 1996-1998 and 2008-2009 did not have as significant of an effect on the Norwegian oil service industry as the current industrial downturn does. Some companies lost their clients back in 2008 due to the financial crisis, and because clients could not pay for their orders. But none lost their business. The safety belt in 2008 came from the flourishing oil industry development in Norway, complemented by several global projects.

Despite the sharp drop of oil prices in 2008, it did not take long to normalize them. The downturn in the oil and gas industry in 2008 was caused by the financial crisis, leading to a decrease in oil prices. OPEC, the Organization of the Petroleum Exporting Countries, took the necessary actions to cut the production and thus managed to normalize the prices of crude oil within several months (Oil & Gas 360, 2016). The oil and gas industry bloomed once again and it seemed as though nothing could go wrong for the oil service industry. Oil and gas producers were investing constantly into numerous oilfield projects and the demand for oilfield services, innovation, and technological expertise kept on rising (Doshi et al., 2015) – the Norwegian oilfield services industry was prospering.

The upturn period for the oil industry lasted until mid-2014, when the crude oil prices started to drop from \$115 per barrel in June, and fell below \$50 in January 2015. The upturn period had lasted surprisingly long, maintaining the profit margins for the oil service companies on

unprecedentedly high levels. Several actors in the industry realized that the expensive oil era would not last forever, but very few saw the downturn coming so suddenly. In January 2016 the crude oil prices were already below \$30, marking the historically lowest number since 1998 (EIA, 2017). Despite the illusionary recovery in crude oil prices since February 2016, the oil industry in Norway is far from its rehabilitation. Neither is the oil service industry, which does not have any safety belts this time (Industry expert 1, 2017). According to the consulting firm EY (2016), the activities on the Norwegian continental shelf (NCS) are expected to stabilize in 2018, helping the oil service industry to recover. Even if this prediction is sound, oil service companies have to make it into 2018 first. The need for appropriate strategies to overcome the worst industrial downturn in Norwegian history could not be more exigent.

### **5.1 The effect of the downturn on the oil service companies in Southern Norway**

The current downturn of the oil service industry has affected all actors involved in the industry in the Southern part of Norway. The main effects of the current downturn are the following:

- *Massive reduction of employees* by on average 40-60% among the interviewed companies. Some companies, like Company 3, with less than 10 employees managed to keep all their employees. This strategy worked because the mentioned company is a small engineering company, engineering services is the core business, and most employees are engineers. Overall, the reduction of employment results in losing competence across the entire industry. This is a positive effect for other industries, which are now benefitting from the know-how of highly skilled professionals who are available for hire, possibly at lower costs (Industry expert 1, 2017). But this competence may not be there for the oil service industry when the downturn is over. This means that the industry needs to become more sustainable for future cycles with increased efficiency of both knowledge and resource utilization. Past high margins of the industry did not actually reflect that the companies were effective, scalable, and clever, but rather showed benefits from high profits in the oil industry during the upturn period.
- *Significant reductions in profits and profit margins*. The results in 2015 were still positive for some companies, due to previously signed contracts. However, a large majority of the respondents saw red figures entering their balance sheets starting from 2016. The most severe effect of the downturn on profits was observed that year and is expected to continue during at least 2017, and most likely over next 1-3 years. Large oil service companies and shipping companies had lost up to 50-70% of their pre-downturn profits by 2017, while

medium-sized and small offshore supply companies lost about 30-40% of their profits. Private investors and banks are key actors in providing financial resources for the industry to overcome the current downturn. Most of the companies were left with extremely low cash flows, but the offshore shipping companies were probably hit hardest in terms of losing profits and had a stronger need to find investors. Some oil service companies, like Company 4, received grants from the Norwegian government for technological product development. However, according to both industry experts interviewed for this thesis, the industry should find a way to become more efficient and cost-effective based on private investments, and not rely on governmental support. Keynes shared this belief (Haralambie, 2011).

- *Market downsizing and market loss.* Most of the oil service companies in Southern Norway are working internationally. The downturn in the oil service industry is global, which has resulted in considerable market shrinking in Europe, Asia, Southern America, and Africa. Countries like Brazil, Russia, Venezuela, Nigeria, and Angola were hit the hardest by the current oil downturn. Most of the respondent companies that operated in Brazil, for example, temporarily closed their offices there. For the Russian market the effect of the downturn has been severe due to sanctions imposed by the EU and the U.S. that came in addition to the low oil prices (Hines, Johnston, Rothberg, & Ignatenko, 2016).
- *Substantial diminution of indirect costs* on a firm level related to management, accounting, production managers, office facilities, traveling etc. Most of the respondents' companies closed several business units or merged them into one in order to reduce the indirect costs. Huge spending on indirect cost was a side effect of the upturn in the industry.
- *Inevitable necessity of the reduction of direct costs* (production); operational costs (cost of operating a rig or a vessel), especially for oil drilling and shipping companies; maintenance costs (preventive measure to keep the equipment work longer and more efficient); and capacity costs (adjusting the size of equipment to the changed markets situation and the modified customers' needs). The industry has to learn to do the same job cheaper and more productive.
- *A general urgency to produce more tailor-made equipment* for customers, which can be achieved through product development, innovation and, shared knowledge. Digitalization of the industry can facilitate the process of being closer to the customers and increase the industry's efficiency as a whole.
- The oil service industry in Southern Norway was hit hard by the downturn, because most companies produced tangible products in large volumes. The consequence of the downturn

is resulting in *the shift from products to services* or significantly increasing the share of services within the product portfolio for most of the respondents to become more flexible and capable to serve several markets and industries at the same time.

- The strategy for most of the respondents has been shifting towards *diversification* into other industries and decreasing their oil industry share, except for the oil drilling companies whose share of the oil industry among their clients continues to be 100%. The strategic direction for such companies is to satisfy current and possible future needs of their existing clients while trying to gain new ones in both existing and new markets.
- *Emerging industries' restructuring and consolidation.* According to the interviewed industry experts and several companies, the oil service industry will see an increased number of mergers and acquisitions. Several M&As have already taken place on the global level, for example the Cameron acquisition by Schlumberger, and will continue to happen on the regional level within the next 2-5 years. Consolidation may be the main strategy for offshore shipping companies, which are very vulnerable to the current downturn due to high operational costs and the lack of cash flows to survive on their own.
- *An increased global competence* among the oil service companies can bring the oil service companies closer on the regional level through shared knowledge platforms, joint projects and ventures on the global markets, and strategic alliances. Networking is extremely important on the regional level to benefit from the potential synergy of having a cooperative strategy to overcome the current downturn. The role of regional energy, maritime, offshore, and consultancy clusters can be crucial to providing the framework for such cooperation.

## **5.2 The possible strategic solutions on a firm-level to overcome the downturn**

The current downturn is a benchmark for the Norwegian oil service industry and most likely for the global oil service industry in general. The era of expensive oil is over, and, even if the oil prices will continue to rise, oil service companies all over the world will undoubtedly change their business models and corporate strategies. They will have to decrease the unconditional reliance on the oil and gas industry in order to reduce the risks of cyclicity. There is a common understanding among the oil service industry in Norway that the time for changes is right now, or, better said, it was yesterday. Companies are realizing that they need to adapt their organizational culture, business models, and technology development strategy in order to continue working in this industry.

Changes of the business and market environments have resulted in strategy changes on a firm level. The empirical strategic solutions reflect on the suggested theoretical solutions to a high degree. However, compared to the theory, companies are not looking for a single optimal solution, but rather try to seize all possible strategic directions simultaneously.

Market penetration strategy is not favored among the respondents, but is not completely discarded either. Several companies are trying to get more international clients to penetrate the developing markets where they are already present. The companies that are subject to the oil industry – like oil drilling companies and drilling rig operators – aim to prioritize product development according to their existing customers' needs. There have been no new offshore rigs built during the last three years, and half of the existing rigs are currently inactive. Companies working with rig operations and maintenance have to focus on increasing the efficiency of the active rigs and enlarge their life span and productivity levels. The first strategic option for these companies is to create products and services that can satisfy the future demands of their existing customers, and then to penetrate the existing markets once the upturn will emerge.

There are two companies among the respondents that pursued the unrelated diversification strategy before the downturn. Having a diversified portfolio of products and services serving unrelated industries helped these companies to be less vulnerable to the cycles in the oil service industry. Several companies among the respondents have already been using the related diversification strategy by not exclusively serving the oil and gas industry, but extending their business to the marine and heavy industry:

*“We experienced many cycles before and probably that is why we diversified to reduce the risks of dependency on one cyclical industry and have several industries in our portfolio.”*

The mentioned alternative industries are also cyclical, but their cycles are different. Thus the companies with diversified portfolios in terms of industries they serve are more resistant to the current downturn in the oil industry.

Market development and product development proved to be the most viable strategic directions for the oil service companies under downturn conditions. The strategic alliance model is perceived as a way to achieve these strategic options, but can be added to the corporate strategy on a firm level. The following subchapters will provide more detailed information about the three selected strategic solutions for oil service companies in Southern Norway to overcome the current downturn: market development; product development; strategic alliance.

### **5.2.1 The case of market development**

The level of internationalization of the oil service industry all over Norway is currently about 40% (Norwegian petroleum, 2017a). For Southern Norwegian oil service companies this figure used to be even higher before the downturn. Even small oil service companies in this region are international. Most of the incumbent companies did not lose their existing markets, but the number of projects and thus the market share dropped significantly. The Brazilian market is currently on hold for most of the respondent companies. Norwegian, UK, German, and Danish markets used to be the principal markets for the respondents, due to the high number of offshore activities in the North Sea. Most of the respondents were involved in international oil projects in Singapore, Korea, USA, Canada, Australia, Poland, and France, and some large companies had their production units in Malaysia, Taiwan, Poland, and Baltic countries.

The Korean market, for example, was overestimated in terms of profit possibilities according to Industry Expert 2 (2017). Having production units in Malaysia and Taiwan turned out not to be profitable any longer for the equipment producing companies, because of losses instead of gains from economies of scale, due to the decreased production volumes. Two companies among the respondents still have their production units in Brazil. Two other companies had their sales offices in Brazil and aimed to open production offices there as well, but were not able to, due the downturn and profits decrease. Poland and Baltic countries have the potential to become production units for a higher number of Norwegian oil service companies, because of their proximity and reduced language barriers compared to Asian countries. Several companies among the respondents were involved in drilling projects with West African countries, a majority of which, however, was hit pretty hard by the downturn, for example the emerging market of Nigeria. Still, two out of seven respondent companies remain currently involved in the projects in Africa.

However, there are still several new market options for offshore drilling, shipping, and engineering companies, as well as suppliers of products and machinery to offshore and marine service companies. In terms of geographical market development, the possible options are: Russia; the Middle East, namely Iran and UAE; Turkey; Japan and the onshore US market.

The Russian market is rather unstable, due to imposed sanctions and cultural barriers, but is still a market full of possibilities for Norwegian oil service companies. The oil service industry in Northern Norway has been growing strong up until the downturn with several offshore projects in Barents Sea. The weather conditions there are even harsher compared to Southern Norway, but the oil service companies from both parts of the country could still benefit from sharing knowledge and developing common projects for the Russian market. There was one

company among the respondents that had to close ongoing operations in Russia due to the sanctions. The other company, however, is considering Russia to be a niche market because the sanctions are not covering 100% of operations, but likely closer to 50%. So it is still feasible to seize business opportunities on the Russian market for companies capable of overcoming legal and economic constraints and finding their way into the market.

Iran has been subject to sanctions as well. Several Norwegian oil service companies were present on the market before the sanctions were imposed. Since the sanctions have been lifted (Dyer, 2016), these companies are strategically planning to reenter the market. However, the companies who aim to enter such markets as Russia, Iran, and other countries in the Middle East need a lot of stamina, knowledge, and proactivity in order to succeed. It takes longer to acquire trust and build relationship in Russia or Japan compared to European or South-Asian countries. The business model to enter these markets should be changed from the classical linear to the cyclic business model. As suggested by Industry Expert 1, the companies that aim to enter Iran should figure out in which segments they can help and complement the Iranian market, creating circular learning and potential business opportunities. A similar strategy could be used in Japan. Japanese produce the best robots in the world, but lack the expertise to utilize them in the most efficient way. These advanced robotic products could be supplemented by Norwegian companies, who have a strong culture and capabilities for testing and developing applications to run those robots. Such cooperation could improve the oil service industry and result in entering new industries based on both parties' capabilities.

Large shale oil reserves in the U.S. are a game changer in the offshore oil market (Wolf, 2015). This leverage can be used to regulate price and production of conventional oil. At the same time, the shale oil market development in the U.S. and other countries brings several opportunities for Norwegian oil service companies. The production and operation costs are several times lower in the onshore market compared to the offshore market. The construction of an offshore oilrig takes 3 years, compared to 2-4 months required to build an onshore oilrig. The respondent from Company 4 particularly outlined the opportunities on the US market:

*“The American market was hit pretty hard by the downturn,  
but will also be among the first markets to pick up.”*

Two other respondents, however, did not see the same opportunities in the U.S. market, pointing out that the market is already pretty saturated and has a lack of counter-cyclical investment culture.

The current downturn in the oil industry will most likely not reshape the existing markets dramatically. However, several oil service companies will assume higher risks than they did before the downturn and try to enter to more vulnerable markets like the mentioned markets of Russia, and the Middle East, keep their business in Brazil, and develop business in Africa. Oil service companies' share of existing markets will most likely be reshaped globally. For most Norwegian oil service companies, the highest profits are anticipated to continue being on the European markets according to the respondents.

There are several possible market development options in terms of new industries for oil service companies. Several of the respondent companies already have a diversified product portfolio serving several industries. The offshore oil market had high market shares for most of the respondents, due to lucrative profits. So during the upturn, a lot of companies prioritized this market due to incredible business opportunities. Since the downturn started, many companies strategically aim to decrease the share of oil and gas and increase the share of other industries among their customers' portfolio. Several companies consider entering new industries in order to diversify their products and services offer and to mitigate the negative effect of the oil service industry downturn. To have a diversified portfolio of clients and fields of business, it is important to be less exposed to the cycles on a firm level. Thus, as suggested by the theory, diversification strategy was empirically confirmed to be optimal under downturn conditions in order to reduce the operational risks (Cole & Karl, 2016).

Oil and gas is extremely cyclical, so it is important to reduce the dependency on this industry. The possible alternative markets for oil service companies are:

- Renewable energy market, namely the offshore wind market, which has strong potential in the North Sea where several international projects have already started;
- Environmental projects for cleaning waste from offshore drilling;
- Deep water mining;
- Land drilling industries with lower lifting costs;
- Unconventional shale oil market where the US market is very promising;
- Marine market;
- Conventional shipping – container transportation;
- Cruise vessels for shipping companies;
- Traditional heavy industry, like metal production;
- Service industries like consultancy and IT for the offshore oil and gas industry, oil service industry, and the above-mentioned markets.



### 5.2.2 The case of product development

The oil service companies in Southern Norway that primarily produced tangible products were hit harder by the downturn than service companies. Those companies whose main assets are people were capable to withstand the downturn better, regardless the size of the company. The companies whose main products were tangible, like offshore equipment, rigs, vessels, etc., were substantially harmed. Offshore shipping companies were especially affected by the downturn because of high operational and maintenance costs of offshore ships.

Most of the interviewees shared the belief that several new actors with less tangible resources are expected to enter the industry. Some of them will be the result of the existing actors' restructuring. In fact, several companies among the respondents have already established smaller daughter companies to complement their core business. Several startups providing IT, software, and consultancy services for improving the technological efficiency of existing products are predicted to appear in the industry. The digitalization process is rising to a new scale within the oil service industry, which will bring a higher number of service companies:

*“Digitalization process will provide more entrances, equipment companies, service companies with a combination of services for oil and other industries.”*

However, the incumbents of the industry realize the need for in-house technological development of their products and services in order to reach higher efficiency and lower costs to continue serving oil industry in the world. Hence, the strategic solution of product development is the most favorable within the industry. The product development direction does not exclude the development of new markets, but complements it. Since the market for oil service products is already global, the downturn conditions claim the need to update the existing products to a higher efficiency level and innovation degree. Only then should oil companies continue to penetrate the existing markets and/or attempt to enter new markets.

Product development in Southern Norway will take place on two levels:

- Diversifying product and services offers within the oil and gas industry
- Diversifying product and services for several industries

The product development strategic direction differs among the various segments within the oil service industry. Transportation, logistics, drilling, and well companies will not change their product offers dramatically. The consumption of crude oil is not decreasing, but growing. Oil producers certainly do not enjoy the low oil prices, but oil consumers do. The demand for crude

oil is not expected to decline for several decades (Clemente, 2016), thus the world will still need offshore vessels, oil rigs, drilling equipment, mooring systems, floating platforms etc. The product offer for such companies will basically continue to be the same, but what the oil industry will require is higher efficiency, lower production costs, and longer life spans of the products offered. Digitalization and increased interoperability – the ability of computer systems or software to exchange and make use of information – is the most vital way for oil service companies to satisfy this urge. Another remarkable trend of the market for oil service companies is stronger buying power. Buyers do no longer aim at higher volume production, but are looking for more efficient production. Thus the product development of offshore equipment, rigs, and platforms will adjust to customers' demands by offering smaller scale equipment with lower operational costs. Improving operational costs is crucial for most companies in the industry.

It is unrealistic for companies serving drilling equipment, well establishment, and offshore oil shipping segments to diversify their core business to other industries. What such companies can do though is to add products and services within other segments to their portfolios. It can be challenging to increase a product portfolio due to high production costs and scalability both for the industry itself and for the industries that are candidates for product diversification, for example marine, heavy industry, offshore wind farms, conventional shipping, etc. The most feasible option in terms of product development for such companies is to move from the offshore to the onshore oil market, which has lower production costs and entrance barriers. Diversification costs have to be measured thoroughly, as has been demonstrated in the case of the flat panel industry (Mathews, 2005).

Adding a diversified range of services sounds more realistic in terms of costs. If companies manage to offer services to different industries simultaneously this strategy has great potential, but it is still difficult to achieve success. Even if the services offer still focuses on the main industry, which is oil and gas, the increased share of services compared to products within a firm will help drilling, well intervention, subsea, topside, and processing equipment companies to reduce the negative effect of the current downturn. Information-based services are gaining considerable importance in the emerging era of artificial intelligence, machine learning, and virtual reality. The technological evolution is inevitably altering the organization of modern industries, including the oil service industry, forcing companies to change their business models to stay buoyant.

Engineering, procurement, maintenance and modification, operational, and professional services segments of the oil service industry have lower production costs and thus are more flexible and prompt in terms of innovation and diversification within the industry (EY, 2016).

It is also easier for them to diversify into other industries. In fact, engineering companies are already decreasing the share of the oil industry among their customers by up to 20%. Another product and machinery supplier company among the respondents is planning to decrease the share of the oil industry from 80% in its customers' portfolios to 50% by the end of this year. One company working with mooring and loading systems, however, plans to maintain the share of the oil industry among their customers' portfolio at 80%. For drilling equipment companies, the share of oil industry portfolios continues to be 100% due to specific equipment characteristics that are difficult to apply in other industries. Notably, a service company with the lowest share of oil industry clients, 35% among their customers, did not decrease the number of employees and stayed the financially healthiest company among the respondents during the current industrial downturn.

One respondent even called the current downturn *a blessing* for the oil service industry in Southern Norway that can improve the industry's technological advantage, effectiveness, interactivity, scalability, innovation, and overall competitiveness:

*“The worst had already happened, the industry entered the downturn period. However, this downturn can be a technological blessing for the industry.”*

While some companies will unavoidably be damaged, the industry as a whole will benefit. During the upturn period for the industry, most oil service companies did not place an emphasis on efficiency of their equipment and products. The market was so strong and lucrative that everyone focused on volumes. Now, the focus has entirely shifted, which is positive for the entire industry. It is very important for the incumbent companies to keep an entrepreneurial spirit on a firm level and react more quickly to a changing market.

To have a diversified portfolio of clients and field of business is substantial for firms to be less exposed to the industrial cycles. It is a common belief among the respondents that it is important to invest into innovation projects to improve the current technological path of the industry. The counter-cyclical investment in technology development is not only a preferable strategy on a firm level but is necessary for the entire oil service industry. This strategy thus follows the pattern established by Dugal and Morbey (1995) who argued that counter-cyclical innovation was more beneficial for incumbent companies involved in cyclical industries. The respondents agreed, outlining that counter-cyclical innovation under the downturn conditions is more efficient because it has to quickly satisfy the changing demand of the industry and reduce production costs. Service innovation takes only a few months to reach the market compared to

product innovation, which can take years, thus showing that service companies are more flexible to innovate. During the upturn period, innovation projects were rather reactive than proactive. The downturn pushes the companies to act more proactively. One company among the respondents hired a Chief Technology Officer, CTO, since the downturn began in order to drive innovation projects more efficiently:

*“Technology is the main driver for us. We have employed a CTO – chief technology officer who will have guide us during this shift.”*

Several companies invested more in R&D since the downturn because of a lack of ongoing projects. Another respondent company’s CEO outlined that now is actually a better time for investing in innovation, because companies have a lot of expertise and human resources available. Financial resources should stem from the government, other companies, and joint ventures. This company received several innovation grants from there Norwegian government, which provides generous public support funds for promising R&D projects. Industry Expert 1 and four other companies, however, pointed out that the market should regulate the industry without a governmental intervention.

Most of the respondents agreed on the following steps to follow when aiming to implement the product development strategic direction:

- Look at the technology base a company has and, based on that, consider towards which industries it is feasible to diversify;
- Increase product efficiency of existing products and services;
- Reduce operational and production costs;
- Produce tailor-made equipment to satisfy the current customers;
- Consider customers’ and markets’ future needs while investing in R&D projects;
- Invest more in R&D; for service companies it is mostly human capital investment, which is more available now than before the downturn;
- Invest in digitalization and automation projects;
- Use cyclic innovation models instead of linear models, as it has also been suggested by Berkhout et al. (2010) in the theoretical part;
- Collaborate with clients, competitors, and cluster members within the oil service industry and among the related industries through: platform strategy, shared knowledge platform for several industries; and an open innovation model (which is however easier

applied for software companies, service companies, and startups, because there are certain business secrets that not all actors are willing to share); and strategic alliances.

### **5.2.3 The case of strategic alliances**

So far, consolidation within the oil service industry has largely been seen in international markets. But industry consolidation is expected to manifest in Norway already this year and to continue for 2-3 years afterwards. More strategic alliances are expected to happen, both under a regional cluster platform or regarding any clusters affiliation. According to Industry Expert 1, a large company will be more open to form an alliance with a small company, with the latter becoming the core business, due to the downturn conditions. Much more alliances are expected to happen with complementary and indirect capabilities.

Large companies were primarily focused on production volumes during the industry upturn. They used outsourcing models in countries with lower production costs for spare parts, such as Malaysia, China, Taiwan, Baltic countries, and Poland. The spare parts of the equipment or the entire product lines were produced and assembled in the mentioned countries, while testing, operating, maintenance, and quality assurance occurred in Norway. Outsourcing, which was achieved through strategic alliances with manufacturing factories, component producers, and sub suppliers in selected countries, was a strategic model for production companies. In contrary, due to the downturn conditions, Company 4 started to insource its production instead of outsourcing in order to keep the labor force at their daughter company employed:

*“Companies tend to outsource because of higher capacities and efficiency, it is actually more cost beneficial to outsource. But when you insource, you get to keep the labor force.”*

For this company, the strategy is opposite to that of most of other respondents, which is to move from services to product owners.

Strategic alliance and integration strategy choices depend on companies' size, capabilities, level of know-how, corporate structure, technological expertise, and competitive advantages. In the theoretical part, strategic alliances were described as a very useful tool for all actors involved (Mirani, 2009), but in practice it is not always the correct assumption. It is possible to group the findings on five levels of strategic alliances preferable for oil service companies in Southern Norway:

- Oil service company – customer (e.g. oil companies and rig companies), which is a forward vertical integration. This type of collaboration is more beneficial in the form of an alliance compared to a merger or acquisition. If one company acquires its client's company but continues to specialize on core products for similar clients, then the company starts to compete with its clients while still trying to sell products to them. This can compromise business ethics and reputation of the company and directly affect its business sales. So, according to Company 7: *“it is better to achieve strategic agreements with your clients instead of acquiring them”*;
- Oil service company – supplier (3<sup>rd</sup> parties, sub suppliers of spare parts for production), which is a backward vertical integration. Such integration model does not result in competition with sub suppliers for an oil service company but can affect the efficiency and flexibility of its production. A higher number of suppliers provide an oil service company with a larger number of choices. It is possible to order one spare part from one supplier, another spare part from another supplier, better control business processes and the consequences of firm's operations, etc. Acquiring a sub supplier limits a firm's choices, as it then has to “buy” products from the acquired sub supplier. The production costs in case of such acquisitions can be underestimated, resulting in losses for the main company if management fails to integrate the newly acquired business unit with the best possible synergy outcome. On the other hand, the acquisition of a sub supplier can add value to a company's product offer if the acquisition is managed efficiently. If an oil service company forms an alliance with such a supplier, it can achieve higher synergies with lower costs and no legal boundaries. This type of strategic alliance most often happens in a way of collaboration with no binding agreement. The pitfall of such alliances is however that one party may benefit from forming an alliance much more than the other. So it is important to discuss the conditions of such alliances for all the parties involved in advance;
- Oil service company – oil service company, which is a horizontal scope of collaboration between competitors. This type of collaboration is better achieved through mergers or joint ventures, because it requires more concrete legal bindings. Joint ventures, for example, are a great option for companies who do not want to outsource. It is also a potential tool to get higher market share and reduced barriers of market entry through merging with a local company. This model was also used among Norwegian companies on international markets, for example in Brazil, where the international companies are obligated to have a local content company in order to operate business. This model can therefore be used in other international markets or new industries for the Norwegian oil service companies. Mergers

are more optimal for medium-sized or small companies that lack market knowledge, financial resources, and technological know-how. It is easier for these companies to achieve synergy of their resources and capabilities and legally restructure their organizations. However, there are certain segments of the oil service industry that were hit harder than others by the current downturn – in segments like offshore shipping and subsea segments, a higher number of mergers may appear from the tougher competition and market conditions;

- Complementary strategic alliances – neither alliances with clients, nor with suppliers or competitors. It is an alliance with companies that are not directly involved with an oil service company's core industry of operations, like software, IT, or consultancy companies. This type of strategic alliance is highly desired by the survey respondents, because most of the companies understand that they lack certain technological capabilities to increase efficiency and decrease costs of their products and services. For example, strategic alliances are already happening within the area of condition-based maintenance and closer customer relationships because these two realms are the most desired in the industry;
- Shared platform knowledge and open innovation models. This is a type of alliance within technological expertise. Knowledge sharing boundaries have been decreasing due to the downturn conditions. But there remains a lack of confidence among oil service companies in Southern Norway. The companies whose technological know-how is what sets them apart from the competition are not willing to share their business secrets. Smaller companies, however, are more open to such types of collaboration. Nevertheless, if the scope of open innovation covers generic issues of interest to all companies in the industry – for example corrosion resistant coatings – then a higher number of players would want to collaborate on such issues.

### **5.3 Resources and obstacles to implement the strategic solutions**

Industrial downturns put companies working in cyclical industries in a position where their resources and capabilities are limited. The oil service industry in Norway has lost a lot of skilled human resources. Most of the companies within this industry are left with lower operational profits and profit margins, and negative cash flows. The oil service industry, globally and particularly in Norway, is in need of further technological upgrade. Moreover, the business models used in this industry are becoming outdated. Principles of linear business models still dominate the market. A company receives an order from a client, develops a certain product,

and sells it to this client. Instead, the usage of circular business models for oil service industry and other cyclical industries was suggested by one of the industry experts in the survey. Involving academia, for example, can improve learning and knowledge within the industry. The modern strategies and modern business models should be more circular in terms of innovation, as was suggested in the theoretical part by Berkhout et al. (2010). It is very difficult to succeed in emerging technologies required by the modern oil and gas industry while keeping outdated business approaches. Implementation of new business models is a managerial task at the corporate level that requires appropriate financial resources and technological capabilities on a firm level.

### **5.3.1 Management level**

Strategy development and implementation in practice is quite a challenging issue according to Industry Expert 2 (2017). Corporate strategy is developed at the corporate office and communicated to the business units of a firm. There are several levels of strategy development for corporations: corporate level, regional level, and local level. There is still a certain degree of hierarchy in several corporations in terms of strategy execution. When a corporate strategy is developed in the main office of a company and 80-100 slides are sent to the local offices to be implemented in the next month, the proper execution of such strategy is very time-restricted and prompted to fail. There are problems of communicating the strategy among the business units that would be related to the process strategy (Bosch et al., 1997). A company that combines several offshore services segments may need to adjust its corporate strategy for each particular segment, while still moving towards a common company vision. Companies that have corporate departments make an effort to communicate their corporate strategy to other offices in different countries, if they are international.

Some oil service corporations are predicted to acquire certain business segments of other companies during the current downturn, which several of them have already done. In both situations they will deal with the problem of not just adding a business unit to their corporate core, but to incorporate this business unit to reach a *better off* effect of synergy, economies of scale, and economies of scope. The corporate strategy should be changed in such situations and properly communicated to all the business units. Not only communicating the, but implementing and supervising its proper execution is vital, as Meyer and Volberda (1997) have previously suggested from the theoretical perspective. Some companies add products and services to their portfolio range that are simply too diversified for an easy transition. In this



situation there is an even higher need of bringing the units together through a joint corporate strategy and corporate values to achieve better synergies for the company. Sometimes, offices act like states with their own rules, so it is important to assure that shared corporate rules are implemented among all units. Corporate and regional managers are responsible for corporate strategy adjustments and its sound communication to local offices.

The strategy and the framework for its implementation come from the corporate top. However, executive level managers are responsible for operationalization, implementation, and execution of strategy within their regional and local business divisions. It is crucial for such managers to involve local employees to participate in the dialogue about strategy execution. In such highly technological industries like the oil service industry, the knowledge about technology does not always come from the top. Instead, it comes from engineers, manufacturers, ship controllers, drilling operators, etc., which is why it is essential to share knowledge and build a dialogue between executive and technological parties on all levels.

Communication is substantial to involve employees to believe in, own, and contribute to the same strategic choices managers implement, respecting and hearing their opinions:

*“The problem of implementation of the appropriate strategy is to make the employees believe and share the strategy, feel the ownership and contribution to the common purpose.”*

If managers and engineers of a company share the belief in achieving the chosen strategic decisions, the chances for its successful implementation are higher than in companies who lack this communication and shared beliefs.

Aside from the strategy operationalization and execution, managers are faced with several factual challenges. During industrial downturns, managers of affected companies undergo a lot of pressure. The consequence for management is to react fast, which is easy to understand but difficult to do, according to Company 1. First of all, it is a very sensitive and difficult task for management to reduce the number of employees from both ethical and legal perspectives. The oil service industry in Norway used to be one of the most stable industries with a low degree of employee rotation and reduction. The current downturn underlines the need for changing the organizational culture in the incumbent companies.

There is a need for companies and employees to become more proactive, work harder, manage multitasking, and to be more flexible and efficient. Moreover, the nature of relationship within a firm, between firms' business units, and between firms and their customers is undergoing a process of transformation caused by the industry downturn. Service companies need to

additionally manage not only internal, but also external people, for example within the offshore crew sector. Navigating this transformation process is a challenge for the executive branch and, if poorly executed, it can become a large obstacle for strategy implementation and overcoming the downturn.

Secondly, the huge task for management is to adjust all levels of costs. Lower profits and lower cash flows are significant obstacles to strategy execution. Primarily, indirect costs related with management have been adjusted. Most respondents, for example, merged their offices in the same cities or countries to achieve indirect cost reduction, also due to a reduced number of employees. These adjustments decrease costs, but can also reduce communication and management efficiency within organizations. Several companies took additional measures such as using more back offices and shared resources between their business units or even with external companies. Besides, there are management level reductions and replacements caused by the downturn, which is also an obstacle for the acting managers and employees to comply with strategic solutions.

Finally, the downturn caused more tensions for project managers, which have to manage the use of technology, resources, capabilities, engineers' time, and efficiency of their products. Technological project managers can have different perspectives of the strategic solutions for a company's ongoing projects than the executive managers, because of their deeper knowledge of technology. Project managers can familiarize themselves with the adjusted corporate strategy and even act like they take a certain part in it. But on the project level, these managers can still be driven by outdated business models, because they do not have the same business understanding and strategy implementation as management. Cooperative implementation of the strategic solutions between executive managers and technological managers is key for the future efficiency of the entire oil service industry.

### **5.3.2 Financial level**

Managing financial resources is an utmost important issue for oil service companies to mitigate the existing downturn, according to the respondents. Besides, if companies manage their cash flows successfully, a lot of business opportunities are open up for them in the downturn. Investment projects that were overrated during the upturn in the industry are more feasible now. Break-even costs for developing new technologies are decreasing. And most importantly, there are a lot of potential acquisitions on the market at a cheaper price than before the downturn. One of the respondent companies already has acquired over ten business units since the

downturn started. Besides, the current downturn in the oil service industry has facilitated the development of the offshore wind industry, due to the decreased costs of products and services that can be applied to the offshore wind segment. This results in more realistic diversification opportunities for oil service companies in Southern Norway who can serve the offshore wind industry and decrease their dependency on the oil and gas industry.

However, most of the incumbents in the oil service industry are dealing with difficult financial threats. In order to stay afloat, they need to adjust the cost structure of their products and services. The cost base is divided into two levels: indirect costs - related to management, accounting, project management, travel, accommodation, office facilities, supporting personnel, and social events; and direct costs – production costs, engineer costs, capacity costs, delivery costs, operation and maintenance costs, and so on. Indirect cost reduction percentage differs among the respondents. Some companies reduced indirect costs by almost 60%. This would be the case for large corporations that used to have several offices on their main markets. Smaller companies also cut their indirect costs, but to a lesser degree. The main focus for most of the respondents' companies to reduce the negative effect of the current downturn is to provide products with higher efficiency and reduced production costs.

The following are examples of measures that can be taken by companies in order to reduce their costs:

- Merge office facilities;
- Use shared offices among business units within the same company or with other companies;
- Use back offices;
- Keep inventory at sub suppliers;
- Outsource manufacturing, production, engineering, crew personnel;
- Increase delivery efficiency;
- Produce tailor-made equipment with lower production costs;
- Automate all possible processes within the value chains;
- Focus on utilization of resources, offices, equipment, and machines;
- Take preventive measures of equipment maintenance;
- Reduce operational costs of the offered services through a higher degree of digitalization.

Furthermore, local managers should control the financial liabilities and investments of their companies and accommodate them appropriately among the business units. They have to take

measures to secure cash flows. For example, having solid contracts with no cancellation due to convenience is a successful tool to control cash flows. From a customer perspective, downturns can be considered as convenient opportunities to ask suppliers for a price discount. From a supplier perspective, such convenience would result in huge financial losses. Payment collection for delivered products and offered services is a sensitive issue under the downturn conditions for oil service companies, because a lot of customers are trying to postpone payments due to decreased cash flows. Some companies prefer to negotiate with their customers and reach an optimal consensus for both parties. Other companies are more rigorous in terms of payment collection; otherwise they could be at risk of bankruptcy. So they leverage their customers by ceasing to provide service or through meeting with management until the payments are received. From a financial perspective, it is very important to keep relationships with customers tight.

Offshore shipping and offshore drilling companies are struggling the most to ensure necessary financial resources. Both segments are primarily serving the oil and gas industry. To name an example, a drilling operator ordered an offshore rig right before the downturn. It takes about three years for an oil rig to come into production. The necessary equipment for the rig was ordered from an oil service company. Several months later, oil prices start to drop. Shortly after that, this drilling operator experiences financial difficulties because of lack of income to pay for the agreed commitments. So the equipment order project gets cancelled, despite of the fact that its production has already started. The supplier company loses the project, the possible revenues, and moreover does not get paid for the work that has already been done. This is a very bad situation in the industry. So from an oil service company perspective, it is important to get a financial guarantor for clients who are not capable to pay their financial liabilities in case of bankruptcy. Thus banks play a crucial role for some firms to survive the current industrial downturn.

Offshore shipping companies experienced similar situations when their contracts got cancelled due to the reduced number of oil and gas extractions. Operational costs for offshore vessels are so high that operating ships that are not fully loaded is much more expensive than to have them on stand-by. However, if the number of active operations for offshore vessels decreases drastically, these vessel owners are left with stringent financial liabilities. So, for example, supporting banking policy for these companies, is an essential tool to mitigate the downturn:

*“Thanks to the strong owner and banking policy to postpone the amortizations and payments to 2020 we can survive the current downturn.”*

Otherwise, these companies have to seek private investors whose deals are riskier and have higher interest rates.

There are several channels for struggling companies to receive investments and loans:

- Corporate parent, mother company, and different divisions within the same company;
- Private investors, bond holders, and other companies;
- Joint ventures, mergers and acquisitions, and daughter companies;
- Governments, public organizations, and grants for technological developments.

Lack of financial resources and operative financial management are tremendous obstacles to implementing the necessary strategic solutions for oil service companies to overcome the current downturn in the industry. Due to the importance of financial management, several companies among the respondents have hired financiers during the downturn. The empirical evidence has also indicated that being a part of a big diversified corporation helps oil service companies better mitigate the risks of an industrial downturn. Service companies that do not own tangible resources like machinery, equipment, vessels have adjusted more quickly and easily to the market conditions. Most of them managed to stay financially healthy during the current downturn.

### **5.3.3 Technological level**

There are certain technological challenges for the continued performance of the oil service companies located in Southern Norway. There is a clear need for an industry alteration towards more advanced and robotized solutions capable to increase the efficiency of the offered equipment while, at the same time, reducing its cost structure. Emerging technologies are expected to drive the oil service industry in Norway in the near future. The incumbent companies should try to understand tomorrow's demand and technology, producing next-generation products and services. The new supply chain should approach another level of scalability. The major challenge is to achieve this scalability. All respondents realized almost immediately after the downturn that the emergent new technology era is a good sign for the industry. All companies stressed technology development as the main strategic theme for upcoming years, not only in order to overcome the current downturn, but also to prepare to take on a stronger position in the market when the upturn will come.

It is essential to connect the executive branch to those understanding technological aspects within a company to simultaneously benefit from both new technology and new business models, so that the company can become more interactive, optimized, efficient, and innovative.

Lack of circular knowledge processes in oil service companies is a big obstacle for the industry's technological development. The role of managers in this process is to establish platforms and channels for sharing this knowledge. They should put hierarchy aside and involve their engineers enough to succeed as a team. Similarly, engineers in oil service companies should become more proactive and more engaged in the strategy process. The communication culture, not only on a manager-engineer level, but also between engineers, should become more transparent. During the upturn the focus was not on efficiency. For example, a medium-sized oil service company produced 10 different product lines. There were certain components that were almost the same for all those products. But the 10 engineers who produced those products did not communicate with each other. If the communication process had been more open and efficient, this company could have achieved a higher degree of economies of scale, reduced inventory, worked smarter, used less metal, and challenged suppliers much more.

Time is a huge obstacle in elaborating a proper technology development strategy. During the upturn, the engineers of the interviewed oil service companies were busy with many ongoing projects. They did not have time to talk to each other about the technology they were using in different divisions within the same company. They did not have time to explain to management how it would be possible to increase the level of efficiency of the existing technology. They did not find time to properly understand the corporate strategy of their companies in order to contribute to it. All innovation happened in ongoing projects, when the products were quickly adjusted to clients' needs. A common technological strategy on a firm level was lacking, and the innovation process was rather reactive than proactive.

It seems that the industry needed the current downturn to change its complete technological innovation strategy. Despite high profits during the upturn period, there was fear of risks of trying new ways of operating the industry because of the possible damages. But now, the worst has already happened since the industry entered the downturn period about 3 years ago. From this perspective, the current downturn can be a technological blessing for the industry. There is an increased acceptance of taking more risks for introducing and testing new technology that has the potential to reduce costs and increase product efficiency. During the upturn, large companies would not take these risks. The balance between reactive and proactive innovation should be reflected in the corporate strategy of firms who aim to compete in terms of product quality and increased resource utilization. It can be smart to attract the external consultant to change the close-minded technological and business approaches within a company. Moreover, downturns bring more available resources and competences to the market, which can be engaged by oil service companies on a project basis.

There are certain technological obstacles for oil service companies aiming to diversify to industries other than oil and gas. For example, one company among the respondents wanted to use their drilling equipment in the thermal energy sector, but the existing equipment was not adapted for such high temperatures:

*“It is challenging market because of the hit, higher temperatures compared to what we used to work in offshore oil and gas. So you have challenges with materials.”*

For several segments of the oil service industry, it is too costly and technologically challenging to diversify towards other industries. The oil service industry possesses intrinsic technologies that can be difficult and too expensive to apply elsewhere.

Even within the oil and gas industry, there are a lot of differences in technology used in offshore segment compared to onshore one. The switch to the onshore market is quite feasible in terms of costs. Operation and production costs on onshore markets are much lower, and projects are much shorter, so payments are more frequent and can provide cash flows for oil service companies much quicker than offshore projects. But the onshore segment has higher automation rates, and its equipment has advanced way faster than in the offshore segment, so this segment is tougher in terms of equipment usage. Still, the onshore oil and gas segment has gained a higher level of efficiency due to repetitive training and automation of its rigs. The offshore segment is under pressure to reach that kind of efficiency and stay competitive with the onshore segment.

While onshore equipment is more automated, the one used in offshore is more advanced and the education level of employees involved in offshore is higher compared to onshore workers:

*“The personnel working on offshore rig is normally high skilled, on onshore – less skilled. So you can not have too advanced equipment, because they can not operate it.”*

So, even if an oil service company aims to apply its offshore equipment on land, it can encounter a lack of necessary knowledge among employees to operate it. The current downturn may eventually push managers, engineers, and technical personnel to upgrade their education through specialized courses and training programs to cope with the technological changes.

## 5.4 Preparation for the upturn

The oil service industry is currently undergoing a transformation process witnessed in Norway by the respondent companies and extending to the international level. The current downturn in the oil service industry is a driving force for the industry's reorganization. It is a common view among the respondents who work for oil service companies based in Southern Norway that the markets for oil service products and operations will continue to be tough for the next 2-5 years.

The downturn is calling for:

- technological breakthroughs;
- increased digitalization;
- new business models being more circular;
- more customer-based solutions;
- likely a lower scope of projects, resulting in tailor-made products and services;
- a higher number of consolidations in the industry;
- a number of new entrants offering complementary services on the software and consultancy levels.

Industry disruptions can be beneficial for the industry but can damage some companies. However, those companies that manage to incorporate appropriate strategies and sets of actions will come out stronger for the upturn.

To stay competitive on international markets, Norway has to utilize technologies in a more efficient way. It has to produce superior products that can provide cost savings or significantly better performance. Norwegian oil service companies can never compete on low costs. Rather, they set themselves apart through a high level of expertise, know-how, and quality products and services. Drilling companies, for example, encountered a high demand during the last upturn because of appropriate timing and market conditions. The drilling business had very high entry barriers, so the companies that managed to enter this segment were able to reap high profits easily. Now this will change. Solutions for serving oil and gas markets have to become more efficient and customer oriented.

Overcoming the downturn is more challenging for product manufacturers than for service companies. Norway has had a long history of maritime and shipping industries, which have been its long-lasting heritage. Maritime operations and crew management should be kept among the core expertise of Norwegian oil service companies on international markets, as stressed by Company 8. Other companies producing equipment, rigs, and platforms have to reinvent themselves. They might still be present in the business, but in a different way. There are several



consolidations expected among drilling contractors, mostly in a vertical scope of integration. Generally, a lot of industry restructuring is expected to happen within the next 2-3 years.

Oil drilling companies and ship owners were hit the hardest. Supporting industries, such as subsea and mooring segments, experienced the domino effect. Some offshore ships, for example, are now valued at a third of what they used to be worth 3 years ago. Mortgages for ship owning companies are currently higher than their income and banks do not want to issue them new loans. Such companies can be pushed to merge in horizontal scope due to the financial tensions. Collaboration through mergers and alliances will help offshore shipping companies to mitigate the current downturn and stay in existing markets when the upturn arises. The current downturn in oil and gas industry and oil service industry will generally facilitate new ways of partnerships, contracts, and new technologies.

A higher degree of diversification is expected for the incumbent companies within the oil and gas industry and within alternative industries. Strategically, the respondent companies realize the necessity to balance between products and services within their portfolio offer, increasing the share of services. Small companies and emerging startups are more open to finding new ways to diversify. However, many small owners still do not act very professionally. For medium-sized and large companies, it is important to react more quickly to market changes, to preserve the entrepreneurial spirit, and to invest in technological innovation, both in terms of human capital, and managerial and financial resources. The biggest challenges in coming out strong for the upturn are to ensure cash flow and receive funding. Certain segments of the offshore industry are expected to be more profitable than others. The companies that have more innovation, more technology, and advanced cost reduction will overcome the downturn more quickly. The respondents commonly outline counter-cyclical investment as the strategic tool to prepare for the upturn, but in reality only few big companies can actually implement it.

On the generic level, the industry will not be back. However, the drilling market will continue to be “bread and butter” for Southern Norway. This segment will come back later for the upturn, because the market is saturated. Other segments are expected to increase their capabilities and sales sooner and start hiring again. This tendency will vary from segment to segment, but several respondents predict that by the end of 2017 some companies will be back. The offshore market is ready for smart solutions to increase the efficiency and reduce the costs of the offered products. Larger companies will now listen to small companies that can contribute more innovative and technologically efficient solutions, as such collaboration is a good preparation strategy for the upturn. The market is improving on the service side, but is more challenging for large companies that produce machinery and equipment for example. The effect of the

digitalization will bring oil service companies closer to their customers and help improve customer relationships. Embracing digitalization processes is key for companies strategically planning to come out strong for the upturn. Organizational culture of the entire industry and on a firm level is anticipated to continue the already started process of transformation towards a higher degree of transparency, cooperation, and strategic alliances.

The complete diversification into, for example, onshore or renewable markets is not considered to be the optimal strategic direction for oil service companies. The offshore oil and gas sector is expected to come back, though probably not in the same shape. There are no other fossils and sources of energy that can completely substitute crude oil. Shale oil cannot substitute crude oil for the upcoming couple of decades. At least until 2030 crude oil will continue to be the primary resource for the energy needs of the growing population (BP, 2013). Moreover, there is a need to reduce coal utilization and substitute it with oil or gas, because of the high levels of CO<sub>2</sub> emissions. Some countries, like Norway, have advanced in increasing the share of renewable sources of energy, following a sustainable development path. But globally, energy consumption and manufacturing are still highly reliant on fossil fuels, particularly oil.

## 6 Conclusions

The oil service industry is a highly technological and complex industry which is very sensitive to the conditions on the oil and gas global markets. The main purpose for this master's thesis was to study, using the example of oil service companies based in Southern Norway, how similarly cyclical industries can better prepare for industrial downturns and reduce the negative effect of such downturns. Strategic solutions were analyzed on the corporate level of firms because industrial downturns often result in industrial disruptions, thus making the top management responsible for coordinating the survival of their firms.

Corporate strategy implementation and execution is a challenging issue for companies undergoing industrial downturns. Some corporations within the oil service industry still follow the pattern discussed by Porter (1989) where a corporate parent acts as a coordinating unit of separated business divisions, each of which has its own strategy. However, the corporations whose business units are more integrated and supportive of each other in terms of finances, resources, offices, and capabilities have stronger resistance to industrial downturns.

The Ansoff Matrix (1957) was applied empirically through the interviews with managers of seven selected oil service companies and two industry experts. **Market penetration** strategy was not suggested by the theory. In practice, however, several companies considered using this strategic solution after introducing modified products to existing markets. Market penetration

strategy is preferable during early upturn periods. It can be beneficial for companies who will be pioneers in introducing new products and new solutions to the struggling markets affected by downturns.

**Conglomerate diversification** was neither suggested by the theory nor favored by the respondents as the reactive solution to mitigate the risks of industrial downturns. However, those oil service companies who belong to conglomerate diversified corporations withstood the current downturn better than less diversified companies. Thus, this strategic direction has higher chances for success during industrial upturn periods. Modern conglomerate diversification does not necessarily have to seek economies of scale and synergy benefits through value chains of these different industries, as it was suggested from the theoretical perspective (Di Minin et al., 2010). This strategy can be used in purely financial terms as the tool to diversify risks and reduce dependency on one industry. As a preventative measure to mitigate downturns, this strategic solution can work in companies who have strict control over their financial resources and manage them efficiently.

**Market development** and **product development** strategic directions were evidenced to be the most optimal in order to reduce the negative effect of the current industrial downturn for incumbent companies. In geographic terms, market development strategy seems to be more optimal during upturn periods. The two main entry barriers reflected in the theory (Løvdaal and Neumann, 2010) – need for capital and need for political support – could become significant obstacles to pursue this strategic direction during downturns. This was reflected by the respondent from Company 5:

*“We cannot expect the new markets to be out there whenever we decide to enter them.”*

Gathering information about new markets consumes a valuable resource – time, which companies involved in cyclical industries do not have during downturn periods. However, downturns push companies to assume higher risks than they would take during upturn periods. Thus companies can reconsider their entry to vulnerable markets due to downturns. Eventually, they can gain stronger market presence in potential markets and ensure their sales when the upturn is there.

New markets strategy concerns entering new industries to which the companies affected by downturns can diversify. For the oil service industry, which has very specific factor and production conditions, entering new industries would be closely correlated to **product development strategy**. This will however depend on which segments of the oil service industry

the companies are part of. For service companies it is easier and less costly to diversify to new industries. Their main assets are people, which are more available during downturns. For product owners, entering new industries would be more technologically challenging and expensive. Industrial downturns offer great possibilities for companies to finally test their innovation strategies, which they failed to apply during upturn periods because of high demand for already existing products. Counter-cyclical innovation was theoretically suggested by Dugal and Morbey (1995) to be more efficient for companies undergoing downturns. However, these companies would have to possess the necessary resources to actually implement this strategic solution. For the oil service industry, the current downturn will mostly result in product innovation, process innovation, and organizational innovation.

The theoretical argument of Mathews and Tan (2010a), who viewed industrial downturns not only as an obstacle, but as a *cleansing mechanism* that can strengthen technological advantage of an industry and result in using new business models and new managerial approaches, was verified by the respondents from the industry. Many companies were suddenly hit by the current downturn in oil service industry and had to act quickly to mitigate the risks of it. Still, most of the respondents also realized that the industry needed to have this downturn in order to become more efficient and, particularly for Norwegian oil service companies, to become more competitive on international markets.

### **6.1 Suggestions for cyclical industries to reduce the risks of industrial downturns**

This research has revealed that industries are not homogeneous and their strategies to overcome downturn periods can differ due to each industry's specific factors. These factors are combinations of external conditions and industries' intrinsic features. External conditions involve supply and demand conditions in markets and economic, legal, political, social, technological, and environmental constraints to enter them. Internal conditions are related to processes and value chains within a certain industry. Especially when it comes to technological industries, the internal factors will differ among the industries. The equipment type, production facilities, human resources, expertise, and know-how of the oil and gas industry will differ from those of the renewable energy industry. For related industries however, several similarities in strategy making can be found, like for example offshore shipping and conventional shipping. Industries can still learn from each other how to increase the efficiency of their products, achieve better economies of scale, integrate value and supply chains more effectively, reduce costs, and become more digital and closer to their customers.

The empirical evidence showed that the companies reacted to the downturn in the oil service industry by taking reactive measures to mitigate its negative effect, but they did not necessarily change the corporate strategy of their firms. The actions taken by these companies can however be grouped into certain strategic directions. **Product development strategy** is the key strategic solution for the oil service industry as found by this research. Product development and innovation strategies are commonly driving cyclical industries nowadays, because most of them are highly technological. Thus, using a product development strategic solution is vital for companies working in technological cyclical industries to be able to withstand industry downturns and come out stronger for industry upturns, offering modified products capable to satisfy the future needs of their customers.

Despite the increased globalization in oil markets, entering new markets still requires detailed market analysis and knowledge of the business environment, as well as establishing confidence and trust with local players. **Market development strategy** is however generally suggested for cyclical industries during downturn periods, especially in terms of related diversification to industries with similar value chains. Pursuing market development strategy to enter vulnerable markets can pay off for proactive companies when the industry upturn comes.

The research findings suggest that companies involved in cyclical industries can achieve diversification strategy by engaging in knowledge exchange with related industry actors through shared knowledge platforms. The framework for operations and generic industrial factors can be shared among related industries resulting in better synergies for all the companies involved. Service companies and startups can benefit through networking via open innovation models that can potentially develop new services for cyclical industries. For product owners sharing their technology knowledge openly is challenging, because their *know-how* is the competitive advantage for these companies. In this case, strategic alliances and integration strategies are suggested for achieving higher innovation output.

**Market penetration strategy** is suggested for early stages of industry upturns. This strategic direction can work as preventive and proactive measure to prepare to industry downturns and to maintain market share through having high number of customers on each market. However, companies involved in cyclical industries cannot rely entirely on this strategy, because industry downturns can affect all the international markets. Nonetheless, a higher number of orders on each of these markets can smooth the risks related to industry downturns and give a larger backlog for such companies to elaborate on complementary strategies to market penetration.

**Conglomerate diversification** strategy can be suggested for cyclical industries in two cases. The first case would be to pursue this strategy during upturn periods when the profits are high.

This would be a proactive strategy. The second case would be to pursue this strategy during downturns in the industries towards which companies want to diversify. Conglomerate diversification can also work for companies that manage their financial resources successfully regardless of industrial cycles. Highly diversified corporations are more difficult to manage while the achieved synergy effect from adding new business units can be greatly overestimated. From a financial perspective, though, diversification helps companies to reduce the risks of industrial downturns, especially if they serve several industries with different cycles. Then, such companies could benefit from allocating their financial resources profitably, both within the company and to external projects.

Upon in-depth analysis of the oil service companies located in Southern Norway, the following corporate level strategic solutions to reduce the risks of industrial downturns can be proposed for similar technological cyclical industries:

- The role of the corporate parent is crucial in order to ensure proper communication and a knowledge-sharing culture within companies working in cyclical industries;
- Strategy development, implementation, and execution should have solid grounds, and be managed by competent leaders with a high risk tolerance;
- Companies involved in cyclical industries are prompted to have long-term strategies and understand future needs of their customers to stay in any cyclical industry;
- Market penetration strategy and conglomerate diversification strategy are suggested for upturn periods as a preparation for industrial downturns;
- Market development and product development are suggested as reactive strategies for mitigating the negative effect of industrial downturns;
- A certain balance between reactive and proactive measures should be embedded into the corporate strategies of firms working in cyclical industries;
- Constant technological and business development – usage of cyclic innovation and business models instead of outdated linear models;
- Innovation is not a one-time action, but a series of activities. Commitment to innovation should be coupled to the corporate strategy. Counter-cyclical innovation has been theoretically tested to have a better effect on companies' performance after downturns. Empirical evidence suggests to have an optimal balance between pro-cyclical and counter-cyclical investments;
- Product development and innovation are no longer driven by industrial growth, but by demand on the customers' side and networks on competitors' side;

- Increased digitalization and automation are measures for cyclical industries to strengthen customer relationships and increase industrial efficiency, safety, and transparency;
- Being part of a diversified corporate group helps firms reduce the risks of industrial downturns;
- Diversification in terms of both markets and products helps leverage business portfolios and reduce the risks of being dependent on one industry;
- Balance between products and services can help companies to manage cash flows more efficiently, due to different payoffs, investment periods, capital intensity, human resources intensity, forms of contracts;
- Finance is a big issue. Diversified corporations can manage their finance better, divesting from more profitable segments to the segments affected by industrial downturn. If companies serve different industries, they become more resistant to downturns;
- Having non-cancellable contracts helps companies involved in cyclical businesses to reduce the risks of negative cash flows and bankruptcy in times of downturns;
- Rigid financial management and cost structure control, not only during downturns, but also during upturns. It is very important to collect payments on time to maintain positive cash flow;
- Involvement of both the executive and technological branches of technological firms in strategy development and decision making processes is critical for the success of the strategy implementation;
- Good partners are important to achieve the selected strategic choices through strategic alliances, mergers and acquisitions, clusters and networks;
- For companies with strong know-how involved in cyclical industries, strategic alliances are advised on company-customer level, company-supplier level, and company-complementary producer level;
- Small companies can benefit from networking and strategic alliances with their competitors. For medium-sized and large companies horizontal scope mergers are proposed to fit better due to control issues;
- Shared knowledge platforms for generic industrial factors are suggested for companies within a certain industry and among several related industries;

- Circular learning and knowledge sharing business models are generally suggested for cyclical industries in order to improve communication and decision-making on a firm level in companies working in such industries;
- Improve managerial flexibility towards new business models and more transparent and circular organizational cultures with removed hierarchy;
- Maintain entrepreneurial spirit in companies with constant technological upgrade;
- Perceive industrial downturns not only as an obstacle to overcome, but as a business opportunity to develop product and services, innovate, grow through mergers and acquisitions, establish stronger partnerships and alliances, enter new markets and industries, and become more digital and cost-efficient.

## **6.2 Research contribution**

This master's thesis has formalized theoretical knowledge and empirical evidence to the importance of the appropriate strategic solutions on corporate level for companies undergoing industrial downturns. The optimal strategic directions of market development, product development, and strategic alliances were highlighted within the oil service industry in Southern Norway. The necessary resources and constraints on managerial, financial, and technological levels were discussed.

The findings, supported by relevant theories, suggest that corporate strategic choices are essential for successfully overcoming industrial downturns and to better prepare for upturns and consequent future downturns. The empirical findings of this research study accentuate that outdated linear business models and innovation strategies should be changed towards cyclical models, involving a higher number of actors on a firm level in strategy development and execution process.

## **6.3 Suggestions for further research**

Despite several common strategic directions for cyclical industries to overcome the industrial downturns, the real actions may differ from one industry to another, depending on the industry's internal factors. Identification of industry cycles helps to better understand which strategies the companies working in cyclical industries need to follow in order to overcome industry downturns. It is highly recommended to conduct similar research for other cyclical industries and, even further, compare strategic solutions among several industries to reduce the risks of industrial downturns for cyclical industries.



The current research was conducted as qualitative study, limited within a certain geographical scope and sampling. The oil service industry is a highly international industry and to evaluate the complete industry would not be possible for a master's thesis, due to limited means, time, and resources. This research study can be complemented by similar studies in other geographical areas and markets. The evolution of corporate strategy in cyclical industries could be suggested for future research. Qualitative studies of cyclical industries could be complemented with quantitative studies in order to reach higher validity and reliability of such research.

Further research to elaborate more on the topic could be:

- How do mergers and acquisitions in oil service industry affect the shareholder value?
- Mergers in offshore shipping industry
- Digitalization process in oil service industry
- Product development strategy for offshore drilling companies
- Innovation models in subsea segment
- The role of corporate parent in managing innovation

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## Appendix

### Appendix 1: Reflection note

The purpose of this research has been to indicate the optimal strategic solutions on the corporate level for companies involved in cyclical industries to reduce the risks of industrial cyclicity. The oil service industry has been chosen as the case industry for this research due to its vulnerability to industry cycles caused by fluctuations of oil and gas prices. The topic is well timed, due to the current downturn in the oil service industry, caused by the oil price decrease three years ago. The study is a qualitative case study based on semi-structured in-depth interviews with oil service companies and industry experts based in Southern Norway. The geographic area for this research has been limited to the mentioned region due to resources and time constraints.

Based on the Ansoff Matrix, complemented with the strategic alliance option, the potential strategic solutions to mitigate industrial downturns and better prepare for future cycles were empirically applied on the oil service companies located in Southern Norway. Throughout the study, the role of managers to coordinate, develop, and implement the necessary strategic directions for their companies to survive the current downturn was emphasized. Market development and product development were suggested as the most viable strategic directions for this purpose, along with strategic alliances. Evidence suggests that for such a technological industry as the oil service industry, the main focus to reduce the risks of industrial cyclicity is on continuing product development. Counter-cyclical innovation and open innovation models were particularly offered from the theoretical perspective, but were found to be difficult to implement in reality. Besides, the downturn conditions will push the incumbent companies to assume higher risks than before the downturn and attempt to enter vulnerable markets. Related diversification towards alternative industries is the less risky solution, but requires large investments, due to the industry-specific factors and equipment types. Generally, appropriate strategy execution is often limited by managerial, technological, and financial resources.

Nevertheless, most of the companies emphasized their will and effort to improve existing products and service offers to reduce the costs and improve the efficiency of the entire industry. Strategic alliances were not perceived as the exclusive strategic direction under the downturn conditions, yet the tool to reach out new markets or products. However, industrial downturns bring a lot of opportunities for industry restructuring, which is expected in the oil service industry worldwide, mostly in form of mergers and acquisitions. The strategic alliance direction is preferable on the company-customer level, but not on the company-supplier or company-



competitor levels, due to control issues. The open innovation model has been found to appear more successful for small companies and complementary equipment startups. For large corporations with strong technological expertise, sharing knowledge with competitors through open innovation and share knowledge platforms is less preferable, unless it concerns generic issues for the entire industry.

The current downturn in oil and gas is a benchmark for the oil service industry. The main conclusions can be summarized in the following points for the companies involved in the oil service industry, and potentially extended to other cyclical industries:

- balance proactive and reactive product innovation;
- increase service shares of their businesses;
- become more digital and more closely related to their customers;
- become more flexible and capable to deliver tailor-made solutions;
- strategically diversify towards related industries to become less dependent on oil and gas production;
- use cyclic business models and cyclic innovation models instead of outdated linear models to reduce the risks of industrial cyclicalities.

In the following paragraphs, the discussion of the findings and conclusions from the thesis will be provided in relation to internationalization, innovation, and responsibility.

### **Internationalization**

The oil service industry is Norway's second-largest industry after oil and gas. 40% of its turnover is coming from international markets, making the industry highly international. For the oil service companies based in Southern Norway this number was even higher before the downturn. While the companies analyzed throughout my research project are based in Southern Norway, the markets they serve are international. That is why the conditions on international markets and fluctuations in oil prices, demand and supply conditions, and political regulations of oil production have a direct effect on the prosperity and survival of the Norwegian oil service companies.

These companies have been prospering for many years, due to the lucrative conditions of the domestic market, which for most of them was still the main market. The current downturn in the oil and gas industry is changing this condition for these companies. Norway as the oil producer country had been hit hard by low oil prices, which has resulted in decreased production and number of operating oil rigs. This has directly affected unemployment of engineers and

personnel working offshore. Several counties in Norway reached the highest percentages of unemployment rates since the discovery of oil in this country. This means that the current downturn is the turning point for the Norwegian industry and business approach which must become more global and cyclic. A similar situation can be experienced in countries which rely on export of natural resources or which main industries are highly cyclical.

### **Innovation**

Cyclical industries mostly produce durable goods such as raw materials and heavy equipment. Oil and gas, construction, metal production, and semiconductor industries are examples of cyclical industries. The mentioned industries are subject to innovation because innovative activities are potentially capable to improve the quality of their products, and the duration of equipment exploitation, as well as prevent damages, reduce costs, and increase efficiency. Most of the cyclical industries are highly technological, which means that development is impossible without innovation nowadays.

This research has focused on the oil service industry based in Southern Norway. These oil service companies are exploiting large benefits from governmental support for research and development activities. There is a lot of support available to finance innovative projects in this country. However, the oil service companies cannot exclusively rely on governmental aid and lucrative profits from oil production and sale, which they have been enjoying for too long. Norwegian oil service companies are among the most advanced and innovative in the world, but they still lack a proactive entrepreneurial approach and flexibility. Industrial downturns push the incumbent industries to innovate to stay in the business. However, the RD&I activities should not be exclusively reactive due to the market and industry conditions. Ideally, the balance between proactive and reactive innovation should be embedded in the corporate strategy of companies serving cyclical industries. Moreover, cyclic innovation models should dislodge the outdated linear models to achieve better performance of such industries. Still, compared to other markets, Norway has all the necessary resources to embrace the mentioned changes. The only gap left is to change the closed-minded business culture on a firm level.

### **Responsibility**

Companies producing durable goods and equipment are responsible for their quality and safety of operations. Working on offshore oil rigs, for example, is a very dangerous process. Oil service companies that produce equipment for oil and gas exploration and production are not only responsible for the proper workings of the equipment, but also for the lives of the personnel

working in this dangerous environment. That is why several oil service companies in my research expressed their concern about sharing technological knowledge and innovation with other companies. For them, it is not only about cost reduction, but also the responsibility and accountability for the products they produce and services they deliver. Moreover, technological knowledge and capabilities to produce certain products and services are the competitive advantage of such companies.

That is why, on the industrial level, the cooperation between production companies and their clients is the most feasible type of alliance. Customers express their needs and preferences and the industrial companies attempt to produce the exact products to satisfy those needs. For example, a certain oil service company produces and sells a technology pattern developed by a third company or through shared knowledge platform to its clients. The equipment fails and several employees from the client company get injured. So, this oil service company is responsible for the equipment they deliver, for insurance of the injured people and can lose its business reputation. That is why quality control and responsibility for the delivered products are crucial factors for cyclical industries.

Norwegian oil service companies strictly follow international and European standards of oil equipment production. They do not prioritize to compete on low prices on international markets, because high quality certified products are expensive. However, it is important to verify suppliers and conditions of operations in emerging markets or other vulnerable markets. Norwegian oil service companies may attempt to enter due to the downturn conditions. Besides, using patents and licenses is critical in this business to mitigate risks of substitutes and falsifications.

## **Appendix 2: Example of interview questions for industry experts**

1. What are strengths and opportunities for the oil service industry based in Southern Norway?
2. What are weaknesses and threats for the oil service industry based in Southern Norway?
3. What is the effect of the oil price decline on the oil service industry based in Southern Norway?
4. How does the current downturn differ from the oil price decline in 1996-1998? 2007-2008?
5. What is the level of internationalization of the oil service companies based in Southern Norway?
6. Were there any bankruptcies in the industry during the last 2-3 years?
7. Were there any new entrants?
8. Were there mergers and acquisitions in the industry caused by the downturn?
9. Did the number of strategic alliances increase due to the downturn? What are the obstacles? Do companies not want to share their technological knowledge?
10. Should the local companies internationalize more to diversify the markets?
11. Should companies diversify the industries they work for?
12. What are the opportunities and obstacles related to the offshore wind industry?
13. Should the companies and maybe the government invest more in RD&I?  
What are the advantages of counter cyclical innovation versus pro-cyclical innovation?
14. What are the possible strategic solutions for the oil service companies based in Southern Norway?
15. Who is responsible for developing and implementing these solutions?
16. What are the obstacles for changing the corporate strategy in these companies?
17. How can the industry prepare for the upturn?

### **Appendix 3: Example of interview questions for companies**

1. What are your main products and services? Which new products/services were introduced by your company since the downturn?
2. Which main industries do you sell your products for? What are the possible alternatives? Obstacles?
3. How big is the share of oil and gas industry among your clients? Its importance?
4. How did the oil service industry downturn effect the size of your company in terms of employees, profits and markets?
5. How did you react to the downturn effect? Which measures did you take?
6. How did the downturn effect your business units? Product lines?
7. How does the current downturn differ from the previous ones in 1996-1998? 2007-2008?
8. What are the strategic solutions for your company to reduce the risks of the industry downturn / prepare for future cycles?
9. What are the obstacles for implementing the mentioned solutions?
10. Did your company change the corporate strategy since the downturn?
11. How did the downturn affect the spending on RD&I for your company?
12. How can you benefit from the collaboration with other companies in the industry to mitigate the negative effect of the current downturn? Strategic alliances?
13. How can your company strategically prepare for the upturn?