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Supervisor: Evelina Gavrilova

Strategic Financial Statement Analysis and Valuation of Aker Solutions ASA

By

Haakon Simonsen Farstadvoll

Abstract

The purpose of this paper is to estimate the fair value of Aker Solutions ASA per 31.05.2017. The fair value is held up against the market price to make a recommendation as to what investment strategy an external, well-diversified investor should follow.

The strategic analysis concludes that Aker Solutions has a potential strategic advantage in the longer term, but faces strong challenges in the market in the short term.

A fundamental valuation by a DCF approach is used as the main technique for estimating the fair value. The valuation is supplemented by a multiple analysis. The fundamental valuation gives an estimate per 31.05.2017 of 43,05 NOK/share. It is supported by the relative valuation of 53,74 NOK/share.

Per 31.05.2017 the shares are traded at a discount relative to fair value of 3,4%. Given the uncertainty in the estimates, a neutral investment strategy is recommended. The conclusion is that an investor should hold shares of Aker Solutions ASA.

Preface

This paper is written as a final part of the master's program at NHH. In the master's program I have specialized in subjects related to accounting, business management and performance analysis, as well as topics in finance. Valuation, as it comprises key elements across several of the courses I have chosen, appears as an opportunity for a practical application of the theoretic understanding gained throughout my studies.

Aker Solutions was chosen as the subject for the valuation because of their position in the Norwegian oilservice industry, which is an industry I wanted to learn more about. The industry's cyclical nature and continuous changes, in addition to Aker Solutions being a knowledge-based company, makes the valuation more challenging, but enhances the learning experience and knowledge gained from writing the paper. A key factor in my choice of topic and framework was to gain experience that may be valuable in relation to future employment.

During the process of writing the master's thesis, I have therefore sought to solve the problems that have arised and the challenges encountered in an independent manner. Writing the master's thesis has been challenging, but a great learning experience and a nice way to complete the studies at NHH.

Bergen, June 19th 2017

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Haakon Simonsen Farstadvoll

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1 Introduction

In this chapter the the background and problem formulation is presented. The choice of valuation techniques and structure of the paper is then addressed. Finally, the limitations and delimitations for the paper are described.

1.1 Background and problem formulation

The topic of this paper is a valuation of Aker Solutions ASA. My main reason for choosing valuation as the topic of my master's thesis is that it involves elements from several disiplines. In this way it allows for applying knowledge and experience gained throughout the course of my studies in a more practical setting.

Aker Solutions is a company with a long history and traditions in the Norwegian oilservice industry, but were the corporate structure of the company has evolved substantially over the years. Aker Solutions mainly operates in the subsea segment of the oilservice industry, which is a segment of strong growth and is becoming an increasingly more important aspect of offshore oil and gas extraction. Both the company and the industry is very appealing, making the process of writing the paper an interesting experience as well as an opportunity to enhance my understanding of the topic.

The paper is primarily based on Knivsflå's framework presented in BUS440 spring 2017, but supplemented with other sources. Instead of strictly following the framework, I have made some smaller adjustments along the way where it was deemed appropriate. I have also put great emphasis on trying to understand the underlying structures of the industry and Aker Solutions' operations, and in this way get as close as possible to the fair value of the company. The presentation of the company and the industry, as well as the qualitative part of the strategic analysis, is therefore somewhat more detailed than a regular application of the framework.

The objective of this paper is to answer the following questions:

What is the fair value of Aker Solutions ASA per 31.05.2017 in terms of price per share?

If the fair value differs from market consensus, what may be the reasons for this?

On the basis of answering these questions I will give a recommendation on which investment strategy a well-diversified investor should pursue, be it buying, holding or selling shares of Aker Solutions ASA.

The valuation of Aker Solutions is found through using two methods, the discounted cash flow method and relative valuation. A fundamental valuation through the discounted cash flow model is the main technique, and the relative valuation will be used as a supplement to test the estimated fair value and the findings in the strategic analysis. The inherent uncertainty in the estimated fair value will be analysed both in terms of a static sensitivity analysis of changes in key assumptions, and through a monte-carlo simulation.

1.2 Choice of valuation techniques

When estimating the fair value of a company, the most widely used technique is a fundamental valuation through a discounted cash flow analysis.

Given the cyclical nature of the industry in which Aker Solutions operates, a fundamental valuation seems most adequate in estimating the fair value of the company. In this way one can take into consideration all the different factors affecting the present value of the company. A fundamental valuation is therefore chosen as the main approach.

A real option based approach could be applicable. This approach is based on the idea that the uncertainty on the future enterprise value of a firm relative to its debt obligations may have a value today. This means that even though the company presently has debt obligations that exceed the value of its assets, the market capitalization can still be positive. In such circumstances, the equity of the firm may behave as a call option on the assets of the firm with exercise price equal to its debt obligations (Damodoran, u.d.). However, as this implies, the model are more useful for companies in financial distress. Aker Solutions are currently not in a situation where this model is not necessary to find a meaningful value of the company. The real option valuation technique is not applied.

Relative valuation techniques are regularly used to analyze and test the estimates form the fundamental valuation. The most widely used methods are Net Asset Value and multiple valuation.
In this case the the Net Asset Value method is less applicable given the limited capital intensity of Aker Solutions. Most fixed assets are recognized at historical cost and the value of its "hard" assets represents a relatively small share of enterprise value. In addition there is no efficient and accessible market for the assets. An asset based valuation technique, such as Net Asset Value, is therefore less applicable and will not be used.

A multiple-based valuation has its limitations[1], but is often used to supplement and control/test the fair value estimate from the DCF analysis. A multiple analysis is applied for this purpose.

[1] A valuation on the basis of multiples has several limitations. This will be treated in detail in chapter 11.

1.3 Structure of the paper

The fundamental valuation technique is the main approach and the necessary steps, which will form the structure of this paper, are discussed briefly.

Structure of the fundamental valuation

The framework for the fundamental valuation is based on five main steps (Penman, 2012):

Step 1 - Strategic analysis

The strategic analysis starts with a qualitative analysis of both external and internal factors affecting Aker Solutions' ability to achieve a strategic advantage[2]. At the same time the competitive advantage[3] will be analysed in order to gain insight on Aker Solutions' performances relative to its peers, and how competitive forces may affect Aker Solutions over time. The internal analysis is based on the VRIN-framework developed by Jay B. Barney[4]. The external analysis will based on the Michael Porter's 5-forces framework, as well as a modified PESTEL analysis of the key drivers in the defined industry, with a focus on the oil price and other prominent risks that may affect the industry. A SWOT-analysis is used to summarize the findings in the strategic analysis.

Step 2 - Financial statement analysis

To substantiate the insight revealed by the qualitative strategic analysis, Aker Solutions' and the industry's financial statements are analysed. The financial statements is reformulated and adjusted for measurement errors in order to increase its representativeness of the underlying economic performance and built a basis for the subsequent forecasting. Due to a lack of homogeneity, both operationally and in the corporate and financial structures of the industry peers relative to Aker Solutions, a synthetic industry performance is created as a weighted aggregation of the financials of representative peers on the basis of the scope of activites in relevant segments and subsegments. The cost of capital for both Aker Solutions and the industry is calculated, followed by an analysis of the historic performance. The historic profitability is analysed both relative to its cost of capital and the industry performance.

[2] Strategic advantage is in this paper viewed as the ability to acheive a return on equity above the cost of equity over time: $r_e > k_e$.
[3] Competetive advantage is the ability to achive a return on equity above the mean industry return over time: $r_e > r_e^{Industry}$.
[4] https://business.illinois.edu/josephm/BA545_Fall%202011/S10/Barney%20(1991).pdf

Step 1 and 2 together make up the strategic financial statement analysis. To gain insight in the credit risks of the company and get a basis for deriving the cost of debt, a synthetic rating is put on the company. The synthetic rating is found by applying Standard & Poor's rating classifications on certain estimated ratios related to the company's liquidity and solidity.

Step 3 - Forecasting and future cost of capital

On the basis of the findings in the strategic analysis, combind with a discussion on the current outlook and future development of the industry and Aker Solutions, the financial statements and cost of capital are forecasted.

Step 4- Fundamental valuation and evaluation of uncertainty

A valuation of Aker Solutions' equity is performed using various models for discounting the forecasted cashflows on the basis of the estimated future cost of capital. The two main methods for deriving at a fair value estimate are finding the NPV[5] of equity directly (Equity-method) and the NPV of net operating capital and subtracting the value of minority interests and net financial debt (Net operating capital-method). To adjust for measurement errors from using budgeted weights, a process of converging the estimates of the two models by updating the value-weights is performed. An evaluation of the inherent uncertainty in the estimates will be made through a sensitivity analysis and a monte-carlo simulation.

A relative multiple valuation is made to supplement and control the estimated value in the fundamental valuation.

Step 5 - Choice of action

The estimated fair value of Aker Solutions' share price will be held up against the current market price. On the basis of the insight gained throughout this paper I will make a recommendation on which strategy a potential investor should pursue, be it holding, buying or selling shares of Aker Solutions ASA.

[5] NPV: Net present value

1.4 Limitations and delimitations

This paper is written in the perspective of an external, well-diversified investor. Information is mainly gathered through annual and quarterly reports, research papers, databases available through the Norwegian School of Economics' agreements, as well as news articles and opinions published by Norwegian and international media houses and consultancy firms. All conclusions are made on the basis of my own studies of publicly available information.

The forecasted financial statements are based on my own opinions on the how the future will evolve, which naturally implies a range of discretionary assessments. In order to arrive at a fair value estimate that is able to answer the defined problem, I have also deliberately chosen not to to prepare my estimates solely on the basis of market consensus.

Furthermore it should be noted that the industry currently is in the midst of a downturn/recession and that the estimated share price is highly dependent upon the future development of external factors. Especially the volatility of the oil-price both in the shorter and longer term and the oil companies' willingness to invest makes the the level of uncertainty in the estimates significant.

2 Presentation of the industry and Aker Solutions ASA

Aker Solutons is specialized oilservice company, operating in several subsegments in the oilservice industry. To get an overview of Aker Solutions operations and the relevant segments/subsegments, the industry presentation starts with a brief explanation on the overall oilservice industry and the value-chain for oil and gas exploration and production. The importancy of the development in the oil price is discussed briefly.

The relevant segments and subsegments in relation to Aker Solutions' operations are identified and analysed more in detail. Aker Solutions' history, organizational structure and other key characteristics are presented after the industry presentation. A more in-debth analysis of the macro environment and the competitive forces in the industry is performed in the strategic analysis in chapter 4.

2.1 The industry

2.1.1 The oilservice industry and its oil-price dependency

All segments in oilservice industry have in common that they more or less directly function as support for the oil companies' exploration and production of oil and gas.

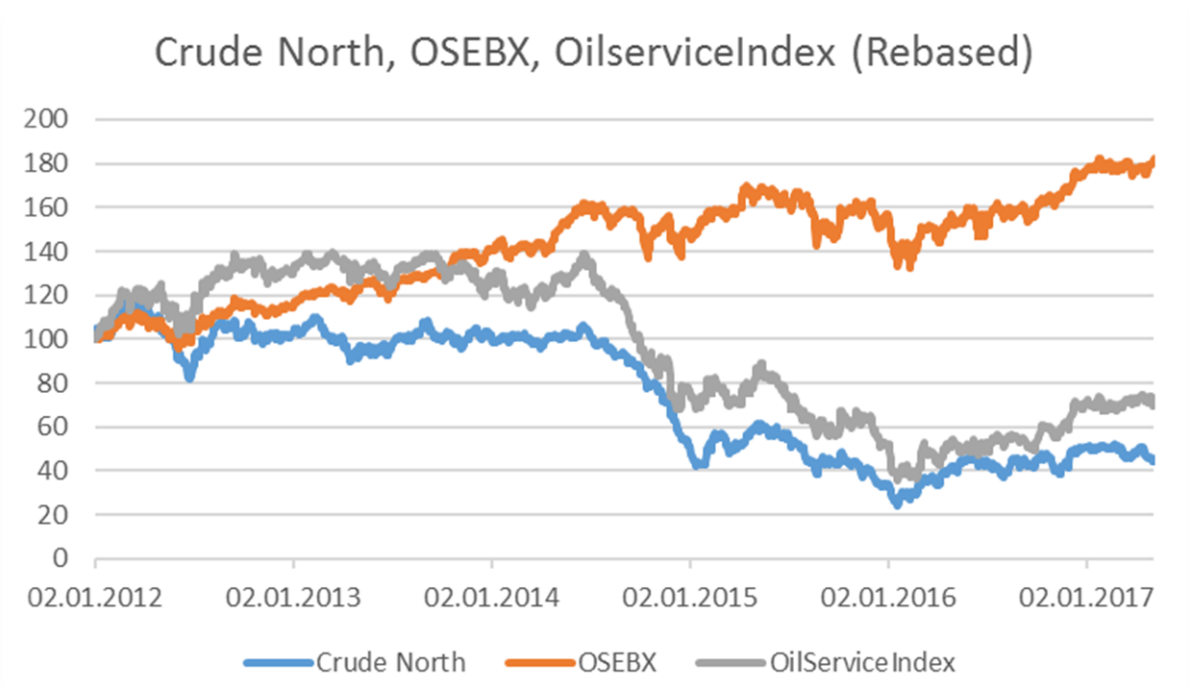


Figure 1: Development in Crude North oil price versus OSEBX and OLS (OilService-index). Rebased from 02.01.2017. (Source: Datastream)

By looking at the development of the oil price and the Oilservice Index (OLS) the correlation is prominent. The reason for the connection between the oil-price and the oilservice industry performance is that the oilservice industry derive its revenues from the CAPEX and OPEX[6] activites from oil companies. Oil companies base their decisions largely on the expected future profitability, driven by the level of the oil price. Commodity prices of oil and gas therefore function as a catalyst, driving the scope and dynamics of the entire oil- and gas related value chain. A general value chain for offshore oil and gas exploration & production (E&P) is shown in table 1. In the table, the subsegments in which Aker Solutions operate are coloured after intensity.

2.1.2 Main segments

A representative value chain is shortly described in order to get a grasp of the relevant segments in relation to Aker Solutions operations.

The main segments and constituent subsegments are described in table 1.

SEISMIC	DRILLING	SUBSEA EQUIPMENT	FIELD DEVELOPMENT / CONSTRUCTION	PRODUCTION / OPTIMIZATION	MMO (Maintenance, modifications and operations)
Seismic	Drilling equipment	Subsea Systems	FPSO	Well Intervention	Coating
EM	Drilling services	Subsea Surveillance / Control systems	Oil processing	Flow management	IMR (Intervention, maintenance & repair)
OBN/OBC	OSV equipment	Subsea Processing	SURF (Subsea umbilicals, risers & flowlines)	Flow assurance	Integrity management
Equipment	Mooring & Offloading	Subsea Power	Engineering/design	Surveillance	Oil processing

Table 1: Segments and subsegments in the oilservice value chain[7].

The first step in a representative oilservice value chain is the discovery of an oilfield through seismic instruments. Different geophysical analyses are made to detect hydrocarbons trapped in the rock formations. Drilling contractors are engaged for further exploration, where an iterative process of drilling and analyzing the gathered data lead to a conclusion on the size and scope of the oilfield. As soon as an oilfield with sufficient size are discovered, engineers are engaged to analyze both the technical and commercial possibilities of extracting oil and gas from the field. This stage is often called the 'field planning' stage, and involves initial

[6] CAPEX: Capital expenditure. Expenditures creating future benefits. Capitalized as an asset in the balance sheet. OPEX: Operating expenditure. Expenses incurred in the course of ordinary business. Expensed in the period they occur.

[7] Coloured after Aker Solutions' core activities. Dark green: Market leader. Green: Core activity. Orange: Operations in part of the subsegment. White: Outside Aker Solutions' core operations.

concept and feasibilities studies[8], and front-end engineering (FEED). A substantial proportion of Aker Solutions' reporting segment "field design" involves operations in this subsegment. Their operations involves activities globally, but are especially prominent on the NCS[9] and the Asia-Pacific markets.

The exploration and field planning phase end in the FID[10]. Given a decision on investing, the development phase begins. This phase involves detailed engineering, procurement, construction and installation (EPCI). If the offshore oilfield is developed with a subsea solution, installment of subsea equipment is included in this stage as well.

Design/engineering, manufacturing and delivery of subsea equipment is Aker Solutions' core activity, amounting to about 60% of total revenues over the last three years[11]. The subsea equipment[12] segment will be examined more in detail later in this paper, cf. chapter 2.1.3.

When the oilfield installations are in place, the next phase is the production of oil and gas and transportation to surface platforms or FPSOs[13], or directly to onshore processing installations. In the production phase, focus is on maximizing recovery through ensuring a steady flow rate (monitoring flows and reducing the numbers and scope of interventions and production downtime) and often so-called artificial lift[14]. The after-market services and solutions are often referred to as MMO[15]. Most oilservice companies enganged in the development and production phase perform some kind of asset integrity and modifications as well, making the MMO-market an opportunity for cross-sales. Aker Solutions is no exception in this relation. In general the MMO-market is primarily driven by oil companies' OPEX spending. With declining oil-prices in 2014, the OPEX spending has been cut substantially, as many integrated oil companies have chosen to postpone non-critical maintantenace projects[16]. In the

[8] These parts of the field planning stage is often referred to as «pre-FEED».
[9] NCS: Norwegian Continantal Shelf
[10] FID: Final Investment Decision
[11] (Aker Solutions ASA, 2016)
[12] 'Subsea equipment' and 'subsea production systems'(SPS) is often used interchangeably.
[13] FPSO: Floating Production, Storage and Offloading vessel
[14] Artificial lift involves pumping fluids back into reservoirs to keep the pressure stable in order to maintain the flowrate from the well.
[15] MMO: Maintenance, modifications and operations.
[16] (Offshore Mag, 2017)

more mature regions such as NCS and offshore UK many oilfields are in need of maintenance work, pushing the expectations of a rebound in this market in the coming years [17]

When a field is depleted, the installations are decommissioned. This market is currently slow, as most of the larger oilfields still have several years of production left before depletion. However, when oilfields grow more mature, as many oilfields on the NCS, in UK and in the shallower waters of the Gulf of Mexico, the market is expected to increase gradually in terms of revenues in the longer term. This is a potential future revenue source for Aker Solutions.

When examining the industry further, the focus will be directed towards the industries where Aker Solutions operates. The subsea equipment segment will be examined first, then field design.

2.1.3 Subsea

A subsea oilfield consists of an interlinked system of different types of subsea equipment where the specific mix varies from field to field, depending on the field complexity, size, the chosen transporting solution (pipelines, FPSOs etc.) and other factors. An often used proxy for analyzing the development in the subsea segment is the annual subsea tree awards.
In a representative subsea field, subsea trees are used to control the flow of oil and gas from the well and are placed directly on the wellhead on the sea floor. The subsea tree is connected to control systems via umbilicals. Manifolds are used to connect the different wells into one or a few flowlines for transporting the produced oil and gas on the seafloor. The oil and gas are then pumped to

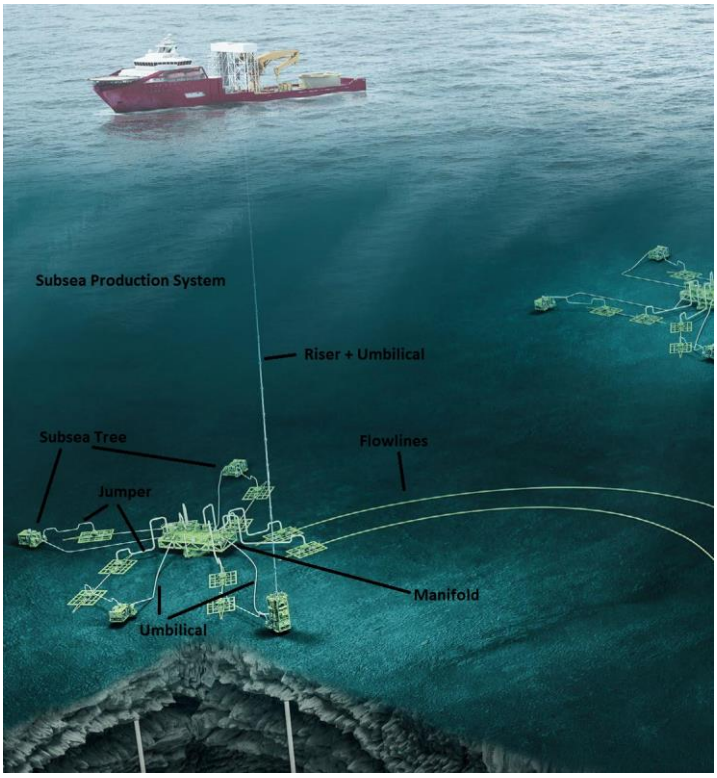


Figure 2: Subsea production system. (Source: Aker Solutions Annual report 2016)

[17] (Aker Solutions ASA, 2016)
and (Offshore Mag, 2017)

surface through risers or onshore through pipelines. These different components make up the subsea equipment mix. The main advantage of analysing the number of subsea trees is that each well has one subsea tree, making the number of subsea trees a good measure of the size of the oil field. At the same time the product mix vary more or less proportionally with the number of trees. The number of trees awarded can also be viewed as an indicator of general activity in the subsea segment, which in turn drive the demand for engineering services related to both design of equipment and field planning of oilfields with subsea installations.

As presented in table 1 Aker Solutions presence in the subsea segment is strong along all the subsegments. In control systems they are the market leader.

The market for subsea trees can be split by water depth and geographical location.
There are three main water depth segments. The technical complexity and the need for added engineering capacity generally increases with the depth of the subsea field (Aker Solutions ASA, 2015).

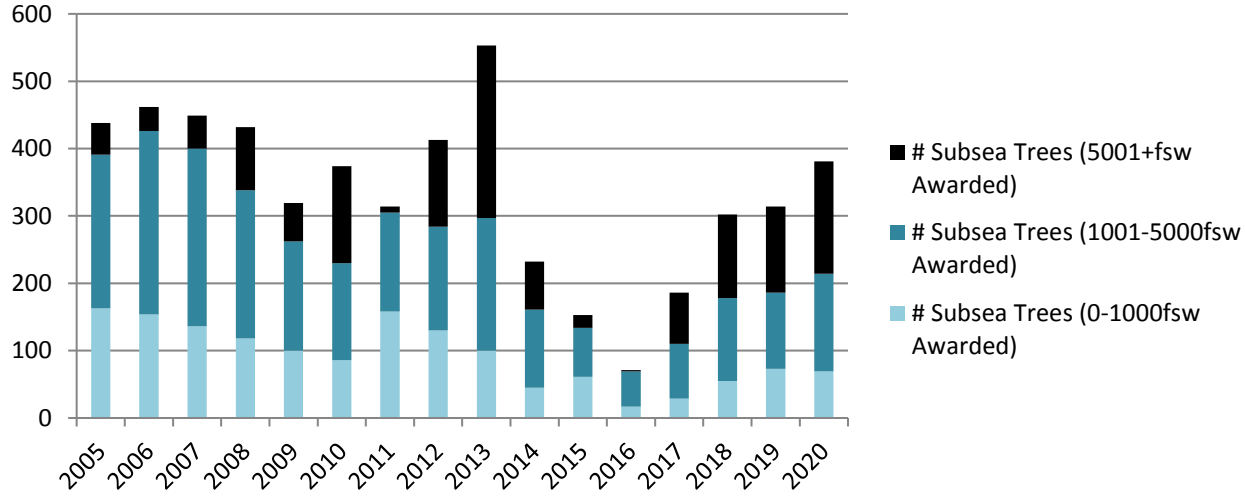


Figure 3: Subsea tree awards 2005-2019, by water depth. (Source: QuestOffshore, Bloomberg terminal.)

Shallow water (SW): Water depths from 0-1000 fsw (ca. 0-400 meter).
Midwater/Deepwater (DW): Water depths from 1000-5000 fsw (ca. 400-1000 meter).
Ultra-deepwater (UDW): Water depths over 5000 fsw (> 1000m).

Figure 3 shows the awarded number of subsea trees each year. The voliatility is prominent, but differs somewhat among the different water depths. This is largely due to the underlying different cost structures and risk of subsea installations at different water depths, with ultra-

deepwater being most complex. In the periods of higher oil prices and increased profit margins from extraction, the focus among integrated oil companies tends to turn towards the larger discoveries in deeper waters (World Ocean Review, 2015). The peak year in 2013 was characterized by strong growth globally across all segments, except for shallow-waters. The biggest growth was in the ultra-deepwater segment, mainly driven by large investments by Petrobras in developments off the coast of Brazil. However, the downturn is the industry and where 2016 is considered the bottom of the cycle in terms of awards, the activity in the shallow and ultra-deepwater segments have currently almost dried up completely. Due to strong oil demand and the industry players focusing on cutting cost and increasing efficiency, the market is expected to grow significantly in the future. This is discussed in more detail in chapter 3.1 and 3.2.

When looking at the geographical distribution of the segments, the different water-depths are not equally distributed among the different regions.

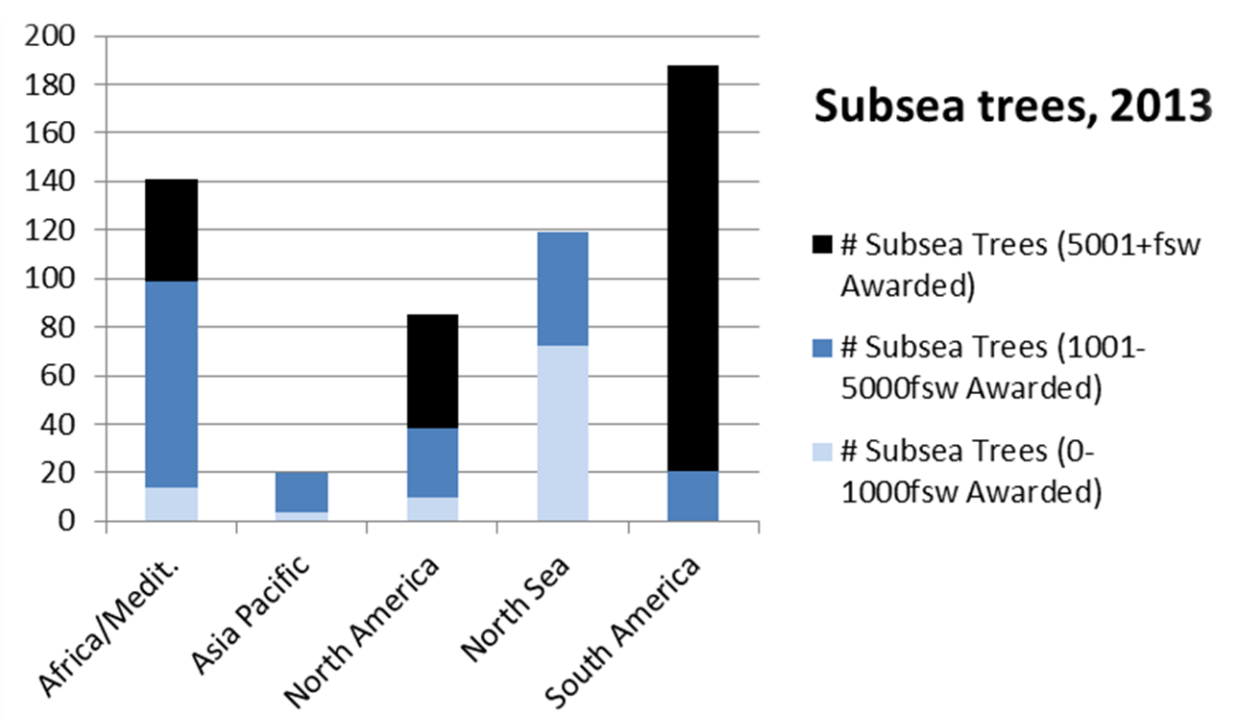


Figure 4: Subsea tree awards 2013, by water depth & geographic location. (Source: Quest Offshore, Bloomberg Terminal.)

The largest market for shallow-water subsea equipment is found in the North Sea offshore Norway and the UK. The deepwater segment is more evenly distributed, with a somewhat higher proportion in West- and North Africa. The ultra-deepwater segment is concentrated

within the so-called "triangle" which stretches from the Gulf of Mexico (GoM) down to the pre-salt basins offshore Brazil and up to offshore region in West-Africa (mainly Angola and Congo). South America, with the largest proportion of discovered, but undeveloped oilfields within the ultra-deepwater segment, is seen as a key growth market in the years to come (World Ocean Review, 2015).

The subsea equipment industry is characterized by a few, but large players who have sufficient engineering capacity to design and manufacture the technically complex equipment needed for subsea oil and gas production. Using subsea tree awards in recent years as a starting point, we can see from figure 5 that the market leader is FMC Technologies (now TechnipFMC[18]). In addition to Aker Solutions, the other subsea market players are GE Oil & Gas, OneSubsea and Dril-Quip. OneSubsea is the second largest player in the market. It was established in 2013 as a joint venture between Cameron International Ltd. (Cameron) and Schlumberger. Prior to the joint venture, the subsea unit was operated by Cameron. Following Schlumberger's acquisition of Cameron in 2016, OneSubsea is now a wholly-owned subsidiary of Schlumberger. GE Oil & Gas is a wholly-owned subsidiary of the industrial multinational conglomerate General Electric, who entered the market in 1994 through its acquisition of the Italian state-owned energy conglomerate Nuovo Pignone[19]. The company has increased its exposure to the subsea segment gradually, culminating by the acquisition of the global player Vetco Gray in 2007[20]. Earlier this year GE Oil&Gas merged with the multinational oilservice company Baker Hughes, forming GE Oil&Gas Baker Hughes. Dril-quip is the smallest player, mainly specializing in the ultra-deepwater segment in the United States.

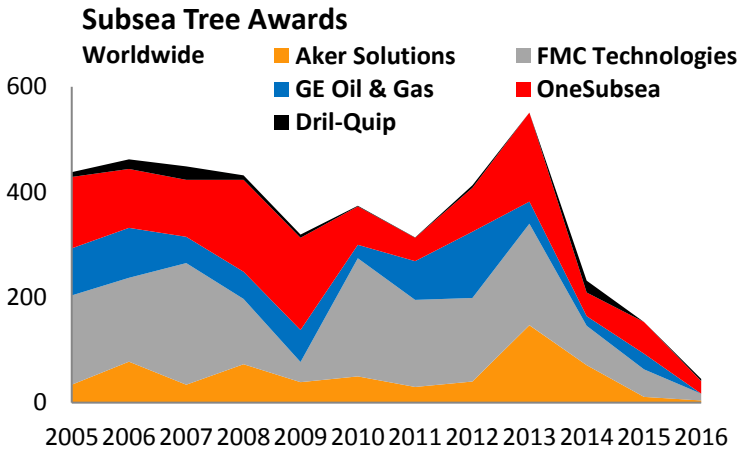


Figure 5: Subsea Tree Awards worldwide 2005-2016, by player. (Source: Quest Offshore, Bloomberg Terminal.)

[18] FMC Technologies and merged with the largest EPCI player Technip SA in 2016, forming TechnipFMC.
[19] (General Electric, 2015)
[20] (Anon., 2007)

The geographical distribution between the players shows that all players have global presence, though with some variation. FMC, as the market leader, has the greatest presence in all geographic markets.

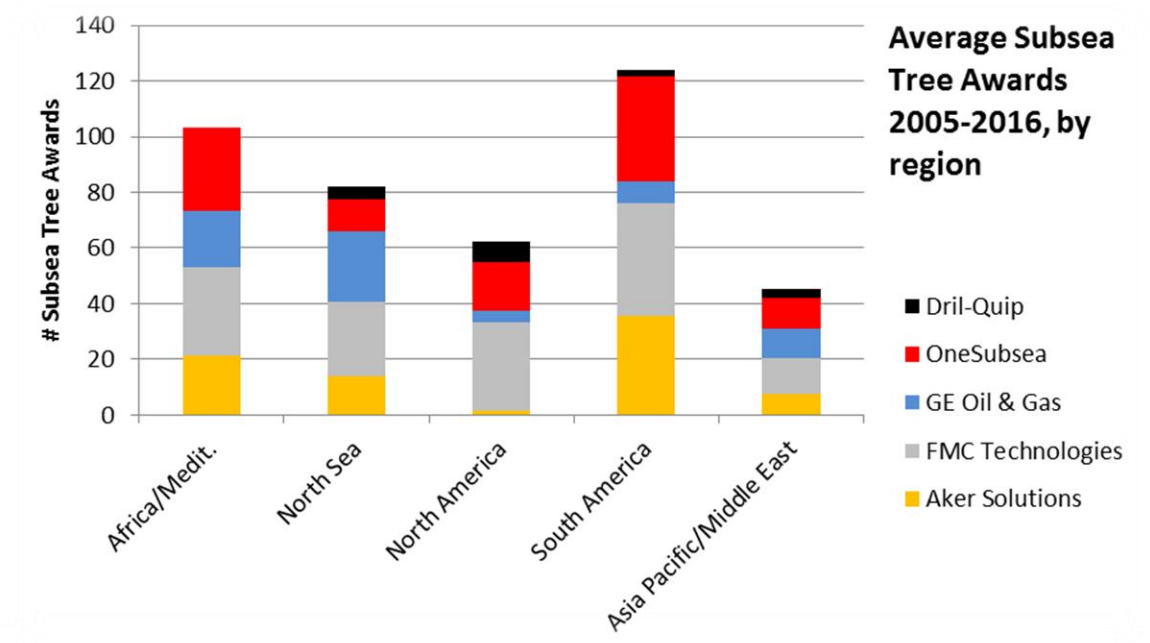


Figure 6: Average # Subsea tree awards 2005-2016, by geographic region & player. (Source: Quest Offshore, Bloomberg Terminal.)

In West Africa and North Africa/Mediterrean, the market shares between the largest players are fairly evenly distributed. In South America, however, GE Oil & Gas is a minor player, with the main share of the market divided between Aker Solutions, FMC and OneSubsea. The opposite is seen in the North Sea, where One Subsea has a smaller share, while the market is predominantly divided between FMC, Aker Solutions and GE Oil & Gas. However, Aker Solutions is a minor player in the North American market, which is mainly divided between FMC and OneSubsea. The geographic distribution of the market shares clearly shows the companies' different focus, where GE Oil & Gas operates throughout the entire value chain, and has a strong connection to onshore production in the middle-east. The subsea business unit was mainly developed through the acquisition of Vetco Gray, which had a strong position in the Norwegian and British subsea markets. On the other hand, OneSubsea has traditionally, first through Cameron International and later on through Schlumberger, been a strong player in onshore production in North America. From this it is evident that both OneSubsea and GE

Oil&Gas[21] are positioning itselves geographically and strategically to achieve synergies with their other operating segments.

Aker Solutions and FMC are more specialized, with their core operations in the subsea segment. Their subsea business units have evolved organically, and they have developed a strong presence in the market even from first subsea installations on NCS and GoM, which is considered the very beginning of the industry. The US market has however largely been reserved for American players. Aker Solutions never developed a strong position in the American market.

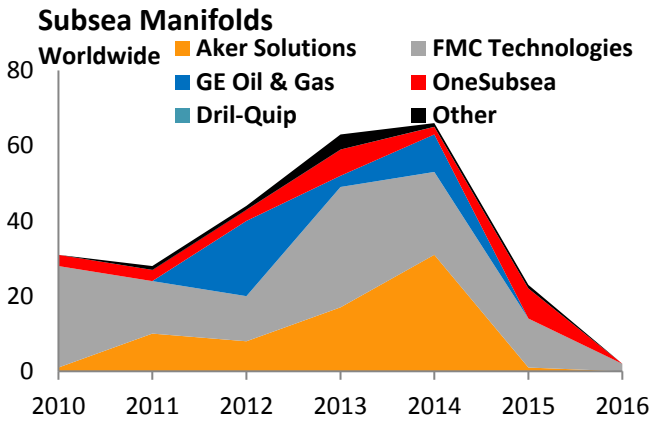


Figure 8: Subsea manifold awards worldwide 2010-2016, by player. (Source: Quest Offshore, Bloomberg Terminal.)

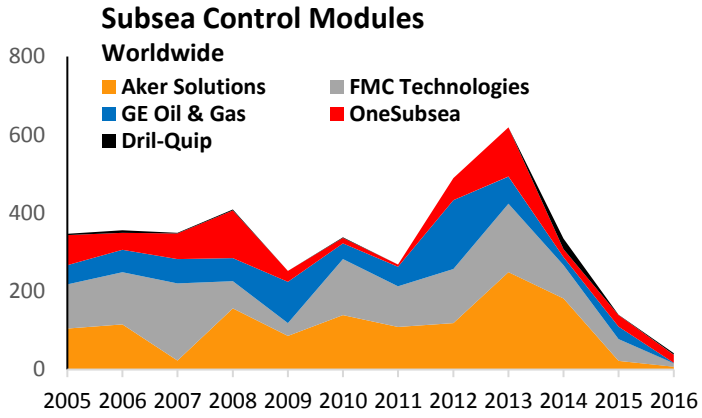


Figure 7: Subsea control modules awards worldwide, by player. (Source: Quest Offshore, Bloomberg Terminal.)

Through the increased streamlining and strategic focus/specialization at FMC and Aker Solutions towards the subsea equipment and services subsegments, relative to its competitors, have yielded a stronger position in the market for other subsea equipment in the product mix.

Both in manufaturing of manifolds and subsea control modules, Aker Solutions og FMC Technologies are the most prominent players. Aker Solutions is the market leader in subsea control modules, which are closesly connected with their umbilical[22] manufacturing capabilities and strategic alliances with ABB[23] and MAN Diesel&Turbo[24].

[21] Now GE Oil&Gas Baker Hughes. A merger of GE Oil&Gas and Baker Hughes was confirmed Oct. 31st 2016 (Market Realist, 2017)
[22] Umbilicals are a certain type of wires that go from the surface to seabed and enable transmission of power and connecting the the control systems to the various components.
[23] (Aker Solutions ASA, 2016)
[24] (Aker Solutions ASA, 2016)

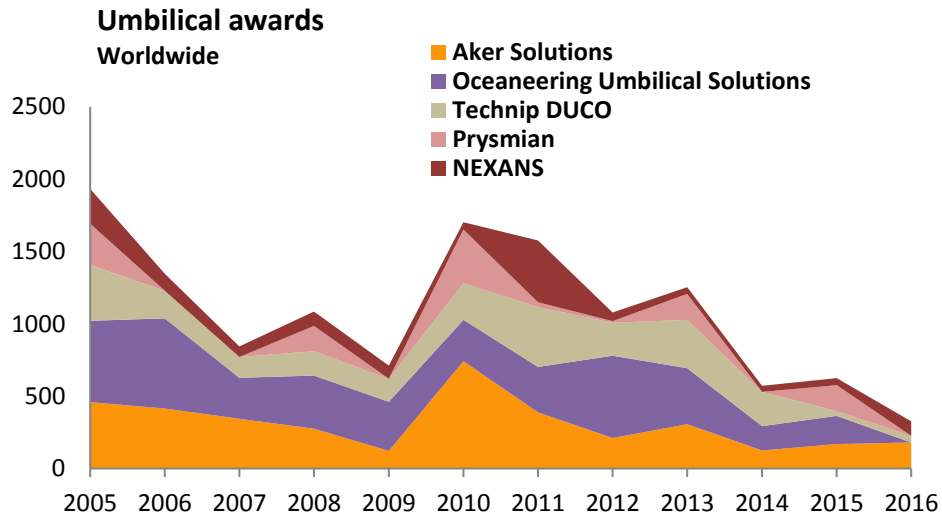


Figure 9: Umbilical awards worldwide 2005-2016, by player. (Source: Quest Offshore, Bloomberg Terminal)

In the umbilical subsegment Aker Solutions has a strong position. Its main competitors are Oceaneering Ltd and the Technip SA. This market has, like the subsea industry in general, declined along the deteriorating activity in terms of number of new oilfield developments.

2.1.4 Field design

The field design segment can be split in two main sub-segments; engineering and MMO/life-of-field services.

Both the engineering and MMO services markets are to a large extent driven by oil companies CAPEX and OPEX, but have some differences in terms the underlying structures.

The engineering subsegment can be split between services related to development of new oilfields (greenfield market) and upgrades and modifications on existing instiallations (brownfield market). In addition to engineering services are provided for development of products such as subsea equipment.

The greenfield engineering market consists of field planning through concept and feasibility studies (Pre-FEED) and front-end-engineering (FEED), which performed as an integral part of oil companies' decision on whether to develop new oil- and gas fields. Detailed engineering and project management of installations is also a considerable part of relevant engineering serves. The greenfield-related part of the market is more CAPEX sensitive, and

tends to experience growth in line with the numbers of new oilfield developments. This market was hit substiantially by the oil-price decline as CAPEX cuts have reduced demand. In the Norwegian engineering market this has been largely offset by the sizable Johan Sverdrup discovery in 2013. This has been an important project for Aker Solutions, who has won important contracts for both for pre-FEED, FEED and project management in Phase I and Phase II of the development[25].

The brownfield engineering services are more OPEX-driven, and largely follows the activity in the MMO-market. Geographically, both the engineering and the MMO subsegment relates to all the geographic areas presented in the subsea section, cf. chapter 2.1.3, but with Aker Solutions primarily operating in the Norwegian, UK and Asia-pacific markets.
The MMO segment can be split in four main subsegments: Asset integrity, Asset services, Support services and Modifications [26]

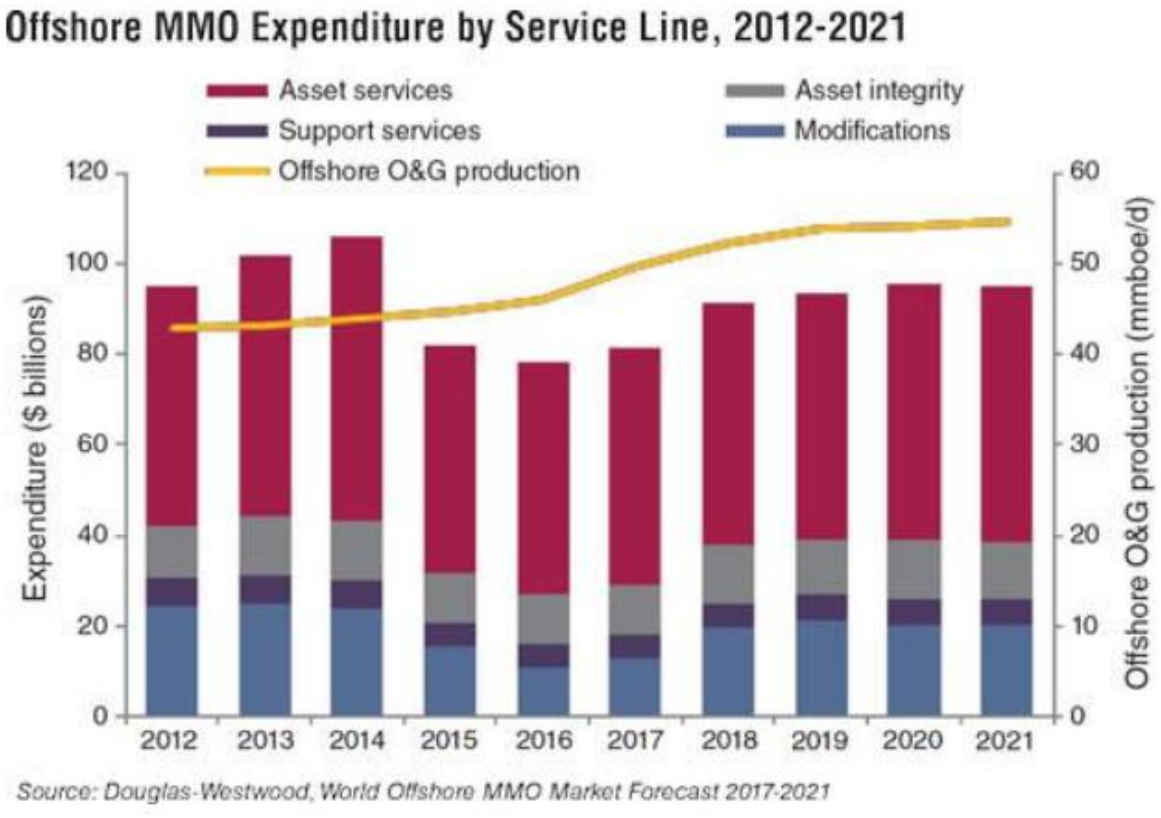


Figure 10: Offshore MMO Expenditure by Service Line, 2012-2021. (Source: Douglas-Westwood, World Offshore MMO Market Forecast 2017-2021.)

[25][25] (Aker Solutions ASA, u.d.) & (Aker Solutions ASA, 2017)
[26] (Offshore Mag, 2017)

The asset integrity market relates to maintenance of existing facilities in order to satisfy HSE requirements, as well as maintaining production levels. It involves services such as consultancy, asset management and inspection, as well as relocation and decommissioning after depletion of the oilfield. The asset services relates to services such as efficient human resources allocation and administrative support, and is considered the most non-critical. This part of the market has been hit hard by the downturn as oil companies are deferring the non-critical work[27].

"Modifications" is the largest part of the MMO market, amounting to about 60% of annual MMO expenditures, and relates to upgrading facilities in order to maximize recovery from the oilfield. The connection to the subsea segment is important in more mature areas, such as the NCS and UK, where subsea tie-back solutions allow for prolonging existing facilities and increase recovery from marginal oilfields.

The MMO market in general is driven by the number of offshore platforms and the amount of previously deferred modifications work[28]. Degradation of facilities over time makes MMO-services a necessity, where the activity generally increases in proportion with the the maturity of the oilfields, depending on the age and attrition of the specific installations. The MMO-activity both in the Norwegian and the UK-markets, which is Aker Solutions main MMO areas, are therefore expected grow steadily in the future. Industry regulations, with increased focus on HSE requirements, is also a potential driver of MMO-activities over time.

Figure 10 shows that the MMO market has been challenging since the oil-price decline started in 2014, especially related to 'modifications'. A global MMO market decline of -22% in 2015, followed by -5% in 2016, has put pressure on the MMO players. Significant overcapacity has increased competition on prices and resulted in large scale reductions in work capacity in all areas.[29] This has particularly affected Aker Solutions' Norwegian business area, cf. employees section in chapter 2.2.5.

[27] (Offshore Mag, 2016)
[28] (Offshore Mag, 2017)
[29] (Offshore Mag, 2017)

Globally, both the engineering and MMO subsegments are characterized by a few, but specialized players that often include engineering services and MMO activities as a part of a broader business portfolio, where engineering function both as an individual business unit and support for the business units in other areas. The market leaders in the Norwegian market is Aker Solutions and TechnipFMC, while the British company Wood Group Plc is the engineering market leader in UK, and the Japanee company Chiyoda Ltd. in the Asia-pacific region. The Italian company Saipem Ltd, which is of the larger players in the EPCI/SURF segment, is also a global provider of topside engineering and MMO services. The MMO market however, by being more diverse, also consists of several smaller, specialized local players.

2.1.5 Industry definition

When examining the players in the various subsegments of the oil service sector mentioned above, it is evident that the homogeneity between the companies is very limited. Different degree of specialization and strategic focus provide significant differences in both organizational structure and market capitalization. For example, Schlumberger, General Electric and TechnipFMC are multinational companies of a completely different size than smaller niche players. These companies have activities throughout the entire value chain. General Electric is by far the largest player in terms of market capitalization and total capital, as they have operations in many other unrelated industries. The organizational structure among the companies is also very different, where the larger players have significant ownership in several smaller companies. Aker Solutions, on the other hand, has chosen a stronger focus on streamlining operations and minimizing financial investments. In the past few years Aker Solutions has therefore had very little or no ownership interests in smaller companies, except those which are wholly-owned and part of its core operations.

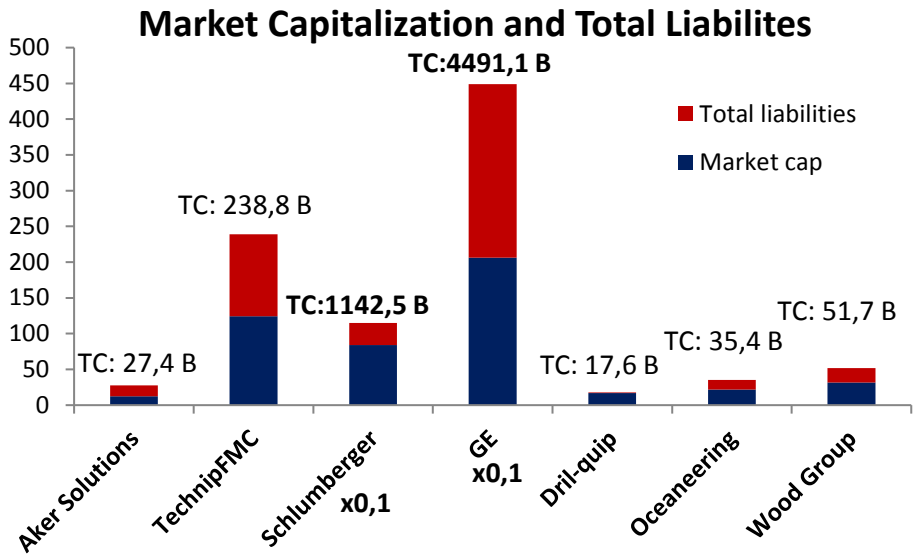


Figure 11: Market capitalization and total liabilities for relevant peers. (Source: Bloomberg Terminal)

The implication of the differences in organizational structure and scope of operating activities is that some of Aker Solutions' competitors have core operations with little or no connection to subsea oil and gas production or field design, while others are more or less comparable and operates in direct competition with Aker Solutions. This variation will be taken into account in the financial statement analysis through designing a synthetic industry with a weigthed aggregation of the companies' financials based on the revenues from relevant segments relative to total revenues. The large variation in market capitalization and total liabilities, which together constitute total capital, is illustrated by figure 11.

Schlumberger and General Electric are by far the largest companies in competition with Aker Solutions. In the table their total capital are scaled by a factor of 0,1 for graphical purposes. From the figure it is evident that the companies also vary substantially in terms of capital structure, with Aker Solutons consistently having a higher debt-to-equity level than its competitors. This will be examined further in the credit risk analysis in chapter 5.

2.2 Aker Solutions ASA

2.2.1 History

Aker Solutions ASA has a long history, initially established as a mechanical workshop along the Aker river in Oslo back in 1841. It soon entered the shipbuilding business, both designing/engineering and building ships for different purposes such as whaling and transport of both passengers and different types of cargo. Manufacturing of components for machinary and equipment in the iron and non-ferrous metals industries has also historically been a central part of their operations. As the company developed in tact with the industrial revolution, it expanded its operations to other areas such as timber, wood and pulp, coal, hydropower and fisheries (Aker Solutions ASA, 2017).

With the discovery of oil and gas in the North Sea in the late 1960s, Aker shifted its focus to take part in the fast-growing industry. Firstly, Aker participated in the development of concrete and steel jackets for oil platforms, but soon built and delivered complete oil rigs. Aker soon became the leading supplier of projects, products and services to the offshore oil and gas industry.

In the 1990s Kjell Inge Røkke gradually increased his ownership in Aker and merged Aker with the international fisheries company Resource Group International.
The rival industrial conglomerate from early on, Kværner, which was established in Oslo in 1853 in Oslo, faced financial problems in the late 1990s. In 2000-2001 the restructuring process resulted in Aker gaining majority ownership which resulted in a merger of the companies in 2002. The new company was named Aker Kværner. With Kværner having long traditions as a leading supplier of turbines for Norwegian hydropower projects, as well as shipbuilding and supplier for the oil and gas, process and wood/pulp industries, the new company spanned along several industries, and was the largest oil-service company in Norway.

The new Aker Kværner management soon decided to focus on the company's core business, supply of products and services to the oil and gas industry. They divested both its shipbuilding business and the wood and pulp business in 2007. In 2008 Aker Kværner divested both the processing and construction business for midstream and downstream oil and

gas, marine and chemicals. The remaining core business, focusing on the whole upstream oil and gas service industry, was renamed Aker Solutions.

2.2.2 Demergers and acquisitions

In 2011 the engineering, procurement, construction and installation (EPCI) was divested, incorporated under the name Kværner ASA. In 2014 the well-intervention services, as well as the mooring & loading business, was divested into Akastor ASA.

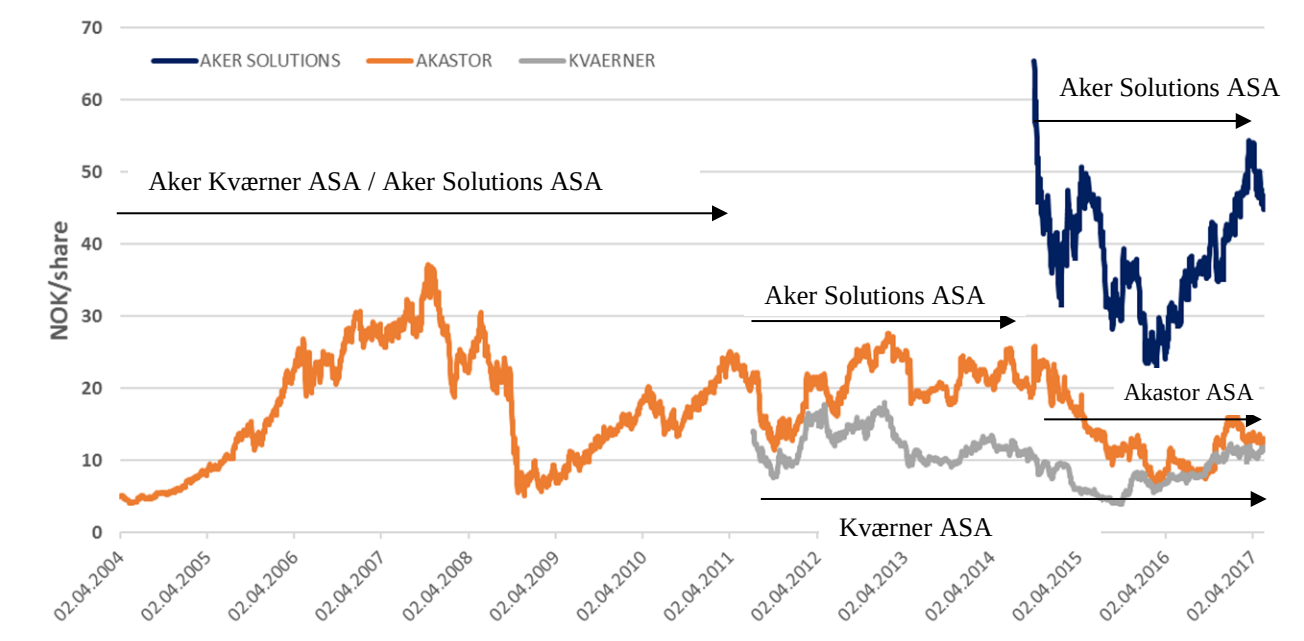


Figure 12: Demergers. Share price development Aker Solutions ASA, Akastor ASA and Kværner ASA. (Source: datastream)

The divestment both in 2011 and 2014 has allowed Aker Solutions to streamline its operations and focus on the two main operating segments: subsea and field design. Figure 13 shows the share price development in the period, with the current Aker Solutions ASA being incorporated in 2014. In early 2017 Aker Solutions also acquired the financially distressed Norwegian MMO specialist Reinertsen AS.

2.2.3 Share price development

Aker Solutions ASA is currently listed on Oslo Stock Exchange as the parent company of several separate entities. Most entities are operating under the Aker Solutions name [30]

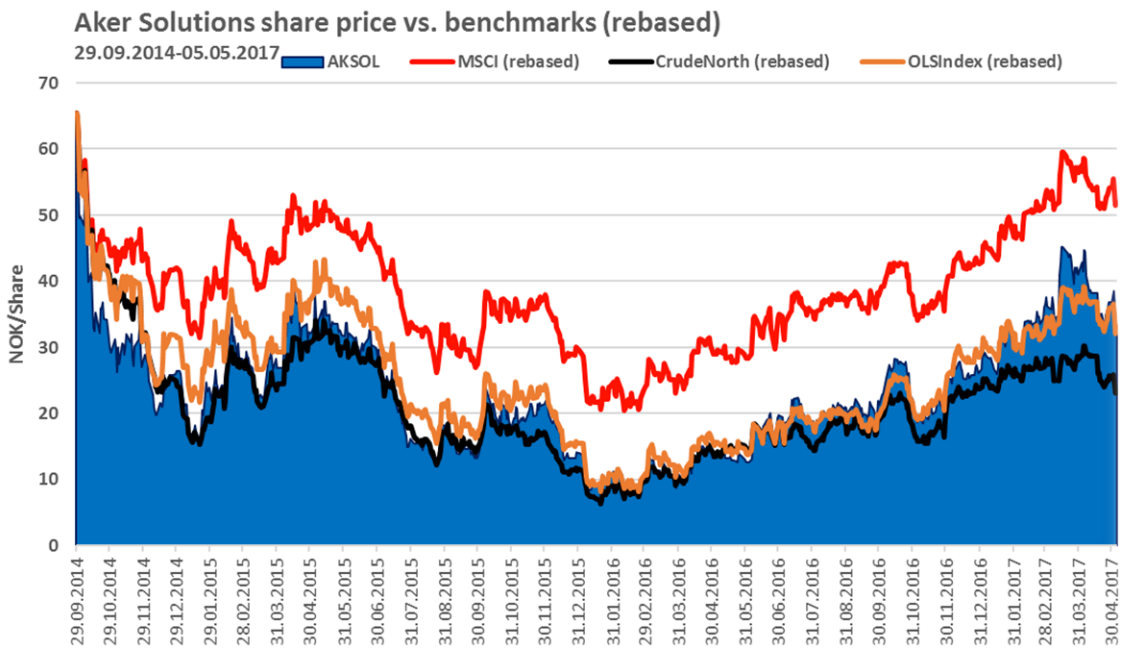


Figure 13: Aker Solutions share price vs. benchmarks (rebased). Benchmarchs: MSCI, North Crude Oil, Oilservice index (OLS). (Source: Datastream)

Aker Solutions ASA was listed just after the oil price started declining in 2Q 2014. Since then the share price fell gradually to its lowpoint at the end of 2015. The share price has largely followed that of the industry, which in turn has been driven by the oil price. However, from 3Q 2016 both the the industry and Aker Solutions has climbed gradually, lossened up on tightly following the oilprice. This may be an indication of the market's positive outlook on the companies' ability to cut costs and stay competitive in a low oil price environment. It's also worth noticing the spike in Aker Solutions' share price in March 2017. This was because of the rumours that Aker Solutions would acquired by the American oilservice company Halliburton (Anon., 2017)[31]. When the deal didn't go through, the share price fell back to its level before the rumours spread.

[30] (Aker Solutions ASA, 2017)
[31] (hegnar.no, 2017)

2.2.4 Revenues

Aker Solutions' historical revenues show how the relative importance of the Field design and Subsea units has changed over the years. While Field design in 2011 amounted to 57.4% of total revenues, the segment has remained fairly stable at around 12 billion NOK annually in the period 2011-2014. In the same period Subsea had a CAGR of 28.05% going from 9.2 billion to 19.3 billion NOK. From 2014, the relative importance has shifted to the opposite, where Subsea now amounts to approximately 60% of total revenues, while field design accounts for the last 40%. The "other" revenues mainly relates to smaller projects, such as development of carbon capture technology, as well as onerous income and costs. This is a very small part of Aker Solutions product- and services portfolio and is not significant seen in relation to the two main segments, and will not be analyzed further.

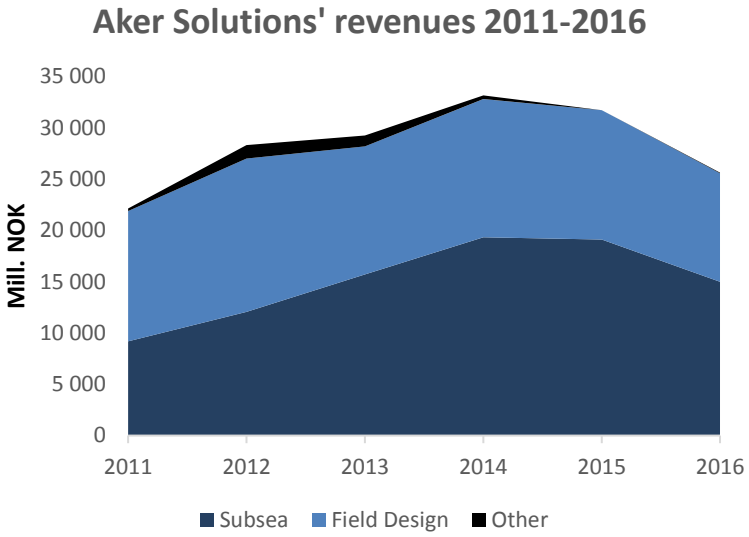


Figure 14: Aker Solutions' Revenues by reporting segment, 2011-2016. (Source: Annual reports 2013-2016 & Bloomberg terminal.)

The growth Aker Solutions has experienced within the Subsea segment is representative of that of the industry in general, as most modern offshore oilfield development projects include subsea installations. The reason lies in subsea technology being both more economical in terms of development costs and production efficiency. This is because subsea compression, pumps and other equipment allows for lower initial investments as it reduces the need for some of the costly topside installations, as well as the systems working more efficiently when pumps and compressors are closer to the source on the seafloor (World Ocean Review, 2015). A safer production than the traditional surface-based solutions is also a factor that favours Subsea installations, at least in later years where government-dictated HSE requirements put pressure on companies ensuring sufficient safety measures to protect employees (Husebø, 2014).

The Subsea and Field design units has different characteristics when it comes to its underlying drivers of its revenue generation. The Subsea unit's revenues are mainly based on manufacturing and construction of equipment, and some after-market services related to the equipments. This segment is thus more capital intensive. Field Design is the opposite, with services related to engineering and inspections constituting most of the revenues. Some modifications work involves fabrication and construction from the yards located in Norway.

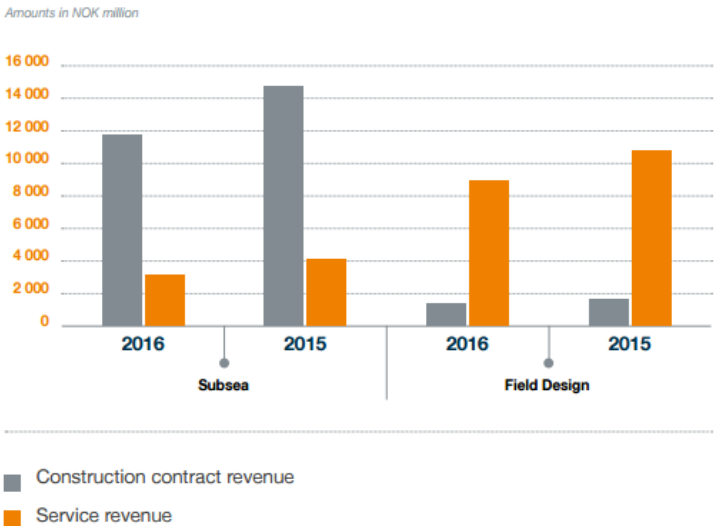


Figure 15: Aker Solutions' revenues by segment and construction vs. services, 2015 & 2016. (Source: Annual Report 2016.)

2.2.5 Customers and geographic distribution

Aker Solutions' customers are primarily large independent oil companies and NOCs[32]. Statoil is the largest customer with most of the activity related to the NCS, both within subsea and field design. Aker Solutions' long-term connection with Statoil has given significant advantages when engineering projects related to major development projects on the NCS has been tendered, as seen by Aker Solutions winning both pre-FEED, FEED and EPMA[33] contracts for phase I and II of the development of the Johan Sverdrup oilfield[34].

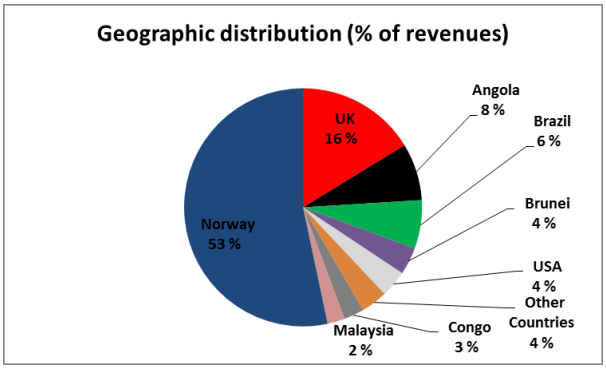


Figure 16: Geographic distribution of revenues 2016. (Source: Annual report 2016)

[32] NOCs: National Oil Companies.
[33] Engineering, procurement & management assistance
[34] (Aker Solutions ASA, u.d.)

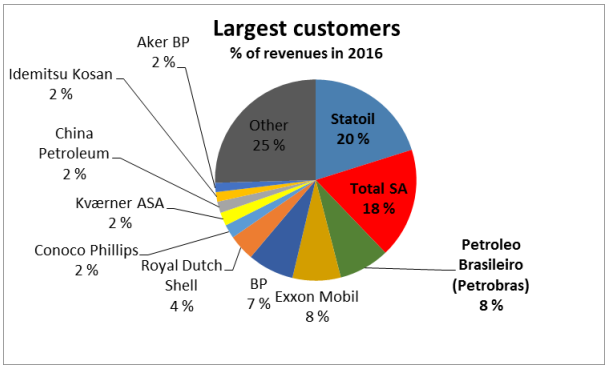


Figure 17: Largest customers. (Source: Bloomberg terminal.)

Total SA is the next largest customer, where Aker Solutions is responsible for a large share of the manufacturing of equipment and after-market services related to their subsea installations in the North Sea and West-Africa. Petrobras is the third largest customer, where the activity mainly relates to deep- and ultra-deepwater installations offshore Brazil. Aker Solutions has traditionally been Petrobras' preferred supplier of subsea equipment, delivering about 2/3 of all subsea equipment from 1997-2016[35].

Geographically revenues are distributed with Norway as their main market, constituting about 53% in 2016. Their second largest market is in the North Sea offshore UK. Services and subsea equipment related to offshore installations in West Africa (Angola and Congo) is their third largest market. However, it should be noted that this distribution relates to 2016. The activity in Brazil was particularly low in 2016, as Petrobras' cuts in spending directly affected Aker Solutions as one of their main subsea providers. In the future however, the Brazilian market is expected to contribute to a substantially larger share of total revenues.
The remaining proportion of the revenues are fairly evenly distributed both geographically and between different operators.

2.2.6 CAPEX

That the Brazilian market is a potential growth market for Aker Solutions is clearly illustrated by the annual CAPEX in 2013-2016. A gradual decline in activity has made oil companies and oilservice companies along the entire value-chain in need of cutting CAPEX. This is the case for Aker Solutions as well, except in the Brazilian market.

[35] (Aker Solutions ASA, 2016)

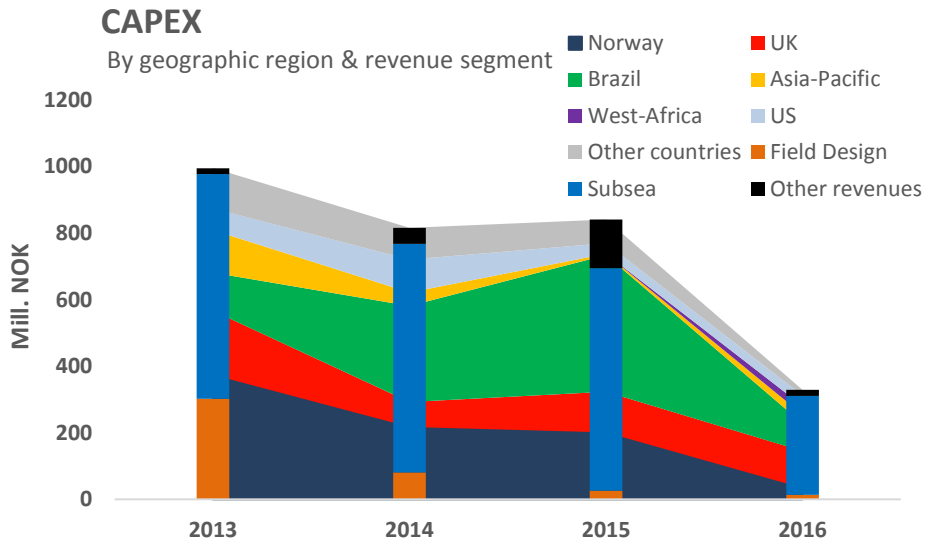


Figure 18: Capital expenditures Aker Solutions 2013-2016. (Source: Annual reports 2014-2016)

As shown by figure 18, Aker Solutions' CAPEX in Brazil increased in both 2014 and 2015. This mainly due to the decision made in 2013 to double its subsea equipment manufacturing capacity in the country to meet future demand. The new facility was set to replace the old, and was operational by the end of 2015 [36]. Their strategy of developing a strong position in the Brazilian market culminated in the last quarter of 2016, when Aker Solutions bought 70% of the Brazilian brownfield service provider C.S.E Mecânica, "building on a strategy to expand its services business in key international market"[37].

In the other regions CAPEX has declined, only remaining at levels ensuring adequate maintenance of its facilities.

2.2.7 Employees

Aker Solutions currently has about 14000 employees in 46 locations in 20 countries [38].

The employees are fairly evenly distributed between the two main operating segments. Geographically, a majority of employees are stationed in Norway. As Norway is the main market both for subsea equipment and field design, employees are distributed among the engineering hub in Oslo, fabrication yards, manufacturing facilities and services-based offices along the west coast.

[36] (Subsea UK, 2017) and (Aker Solutions ASA, 2016)
[37] (Aker Solutions ASA, 2016). The agreement included a 3-year option on the remaining 30% of the shares.
[38] (Aker Solutions ASA, 2017)

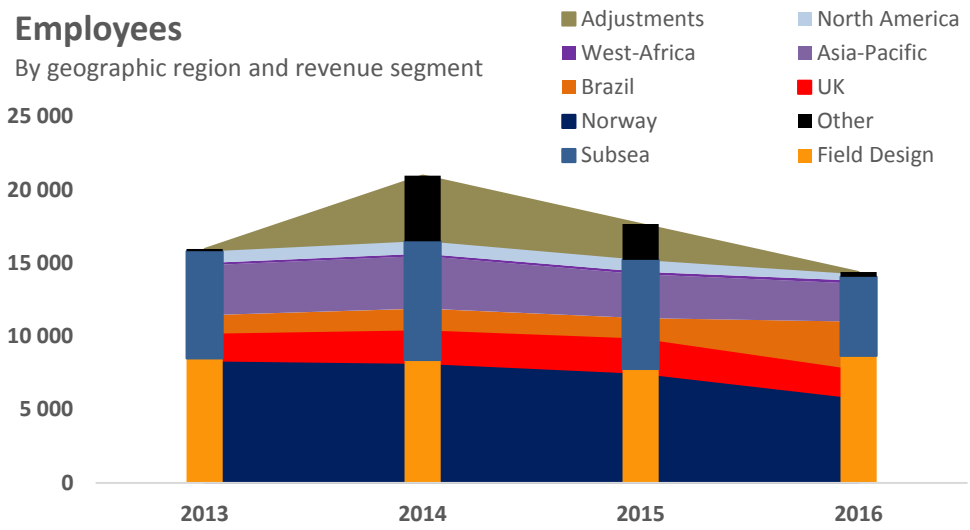


Figure 19: Employees Aker Solutions 2013-2016. (Source: Annual reports 2014-2016.)

In North America and West-Africa, the stationed employees mainly provide services and are located in several smaller offices close to their respective markets. In Brazil however, employees are divided between the manufacturing facilities and services offices. As seen by figure 19 the number of employees in Brazil increased by 230%[39] in 2016, even though the total number of employees was reduced by -15,74% in 2015 and -18,6% in 2016[40], totaling a reduction of -31,4% from 2014-2016. As explained above, this is because of the larger manufacturing facilities and the acquisition of M.S.E which included 1300 new employees[41]. The largest reduction in terms of employees has been observed in the Norwegian market, with the Subsea business area being hit the hardest. Aker Solutions has through the downturn expressed a goal of cutting 30% total operating costs from its 2015 level[42]. Cutting workforce capacity is the main source of this reduction, beside increased cost-efficiencies through standardizations, cf. chapter 3.2.3.

2.2.8 Alliances

In a broader oilservice industry with companies individually having high degree of specialization, but at the same time being strongly connected through the fact they individually offer solutions in a coherent chain of products and services, most companies have formed some kind of strategic partnerships.

[39] 3300(2016)/1378(2015)
[40] 14385(2016)/17673(2015) – 1 = -18,6%. 17673(2015)/20974(2014) – 1= -15,74%. 14385(2016)/20974(2014) – 1 = -31,4%
[41] (Aker Solutions ASA, 2016)
[42] Referred to as «#TheJourney» in the annual report.

While the larger subsea equipment providers have responded to the challenging markets through mergers and acquisitions, with OneSubsea going from a joint venture between Schlumberger and Cameron International to being fully integrated in Schlumberger, GE Oil&Gas merging with the worlds second largest well-services company Baker Hughes, and Technip and FMC Technologies forming TechnipFMC. Aker Solutions has chosen a different strategy. Instead of achieving cost savings through a more efficient and coordinated supply chain, they have focused on closer cooperation with customers and engaging them in the early phases of development where the ability to influence costs are higher. Instead of vertically integrating with other suppliers, their strategic partnerships are more product-specific and focuses on providing innovative solutions by teaming up with "leaders in their fields of expertise"[43]. This will be treated more in detail in the external analysis, cf. chapter 3.2.6.

Their main strategic partnerhips involve collaboration on subsea, power and automation technology with ABB, a "Subsea Production Alliance" with Baker Hughes by combining their world class well completions and artificial lift technology[44], collaboration on subsea compression systems with MAN Diesel & Turbo, and a joint-work-group based alliance with Saipem where they seek to integrate Aker Solutions field planning and project management services with Saipem's EPCI[45] expertise.

These partnerships "close technology gaps in Aker Solutions' portfolio"[46] along the entire spectrum of services Aker Solutions provide, from reservoir to seabed and up to topside facility services.

2.2.9 Corporate structure

The organizational structure of Aker Solutions is concentrated around the streamlining of its operations, with three key business units, Subsea, Field design and Engineering. Subsea and Field design has been a customer-oriented section where the focus is on the interconnection of the various geographic stations that work towards serving the various subsegments. The Engineering division function as a research and development department, as well as support for the two customer-related divisions. Aker Solutions' organizational structure largely

[43] Aker Solutions' Annual Report 2015.
[44] Artificial lift technology involves pumping fluids into the reservoir to maintain pressure as it drops over time when producing oil and gas, and thereby increasing recovery rates from the oilfield.
[45]EPCI: Engineering, procurement, construction and installation. A sub-segment Aker Solutoins divested into Akastor ASA in 2013. More capital intensive as it requires a fleet of supply-vessels.
[46] Aker Solutions Annual report 2015.

reflects the revenue generation as the business units are organised on the basis of operating segment and geographical markets. The organizational chart is presented in figure 20.

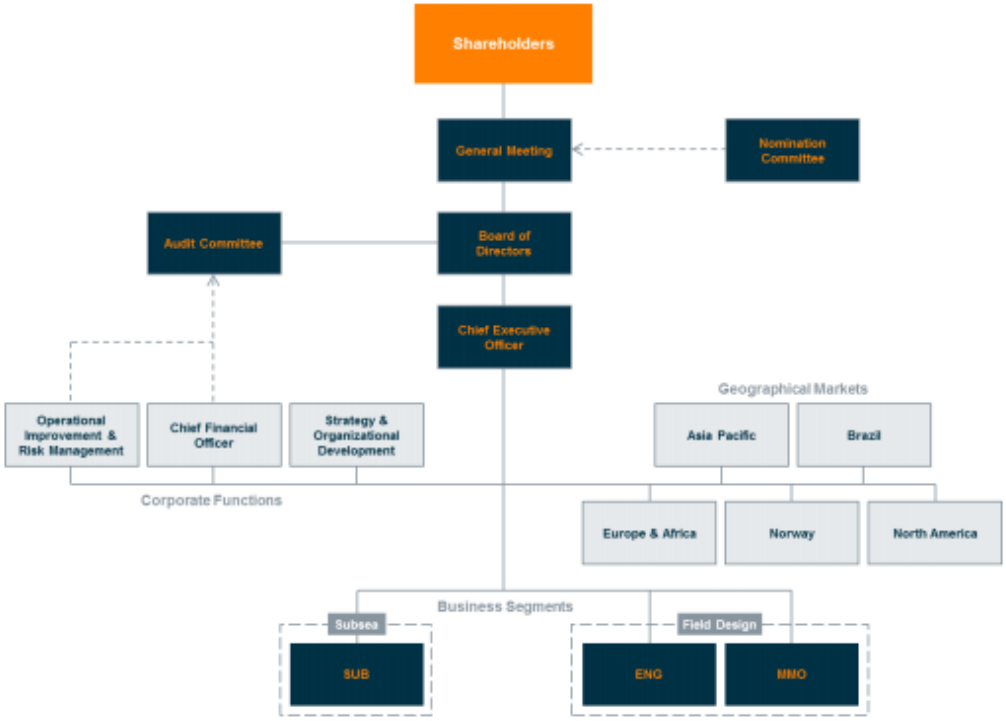


Figure 20: Aker Solutions' Organizational chart. (Source: Aker Solutions Corporate Governance report 2016)

The headquarters of Aker Solutions is located in Fornebu outside Oslo. This works both as a support center for Subsea and Field design divisions, and as the main engineering hub, connecting the engineering hubs in London, Mumbai and Kuala Lumpur.

The Field design division has a strong base in Norway and primarily serves the Norwegian MMO market through its three fabrication yards along the Norwegian coast, with the largest yard in Ågotnes, and offices in Oslo and Bergen. It also provides services field planning and life-of-field servies across different regions, with especially strong presence in the Asia-pacific region.

The Subsea division on the other hand serves the global subsea equipment market and manages a vast network of manufacturing facilities and offices along all continents. During the period 2012-2015, the growth in the Brazilian market was substantial. Currently the shallow- and deepwater North Sea market and the deep- and ultra-deepwater markets in Brazil are Aker Solutions' main Subsea markets. As the downturn with declining oil prices has hit the Brazilian subsea market more severily than other geographic markets, Aker Solutions

current competitive position is therefore somewhat more challenging than some of its main competitors. This will be examined more in detail in the strategic analysis, cf. chapter 3.2 and 3.3.

In the 2016 annual report Aker Solutions presented a new organizational structure by replacing the business areas with five delivery centers: Management, Front End, Products, Projects and Services. The organizational restructuring is made to "better reflect our workflow from early engagement with customers to project execution and through to life-of-field services". The changes are only organizational, and is not expected influence the estimates in this paper. It is not analysed further.

2.2.10 Shareholders

Aker Solutions has by april 24th 2017 a share capital of NOK 293,807,940.12, divided into 272,044,389 shares outstanding[47]. Aker Kværner Holding AS is the most prominent shareholder of Aker Solutions ASA, with at stake of 40,56% of total issued shares. Aker ASA holds 6,37%. Folketrygdfondet, which is the largest institutional investor on Oslo Børs and are responsible for the investments of the Norwegian government's pension fund in Norwegian companies, owns a stake of 6,8%[48]. Indirectly, through the Norwegian government's 30% stake in Aker ASA, the government effectively holde 19,2% of the shares in Aker Solutions ASA. The rest of the shares are held by institutional and individual investors. The main institutional investors are mutual fund Verdipapirfondet DNB Norge, FERD AS, and the different divisions of the investment banks JP Morgan and Morgan Stanley, who in total owns about 17,76% of the outstanding shares.

Kjell Inge Røkke is the most prominent individual shareholder. Directly through his holding company TRG Holding AS and indirectly through Aker ASA and Aker Kværner Holding ASA, he effectively owns 23,10% of the outstanding shares.

[47] (Aker Solutions ASA, 2017)
[48] (Proff.no , 2017)

2.2.11 Dividends

Aker Solutions has traditionally been quite dividend friendly, having a strategy of maximizing shareholder return and paying out dividends if they view the current investment opportunities to be inferior to potential market return[49].

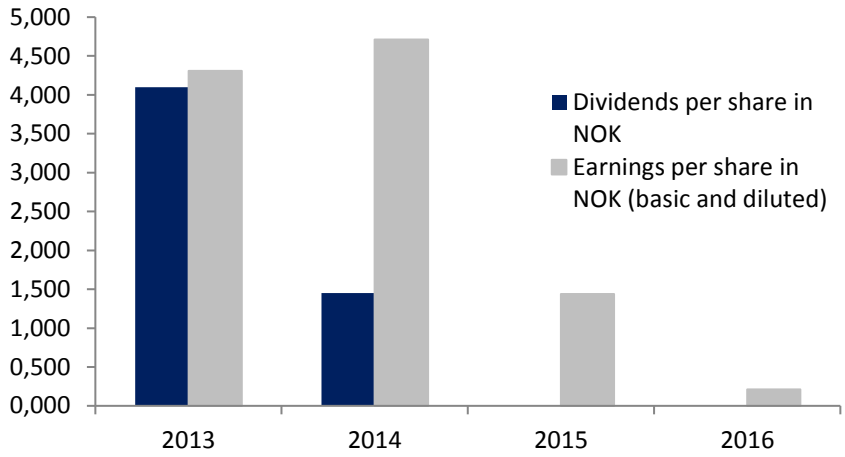


Figure 21: Dividends 2013-2016 and reported earnings per share (EPS) 2013-2016. Source: Annual reports 2014-2016.

Since the oil price decline and following market downturn in mid 2014 Aker Solution has cut its dividends gradually, paying no dividends in 2015 and 2016. The management have expressed reluctancy to pay out dividend unless the market conditions improves[50]. Whether there will be paid any dividend payments in the near future are therefore unlikely, but depending substantially on the overall activity and expected profitability in the industry in the future.

[49] Aker Solutions Annual report 2016
[50] Aker Solutions Annual report 2016

3 Strategic analysis

In this chapter I will perform a strategic analysis of Aker Solutions ASA and the relevant industry in which it operates. The main goal is to assess whether Aker Solutions has a strategic and competitive advantage that may generate value for its shareholders.

The strategic analysis will be split in an external and an internal part. The external analysis will consist of an analysis of the overall drivers on the basis of the PESTEL-framework, first focusing on the oil price and how it affects the industry dynamics and then other macro factors and risks. The competitive environment will be analysed through the Porter's 5 forces framework.

An internal analysis of Aker Solutions strategic capabilities is made through a resource- and competence-based view combined with the VRIN/VRIO-framework for analysing its strategic potential.

Aker Solutions strategic position will be summarized using a SWOT-analysis. The complete qualitative strategic analysis can be expressed through the following structure:

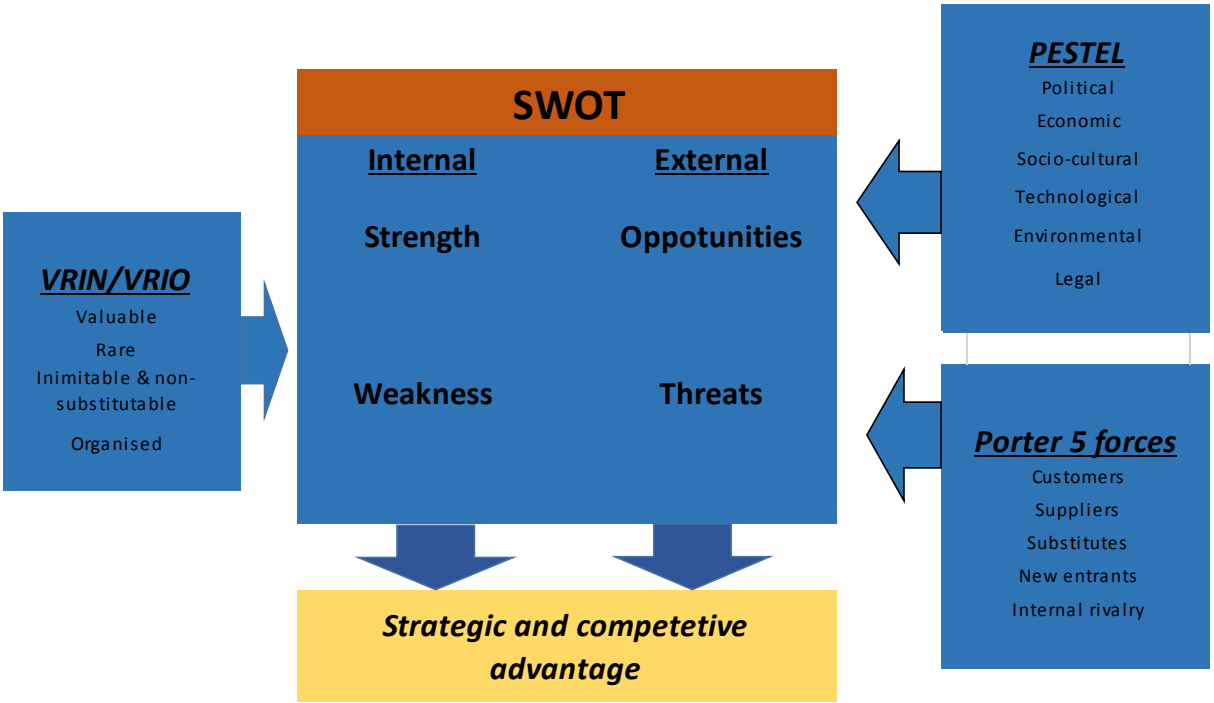


Figure 22: Framework for the qualitative strategic analysis

3.1 Key drivers and risks

The PESTEL framework categorises external influences that drive changes in an industry and has the potential to impact success or failure of strategies into six main types: political, economic, social, technological, environmental and legal (Johnson, et al., 2011). Instead of a strict application of the framework for each element, the PESTEL-framework is used as a basis to identify and treat the most relevant and prominent factors. I will first explain briefly how the declining oil prices has led to a demand shock in the oilservice industry. I will then identify other important external risks that in both short- and long-term may affect the industry. Furthermore, this chapter must be seen in relation to chapter 8.3.1, where important macro factors driving supply and demand in the industry are analysed when forecasting Aker Solutions' revenues.

Oil price deterioration and changing market dynamics

As presented in the introduction, the oilservice industry in general highly depends on the development of the oil price, cf. figure 1. The oil price deterioration starting 3Q 2014 has changed the dynamics in the entire oilservice industry, and the subsea equipment and field development/engineering subsegments are no exception.

Since the rapid decline of the oil price from a level of around 100$/bbl in 2Q 2014 down to 25$/bbl in 1Q 2016, the oil-service industry has been challenging along the whole value chain culminating in a 23% reduction in global E&P spending for 2016[51]. Even though the challenges vary somewhat, largely dependent upon the underlying cost structure, with asset-heavy companies such as contract drillers and supply vessel providers being less flexibility on the cost side and thus finding it most troubling, the whole supply industry have faced challenges.

When the oil price was in the level of above 100$/bbl in the period before mid 2014, most projects offshore were deemed attractive as it yielded positive NPVs[52]. High profitability and generation of substantial cash flows for the oil companies, and a market outlook remaining highly positive as the expectations of oil prices remaining high, directed the focus to

[51] (Organization of the Petroleum Exporting Countries, 2016, p. iii)
[52] NPV: Net present value.

"greenfield"[53] projects. High exploration activity led to a significant amount of new offshore discoveries, especially in the deep- and ultra-deepwater areas offshore Brazil and West-Africa (Crooks & London, 2017). Some discoveries were also made in the arctic region of Canada and in the Barents Sea offshore Norway and Russia. In retrospect, a problem in the industry was that the focus towards new fields rather than optimalization of producing fields led to substantial cost inflation.

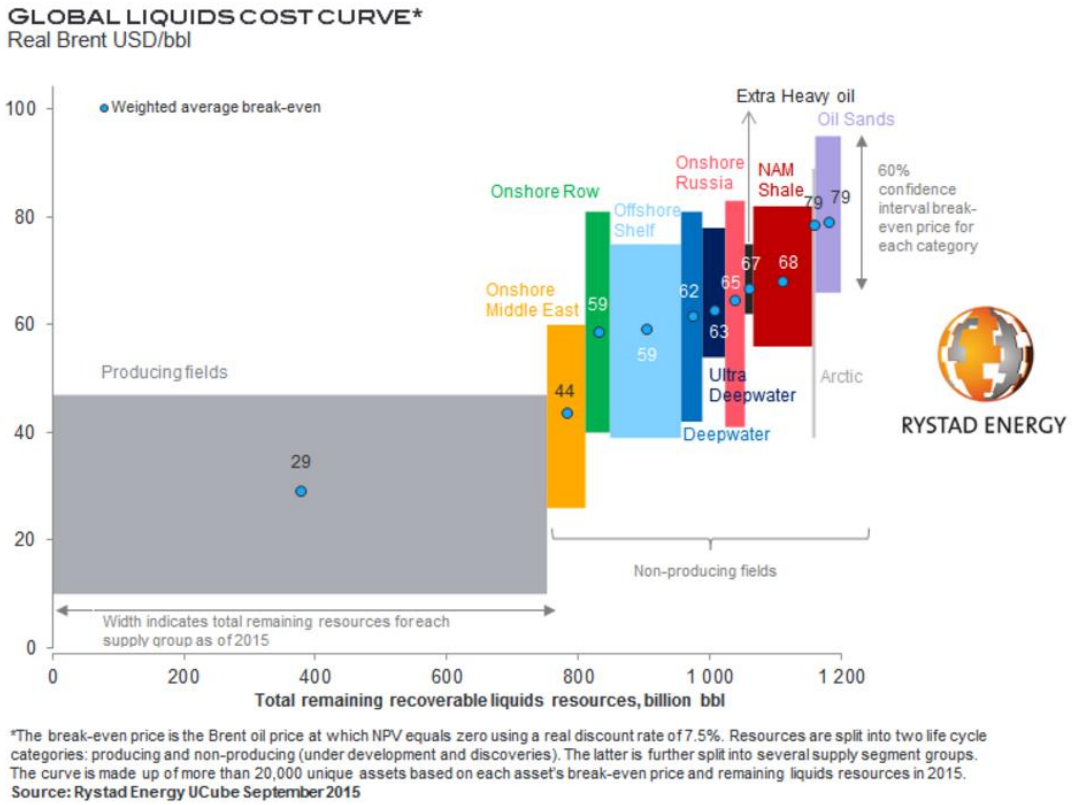


Figure 23: : Break-even oil-prices for different types of oil extraction. Estimated by Rystad Energy per September 2015. (Source: https://www.rystadenergy.com/NewsEvents/PressReleases/global-liquids-supply-cost-curve)

In septemer 2015, Rystad Energy estimated that the break-even oil price for offshore extraction on average ranged from 59 to 63 $/bbl, depending on water depths, cf. figure 23. When the oil price fell below 50$/bbl, most planned and ongoing deep- and ultra-deepwater development projects were postponed. Due to lack of profitability and oil companies cutting CAPEX and OPEX, it has resulted in a sharp reduction in the overall activity in the oilservice industry. In order to increase profitability at lower oil prices, the industry has had to shift its focus. While the focus previously were on exploring growth opportunities, it has shifted to maximizing production from existing fields and an extreme focus on cutting costs. How these

[53] . Greenfield: Proven, non-developed oilfields.

changes affect the industry and the competitive environment will be dealt with more thoroughly in the competitive analysis, cf. Chapter 3.2.

Volatility in the oil market

Developments in the oil price are driven by a complex interaction of many different factors. Historically, the volatility in the oil price has been significant. Exogenous shocks with varying frequiency has moved prices substantially. The tendency, however, seems to indicate that volatility in the oil market has increased in later years, cf. figure 25.

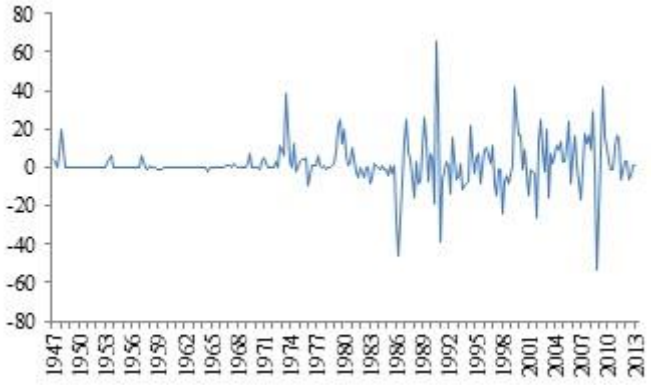


Figure 24: Percentage changes of the quarly price of crude oil (Source: Dow Joness & Co., Thomson Reuters, http://blogs.worldbank.org/developmenttalk/oil-price-volatility-its-risk-economic-growth-and-development **)**

The oil market is generally characterized by relatively strong demand, which largely follows the overall trend in the world market/GDP. More frequent macroeconomic crises that create a negative demand shocks may be one of the reasons for this increased volatility. At the same time, the supply side is characterized by several providers of different sizes. OPEC, which is a collaboration between 14 oil exporting countries, has a significant market power. Their market share is around 44% of annual global production and about 73% of the "proven" oil reserves (Organization of the Petroleum Exporting Countries, 2016). Their decisions about the size of agreed production cuts are able to move the spot price several percentage points in a short period of time. At the same time, the entry of American "unconventional" onshore oil production[54] has changed the dynamics of the market. With more expensive production, but the ability to resume production very fast, it provides the basis for significant positive supply shocks as observed in 2Q-3Q 2014. At the same time, their ability to resume production as soon as the oil price reaches break-even, limits the expectations of higher oil prices in the

[54] Often referred to as "shale-oil".

longer term. More unstable oil markets is a factor that may have significant impact on the oilservice industry and affect Aker Solutions performances over time.

Exchange rate risks

The global nature of the oilservice industry, with each industry player serving markets in many different countries, the development of the exchange rates may have a substantial and often unpredictable impact on net income each year. Some of this risks can be neutralized through hedging, but in a longer period the relative competitiveness of companies may be affected by how their respective currency develop in relation to that of customers, suppliers and competitors.

Political unrest

Geopolitical turmoil is a factor that significantly affects oil prices and indirectly the activity in oil-related industries. Several important oil producing countries are geographically closely linked to the conflicts in the Middle East. At the same time, embargoes imposed on imports and exports of oil and gas have often been used to exert pressure on a country in political conflicts. Geopolitical unrest is therefore another factor that can significantly affect the oilservice industry.

Environmental focus and new energy sources

The irreversible environmental impact of fossil fuels has been widely accepted, driving the focus on greenhouse gas emissions mitigation. In extension of the impact fossil fuel has on the environment, the focus has increasingly been directed towards renewable energy sources. As solar, wind and marine renewables become increasingly more cost-efficient, closing the gap to more traditional fossil energy sources in terms of competetiveness, the long-term threat to the oil and gas industry becomes increasingly more realistic. The so-called “green shift” towards renewable energy sources is therefore a potential driver of change in the oil and gas industry over time. However, given the current long-term estimates of a growing global energy demand, and the rate depletion of existing oilfields, it will unevitably be need for developing new oilfields in the foreseeable future. The outlook on future growth in the subsea segment is therefore not limited by alternative energy sources, even though it may be affected to a smaller or larger extent by the rate of transition towards a clean energy economy. Increased focus on reducing emissions also provide an opportunity in the industry. For example, both Aker Solutions and most of its peers are has been successful in developing functional carbon-capture technology.

Technology and innovation

As previously mentioned, development of subsea equipment is both technologically highly complex and often involves innovative solutions. The development of disruptive, groundbreaking new technology is something that may create substantial changes in the industry. For example, Aker Solutions, together with MAN Diesel & Turbo, has developed the world's first subsea gas compression system[55]. This opens up for a subsea gas production system without the need for topside installations. Such technology opens for developing new types of oilfields and in areas that were not previously available. The ultra-deepwater segment in particular will be driven by the opportunities created by such new technological advances.

HSE Regulations

Oil and gas extraction is associated with significant safety risks, where accidents may have fatal outcomes. Over time, this has led to a strong awareness of such risks. Rules and regulations are increasingly strengthening the HSE[56] requirements. For example, after both Exxon Valdez 'oil spill in Alaska in 1989 and the Deepwater Horizon disaster in the Gulf of Mexico in 2010, the US government has reviewed technologies and procedures, and formed new regulations to minimize the risks of similar events happening in the future. In both these cases, the activity in the region has deteriorated after the disaster. This has led to an increased focus among oilservice players on having sufficient processes in place to satisfy such requirements. Aker Solutions has even gone as far as having it as a top priority, including it in its vision for the company as a way to "emphasize our commitment to responsible operations"[57].

[55] (Aker Solutions ASA, 2017)
[56] Health, Safety and the Environment
[57] (Aker Solutions ASA, 2017)

3.2 Porter's 5 forces

Porter's 5 forces is a framework developed by Michael Porter, and helps identify the attractiveness of an industry by analysing its 'structure' through the five competitive forces: bargaining power of customers and suppliers, threats of new entrants and substitutes, and the internal rivalry among the industry players (Johnson, et al., 2011). The framework suggest that profitability in industries where these forces are weak tends to be more attractive, and correspondingly less attractive when the forces are strong. As the forces tends to remain fairly stable, at least in more mature industries, the framework is often view as "static" (Grundy, 2006). Due to the cyclicality of the the subsea equipment and oilfield engineering industries, the framework will be used with a more dynamic approach. This includes analysing both the current situation and the underlying changes in the industry.

The first step in the analysis is to define the industry.

3.2.1 Industry definition

In the analysis the focus is primarily aimed at the subsea equipment segment as it is presented in chapter 2.1, because this is Aker Solutions' most important revenue segment. In areas where the competitive forces are significantly different affect in the subsea equipment segment than other relevant subsegments they will be analysed separately.

3.2.2 Bargaining power of Customers

Competitor balance – Few, large customers and few players

The customers in the industry is characterized by a few large, integrated oil companies making up a large share demand for subsea equipment and offshore engineering services, cf. chapter 2.2.5. On a global basis, Petrobras and Statoil are the two largest customers, and Total, Shell and BP making up a substantial portion. The rest of the market is characterized by several companies, both IOC[58]s, NOCs and independents, individually placing smaller orders. At the same time, there are only four players with a global reach and sufficient engineering expertise to serve the larger customers. By being a few, large players on both sides, there is no underlying constant bargaining advantage for either the customers or the manufacturers/service providers in the industry.

[58] IOC: Integrated oil company

Capacity constraints

Because subsea production systems are essential for deepwater and ultra-deepwater oil and gas production, the bargaining power fluctuates. The main driver of the bargaining power is the number of new developments and demand for tie-backs to existing offshore facilities (demand-side) and the the manufacturing and workforce capacity in the industry (supply-side). The bargaining power can therefore be seen in relation to the utilization rates and lead-times in the industry.

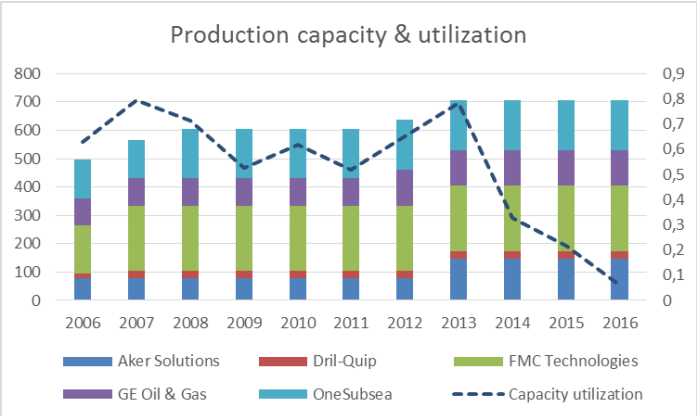


Figure 25: Subsea tree production capacity (left) and utilization rates (right). (Source: Quest Offshore, Bloomberg Terminal).

Since the recovery from the financial crisis in 2008-2009, the industry has seen substantial growth and investments in increased capacity. High utilization rates have put substantial pricing power at hands of the industry players, driving up unit prices on subsea trees. Since the oil-price decline and oil companies freezing CAPEX through postponements of new developments and modifications on existing fields, the utilization rates and lead times has declined. The current market is therefore characterized by a shift towards customers having stronger bargaining power.

Project complexity

Another factor that affects the bargaining power of customers in is the project complexity. Deepwater and ultra-deepwater developments are more complex and comes with higher risks both economically, as the total development costs and lead times are higher, and in terms of the technological complexity and risks related to potential failures. The need for additional engineering and product customization in order to ensure sufficient quality and reduce risks, have historically led to higher loyalty to the preferred supplier. Higher switching costs for developments in deeper and harsher waters, is a factor that reduces the customer's downward pricing pressure on the industry players. In the current market however, where the customer's willingness to invest in such developments is low, it seems that the effect of customer loyalty is lower. The transparency in the market is relatively high, as all the larger industry players have relationships with the larger customers, and customers are pushing the industry towards

increased standardization of solutions due to increased focus on costs, cf. chapter 3.2.6 on internal rivalry. This increases the competition on prices and shifts bargaining power to the customers. The potential customer loyalty for higher risk projects, where the focus previously has been on differentiation through high-quality solutions, therefore only extends so far as the perceived ratio between price and performance is sufficient. Given that the industry is able to reduce costs and keep innovation rates stable, a market recovery will drive up the utilization rates and balance the bargaining power over time.

Strength: Currently strong. Will remain strong in the short term. Decreasing in the longer term.

3.2.3 Bargaining power of suppliers

When analysing the bargaining power of suppliers, it will be split between different types of suppliers.

Subcontractors

The industry players use different types of subcontractors for an arraw of different services. A general feature however, is that the market is characterised by subcontractors being relatively smaller, local and more specialized. The bargaining powers depends on the importance of the services and the underlying competition in the market. In general terms the industry players' size strengthen the bargaining power relative to smaller subcontractors.

Financing

When it comes to financing, the need for external debt financing largely depends on the type of investments the companies pursue. In the subsea equipment segment, the need for manufacturing plants and raw materials makes it advantegous with external debt financing. Given the size of the players in the industry, all have access to capital through bonds and term loans at banks. As the high-yield bond-market in both the US and Norway have seen substantial growth over the last years, the access to capital must be considered adequate Interest costs vary somewhat among the players, mainly based on the relevant credit markets' assessment credit risks. As both GE oil&gas, OneSubsea (Schlumberger) are part of a larger conglomerate, their access to internal capital through interconglomerate loans may possibly drive down the overall interest costs and yield a small advantage relative to the other players.

Labor

Both subsea equipment and the field planning segments are characterized by sophisticated and technologically complex engineering activities. The need for highly skilled engineers, limited supply and strong competition not only among the competitors in the aforementioned segments, but also from other industries, put upward pressure on personell costs. This generally strengthen the bargaining power of employees.

In periods of strong pressure on cost, where the industry is forced scale down, cut staff and terminate employees, the bargaining power shifts. However, because it takes about 2-3 years to educate newly employed engineers, and terminated employees may choose to find new employment in other industries, the shift is somewhat limited.

Another factor in relation to the bargaining power of employees are participation in labour and trade unions. Both in the US, Brazil and Africa, this tendency of union participation is lower, which favours the players with stronger presence in these geographic markets. The highest participation rates is in the North Sea, especially on the Norwegian Continental Shelf. This may potentially favour OneSubsea somewhat during the downturn, as they are less exposed to markets that has stronger limitations on lowering the headcount.

Overall, given the limited supply and the strong dependency on skilled engineers in the industry, the bargaining power of employees must be considered relatively strong

Raw materials

The main raw materials used in subsea equipment are various forms of steel and aluminium, with stainless steel being preferred for deep- and ultra-deepwater equipment due to its non-corrosive capabilities. The steel market is characterised by many buyers and suppliers, as steel is used in an array of industrial applications. The access to raw materials is therefore based on the current market conditions in the steel industry. The market is highly cyclical, and currently in a state of substantial overcapacity. The overcapacity is expected to persist for a longer period, as the Chinese steel producers, with about 50% global market share, are favoured by the Chinese government through subsidies and artificially low currency rates, and therefore are expected to maintain current production levels[59]. The access to raw materials is considered good both in the short- and longer term.

[59] Nucor Steel, Annual report 2016.

Software

Another significant item is engineering software. The market are characterized by several suppliers and buyers, with intense competitions between suppliers in delivering high-quality solutions, and therefore lower switching costs for the industry players. This gives substantial bargaining power in favour of the industry players.

Strength: Low to medium. Some variation among the different types. Expected to remain stable.

3.2.4 Threat from new entrants

Corporate history and experience

All of the four larger participants in the industry have long traditions and experience, stretching back to the first subsea installations in the North Sea and Gulf of Mexico in the 1960s, although GE Oil&Gas and Schlumberger more indirectly. GE Oil&Gas through its acquisition of Vetco Gray, who traditionally has had a strong position in the Norwegian and UK subsea market, and Schlumberger through its acquisition of Cameron International. Dril-quip is the newest entrant to the market, being incorporated in 1983 by three former Vetco Gray employees[60]. The point, however, is that as subsea equipment manufacturing and engineering require substantial know-how and engineering capacity, new entrants will find it difficult to compete with established players. Especially in the current market, where there is greater focus on cost cuts. Long experience and technological complexity serve as both structural and strategic barriers of entry in the subsea industry.

Scale and capital requirements

First of all, even though subsea oilfields vary in scope and complexity, they often span a couple of dozen wells or more. As most equipment are delivered on a project-by-project basis, the player have to have some scale in both its manufacturing facilities and engineering capacity in order to compete for projects. At the same time, as manufacturing facilities are highly specialized and expensive, sufficient scale is necessary for competitive pricing in the industry. Sufficient engineering capacity, and in particular the need of attracting talented people, is even more a factor that favours companies with longer traditions and scale in its

[60] (Anon., 2017)

operations. Given these factors, sufficient scale is natural barrier of entry to the market. Dril-quip Inc, being the only player without a global presence, have been able to establish itself in the niche of projects in very harsh enviroments, in which substantial customization and differentiation leads to higher prices which cover the higher costs that follows with lack of scale.

From this is seems that for a new player to enter the market, it has to be either in the form of being highly specialized and where it aims at a niche in the market, or multinational companies expanding their business portfolio through acquisitions or forming a new business unit by attracting employees from already established players. Private equity investors may also be a possible source of establishing new entrants through the same channels.

Patents and other proprietary assets

Another barrier for new entrants however, may be that as established players over time have developed the subsea equipment through innovations, those innovations have regularly been patented. For potential entrants, the use of patented technology is dependent upon the acceptance of the patent holder and may involve royalties/licenses. This induce addictional costs, which assymetrically favours its competitors. Patents may therefore, through its protection by law, often impose both a strategic and structural barrier for the entrance to the market.

Fixed price contracts and project risks

Both in the subsea equipment and the field planning markets, revenue are generated through projects awarded on a project-by-project basis, based on the initially negotiated or offered price. Fixed price contracts require extensive management of costs and evaluations of inherent project risks. Often, if not done properly, it may result in delays and cost overruns. When prices are initially fixed, unbudgeted costs cannot be transferred to the customer through higher prices. The offered price of the project therefore has to be estimated in an environment of substantial uncertainty and therefore favoures more experienced players. When higher risks stem from lack of experience, it indirectly makes entering the market more costly due to higher cost of capital. This unfavourable position are amplified by the inherent cyclical nature of the industry.

Strength: Weak.

3.2.5 Threat from substitutes

Substitutes are products and services that, even though they are not identical, serve the same or substantially the same need for customers (Johnson, et al., 2011, p. 57).

Other energy sources

In a long-term perspective, with increased environmental awareness and technological advancements, the threat from substitutes may come from other energy sources. However, on the basis of the estimated future energy demand increasing substantially, and gradual depletion of conventional oil production, the demand for subsea oil and gas production systems are expected to increase and stay strong for the foreseeable future, cf. chapter 3.1. The threat from other energy sources is considered low.

Other types of oil and gas extraction

Onshore "unconventional" oil and gas production are a potential substitute in the sense of oil companies pursuing investments in this area on behalf of offshore and subsea oil and gas production. In the longer term, increasing demand for oil and gas will make deep- and ultradeepwater production necessary and drive growth beyond what may be covered by onshore unconventional sources. In a shorter term, however, some customers may allocate resources away from subsea production.

In shallow to deepwater (0-1000m), extraction through traditional topside oilfield platforms/installations (jack-ups, semisubmersibles, SPARs etc) is an alternative to subsea production systems. Given the advantages of subsea installations, which increase more or less proportionally with water depths, most modern facilities include subsea production systems of some kind. In already producing fields, the advantage of subsea tie-back solutios may even make existing facilities complementary in the way of creating demand for subsea solutions that otherwise would not have existed. Production through traditional surface platforms may therefore both pose a threat and an opportunity.

The relatively newly invention of 'unmanned' platforms with wellheads placed on the surface, which is a simpler, more secure and cost-effective surface platform solution, may pose a threat to subsea production systems in shallower waters. In deeper waters however, such installations often becomes more costly and less effective, cf. chapter 2.2.2, and pose a

smaller threat. In the ultra-deepwater segments, subsea production systems faces no substitutes.

Overall, given the advantages of subsea production systems, the threat from substitutes is considered low to medium, depending on water depths and field complexity.

Strength: Low to medium.

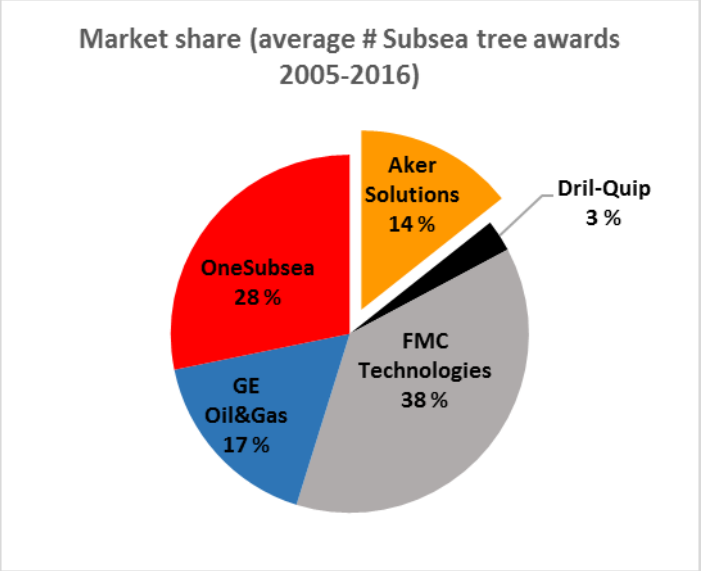
3.2.6 Internal rivalry

All the other factors impinge on the direct competitive rivalry between the industry players, which can be seen as "organisations with similar products and services aimed at the same customer groups" (Johnson, et al., 2011).

Competitor balance

The subsea equipment market consists of five players having approximately all the market share globally.

The competitors are fairly similar in size. As the market share is fairly evenly distributed, except Dril-Quip's position as a niche player, and none of the competitors are sufficiently large to have the power of possibly exerting competetive pressures through greater capacity or substantially lower cost structures (scale), the rivalry among the competitors should in generally terms be quite strong.



However, there are several factors leading to a variation in the intensity of the internal rivaly, largely depending on the industry cycle.

Capacity constraints

First of all the growth potential in the industry has been, and is still considered to be substantial. The fact that many of the deep- to ultra-deepwater discoveries made in basins of Brazil, Gulf of Mexico, Africa and Asian-pacific are yet to be developed, together with

considerable barriers of entry, it leaves substantial room for the companies to keep market share stable by growing with the market. At the same time, increasing capacity is often lagging demand because in order to increase capacity the companies often have to train local engineers to satisfy regulations rendering it necessary to have a certain amount of local activity and building specialised manufacturing and testing facilities. Together the process of increasing capacity often may take 3-4 years. So when increasing capacity to fulfil increased demand in time of higher oil prices is less flexible, the shortage of capacity makes the total market demand greater than the supply of subsea equipment, increasing the players' pricing power relative to customers. However, with declining oil prices and subsequent slowdown of activity, the excess capacity increases competition among the players for important contracts.

Growth and differentiation

When oil-prices were high, the focus among the oil companies turned towards developing discovered reservoirs/oilfields at ingreasingly greater water depths, cf. chapter 3.1. Just up until recently, developing deep- and ultra-deepwater oilfields have made it necessary with customized solutions for the specific properties of the particular oilfield. In such circumstances the market tends more towards intensive engineer-to-order customization, focusing on differentiation through high-quality solutions rather than standardization and cost-efficiency. The players employ substantial amounts of engineering resources in developing uniquely innovated solutions, customized to the customer's needs. In the case of higher oil-prices, the companies therefore compete more on offering a unique and differentiated product rather than on price. The recent shift in focus towards cost-cutting, however, has increased to need for substantial standardizations to lower prices. This trend is expected to remain important with lower future oil prices, at least in the shallow- and deepwater segments.

Market maturity

The competitiveness of both the subsea equipment and field design markets also vary somewhat among the geographic regions due to different market maturity. On the NCS and offshore UK, where most of the discovered oilfields already are producing or in the late stages of development (except relatively newly discovered Johan Sverdrup field), the potential growth in the subsea equipment market mainly lies in subsa tie-back solutions, where marginal fields are tied back either to shore or an existing topside facility. Lower growth

opportunities therefore sharpen the competition for projects. The opposite seems to have been the case in Brazil and West Africa. Here most of the discovered and recoverable oilfields are not yet developed. Strong demand for subsea solutions as many of the oilfields have water depths >1000m, combined with limited local capacity to serve the markets without having to rely on the global availability of supply-vessels stationed in other regions, these geographic regions are not that far out in the market life-cycle and tend to be less competitive.

On the other hand, as oil prices has remained higher for a long period (2005-2008 & 2011-2014) and revenues growing considerably each year, the margins have largely stayed put due to cost inflations. Cost inflations seem to come from different sources, but mainly some unresolved structural problems in the industry.

Problems

In an environment of high growth and focus on increasing capacity as well as providing a uniquely differentiated solutions for the customer, and where higher oil prices yields vast profit margins both for the customers and the players, some structural problems in the industry tends to persist or even increase, and thus increasing costs. The current competitive environment and the future short-term development can therefore be expressed through the structural problems that exist in the industry and how the companies meet these challenges with different strategies.

Supply chain coordination

The first problem, which increases the costs of bringing subsea equipment to market, is lack of supply chain coordination.

In order to bring to bring subsea equipment to market, a multitude of companies need to coordinate their services. For example, timely delivery of raw materials such as steel and aluminium, manufacturing the subsea equipment without delays and having installation vessels and support equipment available at time of completion, are three possible bottlenecks which may prevent the projects to develop as planned. When these services are provided with strong coordination among the different companies, it often delays the project and materialize in longer lead times and higher costs. Increasing supply chain coordination is therefore an important success factor in the current market (Ramsøy, et al., 2016) (Ramsøy, et al., 2016).

Complexity creep

Another is what is often referred to as "complexity creep" (Whittaker, et al., 2017). When individual projects are provided by innovative and complex solutions tailored to the specific needs of the customer, those solutions often give rise to new equipment and solutions. Even though such innovations in theory should, and often does, increase to productivity of the applied technologies, they may as well add to an already complex portfolio. Lack of simplicity may therefore subdue the potentially synergistical gains from new technologies. Simplification of processes and a more transparent product portfolio/standardizations seems to be an important factor in increasing productivity and reducing costs to compete in the new low-oil price-environment.

Slow adoptation

Another competitive factor in the subsea market in general is that the high innovation rates make the ability to adopt new technologies important. A general problem in the industry has historically been that actual and expected adaptation of new innovations and technologies not allways coincide. Given the complexity of subsea equipment, there were (and still are) several challenges in which it has taken longer time to establish a commercially sound solution than expected. For example, the implementation of subsea processing, which involves the process of separating gases and different fluids[61] at the seabed rather than at a surface or onshore facility, was first developed in the early 1960s, but have not been commercially attractive in deepwater application until the late 1990s/early 2000's (Müller, 2015). The potential gains from installing complete subsea productions systems have long been absent due to the need additional costly topside facilities. The companies' relative ability to adopt new technologies may therefore be an important factor in maintaining its competitive position in the market.

After-market services and production losses

Another problem closesly related to that of the lack of supply chain integrations, is that specialized/customized products and services are often delivered without integrating after-market maintenance, modifications and repair services.

The subsea MMO market have therefore evolved into a separated subsegment. Lack of coordination of initial delivery and after-market services makes it more costly for customers. The higher prices come from supply and demand factors, such as engineering capacity and customers decisions on whether to increase the life-span of existing systems or replace with

[61] Oil and water primarily

newer equipment, but also from higher costs in the industry due to lack of planned intervention, delays and suboptimal decisions on how and when to replace obsolete assets. At the same time, lack of integration leads to more volatile markets given the supply chain constraints in availability of highly specialized intervention equipments and necessary support infrastructure. This in turn has led to higher OPEX costs for the customers and higher break-even oil price estimations on new developments, and thus potentially reduced the demand for new projects.

Strategies in the lower oil price environment: Supply chain integrations vs. design

With lower oil prices, oil companies have expressed reluctancy to keep investing in new developments unless oilservice companies are able to prove its ability to cut costs sufficiently. The problem is that capacity are largely fixed, both in terms workforce and manufacturing capabilities. Reducing the the workforce are a somewhat more flexible solution than divesting specialized manufacturing and fabrication facilities, even though trade unions and regulations remain a barrier on lowering wages too much or instantly reducing the workforce. However, when the long-term potential in the industry still remains positive, given the ability to cut costs sufficiently, the players have been fairly reluctant to reducing capacity as it would prevent them from taking advantage of the growth opportunities and possibly put them in an unfavourable competive position relative to the other players. The players have therefore sought to reduce costs through solving some of the structural problems mentioned above. This has led to substantial changes in the industry dynamics.

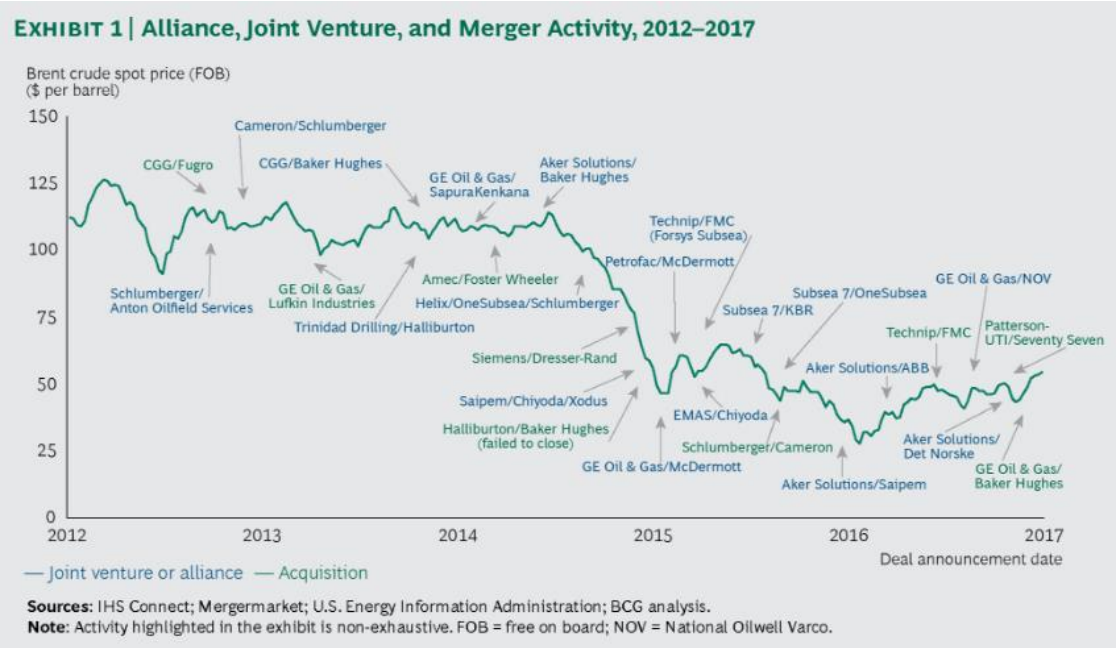


Figure 26: Alliance, Joint Venture, and Merger activity, 2012-2017. Source: BCG[62]

During the period up until the oil decline, most alliances were targeting closure of technology gaps. When oil-prices fell in 3Q 2014, the industry soon turned towards tighter integrations. Technip and FMC Technologies merged to form TechnipFMC early 2015, followed by Schlumberger acquiring Cameron (and forming an alliance with Subsea 7) and GE Oil&Gas merging with Baker Hughes. What resembles all these consolidations is that they involve vertical integrations in order to increase the companies' ability to cover larger parts of the value chain, and in this way target the lack of coordination of activities.

Aker Solutions has on the other hand continued its focus on strengthening its alliances that target technology gaps. Their strategy to cut development costs is to leverage its expertise in field planning, and implementing more cost-effective integrated topside and subsea solutions already from the early design phases. The rationale is that by bringing the customer into process at the earlier stages of development, they would target costs at a stage where most costs are not yet locked in.

The current competitive environment is therefore rather interesting. Aker Solutions' strategy may have the potential of providing a better overall balance between cutting costs and maximizing recovery, but where the effectiveness of the strategy is more uncertain. Supply chain integrations, on the other hand, provide more provable cost cuts, by for example

[62] (Whittaker, et al., 2017)

integrated software along the value chain, faster delivery, stonger bargaining power over suppliers of raw materials and subcontractors etc., but the overall potential cost cuts are smaller.

Given the recent numbers on awarded subsea trees, cf. chapter 2.1.3.2 and 8.3.1, Aker Solutions has lost out relative to TechnipFMC and OneSubsea, indicating their strategy has been less able to win important contracts during the downturn. Going forward, it is therefore expected that TechnipFMC and OneSubsea will be better positioned in the market in the short-term. Given Aker Solutions strong relationship with Petrobras, historically being their preferred supplier, may however create an opportunity for regaining market share as the market recovers, cf. 8.3.1.

However, Aker Solutions current market position, where they are becoming an increasingly smaller player in terms of market capitalization and overall resources due to industry consolidations, have made them a clear acquisition target. Recently both Halliburton and the Chinese oilservice company COOEC has been rumoured to be close to a bid on the company, even though this has been refuted by the chairman several times[63].

The current competitive environment, with low utilization rates and increased competition on prices, closesly resembles that of hypercompetitive markets where few buyers let suppliers fight between them for market share. In the longer term the market is expected to grow substantially. In the periods of high growth, the rivalry among the players become less fierce and open for abnormal returns for all players.

Intensity: High. Remain high in the short term. Lower in the long-term along expected market growth.

[63] (Dagens Næringsliv, 2017)

3.2.7 Summary

The attractiveness of the industry can be expressed by the following table, where the stronger total intensity indicate lower attractiveness.

					Trend	
Force	**Source**	**Weak**	**Medium**	**Strong**	**Short term**	**Long-term**
Bargaining power	Customers			x	→	↘
	Suppliers		x		→	→
Threat	New entrants	x			→	→
	Substitutes		x		→	→
Competetion/rivalry	Industry players			x	↗	↘
Total intensity of competetive forces				**X**	→	↘

Table 2: Summary of conclusions from the Porter's 5 forces framework and the underlying trends

When the different forces are seen in relation to one another, the total intensity is currently considered to be medium to strong. This indicates that the attractiveness in terms of average profitability in the industry in the short term is low. In the longer term the industry is expected to experience substantial growth. This will lower the intensity of the competitive forces and provide opportunities for abnormal returns.

3.3 VRIN/VRIO

VRIN/VRIO				
Valuable?	Rare?	imitable and non-substitutabl	Organised?	Result:
NO				Competetive disadvantage
YES	NO			Parity
YES	YES	NO		Temporary competetive advantage
YES	YES	YES	NO	Potential/unused competetive advantage
YES	YES	YES	YES	Sustained competetive advantage

Table 3: VRIN/VRIO-framework

The purpose of the internal analysis is to determine the strategic standing of Aker Solutions'. This includes determining its strengths and weaknesses relative to its competitors, both in a shorter and longer term, and whether they have a competitive advantage in the form of the ability to deliver stronger operational and financial results than the average in the industry over time.

To evaluate the strategic position, one must first try to detect their strategic capabilities. When trying to define Aker Solutions strategic capabilities, it will be split between the two main components of strategic capabilities: resources and compentences. Resources can be defined as *assets* that organisations have or can call upon. Competences on the other hand, are" *how* those assets are used or deployed effectively" (Johnson, et al., 2011).

Furthermore, these resources and capabilities can be split in four main categories:

Physical resources and capabilities comprises both physical and proprietary things such as technology, plants, machinery, offices, and how these physical assets are employed. A strategic dvantage through an advantageous geographic location or access to suppliers can explained through this category as well.

Financial resources contains the financial standing of the company through how it manages its finances, as well as having timely and sufficient access to capital.

Human capital is the competences, skills, experience and other capabilities that human in the organisation possesses.

Organisatoric resources are how the company are structured, its processes and the relationship between the different resources the company possesses. These structure are often imbedded in the company's culture, and are often based on tacit knowledge and know-how that is hard to imitate.

The resources and capabilities that are identified will then be analysed through the VRIN-framework in order to determine whether they are or could become a competitive advantage.

The VRIN-framework is built on the idea that it is only those resources and capabilities that are valuable, rare, inimitable and non-substitutable[64] that are able generate a superior performance and return in a competitive environment over time (Barney, 2014).

3.3.1 Physical resources

The physical resources Aker Solutions hold consists mainly of manufacturing facilities, offices and fabrication yards. The three fabrication yards are strategically placed along the coast in Norway, Egersund, Ågotnes and Sandnessjøen, and serves primarily to serve the Norwegian MMO market. The main fabrication yard is the one in Egersund, with capacity to assemble larger modules and manufacture entire topside facilities.

Although the aforementioned physical resources are geographically and strategically linked to Aker Solutions core markets, especially the Norwegian and Brazilian subsea markets, they represent a limited advantage relative to competitors. The construction of such facilities is easily imitated, and when all the larger competitors are part of a conglomerate with substantial financial resources to invest in similar facilities, the advantage is only limitied in time.

Proprietary intangible assets are also prominent resources at Aker Solutions. Through their state-of-the-art engineering division they have the capabilities of securing advanced technologic solutions through patenting. An example of this is the world's first subsea gas

[64] The VRIN and VRIO framework is built on the same idea, but where the «O» refers to Organised. It means the ability to currently make use of the strategic advantage to generate abnormal returns.

compression system that Aker Solutions developed in connection with the project at the Åsgård field in the North Sea [65].

However, the innovation rates in the industry is high, where competitors with a similar degree of technological competence are able develop products that are capable of imitating or substituting those already developed.

The potential strategic advantage thus lies to a greater extent in the ability to possess dynamic capabilities to develop new solutions to the problems that arise when new, complex oilfields are developed.

Overall, Aker Solutions is considered to be at parity with its competitors when it comes to its physical resources.

Conclusion: Parity

3.3.2 Financial resources

Since the divestment from Kværner in 2011, Aker Solutions has a strategy of achieving operational synergies and higher efficiency through streamlining operations (Aker Solutions Annual Report 2014).This has resulted in Aker Solutions having a very small proportion of financial assets in the balance sheet. However, they have a higher debt ratio than their competitors, meaning that they have been able to leverage the high growth and profitability in the industry, cf. chapter 7.2.4.

The financial competence associated with ensuring profitable operations and serving a higher debt ratio, and their willingness to take on higher financial risks, has given a temporary benefit. However, as shown by the financial statement analysis, the advantage has decreased along the downturn in the industry since mid 2014.

[65] (Aker Solutions ASA, 2017)

The ability to serve a higher debt ratio is also relatively easy to imitate, as it can largely be achieved by absorbing more debt and hiring financially skilled employees. In the long run, such an advantage could also turn into a disadvantage in more turbulent times.

The financial resources is considered to provide a small, but temporary benefit. It's not considered suitable for creating a competitive advantage for Aker Solutions.

Conclusion: Temporary competitive advantage.

3.3.3 Human capital

The human capital in Aker Solutions is primarily related to its strong base of highly qualified and skilled engineers. Aker Solutions has for a number of years focused on and been adept at attracting talent

However, attracting talent has been a constant challenge in the industry[66]. The challenge lies in that Aker Solutions faces intense competition in recruiting talented people not only from their competitors, but also from other industries. The cyclicality of the industry, where they have to terminate employees during downturns, is also a factor that may lead to difficulties in retaining the recruited talents over time.

Both GE, OneSubsea (Schlumberger) and FMC Technologies also has strong capabilities in attracting talent. It can hardly be assumed that Aker Solutions has a strategic advantage relative to its competitors. Attracting talent is a precondition to compete in the industry and is not a rare capability. Currently Aker Solutions may very well be in a disadvantageous position relative to its customers. During the downturn since mid 2014, Aker Solutions has had to cut about 31%[67] of its staff to reduce costs. Due to relatively higher personell costs than their competitors, the advantage Aker Solutions previously has experienced in being able to attract and retain skilled engineers, may have turned into a disadvantage in the shorter term.

That Aker Solution has a strong management with an average of over 20 years of experience from the oil and gas industry are furthermore a factor that strengthen Aker Solutions position

[66] (Aker Solutions ASA, 2016)
[67] 14385 (2016) / 20974 (2014) - 1 = -31,415%. From Annual reports 2014-2016.

in the market, especially so as they during the last years they have been able to attract three former Schlumberger executives in positions in Aker Solutions management[68]. However, even though it may strengthen Aker Solutions position, it illustrates the limitations in having employees/executives as a strategic advantage; skilled personell may leave if they are given a better terms elsewhere. Such an advantage are therefore often to a large extent imitable.

In conclusion, as the competitors both have highly qualified personell and strong capabilities in attracting talent, Aker Solutions human capital is not a resource that may lead to a sustainable strategic advantage that may materialize in superior performances over time.

Conclusion: parity

3.3.4 Organizational resources

Aker Solutions has a strategy of "streamlining operations and gaining synergies between business units"[69]. The exact meaning of this statement by the management can be somewhat unclear, but when analysing its performances relative to its competitors it is evident that Aker Solutions are able to gain an advantage in relation to its organizational resources. When looking at the unweighted turnover advantage relative to the industry (details are presented in the ratio analysis in chapter 7.2.3.1.2), we see that Aker Solutions turnover ratio exceed 3x operating assets, where the weighted industry average is about 1,5x. Even though this estimate is distorted somewhat by the lack of homogeneity among the companies comprising the weighted industry average, where the companies involved in more capital intensive industries will push the estimated turnover rate for the industry down, it shows that Aker Solutions are

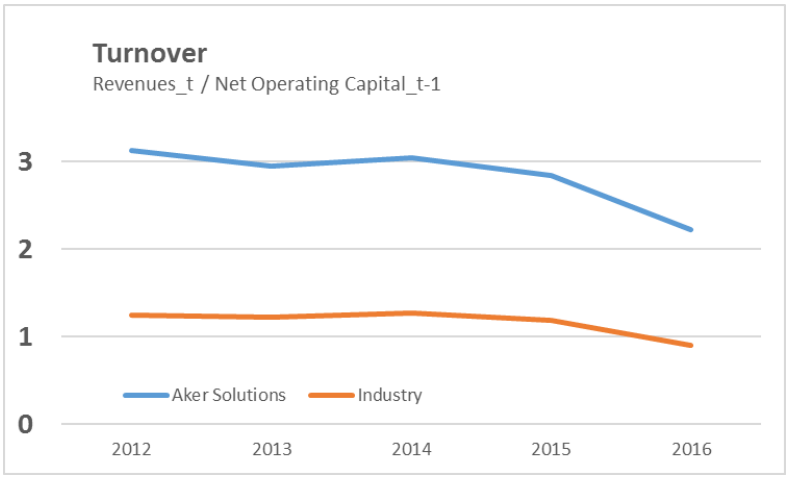


Figure 27: Turnover rates for Aker Solutions and the industry in 2012-2016

[68] (Aker Solutions ASA, 2017)
[69] Annual report 2015

able to generate revenues by having a relatively lower amount of invested capital on an overall basis.
Even though this advantage is somewhat offset by lower profit margins, the net effect has been a substantial strategic advantage for Aker Solutions in previous years. The cause of this advantage seems to lie in the way Aker Solutions organizes its resources. As mentioned in the introduction, Aker Solutions is organized with two business units, Field design and Subsea. At the same time they have an engineering department that targets R&D and operates across the business units. The fact that their engineering teams work on both front-end engineering of offshore installations and the design and engineering of subsea equipment, gives Aker Solutions the ability to leverage its expert knowledge on both design of subsea equipment and topside facilities. It opens for creating an integrated solution that balances cost efficiency and maximizing recovery rates in a more coherent manner. During the period of higher oil prices and demand for customized solutions, this was a critical success factor in Aker Solutions' ability to win important contracts. The ability to provide such integrated solutions is unique in the industry.

Furthermore it seems that by leveraging its engineering expertise across both business units, Aker Solutions are able to gain synergies that are hard to imitate. In field planning the synergistial gains comes from having an egde in the ability of presenting a fully integrated solution to the customer, and thereby to locking in subsequent project management services, subsea equipment deliveries, as well as after-market/life-of-field services. For its Subsea business unit it creates an advantage by designing oilfield development concepts that fit their engineering and manufacturing capacity. In this way they are able to ensure delivery in accordance with customer specification and minimize the risks of costly delays.

The opportunity to offer an integrated solution already from the initial stages in the development of new oil fields, as mentioned above, it is unique in the industry. Aker Solutions is the only company with expertise in field planning and subsea equipment design and manufacturing. Much of the reason for this position appears to be in the company's history. As mentioned in the introduction, Aker Solutions has been involved in oilfield projects from the very start of Norwegian oil production in the early 1960s. In this way the company has accumulated knowledge and experience in designing and building all types of platforms and equipment needed for oil and gas production. After the yard- and platform construction business was divested in 2011 through the demerger Kværner ASA, they

continued with the design and engineering activities, building on the established knowledge and know-how.

Aker Solutions also was the first to develop subsea production equipment, and was the leading provider on the NCS since its first subsea installations in the early 1990s. Thus, the ability to design topside and subsea installations has evolved over several decades.

This ability to effectively apply the expertise in the various fields is a so-called "tacit" capability, which is a part of the corporate culture and very difficult to imitate. The advantage of being able to provide integrated solutions is therefore a potential lasting strategic advantage.

The biggest threat to the benefit Aker Solutions has created over time, however, may relate to the substitutability of its solutions. As mentioned in the external analysis, there is currently a strong focus on cutting costs the industry. The ability to customize the solution specifically to the individual oil field is, in part, a less important priority than having cost-effective standardized solutions available to the customer. Supply chain integration, where players along the various stages of the value chain merge together or form long-term, functional alliances, seem to be more effective in lowering cost levels in the short term. They also get an advantage when it comes to proving the impact of its cost-cutting measures to customers. When cost-effectiveness becomes the most critical success factor in oil companies' choice of supplier for new projects in a lower oil-price environment, the strategic advantage Aker Solutions has accumulated over time may not materialize. This means that although the ability of providing integrated solutions is not directly substitutable, it may indirectly be less competitive as customers are putting pressure on reducing costs, where other types of organizational resources are more effective.

Overall, the strategic advantage appears to be historically significant, but uncertain in the future. Potentially it may be valuable if Aker Solutions' ability to adequately cut costs, and less valuable if Aker Solutions's current higher cost level than its competitors prevents them from winning important contracts.

Conclusion: Potential long-term strategic advantage, but short-term uncertainty or disadvantage.

3.3.5 Summary of VRIO

In conclusion, Aker Solutions is at par with the industry when it comes to its tangible assets and human capital. Their ability to manage a higher level of debt and thereby achieving a gearing advantage relative to the industry, cf. chapter 7.2.4, is a short term competitive advantage given that they remain profitable. Their primary strategic resource lies in their organizational resources by having two streamlined business units that are connected through its engineering division. This gives them a unique ability to provide integrated solutions to its customers and achieve cross-sales that increases the utilization of its available resources. The results are summarized in table.

Resource/competences	Valuable?	Rare?	Inimitable and non-substitutable?	Organised?	Result:
Physical resources	**YES**	NO	NO	**YES**	Parity
Financial resources/competences	**YES**	**YES**	NO	**YES**	Temporary small competetive advantage
Human capital *Highly qualified/skilled employees*	**YES**	NO	NO	**YES**	Parity
Organizational resources *Integrated solutions'*	**YES**	**YES**	**YES**	**YES/NO**	**Potential competetive advantage**

Table 4: Results from VRIN/VRIO-analysis

3.4 SWOT

To summarize the assessments and findings in the external and internal analysis, a SWOT-analysis is used to chart Aker Solutions' strengths and weaknesses, and external opportunities and threats they face.

Strengths	***Opportunities***
- Streamlined operations and synergies through providing integrated solutions that are unique in the industry - Strong relationships with important customers - Long history and experience in the industry	- Well positioned for future growth in Brazilian subsea market - Long-term demand for integrated solutions
Weaknesses	***Threats***
- Higher cost base than competitors - Strategic flux/out of position in the short term - Strong dependency on Statoil, Total and Petrobras	- Oil price volatility - Industry consolidations - Acquisition target

Table 5: SWOT

Aker Solutions' main strength is that they have a streamlined organization with the ability to achieve synergies between the business units and provide integrated solutions that is unique in its industry. Other strengths is their long history and experience in the industry and their strong relationship with its important customers. Their depency on the important customers are also viewed as a weakness, which is evident by the effect lack of activity from Petrobras has had on revenues in 2015 and 2016. More than that Aker Solutions currently struggles with winning important subsea contracts in competition with TechnipFMC and OneSubsea (Schlumberger). Their position can be characterized as a strategic flux, where the future strategic evolvement is unclear.

In the longer term their position in Brazil may provide substantial opportunities for future growth. As future development projects will be at increasingly deeper and harsher waters, expertise in both field planning and subsea production systems will be in demand. Aker Solutions may have a competitive advantage through their integrated solutions in the longer term. The increasing oil price volatility and the expectation of it remaining lower for longer may pose a potential threat to all the players in the industry. If oil prices drop below 40-45 $/bbl, most deep- and ultra-deepwater projects in general will hardly be profitable. Furthermore the industry consolidations have strengthen their competitors, posing a threat to Aker Solutions strategic position. Their relatively smaller size and attractive expertise has made them a target of being acquired by larger oilservice companies.

4 Financial statement analysis

In this chapter the main purpose is to analyse the historical financial statements to get insight in its underlying economic performance of Aker Solutions.

4.1 Framework for financial statement analysis

The framework for analysing the financial statements is mainly based on lectures from the course BUS440 by Kjell Henry Knivsflå spring 2016 and 2017, as well as other supplementary sources. The framework consists of five main steps:

1. Defining the scope of the analysis
2. Trailing of the current years income statement and balance sheets
3. Reformulating the financial statements
4. Analysis and adjustments of material measurement errors
5. Assessment of the underlying financial performance

4.2 Defining the scope of the analysis

4.2.1 The consolidated group or individual business units?

The first question is whether to analyse the integrated group financial statement or the individual business units separately. In general, the decision should be based on what best reflects the underlying performance of the company. Different key performance drivers, geographic presence and competitive factors for the different business units indicate that they should be viewed separately[70]. However, other factors such as the tightness of the organizational structure and the available financial information may put constraints on the ability to perform a detailed financial statement analysis of the different segments and the corporate function individually.

Aker Solutions is organized into two reporting segments: Subsea and Field design. As the segments relate to different performance drivers and competitive environments, the optimal solution would be to analyse the business segments separately. However, substantial overlap through integrated projects and cross-segment engineering activities gives a tighter organizational structure. The reported segmented information is given on a more aggregate basis and are not suitable for a detailed reformulation and after-tax analysis of the financial

[70] (Kaldestad & Møller, 2016)

statement. The consolidated financial statement of the group is therefore used as the basis for the financial statement analysis of Aker Solutions ASA in this paper.

4.2.2 Length of the period

The main point of the financial statement analysis is to gain insight into the underlying business performances. The length of the period that is analysed must therefore be sufficiently long for it to be representative of the true historic performance. Businesses in cyclical industries with higher volatility will therefore in general require a longer historic timeframe.

However, there are often factors constraining the ability and appropriateness of the historic reported financial statements.

As mentioned in the chapter 2.2.1, Aker Solutions have gone through substantial reorganizations and divestments in relation to the strategy of streamlining its operations in recent years. The demerger of Aker Kværner in 2011, as well as the demerger/divestment of its mooring and well-intervention services business units into Akastor ASA in 2013, makes it inexpedient to base the analysis on the prior reported financial statements before 2013. However, through the Bloomberg Terminal, information on the fiscal years 2011 and 2012 are presented with relation to the current operating segments. However, because of the lack detailed specifications from 2011 and 2012, especially in relation to the the reported balance sheet numbers, these years have to be viewed with necessary precautions.

The length of the period are set to the fiscal period 2011-2016.

4.2.3 Benchmarks

In order to perform a meaningful strategic financial statement analysis one should analyse the performance of the company relative to a benchmark. In the financial statement analysis, both cost of capital and the industry are used as benchmarks.

To define the industry where Aker Solutions operates are not straight forward, however. The companies in the industry vary substantially in terms of size and scope of their business activities, with no clear overlap. This leaves a simple aggregation of all relevant companies unfit as a measure of the relative performance in relation to Aker Solutions' business activities. For example General Electric, which is one of the main competitors in the Subsea

equipment market, is a vast multinational conglomerate operating in several industries. The total annual revenues in 2016 was about $ 100 bn, where just 20% was from oil and gas activities, and just about 5% of which is considered relevant from the standpoint of Aker Solutions' business activities.

Because the segmented financial reports are lacking in detail, as well as companies migrating from between different business segments through frequent M&A activity, the best solutions is considered to be to create a weighted aggregate of the relevant companies' financials for each year, by adding each companies financials to the total aggregate by a factor of 0 to 1 on the basis of how relevant the company is. Relevance is estimated by $\frac{relevant\ revenues}{total\ revenues}$ in the given fiscal year. This gives the following basis for each company's relative contribution to the aggregated financial statement of the industry:

Percent of company in relevant segments	2011	2012	2013	2014	2015	2016
Aker solutions ASA	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %
Cameron International Corp	100,0 %	100,0 %	76,5 %	73,2 %	71,3 %	0,0 %
TechnipFMC PLC (FMC Technologies Inc. 2011-2015)	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %	100,0 %
Technip SA	49,8 %	49,8 %	52,3 %	53,1 %	59,0 %	0,0 %
Oceaneering International Inc	89,4 %	89,8 %	91,3 %	92,8 %	89,6 %	86,4 %
Schlumberger Ltd	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	15,1 %
John Wood Group PLC	78,9 %	89,5 %	100,0 %	100,0 %	100,0 %	100,0 %
Dril-Quip Inc	71,6 %	72,2 %	72,0 %	72,3 %	72,9 %	73,2 %
General Electric Co	4,9 %	5,4 %	6,1 %	8,2 %	7,1 %	5,4 %

Table 6: Percent of each company's financials each year in the weighted aggregate industry financial statements

The individual peer's financial statements is adjusted the same way as Aker Solutions before the aggregation, cf. especially chapter 4.6, but with some minor differences due to company-specific factors.

4.3 Presentation of Income and Balance Sheet statements

The financial statements of Aker Solutions ASA are presented for the period 2011-2016. Information are gathered through the annual reports in the period, supplemented by information from Bloomberg Terminal. All numbers are presented in million NOK.

4.3.1 Income statement

INCOME STATEMENT - AKER SOLUTIONS ASA	2011	2012	2013	2014	2015	2016
IFRS - ALL NUMBERS IN NOK Mill.						
Subsea	9185	12066	15703	19330	19112	14997
Field Design	12702	14939	12502	13472	12612	10576
Revenue from operating segments	21887	27005	28205	32802	31724	25573
Other Income	194	1340	853	169	172	-16
Sum Operating Revenues	**22081**	**28345**	**29058**	**32971**	**31896**	**25557**
Materials, goods and services	-11123	-14163	-13752	-13561	-12979	-10369
Personell expenses	-6966	-8023	-9775	-11171	-11750	-9475
Other operating expenses	-2983	-3911	-3452	-5565	-5326	-3784
Depreciation, amortization and impairment	-301	-357	-499	-665	-883	-1243
Operating income	**708**	**1891**	**1580**	**2010**	**958**	**686**
Interest income	145	59	52	71	76	65
Net other financial items	23	-43	180	51	-1	-1
Interest expenses	-133	-183	-235	-315	-348	-477
Net financial income (costs)	35	-167	-3	-193	-273	-413
Income before tax	**743**	**1724**	**1577**	**1817**	**685**	**273**
Income tax	-253	-479	-397	-516	-302	-121
Net income	**490**	**1245**	**1180**	**1301**	**383**	**152**
Attributable to:						
Equity holders of the parent company	456	1235	1173	1281	392	57
Non-controlling interests	34	10	7	20	-9	95
Earnings per share in NOK (basic and diluted)	—	—	4	5	1	0
OTHER COMPREHENSIVE INCOME (OCI)						
Items that may be reclassified subsequently to profit or loss:						
Cashflow hedges, effective portion of changes in fair value			510	-2103	-1385	-81
Cashflow hedges, reclassification to income statement			-138	411	1135	982
Cashflow hedges, deferred tax	-20	-18	-119	465	39	-232
Translation differences - foreign operations	-19	-262	412	1213	907	-852
Change in fair value of derivatives, net of tax	441	117				
Items that will not be reclassified to profit or loss:						
Remeasurements of defined benefit plans	-220	101		-161	89	42
Remeasurements of defined benefit plans, deferred tax	62	-28	6	44	-21	-13
Other	1	-1			-10	41
Other Comprehensive Income	**245**	**-91**	**671**	**-131**	**754**	**-113**
Total comprehensive income	**735**	**1154**	**1851**	**1170**	**1137**	**39**
Attributable to:						
Equity holders of the parent company	726	1132	1849	1116	1120	-45
Non-controlling interests	9	-6	2	53	17	84

Table 7: Income statements 2011-2016

In the period 2011-2016 Aker Solutions went through the cycle from higher to lower oil prices, which has substantially affected the financial performance during the period. In 2011-2014 Aker Solutions experienced sharp growth in both revenues and operating income, with correspondingly sharp decline in 2015 and 2016, with 2016 having the lowest activity since 2011. As mentioned earlier, this mainly relates to lower CAPEX and OPEX spending from E&P oil and gas companies.

The Subsea business unit has developed gradually through above 20% year-on-year revenue growth in 2012-2014, and are currently the most important segment for Aker Solutions. Due to postponements of subsea developments along the whole industry, the revenues from 2016 are significantly lower than in 2013 and 2014.

Field design revenues declined more than subsea in 2015 and less in 2016. This is mainly because the segment is related to services along the whole life of oil and gas installations, with lower activity in both FEED and pre-feed (concepts and feasibility studies) in 2015. Slowdown in the Norwegian MMO market has also put downward pressure on the Field design segment in both 2015 and 2016, partially offset by increased MMO activity on installations in West Africa.

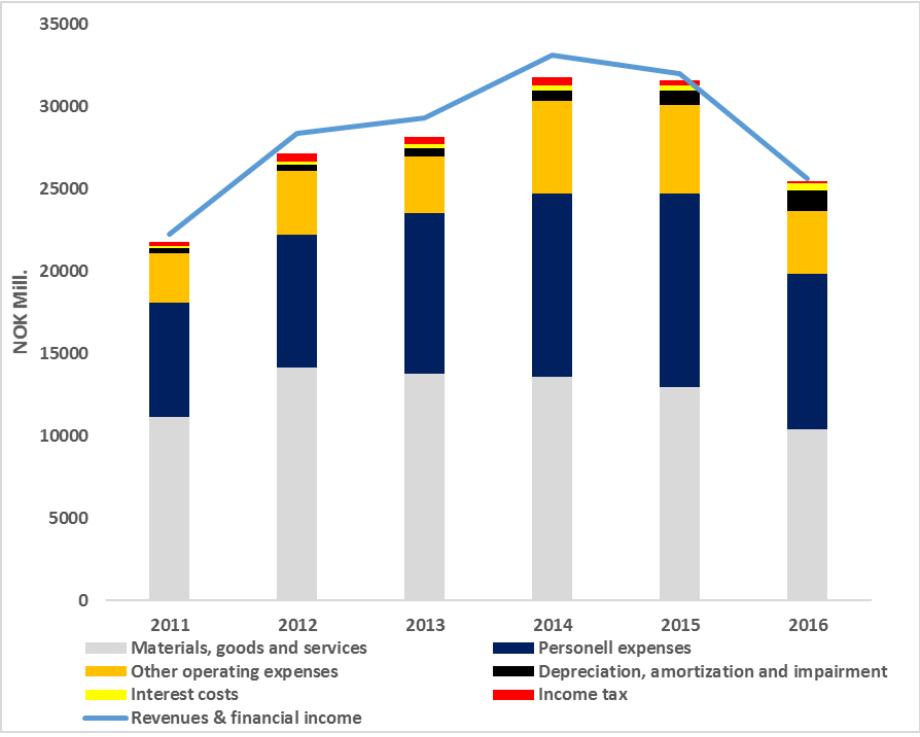


Figure 28: Reported revenues and costs 2011-2016. (Source: Aker Solutions annual reports 2013-2016 and Bloomberg Terminal)

However, Aker Solutions has managed to reduce costs, especially related to reduced workforce capacity and other operating expenses such as travel expenses and premises. This has yielded profitable results in both 2015 and 2016, even though substantial debt financed capital investments in 2013 and 2014 have led to higher depreciations and interest costs in 2015 and 2016.

During the downturn in 2015 and 2016 there were some impairments, among them a 464 mill NOK write-down of capitalised R&D programs and other machinery and equipment in 2016. Cost of restructuring and reducing workforce capacity, as well as rent expenses on vacant office spaces totalled 163 mill NOK in 2016.

4.3.2 Balance sheet statement

BALANCE SHEET - AKER SOLUTIONS ASA	2011	2012	2013	2014	2015	2016
ASSETS						
Non-current assets						
Property, plant and equipment	1894	2365	3072	3603	3962	3808
Deferred tax assets	290	350	444	380	332	666
Intangible assets	3427	3833	5080	5763	6207	5647
Other non-current assets	11	11	17	27	36	165
Total non-current assets	5622	6559	8613	9773	10537	10286
Current assets						
Cash and cash equivalents	3267	3155	4462	3339	3862	2480
Current tax assets	82	111	136	106	118	242
Inventories	498	612	588	862	814	575
Derivative instruments	266	96	698	1187	1295	93
Trade and other receivables	7446	9705	11478	12124	11103	7836
Total current assets	11559	13679	17362	17618	17192	11226
Total assets	17181	20238	25975	27391	27729	21512
EQUITY AND LIABILITIES						
Equity						
Share capital and other capital paid in	—	—	294	294	294	294
Treasury shares				-1	-1	-1
Retained earnings			5693	5391	5382	5349
Reserves	6167	4424	244	-7	721	635
Total equity attributable to the parent	6167	4424	6231	5677	6396	6277
Non-controlling interests	166	154	156	216	234	138
Total equity	6333	4578	6387	5893	6630	6415
Non-current liabilities						
Non-current borrowings	747	3063	3533	3154	3137	1844
Employee benefit obligations	640	520	524	670	572	540
Deferreed tax liabilities	742	1033	1203	699	283	331
Other non-current liabilities	60	75	75	22	26	85
Total non-current liabilities	2189	4691	5335	4545	4018	2800
Current liabilities						
Current borrowings	505	644	14	674	561	2110
Trade, accruals and other payables	4227	6784	7231	7574	5838	4052
Derivative financial instruments	227	86	502	2581	2995	1069
Other non interest-bearing liabilities	3700	3455	6506	6124	7687	5066
Total current liabilities	8659	10969	14253	16953	17081	12297
Total liabilities	10848	15660	19588	21498	21099	15097
Total liabilities and equity	17181	20238	25975	27391	27729	21512

Table 8: Balance sheets 2011-2016

The non-current assets have increased in the period and stayed at aroung 3700 mill NOK from the start of the decline in 2014. This mainly due to strategic investments in manufacturing facilities to increase capacity and meet expected demand growth in the subsea segment, but where oil companies' CAPEX freezes during the downturn has stalled further investments. The previous investments were primarily financed through two Norwegian bonds of 1500 mill. NOK and 1000 mill. NOK, with the 1500 mill NOK bond maturing June 2017.

However, the equity ratio[71] have increased during the downturn, as lower activity has led to substantial reduction in operating liabilities such as trade payables and other accruals.
The cash reserve generated through the period 2012-2014 have also been reduced in 2015 and 2016, but are still sizable as it constitutes 11% of total assets, and in addition to a 5000 mill. NOK unused credit facility leaves a liquidity buffer of approximately 7500 mill NOK.

It is also worth noticing that Aker Solutions through the demergers have sought to streamline its business. This includes reducing the size of the corporate function and avoiding investments in companies if it is not a part of the core business and the company cannot have majority ownership. This is reflected in the balance sheet with very low other non-current assets.

4.4 Trailing

Usually the interim quarterly or semi-annual results are combined with historic financial statements and expected growth rates to trail the financial statement items for the current fiscal year.

However, even though the Q1 results for Aker Solutions was released in early May and therefore could have been used for trailing, the analysis of the historical performance are based on the annual statements from 2011-2016. The downturn has left the future performance both for Aker Solutions and the industry highly uncertain, and the expected future performance are treated more in detail in the forecasting section, cf. chapter 8.

[71] Equity ratio: Equity/Total capital

4.5 Reformulation of the financial statement

Aker Solutions' financial statements are reported in accordance with IFRS. Financial reporting after the IFRS framework are based on the balance sheet oriented of conceptual framework[72] and classify balance sheet items in relation to when assets are expected to generate revenues and income statement items as changes in balance sheet items. Furthermore liabilities are classified on the baiss of liquidity and when obligations are due. Thus a more 'creditor-oriented' framework[73]. The income statement and the balance sheet are reformulated in order to make it more 'investor-oriented', and better reflect the underlying performance of the company. An important aspect of the reformulation is to identify the sources of different incomes/costs and how this contributes to the income to the shareholders of the parent company.

4.5.1 Reformulation of the income statement

The reformulation of the income statement can be split into four steps:[74]

1. Identification of complete comprehensive net income
2. Distribution of complete comprehensive income to total operating income and total financial income.
3. Differentiate between normal and non-normal items
4. Distribution of taxes to the relevant income

Step 1 – Identify the complete comprehensive income

The first step is to identify the complete comprehensive income for the period.

The total comprehensive income constitutes the reported net income and "other comprehensive income" (OCI). The OCI relates to non-realized gains and losses that affect equity of the company due to assets and liabilities recorded at fair value, as well as actuarial gains and losses and currency translation differences (Aker Solutions ASA, 2014).

Other changes in equity than those recognized through the income statement are referred to as "Dirty Surplus" (DSP). This is when items are reported directly through the changes of equity without being recognized in the income statement, and is a breach of the principle of

[72] (Kvifte & Johnsen, 2008)
[73] (Knivsflå, Spring 2017)
[74] (Knivsflå, Spring 2017)

congruity, where according to IAS 8, all income and expenses must be recognized through the income statement[75].

The reported numbers from 2011 and 2012 are taken from Bloomberg, which comes without a statement of changes of equity. The remaining changes in equity in 2011 and 2012, after subtracting the total comprehensive income and net dividend payments[76] to shareholders are identified as a "Dirty surplus".

Dirty surplus	2011	2012	2013	2014	2015	2016
Equity UB	6167	4424	6231	5677	6396	6277
Equity IB	—	6167	4424	6231	5677	6396
Change in Equity	—	-1743	1807	-554	719	-119
Total Comprehensive Income	701	1144	1844	1150	1146	-56
Non-controlling interests	9	-6	2	53	17	84
Dividends paid, net of tax	0	0	0	0	-394	-34
Net purchase of treasury shares and share purchase	0	0	0	-129	-6	0
Net dividend paid to shareholders	0	0	0	-129	-400	-34
Dirty Surplus	**-692**	**-2893**	**-35**	**-1522**	**-10**	**55**

Table 9: Dirty surplus

The total comprehensive income and DSP together constitute the complete comprehensive income.

Complete comprehensive income	2011	2012	2013	2014	2015	2016
Net Income (without non-controlling interests)	456	1235	1173	1281	392	57
Other Comprehensive Income	245	-91	671	-131	754	-113
Total Comprehensive Income	**701**	**1144**	**1844**	**1150**	**1146**	**-56**
Attributable to non-controlling interests	9	-6	2	53	17	84
"Dirty Surplus"	-692	-2893	-35	-1522	-10	55
Complete comprehensive income	**692**	**-1749**	**1809**	**-372**	**1136**	**-1**

Table 10: Complete comprehensive income

Step 2 – Distribute the complete comprehensive income

The next step is to decompose the complete comprehensive income into total operating and total financial income and to distinguish between the sources of income that can be seen as the core business, and other assets that generate income. The operating income relates to and are created by the balance sheet items that represent the core business. Other non-operating income and costs of financing are treated as financial income.

[75] (Anon., u.d.)
[76] Dividends and repurchase of shares, less issuance of new shares.

Total Operating Income	2011	2012	2013	2014	2015	2016
Operating revenue	22130	28319	29242	33161	31708	25642
Operating costs	-21414	-26530	-27488	-30723	-30886	-24995
Operating Income	**716**	**1789**	**1754**	**2438**	**822**	**647**
Operating OCI	203	-45	784	-640	736	132
Operating DSP	-692	0	-35	0	-10	55
Complete operating income, before taxes	**227**	**1744**	**2503**	**1798**	**1548**	**834**

Table 11: Total operating income

The OCI mainly relates to cashflow and currency hedges, which are used to secure the revenues from the geographically different regions where Aker Solutions operates. The OCI are therefore classified as operating income in the reformulated income statement.

Both in 2012 and 2014, after demerging part of the company, there were changes in equity coming from a redefinition of the ownership structure. The dirty surplus in 2012 and 2014 are therefore treated as financial items. The rest are viewed as operating DSP.

Total Financial Income	2011	2012	2013	2014	2015	2016
Interest income	145	59	48	55	76	65
Interest costs	-133	-183	-210	-191	-308	-454
Net other financial income	13	31	-15	-485	95	15
Net financial income, before tax	**25**	**273**	**243**	**-239**	**479**	**534**
Financial OCI	0	0	0	0	0	0
Financial DSP	0	-2893	0	-1522	0	0
Complete financial income, before tax	**25**	**-2620**	**243**	**-1761**	**479**	**534**

Table 12: Total financial income

Except interest costs and interest income related to financial debt and receivables, other incomes that are classified as financial income mainly relates to sale of investments and unrealized gains and losses. Subleases, which are reported as a negative operating cost are reclassified under ‘net other financial income’.

Step 3 – Normalizing

To better reflect the company’s underlying performance and using this information for predictive purposes, the operating and financial income are further split into items that are normal and non-normal. Non-normal items can be viewed as items that are outside the scope of the business day-to-day activities. Such items are often driven by factors outside the company’s control and happen on a one-time basis or just affect one or a few fiscal periods.

As most items are recurring, the items that occur more seldom or otherwise appear "special" are identified and considered separately.

Operating income

Operating income	2011	2012	2013	2014	2015	2016
Field Design	12702	14939	12502	13472	12612	10576
Subsea	9185	12066	15703	19330	19112	14997
Other	194	1340	853	169	172	-52
Operating Revenue	**22081**	**28345**	**29058**	**32971**	**31896**	**25521**
Materials, goods, services	-11123	-14163	-13752	-13561	-12979	-10369
Salary/wages/security and pension costs	-6966	-8023	-9775	-11171	-11750	-9475
Other normal operating costs	-3024	-3987	-3462	-4921	-4571	-3637
Depreciations & Amortizations	-301	-357	-486	-591	-720	-779
Normal operating income, before taxes	**667**	**1815**	**1583**	**2727**	**1876**	**1261**
Abnormal derivative gains	0	0	0	241	-119	44
Foreign exchange gain(losses)	49	-26	184	-51	-69	41
Disposal of assets	0	0	0	0	0	36
Merger/Acquisition expense	0	0	0	-90	-22	0
Restructuring	0	0	0	0	-416	-163
Other non-normal items	0	0	0	0	-265	-108
Write-down of assets	0	0	0	-39	-27	-464
Impairment of Goodwill	0	0	0	-289	0	0
Impairment of other Intangibles	0	0	-13	-61	-136	0
Non-normal operating income, before taxes	**49**	**-26**	**171**	**-289**	**-1054**	**-614**
Operating income, before taxes	**716**	**1789**	**1754**	**2438**	**822**	**647**
Operating OCI	203	-45	784	-640	736	132
Operating DSP	-692	0	-35	0	-10	55
Total operating income, before taxes	**227**	**1744**	**2503**	**1798**	**1548**	**834**

Table 13: Operating income

Write-downs and impairments are driven by the downturn of the industry and affects all companies more or less equally. These items are viewed as a non-normal both for Aker Solutions and its peers.

Other non-normal items mainly relates to rental costs for vacated office space. This is also a consequence of the downturn in the industry and are expected not to recur when the leases expire or the company are able to arrange subleases.

Foreign exchange gains- and losses are recurring, but highly fluctuating. This is because they relate to the currency in the countries Aker Solutions operate relative NOK. Both foreign exchange gains- and losses and the corresponding currency hegdes are view as non-normal operating income.

Financial income

Financial income	2011	2012	2013	2014	2015	2016
Interest income	145	59	48	55	76	65
Interest costs	-133	-183	-210	-191	-308	-454
Normal other financial income	13	31	-15	66	49	15
Normal financial income (cost)	**25**	**-93**	**-177**	**-70**	**-183**	**-374**
Sale of investments	0	0	0	113	0	0
Unrealized Investments	0	0	0	-664	46	0
Non-normal financial income	**0**	**0**	**0**	**-551**	**46**	**0**
Financial income, before taxes	25	-93	-177	-621	-137	-374
Financial OCI	0	0	0	0	0	0
Financial DSP	0	-2893	0	-1522	0	0
Complete Financial income, before taxes	**25**	**-2986**	**-177**	**-2143**	**-137**	**-374**

Table 14: Financial income

Both sale of investments and costs related to unrealized investments are one-time occurrences and are taken out of the normal financial income.

Step 4 – Distribution of taxes

In the previous steps, the gross operating and financial income were identified. This step involves distribution of the reported tax expense to its relevant sources, so that each income may be evalued on an after-tax basis. The method for distributing the taxes involve splitting taxes into 8 categories, depending on whether its 'normal' or 'non-normal' and whether it relate to operating income, financial income/costs or are non-distributable (Knivsflå, Spring 2017).

Aker Solutions ASA is incorporated in Norway, and the Norwegian corporate tax rate applies to the group financial statement. The historical corporate tax rates is presented in table 15.

Year	2011	2012	2013	2014	2015	2016
Corporate tax rate	28 %	28 %	28 %	27 %	27 %	25 %

Table 15: Corporate tax rates

As Aker Solutions global activites spans over several jurisdictions, the applicable corporate tax rate differs between these countries. The operating tax rate is therefore normalized. The normalization of the operating tax rate is made through the following formula:

$$\textbf{\textit{Normalized operating tax rate}}: \frac{Normal\ tax - Abnormal\ tax - Tax\ on\ interest\ income + Tax\ benefit\ from\ interest\ costs - Tax\ on\ other\ financial\ income - Tax\ on\ net\ nonnormal\ financial\ income}{Normal\ Operating\ income + Nonnormal\ Operating\ Income}$$

The first step in finding the normalized operating tax rate is to subtract the abnormal taxes that are not distributed. The abnormal tax rate are found through identifying the non-normal items that are reported as adjustments to the expected tax[77].

Abnormal tax	2011	2012	2013	2014	2015	2016
Adjustments for prior periods	0	0	-19	-46	-89	-2
Write down of tax loss carry-forwards and deferred tax assets	0	0	14	0	48	46
Additional withholding taxes	0	0	0	36	114	109
Current year effect of tax incentives	0	0	0	0	-16	-23
Previously unrecognized tax losses used to reduce payable tax	0	0	-32	0	0	0
Tax effects from demerger	0	0	0	13	0	0
Current year effect of R&D tax relief	0	0	0	-19	0	0
Abnormal taxes	**0**	**0**	**-37**	**-16**	**57**	**130**
Tax on Other Comprehensive Income	42	-46	-113	509	18	-245
Total abnormal taxes	**42**	**-46**	**-150**	**493**	**75**	**-115**

Table 16: Abnormal tax

By subtracting the abnormal items from the total reported tax expense we get the normal tax for the period. The normal tax are then used as the basis for the normalized tax rate, by subtracting the taxes that relate to financial incomes[78] and costs[79], and dividing it by the total operating income.

Operating taxes	2011	2012	2013	2014	2015	2016
Total tax expense	253	479	397	517	302	121
Abnormal tax	0	0	-37	-16	57	130
Normal tax	**253**	**479**	**434**	**533**	**245**	**-9**
Tax on interest income	27	11	9	10	14	11
Tax on net other financial income	2	6	-3	12	9	3
Tax benefit from financial costs	-37	-51	-59	-52	-83	-114
Tax on non-normal financial income	0	0	0	-99	8	0
Normal operating income	667	1815	1583	2727	1876	1261
Non-normal operating income	49	-26	171	-289	-1054	-614
Operating tax rate	**36,43 %**	**28,70 %**	**27,74 %**	**27,15 %**	**36,18 %**	**14,09 %**
Normalized tax rate on operating income	**28,22 %**					

Table 17: Operating taxes

[77] Expected tax = Corporate tax rate ∗ Income before tax

[78] Tax rate on financial income is set to 2/3 of the corporate tax rate, which is a fair estimate given the relationship between capital gains and dividens which is not subject to taxation at the corporate level, and other financial income subject to the corporate tax rate (Knivsflå, Spring 2017).

[79] The tax benefit from financial costs is estimated by applying the corporate tax rate.

The normalized tax rate is found as the average of the operating tax rates in the period. The median and the average both amounts to just over 28%, with the average being slightly higher. The average is used as the basis in this case. The total reported tax expense are then distributed to the normal and non-normal incomes with its relevant tax rate. It gives the following distribution of the reported tax expense:

Distribution of reported tax expense:	2011	2012	2013	2014	2015	2016
Operating taxes:						
Normal operating tax	188,1	512,2	446,8	769,6	529,4	355,9
Non-normal operating tax	54,7	8,7	-7,6	-29,2	149,2	-178,2
Tax on non-normal operating income	17,8	-7,5	47,4	-78,5	-381,3	-86,5
Sum Operating taxes	**260,7**	**513,4**	**486,6**	**662,0**	**297,4**	**91,2**
Financial income taxes:						
Tax on interest income	27,1	11,0	9,0	9,9	13,7	10,8
Tax on net other financial income	2,5	5,8	-2,8	11,9	8,8	2,5
Tax benefit from financial costs	-37,2	-51,2	-58,8	-51,6	-83,2	-113,5
Tax on non-normal financial income	0,0	0,0	0,0	-99,2	8,3	0,0
Sum Financial income taxes	**-7,7**	**-34,4**	**-52,6**	**-129,0**	**-52,4**	**-100,2**
Abnormal tax	**0,0**	**0,0**	**-37,0**	**-16,0**	**57,0**	**130,0**
Reported tax expense	**253,0**	**479,0**	**397,0**	**517,0**	**302,0**	**121,0**

Table 18: Distribution of the total tax expense

Reformulated income statement

The reformulated income statement are presented by implementing the prior steps and by splitting operating and non-operating income and costs, as well as normal and non-normal items. The normalized operating income and normal financial income and costs are used as the basis for analysing credit risk, profitability and forecasting, as these may be viewed as more representative of the underlying performance of the companies.

Reformulated Income Statement	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Field Design	12702	14939	12502	13472	12612	10576
Subsea	9185	12066	15703	19330	19112	14997
Other	194	1340	853	169	172	-52
Operating Revenue	**22081**	**28345**	**29058**	**32971**	**31896**	**25521**
Materials, goods, services	-11123	-14163	-13752	-13561	-12979	-10369
Salary/wages/security and pension costs	-6966	-8023	-9775	-11171	-11750	-9475
Other normal operating costs	-3024	-3987	-3462	-4921	-4571	-3637
Depreciations, Amortizations and other normal capital costs/expenses	-301	-357	-486	-591	-720	-779
Normalized operating profit, before tax	**667**	**1815**	**1583**	**2727**	**1876**	**1261**
Operating taxes	-188	-512	-447	-770	-529	-356
Net normalized operating profit	**479**	**1303**	**1136**	**1957**	**1347**	**905**
Net financial income	118	48	39	45	62	54
Net other financial income, after taxes	11	25	-12	54	40	13
Net normalized income from Capital Employed	**607**	**1376**	**1163**	**2057**	**1449**	**972**
Net financial costs	-96	-132	-151	-139	-225	-341
Net non-controlling interests	-34	-10	-7	-20	9	-95
Net Normalized Income to equity holders of the parent company	**478**	**1234**	**1005**	**1897**	**1233**	**536**
Net non-normal operating income	-22	-24	134	-177	-819	-347
Net non-normal financial income	0	0	0	-452	38	0
Non-normal taxes	0	0	37	16	-57	-130
Net Income to equity holders of the parent company	**455**	**1210**	**1176**	**1284**	**395**	**59**
Net OCI	245	-91	671	-131	754	-113
Dirty surplus with profit/loss elements	-692	-2893	-35	-1522	-10	55
Non-controlling interests	9	-6	2	53	17	84
Comprehensive income to equity holders of the parent company	**-1**	**-1768**	**1810**	**-422**	**1122**	**-83**
Net payments to shareholders	0	0	0	-129	-400	-34
Change in equity	-1	-1768	1810	-551	722	-117

Table 19: Reformulated income statement

From the reformulated income statement we see that both in 2014 and 2016, the non-normal items related to write-downs and impairments makes the operating income substantially higher than the total net income. However, even though the consequence of normalizing often is a larger subtraction of costs than revenues, the financial statements become more suitable

for comparison over time and as a basis for forecasting when non-recurring items are eliminated.

As the main purpose of the analysis is to evaluate the income related to the shareholders of Aker Solutions, the non-controlling interests are subtracted from the normalized income as well. This gives a better reflection of the income that affects the equity to shareholders of the parent company (Knivsflå, Spring 2017).

4.5.2 Reformulation of the balance sheet

The balance sheet, as earlier mentioned, should be reformulated so that the assets and capitals are linked to its relevant income. The reclassification of the balance sheet can be split into 4 different steps (Knivsflå, Spring 2017).

1. Reclassification of dividends payable
2. Differentiate between operating and financial assets
3. From total capital to capital employed
4. From capital employed to net operating capital

1. Reclassification of dividends payable

IFRS does not classify dividends as debt until final declaration from the board. There is no need to reclassify declared interim dividends from debt to equity in Aker Solutins' balance sheet statement.

2. Differentiate between operating and financial assets

The reformulation of the balance sheet to a more investor-oriented perspective involves making a distinct differentiation between operating assets, which are part of the core business, and non-operating assets such as financial receivables and investments. This involves the reclassifications from non-current and current assets to operating and financial assets.

Table 20: Reformulated balance sheet

Rearranged balance sheet	2011	2012	2013	2014	2015	2016
Operating current assets	9815	12014	15025	15867	15144	9549
Operating Non-current assets	5622	6559	8613	9773	10524	10211
Operating assets	**15437**	**18573**	**23638**	**25640**	**25668**	**19760**
Financial current assets	1744	1665	2337	1752	2048	1677
Financial non-current assets	0	0	0	0	13	75
Financial assets	**1744**	**1665**	**2337**	**1752**	**2061**	**1752**
Total Assets	**17181**	**20238**	**25975**	**27391**	**27729**	**21512**
Equity	**6167**	**4424**	**6231**	**5677**	**6396**	**6277**
Non-controlling interests	**166**	**154**	**156**	**216**	**234**	**138**
Operating short-term liabilities	8154	10325	14239	16279	16520	10187
Operating long-term liabilities	1442	1628	1802	1391	881	956
Operating liabilities	**9596**	**11953**	**16041**	**17670**	**17401**	**11143**
Short-term financial debt	505	644	14	674	561	2110
Long-term financial debt	747	3063	3533	3154	3137	1844
Financial debt	**1252**	**3707**	**3547**	**3828**	**3698**	**3954**
Total Capital	**17181**	**20238**	**25975**	**27391**	**27729**	**21512**

PPE[80], Intangible assets (development costs and goodwill), deferred tax assets and employee benefit assets are all classified as operating assets and considered part of the core business. "Other long-term receivables" placed under "Trade and other receivables" does not have further specifications in the notes. Given that financial non-current receivables are reported specifically, it is considered as operating assets. The financial non-current assets in 2015 and 2016 consist of marketable securities.

Current assets are split by inventory, trade receivables and current tax assets. All of them are classified as operating assets. Aker Solutions has a fair amount of derivatives, used in hedging both cash flows and currency. All of which is considered operating assets as they are closely related to Aker Solutions global operations.

Cash & Cash Equivalents is split 50/50 between operating and financial current assets. The cash portion of Aker Solutions has on average been quite substantial, between 8-11% of total assets. As the purpose of the cash portion has been to function as a liquidity buffer[81], some of

[80] PPE: Property, plants and equipment
[81] (Aker Solutions ASA, 2015)

the cash-portion is exceeding what are necessary for the day-to-day operations. In this case 50% of the cash portion are viewed as non-employed and classified as a financial asset[82]. The long-term financial debt consists of borrowings in terms of bank loans and bonds, cf. chapter 5.2. The long-term operating assets mainly consists of pension obligations and deferred tax liabilities, as well as a small portion of non-specified "other" liabilities.

The short-term portion of debt is the only item classified as current financial debt. The rest is considered operating liabilities, including a substantial portion reported as "other payables and accruals" under "Trade and other payables", without further specifications.

3. From total capital to capital employed

Capital Employed is invested capital, either through equity or interest-bearing loans[83]. The first step to reach the capital employed is to find the net working capital and the net operating non-current assets. What characterizes these items are that they are not explicit investments and therefore often non-interest bearing (Gjesdal & Johnsen, 1999). This is a form of indirect financing of the operations through payables and other accruals.

Net operating assets	2011	2012	2013	2014	2015	2016
Operating current assets	9815	12014	15025	15867	15144	9549
Operating short-term liabilities	8154	10325	14239	16279	16520	10187
Net working capital	**1661**	**1689**	**786**	**-413**	**-1376**	**-638**
Operating Non-current assets	5622	6559	8613	9773	10524	10211
Operating long-term liabilities	1442	1628	1802	1391	881	956
Net operating non-current assets	**4180**	**4931**	**6811**	**8382**	**9643**	**9255**
Net operating assets	**5841**	**6620**	**7597**	**7970**	**8267**	**8617**

Table 21: Net operating assets

Capital employed is obtained by adding the financial assets. The Capital Employed are then comprised of the equity from the shareholders of the parent company (Eq.), the non-controlling interests (MIN) and the financial debt (FD).

Capital Employed	2011	2012	2013	2014	2015	2016
Net operating assets	5841	6620	7597	7970	8267	8617

[82] By splitting this, the interest income related to bank deposits therefore needs to be split between interest income and operating income as well. This is not done as the interest income is insignificant given the currently low interest rates on deposits. It may distort the estimation in the profitability analysis in chapter. 6 by a small amount by lowering net financial costs. It will not affect the valuation, as it is adjusted for when calculating the cost of capital.

[83] Cash & Cash equivalents are often not viewed as "employed", and therefore netted against interest-bearing debt. Given that 50% of cash is considered a financial assets, and are netted against interest-bearing debt to find net operating capital, the capital employed is found without subtracting the cash pool in this paper.

Financial assets	1744	1665	2337	1752	2061	1752
Capital Employed	**7585**	**8285**	**9934**	**9721**	**10328**	**10369**
Equity	6167	4424	6231	5677	6396	6277
Non-controlling interests	166	154	156	216	234	138
Financial debt	1252	3707	3547	3828	3698	3954
Capital Employed	**7585**	**8285**	**9934**	**9721**	**10328**	**10369**

Table 22: Capital employed

4. From capital employed to net operating capital

Net financial debt is calculated as the financial debt less the financial assets.

Net financal debt	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Financial debt	1252	3707	3547	3828	3698	3954
Financial assets	1744	1665	2337	1752	2061	1752
Net financial debt	**-492**	**2042**	**1210**	**2077**	**1637**	**2202**

Table 23: Net financial debt

Net operating capital is obtained by adding net financial debt to the equity and non-controlling interests.

Net operating capital	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Equity	6167	4424	6231	5677	6396	6277
Non-controlling interests	166	154	156	216	234	138
Net financial debt	-492	2042	1210	2077	1637	2202
Net operating capital	**5841**	**6620**	**7597**	**7970**	**8267**	**8617**

Table 24: Net operating capital

From table 25 we can see that the net operating capital has increased by almost 50% in the period. This mainly relates to substantial increases in non-current assets through investments in manufacturing facilities in the Brazilian and Asia-Pacific regions[84]

4.6 Analysis and adjustment of measurement error

In an ideal world, where the balance sheet items amounts to fair value, or the net present value of all future income, the return on capital will equal the cost of capital (Gjesdal & Johnsen,

[84] (Aker Solutions ASA, 2015).

1999). When items in the balance sheet are recognized according to the applicable standards, which often follows the historic cost model where the value of the assets are presented as the historical cost of acquiring the asset less accumulated depreciations, return on capital and cost of capital differs, allowing for measuring performance through return on capital (Gjesdal & Johnsen, 1999).

The problem is that the true return on capital is unobservable, as the framework for recognizing and measuring the items in the financial statements often open for discretion, which makes the recognized items deviate from the true, underlying economic reality. This leads to potential measurement errors (Knivsflå, Spring 2017).By defining the observed return on equity as r_e, the true return on equity as r_e^* and cost of equity as k_e, we can split the potential measurement errors in three kinds (Knivsflå, Spring 2017)

$$ME = (r_e^* - k_e) + \left(r_e - r_{e_{IFRS}}\right) + (r_{e_{IFRS}} - r_e^*)$$

The difference between r_e and $r_{e_{IFRS}}$ are errors that comes from so-called "creative" accounting, both those that are in according to the framework, but in breach of what those standards are intended to accomplish, and those that deviate from the standards[85]. Such measurement errors cannot be guarded against completely, but the possible existence of such measurement errors are important to be aware of. There are no indications of creative accounting in Aker Solutions' financial statements, and no adjustments to counter these issues are made.

The difference between the $r_{e_{IFRS}}$ and r_e^* are measurement errors that comes from the specific requirements of the accounting standards deviating of what best reflects the underlying economic reality. There several possible adjustments that can be made, but in order to perform meaningful adjustments one has to have in-depth knowledge of the underlying economic conditions and the effect of adjusting the financial statements[86]. The critics often emphazised that the probability of an external analyst having sufficient and reliable information that let them adjust the financial statements to better reflect the economic reality than what the company that prepares the financial statements are low (Penman, 2012).

[85] (Knivsflå, Spring 2017)
[86] (Knivsflå, Spring 2017)

However, some adjustments are made in this case.

4.6.1 R&D

Both the segments Subsea and Field design are largely dependent upon innovative engineering, which involves spending a significant amounts on developing new products and services each year. This relates not just to Aker Solutions, but the whole industry.

The problem with R&D is that the accounting standards require the company to recognize the expenses immediately in the income statement unless the research and development fulfil certain criteria. This, among other criteria, involves an assessment on whether it is "probable" that the research will provide future benefits for the company[87]. Such assessments are highly discretionary, and even though other criteria such that the management have commited to complete the development makes the recognition more objective, the amount of R&D capitalized relative to recognized as costs, differ substantially between different companies and different periods. Because of this, all R&D costs are capitalized both for Aker Solutions and its peers.

R&D is capitalized by taking the average expensed R&D in the period 2011-2016, and dividing it by a factor of 1/6, assuming a lifetime of capitalized R&D of 6 years.

[87] (Anon., 2004)

Year	2011	2012	2013	2014	2015	2016
Expensed Research & Development						
Average R&D expense	**130**					
Capitalization factor	1/6					
Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Effects on P&L statement:						
Reversed R&D expense	64	65	132	185	211	125
Increased depreciation	-64	-65	-132	-185	-211	-125
Effect on operating income (EBIT)	0	0	0	0	0	0
Balance sheet effects:						
Gross capitilazation of R&D expense (increase in "other intangibles")	782	782	782	782	782	782
Deferred taxes	222	222	222	222	222	222
Equity	560	560	560	560	560	560

Table 25: Capitalization of R&D

The capitalization has no effect on operating income (or earnings before interest and taxes), but increases the operating non-current assets by 782 mill NOK each year. The net capitalization, after deferred taxes[88] multiplied by the gross capitalization, equals the estimated increase in recognized equity from the R&D capitalization.

4.6.2 Operating leases

The operating leases are annual rent paid for offices and other equipment, often over the whole lifetime of the asset. Leasing is an alternative to purchasing, but with the advantage of not having to put out the initial investment. Because of the effect recognizing leases as costs relative to purchasing[89], with lowering both profits and the size of the balance sheet, the annual lease should be capitalized in order to ensure consistency in the analysis of returns across the industry.

[88] The normalized operating tax rate found in chapter 4.5.1 is used to calculated deferred taxes.
[89] Or capital leases, where the value of the asset is capitalized in the balance sheet and rent expenditures are reported as amortizations rather than expenses.

Estimated interest rate for capitalization:	2011	2012	2013	2014	2015	2016
Financial costs	133	183	210	191	308	454
Financial debt	9596	11953	16041	17670	17401	11143
Average financial costs	246,5					
Average financial debt	13967					
Estimated interest rate for capitalization:	1,76 %					

Table 26: Estimated interest rate for capitalization of rents

The leases are capitalized by estimating the average interest rate in the period 2011-2016. The reported expensed rent are then split between depreciation of the capitalized rent-claim and the interest cost related to the rent-obligation.

Lease	2011	2012	2013	2014	2015	2016
Reported rent expenses	403	445	651	711	894	854
Interest	7,1	8,5	11,4	8,5	15,6	22,3
Depreciation of rent-claim	395,9	436,5	639,6	702,5	878,4	831,7

Table 27: Splitting reported rent expense in interests and depreciation of rent-claim

By assuming an average life-time of the asset of 6 years, the average rent are capitalized through using the invers annuity. The capitalization has no effect on the equity, as the net capitalized rent-claim correspond to the short- and long-term net rent obligation.

Capitalization of rents:							
Average rent:		**660**					
Years		**6**					
Year		**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Invers annuity		5,6	5,6	5,6	5,6	5,6	5,6
Year		**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Gross capitalization of rent-claim		3724,6	3724,6	3724,6	3724,6	3724,6	3724,6
Deferred tax liability		1057,1	1057,1	1057,1	1057,1	1057,1	1057,1
Net capitalization of rent-claim		2667,5	2667,5	2667,5	2667,5	2667,5	2667,5
Rent obligation							
	Short term	395,9	436,5	639,6	702,5	878,4	831,7
	Deferred tax benefit	112,4	123,9	181,5	199,4	249,3	236,1
	Net short-term rent obligation	**283,5**	**312,6**	**458,0**	**503,1**	**629,1**	**595,7**
	Long term	3328,7	3288,1	3085,0	3022,0	2846,2	2892,9
	Deferred tax benefit	944,7	933,2	875,6	857,7	807,8	821,0
	Net long-term rent obligation	**2384,0**	**2354,9**	**2209,4**	**2164,3**	**2038,4**	**2071,8**
	Total financial obligation	**2667,5**	**2667,5**	**2667,5**	**2667,5**	**2667,5**	**2667,5**

Table 28: Capitalization of rents

The capitalization does not affect the income statement by any significant amount. The net effect is that the increased annual interest cost related to the rent obligation is shifted from the EBIT to income before tax.

Adjustment to the Income statement	2011	2012	2013	2014	2015	2016
Reduced rent	403,0	445,0	651,0	711,0	894,0	854,0
Increased depreciation	-395,9	-436,5	-639,6	-702,5	-878,4	-831,7
Increased Deferred tax obligation[90]	-2,0	-2,4	-3,2	-2,4	-4,4	-6,3
Effect on operating income (EBIT)	**5,1**	**6,1**	**8,2**	**6,1**	**11,2**	**16,0**
Increased interest, on rent obligation	-7,1	-8,5	-11,4	-8,5	-15,6	-22,3
Increased deferred tax benefit	2,0	2,4	3,2	2,4	4,4	6,3
Adjustments to Income before tax	0	0	0	0	0	0

Table 29: Adjustment to the Income statement

4.6.3 Deferred tax, share options and pension costs

Deferred tax, share options and pension costs are in general items that may lead to irregular costs that should be adjusted for. When it comes to deferred tax assets and liabilities, it is assumed that Aker Solutons' operations will continue and that they will not sell of its assets. It's not made any adjustments to the reported deferred tax.

Aker Solutions does currently not use share options in their compensation of executives and employees, and no adjustments is necessary. The pension obligations could be adjusted, by estimating the fair value in terms of the present value of expected returns rather than the reported real returns which are more varying. Given the relatively modest size of Aker Solutions pension obligations, and the corresponding pension costs, it is not made any adjustments in this regard.

[90] The normalized operating tax rate is used for estimating the increase in deferred tax obligations and benefits.

4.7 Analysis of ratios

In the next chapters the rearranged and adjusted income and balance sheet statements are used as the basis for analysing different returns and ratios go gain insight in the underlying economic performance of Aker Solutions during the period 2011-2016. Ratios express the relation between two or more financial items, and can be used to gain insight in the underlying risk characteristics and financial performance of the company (Gjesdal & Johnsen, 1999). An evaluation of the financial risks is made in chapter 6 and profitability in chapter 8. The risk assessment is based on calculating different ratios that in different ways express the liquidity and the solidity of Aker Solutions and the industry. Because there is no publicly available risk assessment of Aker Solutions from certified credit rating agencies[91], the company are given a syntethic rating by applying Standard and Poor's rating classifications on the basis of the credit risk analysis.

4.7.1 Time-weighted returns

In a cyclical industry such Subsea oil and gas development and production, the annual returns will vary substantially over time. Both for Aker Solutions and the industry, it's important not just to look at the year-on-year performance, but also the trend through the cycle. In this case however, 2016 and 2017 are viewed as the bottom of the downturn in the industry cycle, and the performance are expected to improve in 2018-2020. The weighted average have therefore been estimated by putting more weight on 2012-2014 than the normal case of emphasizing the performances closer to the present. The weights given to each year are presented in table 31:

Year	2012	2013	2014	2015	2016
Time-weights	10 %	15 %	20 %	25 %	30 %

Table 30: Time-weights 2012-2016

[91] At least not to my knowledge.

5 Credit Risk Analysis

5.1 Purpose of analysing credit risks

In this step the credit risk of Aker Solutions is analyzed both separately and in relation to the industry. First, the debt financing facilities and the associated debt covenants are presented. Afterwards, the credit risk is analysed through calculating ratios describing the liquidity and solidity of Aker Solutions' financials. The purpose of this analysis is to look at the downside risk, which is the risk of Aker Solutions not being able to pay contractual interests and principal on its debt obligations when it is due. Through combining the ratio-analysis with qualitative insight from the strategic analysis, the credit analysis will be concluded by giving Aker Solutions a synthetic credit rating. This rating will be used when calculating the credit risk premium and cost of debt later in chapter 7.

5.2 Debt maturity

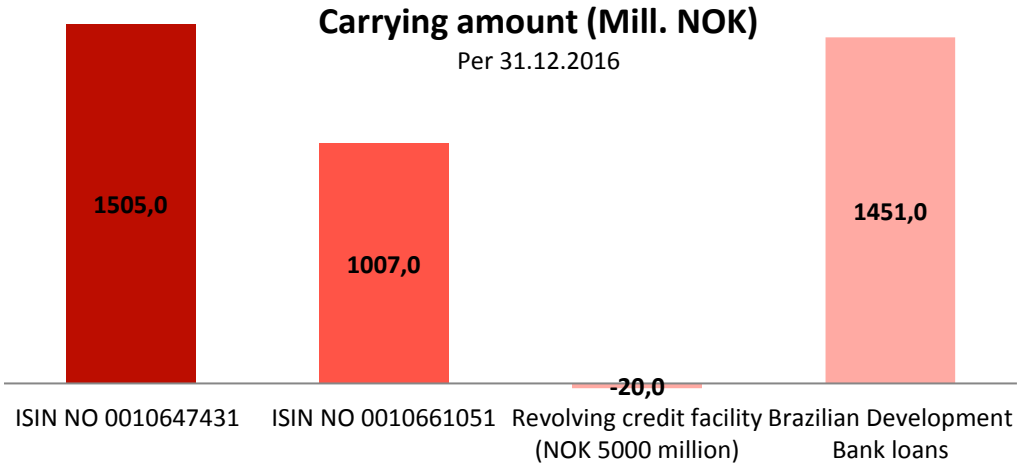


Figure 29: Carrying amount of outstanding bank loans and bonds per 31.12.2016

Aker Solutions has per Q1 2017 a long-term financing with 37% financing through bank / export credits and 63% through bonds issued in the Norwegian bond market. Beside this they have a undrawn revolving credit facility of 5000 NOK. Historically Aker Solutions has issued new bonds soon as existing bonds are repayed, keeping the total amount of bonds outstanding relatively stable, although varying somewhat in maturity.

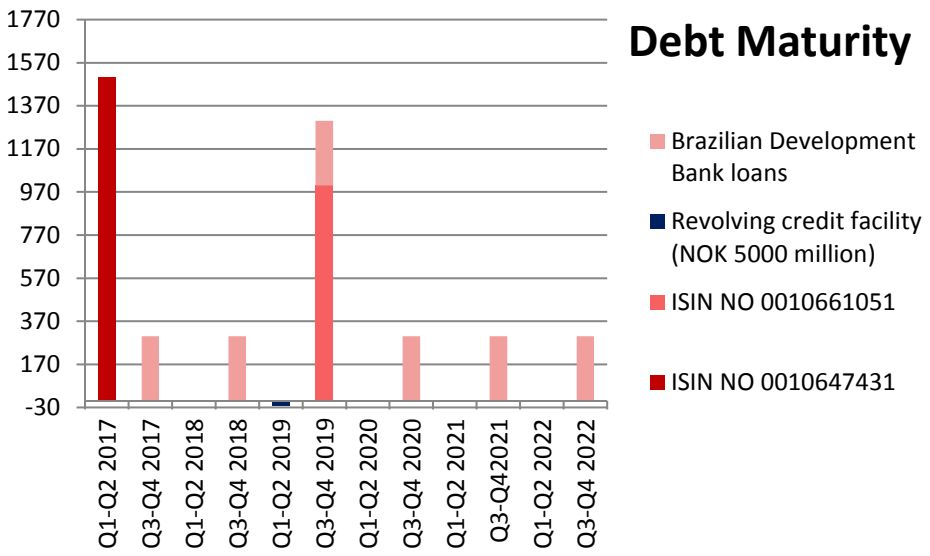


Figure 30: Debt maturity

The maturity of current outstanding debt are divided between the Brazilian development bank loan and two coupon bonds. The loan has term structure of annual amortizations of 300M NOK. The two coupon bonds are paid in full on the maturity date, with the bonds maturing in 2017 and 2019 respectively.

5.3 Debt covenants

Aker Solutions reports that they have the following debt covenants[92] attached to their credit facilities:

1) $Gearing\ ratio$: $\frac{Net\ interest\ bearing\ debt}{Adjusted\ EBITDA} < 3{,}5\ (bank\ loans),\ 4(bonds)$

2) $Interest\ coverage$: $\frac{Adjusted\ EBITDA}{Net\ finance\ cost} > 3{,}5$

The level of fulfilment of the debt covenants will be examined when analysing the liquidity and solidity ratios below.

[92] Covenants are agreed restrictions on the capital structure and other requirements that the issuer sets as a condition for the loan and which the borrower is obliged to comply with. The effect of a breach of the contracted terms is that the issuer may require the entire credit facility to be repaid immediately.

5.4 Capital structure

The financial structure of the company can be analysed by a matrix with assets vertically sorted from the less to most liquid assets and the financing horizontally sorted from when they are due and whether they are interest bearing. In this way one can see how the assets are financed. As can be seen from table 18, Aker Solutions financed 11,64%[93] of its non-current operating assets through short term liabilities. At the same time ca. 13% of their short term obligations (liabilities and debt) was covered by long-term assets. In isolation, such a financial structure appears risky. An unused credit facility of 5000 Mill. NOK, which constitutes about 38% of the total short term obligations. This liquidity buffer doesn't show up in the matrix. When this is included the company currently has sufficient liquidity to meet its short-term obligations.

Aker Solutions 2016	Eq.	MIN	LT.op.liab	LT.fin.debt	ST.op.liab	ST.fin.debt	Total capital
Non-current operating assets	6837	138	1178	3916	1592	0	13660
Non-current financial assets	0	0	0	0	75	0	75
Current operating assets	0	0	0	0	8520	1029	9549
Current financial assets	0	0	0	0	0	1677	1677
Total Assets	6837	138	1178	3916	10187	2706	24961

Table 31: Financial structure matrix 2016

Another factor is that the capital structure has changed from 2014, where the new order growth in 2012-2013 was materializing in strong top- and bottom lines. In 2014, all non-current assets and some of its current assets were financed through long-term financing facilities. This shift in financial structure from 2014 to 2016 indicates that even though the equity-ratio increased in the period, cf. chapter 5.6.1, the coverage of short term obligations went from an excess coverage to the need of using its available interest bearing credit facilities.

Aker Solutiosn 2014	Eq.	MIN	LT.op.liab	LT.fin.debt	ST.op.liab	ST.fin.debt	TE
Non-current operating assets	6237	216	1613	5156	0	0	13222
Non-current financial assets	0	0	0	0	0	0	0
Current operating assets	0	0	0	162	15705	0	15867
Current financial assets	0	0	0	0	574	1177	1752
Total Assets	6237	216	1613	5318	16279	1177	30840

Table 32: Financial structure matrix 2014

[93] 11,64% = 1591,66/13660,48

5.5 Liquidity analysis

Aker Solutions' liquidity is analysed through the current- and quick-ratios, the short- and long-term debt coverage and the interest coverage.

5.5.1 Current ratio

$$Current\ ratio = \frac{Current\ assets}{Current\ liabilities}$$

The current ratio is calculated by dividing the current assets by current liabilities. A ratio over 1 indicates that there are sufficient assets that can be realized in less than one year to cover liabilities and debt that are due within one year. A liquidity ratio of 2 is considered good.

Current ratio:	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	1,293	1,213	1,180	1,009	0,971	0,871	1,084
Industry	1,195	1,373	1,430	1,731	1,625	1,350	1,547

Table 33: Current ratio

Aker Solutions has through the period has a lower current ratio than the industry. The current ratio has declined gradually, going below 1 in 2015 and 2016. The main reason for the decline in 2015 and 2016 is that the portion of accounts receivable declined relatively more than the decline in accounts payable through the slowdown in activity. In addition, a substantial portion of the outstanding debt obligations are due in 2017, which places this portion as current debt in 2016. Together with declined cash reserves, this has put downward pressure on the current ratio.

It's also worth noticing that as Aker Solutions increased its cash reserves through the period 2012-2014, the industry did so even more. In 2014 the industry increased the cash reserves by 30% against Aker Solutions' 17%. It has led to a higher current ratio for the industry during the downturn, thereby lowering the risk of not meeting short-term obligations. The sharp increase in the industry current ratio in 2014 are caused by GE offloading its financial business unit. This shows on the graph because of the industry being a weighted sum of the companies' assets.

5.5.2 Quick ratio

$$Quick\ ratio = \frac{Current\ financial\ assets}{Operating\ liabilities + Short\ term\ financial\ debt}$$

The quick ratio is usually calculated by subtracting the inventory from the current assets, as the inventory are viewed as least liquid current asset. In this case, the quick ratio are

calculated by dividing the current financial assets over operating liabilities and short term financial debt.

Quick ratio:	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	0,195	0,148	0,159	0,100	0,116	0,130	0,128
Industry	0,303	0,324	0,354	1,005	0,662	0,420	0,600

Table 34: Quick ratio

The quick ratio shows that Aker Solutions has a more risky short term financing than its peers. This is a direct consequence of Aker Solutions streamlining of its operations, having very little financial assets on its balance sheet. The substantial increase in quick ratio of the industry in 2014 is because of the GE divestiture becomes even more prominent as assets held for sale viewed as a financial assets.

5.5.3 Debt coverage

5.5.3.1 Long-term debt coverage

$$Long\ term\ debt\ coverge = \frac{Financial\ assets}{Financial\ debt}$$

The ratios for debt coverage are used to evaluate whether the company has a sufficient funds to cover the financial debt, the long term debt coverage is calculated by dividing the financial assets over the financial debt.

Long-term debt coverage	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	0,445	0,261	0,376	0,270	0,324	0,265	0,299
Industry	0,658	0,623	0,666	0,807	0,594	0,535	0,667

Table 35: Long-term debt coverage

The long-term debt coverage of Aker Solutions being much lower than the industry indicate a more streamlined business model, with less financial investments as part of the allocated capital. With an even higher debt financing than the industry this shows a substantially lower long-term debt coverage.

5.5.3.2 Short-term debt coverage

$$Short\ term\ debt\ coverage = \frac{Current\ financial\ assets}{Short\ term\ financial\ debt}$$

Short-term debt coverage is calculated by dividing short term financial assets over short term financial debt.

Short-term-debt coverage	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	2,212	1,740	4,951	1,488	1,721	0,620	2,153
Industry	0,718	0,914	1,141	1,834	1,469	1,565	1,345

Table 36: Short term debt coverage

Aker Solutions seems to be at parity with the industry when it comes to the short term debt coverage. This can be explained by Aker Solutions having a relatively higher cash pool than its peers. The drop in 2016, as earlier mentioned, are mainly due to financial obligations being due in 2017, and therefore falling below 0.

5.5.4 Interest coverage

$$\frac{(Net\ operating\ income + Financial\ income, after\ tax)}{Interest\ costs}$$

The interest coverage ratio is calculated as the the income from capital employed, which means the operating and financial income, relative to interest costs. It measures the ability to pay interests when they are due. An interest coverage < 1 indicate that the company would have to pay interests through taking on more debt or selling of assets and thereby reducing the equity.

Interest coverage	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	6,981	10,665	8,751	15,829	7,398	3,266	10,689
Industry	18,318	17,513	18,438	17,675	13,601	9,173	16,519

Table 37: Interest coverage

Both Aker Solutions and the industry have in the period had strong operating incomes, yielding a high interest coverage. That Aker Solutions' has a somewhat lower interest coverage is natural as they have higher relative debt financing, and therefore higher interest cost relative to its net operating income and income from financial assets.

However, seen in relaton to the second covenant of having $Interest\ coverage > 3{,}5$, Aker Solutions interest coverage in 2016 was just above that level, which indicates certain risks related to not fulfilling the covenants. This is certainly a red flag, but are offset somewhat by a

small increase in new orders in the subsea segment, indicating that the bottom of the cycle downturn is past, cf. chapter 8.3.1.

5.5.5 Summary liquidity analysis

In general, from its lower ratios than the industry, Aker Solutions has a more risky short-term capital structure. A relatively larger cash pool makes the short-term debt coverage the only ratio in which Aker Solutions score higher than the industry average. A red flag is the low and declining interest coverage ratio, which in 2016 fell below the required 3,5x from its covenants, cf. chapter 5.3.

5.6 Solidity analysis

5.6.1 Equity ratio

$$Equity\ ratio = \frac{Equity + Minority\ interests}{Total\ capital}$$

The equity ratio are calculated by dividing the equity and non-controlling interests by the total capital. As losses are recognized against the equity, the size of the equity relative to total assets function as ma measure of the long-term ability to withstand period of negative profits. The higher the equity ratio, the less risk there is of the company going bankrupt during a downturn.

Equity ratio	2011	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	0,334	0,217	0,236	0,209	0,231	0,279	0,222
Industry	0,298	0,312	0,323	0,294	0,321	0,403	0,312

Table 38: Equity ratio

As we can see from table 25, both Aker Solutions and its peers have had a quite stable equity ratio in the period. In 2015 and 2016 the equity ratio has increased, signalling that the companies are seeking to reduce the leverage during the downturn of the cycle. Aker Solutions' having almost 15%-points lower equity ratio are a further indication of their strategy of leveraging their operations through higher debt levels relative to its competitors.

5.6.2 Net operating return

Net operating return is calculated as net operating income over net operating capital. Aker Solutions has in the whole period had a higher return on net operating capital than its competitors.

Netoperating return	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	0,154	0,135	0,205	0,148	0,095	0,162
Industry	0,112	0,108	0,128	0,115	0,063	0,116

Table 39: Net operating return

The higher return on net operating capital indicates higher profitability and that Aker Solutions are able to perform better than its competitors. Stronger performance over time can therefore defend having higher levels of debt financing and a more risky short-term financing. The return on net operating assets will be analysed further in chapter 8.

5.6.3 Summary

With both lower current ratio, lower debt-coverage and lower interest coverage, Aker Solutions has a short-term financing that are more risky than the industry. The liquidity ratio even falls below 1, which are a minimum requirement for having sufficient liquidity to cover the debt obligations over time. It shall be noted however that Aker Solutions has an unused credit facility of 5 bn NOK that are not reflected through the liquidity ratios. It means that the lack of liquidity is somewhat overestimated. But over time, with tighter liquidity, Aker Solutions is more dependent on generating sufficient cash flow through its operatins than its competitors.

Higher profitability makes the risks related to having higher leverage and more risky short- and long-term financing less prominent as the ratios could indicate. However, as the equity ratio are significantly lower than that of the industry, Aker Solutions may be hit harder by the market downturn if they are not able to sustain sufficient activity.
With the activity levels declining, at least for new oilfield and subsea developments, as well as decreased OPEX spending on maintenance and modifications, Aker Solutions' leverage may be viewed as more risky than in periods of high activity and growth. It's also worth noticing that the Brazilian development bank loan was used to finance the development of subsea equipment manufacturing facilities in Brazil, strategically placed to serve the expected growth in the deep- and ultra-deepwater subsea oilfield developments offshore Brazil in the coming years. The investment decision was made when Luis Araujo, the current CEO, was head of operations in the Brazilian subsea unit in 2014. When oil prices fell in mid 2014, Petrobras, who is heavily exposed to the high-cost ultra-deepwater segment, completely cut its capex. With no subsea equipment orders in 2016, the expteced revenues generated from

the manufacturing facility may be substantially lower than expected. At least in the shorter term. Debt financing the development of the new facility has therefore turn out to be more risky move than initially anticipated because of the downturn. Especially given that their cometitors are substantially reducing their debt-to-equity levels. These factors must be taken into account when creating the synthetic rating for the company.

5.7 Synthetic rating

On the basis of the calculated current ratio, interest coverage, equity ratio and net operating return, Standard & Poor's rating classifications is used to put a synthetic rating on Aker Solutions (Knivsflå, Spring 2017). The synthetic rating will be used when calculating the the credit risk premium and cost of debt.

The rating table is based on a ratings ranging from AAA to D, where the probability of default increases almost exponentially as the rating lowers.

Rating	Current ratio	Interest coverage, after tax	Equity-ratio	Net return on operating assets	Probability of default in one year
AAA	11,6	16,9	0,94	0,35	0
	8,9	11,6	0,895	0,308	
AA	6,2	6,3	0,85	0,266	0,0002
	4,6	4,825	0,755	0,216	
A	3	3,35	0,66	0,166	0,0097
	2,35	2,75	0,55	0,131	
BBB	1,7	2,16	0,44	0,096	0,0026
	1,45	1,69	0,38	0,082	
BB	1,2	1,22	0,32	0,068	0,0097
	1,05	1,06	0,27	0,054	
B	0,9	0,9	0,22	0,04	0,0493
	0,75	0,485	0,175	0,026	
CCC	0,6	0,07	0,13	0,012	0,1261
	0,55	-0,345	0,105	-0,002	
CC	0,5	-0,76	0,08	-0,016	0,2796
	0,45	-1,17	0,03	-0,03	
C	0,4	-1,58	-0,02	-0,044	0,5099
	0,35	-1,995	-0,1	-0,058	
D	0,3	-2,41	-0,18	-0,072	0,8554

Table 40: Standard & Poor's rating classifications and estimated probability of default within 1 year on the basis of the current ratio, interest coverage after tax, eguity ratio and net operating return

By applying the rating classifications on the ratios each year in the period 2011-2016, we see that Aker Solutions credit rating differs from a time-weighted rating of B in terms of equity ratio and current ratio, to an interest coverage of AA.

Synthetic rating - Aker Solutions	2011	2012	2013	2014	2015	2016	Time-weighted average
Current ratio:	1,29	1,21	1,18	1,01	0,97	0,87	1,00
Rating	**BB**	**BB**	**BB**	**B**	**B**	**B**	**B**
Interest coverage:	6,98	10,66	8,75	15,83	7,40	3,27	8,37
Rating	**AA**	**AA**	**AA**	**AAA**	**AA**	**A**	**AA**
Equity-ratio:	0,33	0,22	0,24	0,21	0,23	0,28	0,24
Rating	**BB**	**B**	**B**	**B**	**B**	**BB**	**B**
Return on NOC	-	0,15	0,13	0,21	0,15	0,09	0,07
Rating	**-**	**A**	**A**	**A**	**A**	**BBB**	**BB**

Table 41: Synthetic rating - Aker Solutions

Synthethic rating - Industry	2011	2012	2013	2014	2015	2016	Time-weighted averag
Liquidity ratio:	1,19	1,37	1,43	1,73	1,62	1,35	1,51
Rating	BB	BB	BB	BBB	BBB	BB	**BBB**
Interest coverage:	18,32	17,51	18,44	17,67	13,60	9,17	14,20
Rating	AAA	AAA	AAA	AAA	AAA	AA	**AAA**
Equity-ratio:	0,30	0,31	0,32	0,29	0,32	0,40	0,34
Rating	BB	BB	BB	BB	BB	BBB	**BB**
Return on net operating capital	-	0,11	0,11	0,13	0,12	0,06	0,05
Rating	-	BBB	BBB	BBB	BBB	BB	**B**

Table 42: Synthetic credit rating - Industry

Except in terms of net operating return, the time-weighted average of Aker Solutions is lower than the industry. On an overall basis, as Aker Solutions had solid returns and interest coverage, and a liquidity buffer[94] that was not included in the current ratio estimates, the average credit rating is considered to be **BBB** for the historic period 2011-2016.

[94] Aker Solutions had an undrawn (more or less) credit facility of 5000 Mill. NOK during the period 2011-2016.

6 Cost of Capital

The cost of capital is the return investors require of an asset in order to be willing to invest. In a perfect capital market, the cost of capital resembles the true economic alternative cost of an investment, which means the return one would get by allocating the capital to the next best alternative asset with the same risk characteristics.

There are different models available for calculating the cost of capital. The most widely used are the Capital Asset Pricing Model. The CAPM-model is simple, but effective, as it is fairly robust, easy to calculate and applicable to all asset classes (Gjesdal & Johnsen, 1999). The CAPM model is used as the basis for cost of equity in this paper.

6.1 CAPM

The initial CAPM model express the cost of capital as $k = r_f + \beta mrp$.[95]

The model is built on the premise that investors are risk averse. It means that if an investment has risks, this must be compensated by a higher expected return. However, assuming that investors are perfectly diversified, the only risks that the investor are compensated is the systematic risks. The differentiation between systematic and idiosyncratic risks are based on whether the associated risk are affecting all assets or just the given asset or a small group of assets[96]. Idiosyncratic risks are eliminated through diversification as the asset specific fluctuations are offset by other assets in the portfolio[97].

The investor require compensation for the systematic risks on the basis of the specific investment's exposure to the market risk, often referred to as the assets beta (β), which is the ratio between the market risk of the investment and the representative market risk (Gjesdal & Johnsen, 1999). The practical way to calculate this is through evaluating the standard deviation of the asset's return over the standard deviation of the market portfolio's return, multiplied by the their correlation. This can be expressed as:

$$\beta = \frac{market\ risk\ of\ the\ investment}{representative\ market\ risk} = corr(r, r_m) \cdot \frac{std(r)}{std(r_m)}$$

Because of the simplicity of the initial expression of the CAPM-model, where it excludes other risks that may be related to the specific investment that cannot be eliminated through

[95] (Gjesdal & Johnsen, 1999)
[96] (Gjesdal & Johnsen, 1999)
[97] (Gjesdal & Johnsen, 1999)

diversification, it is often added an additional premium referred to as the illiquidity premium (ilp). Even though cost of lack of liquidity often is the main factor, which means that the investor require a higher return to cover expected costs of divestment, other risks may be included as well. In essence it expresses certain forms of market imperfections (Knivsflå, Spring 2017). Even though the model in theory is applicable to all asset classes, it is in this case used to calculate the cost of equity (k_e). The cost of equity and the cost of debt, where the cost of debt are found by the procedure explained in chapter 6., are then weighted in order to find the weighted average cost of net operating capital (k_{NOC}) (Knivsflå, Spring 2017).

6.1.1 Tax adjustments

In this paper, the historic cost of capital are primarily used to analyse the performance relative to the returns on capital. The returns on capital are calculated on an after-tax basis, which means the cost of capital has to be adjusted for taxation as well.

If we assume that the investor is a Norwegian investor following ordinary Norwegian tax on capital gains, all taxes related to income to the owner are paid by the company. This gives consistency such that the cost of a risk-free equity investment is equal to the after tax risk free cost of debt. The risk free rate are then adjusted by the corporate tax rate. This gives the following formula for the after tax CAPM cost of capital:

$$k^t = r_f(1-t) + \beta\left(E(r_m) - r_f(1-t)\right) + ilp$$

This can be rewritten as

$k^t = r_f(1-t) + \beta * (mrp^t) + ilp$, where $mrp^t = mrp + t * r_f$.

However, as the observed r_m are reported on an after tax basis, and where the market risk premium (mrp) often are calculated by a combination of quantitative and qualitative measures, the significance of adjusting the market risk premium for taxes is small (Knivsflå, Spring 2017). In this paper, the market risk premium will therefore not be adjusted for taxes.

The formula that will be used as the basis for calculating the cost of equity in this paper is therefore: $k_e^t = r_f(1-t) + \beta mrp + ilp$

Even though this estimation of cost of equity is not perfectly representative for the industry, where most companies and investors are subject to American corporate and investor taxes and

the significance of tax adjustments are more important[98], the same model will be used to ensure consistency in the comparative analysis.

6.1.2 Risk free rate

The first step in calculating the cost of equity is to determine the risk-free rate.
The risk-free rate are supposed to resemble the expected and required return of an investment that bears no or insignificant risks, which means a very low volatility and probability of default being close to 0.
Government bills and bonds are often used as a proxy for the risk-free rate, as financially solid national governments are not likely to default on its obligations. However, government bonds and bills have several different maturities, with lower maturities tending to have higher volatility and longer maturities tending to have a higher risk free rate due to factors such as a premium for longer holding period of securities (Gjesdal & Johnsen, 1999).
In this paper it will be used a five year maturity for the historical analysis. This seems reasonable, as the duration of the 5 year coupon bond are relatively close to the length of the period of analysis is from 2012-2016.

The Norwegian 5-year government bonds, as all cash flows are stated in NOK. The risk-free interest rate are closely linked with the national currency and rate of inflation, which both are currency specific. It is therefore important that the risk-free interest rate are based on the same currency as the investment it relates to (Damodoran, 2012).

6.1.3 Market risk premium

In theory, the market risk premium is the difference between the expected return of investing in an asset portfolio that resembles to total market index, and a risk-free investment after tax. This can be expressed by the formula $mrp = E(r_m) - r_f(1-t)$ Assuming that investors are risk averse, the market risk premium is the additional return that are required by investors to take on higher levels of risk.

There are several methods of calculating the market risk premium, with three methods being the most common.

[98] (Gjesdal & Johnsen, 1999)

Firstly, the market risk premium can be found by subtracting the current market return from the risk-free rate after tax. The advantage of this method is that it is more future oriented, by incorporating the current expectations of future development of the market and the risk-free rate. However, this estimate fluctuates greatly between different periods depending on the overall market cycle, investor confidence through perceived market risk and volatility (Gjesdal & Johnsen, 1999).

Secondly the market risk premium can be found by estimating the average (arithmetic or geometric) historical premiums over a defined period. This method is often used in practice, as it is more reliable through objectively quoted market prices over time.

A third method is to base the market risk premium on a more qualitative approach, using a combination of the consensus estimate as well as both historical and future factors taken in consideration. Fernandez et al. published a paper in 2016 where they reported the required equity premium used in 2016 for 71 countries, estimated on the basis of over 6000 respondents ranging from independents such as professors and analysts, to companies' own estimates. They reported an average required market risk premium of 5,5% (median 5%) in the Norwegian market (Fernandez, et al., 2016). PWC, performing a similar analysis from different Norwegian respondents in desember 2016, reported an estimated market risk premium of 5% (PWC, 2016).

In this case, the required market risk premium is set to 5%. This in accordance both with the consensus estimate in the Norweigan market, as well as what has been found as long-term the historical normalized market risk premium (Knivsflå, 2016).

6.1.4 Illiquidity premium

The liquidity premium is a premium beyond what is incorporated in the market risk premium, and are ment to compensate the investor for the risk of being locked in an illiquid position that makes it more expensive to get of the position quickly (Gjesdal & Johnsen, 1999). In a liquid capital market where there constantly are available buyers and sellers, the liquidity premium for a representative investor should be zero. This indicates that all relevant risk are incorporated in the market risk premium, which in turn are weighted by the beta in accordance with the company's exposure to relevant market risks. For Aker Solutions, which is one of the most liquid shares on Oslo Børs, it is less likely that there are any significant

costs related to getting out of a position of holding the company's shares. There is also no majority owner with exclusive powers to make decisions that impair values for minority shareholders, as has been the case for the largest owner Aker ASA and the so-called "Røkke-discount"[99]. The Norwegian Government's stake of about 20% of the shares could[100] potentially be a reason for a small liquidity premium. On the basis of what has been expressed through the press, the stake is seen as a long-term investment to secure Norwegian jobs in the company, even though the contract expires in June 2017. A potential bid will be evaluated on a case-by-case basis[101], which means that even though the government is not obligated to hold its shares[102], they will only sell those shares if it comes a competitive bid and are not actively seeking to offload its stake in the company. The Government's stake in the company is therefore not seen as a reason for adding an illiquidity premium on the cost of equity for Aker Solutons.

However, in times of high volatility and globalised interconnectedness in financial and industrial markets, the correlation in downside risks between companies are often higher (Pu & Zhao, 2010). The downside risk are company-specific, but cannot be reduced through portfolio diversification as a bankruptcy would involve liquidation of the company's assets (Knivsflå, Spring 2017). In such circumstances the illiquidity-premium should reflect the underlying non-diversifiable risks other than the market risk (Gjesdal & Johnsen, 1999). The illiquidity premium is set to a discretionary 0,5% for both Aker Solutions and the industry.

6.1.5 Beta

When calculating the cost of equity, and from this the weighted average cost of capital, the systematic risks which investors are compensated are measured through calculating the`β of the company's shares. The usual measurement of risk in relation to stocks are the volatility of the share price returns. The equity beta, as previously explained, is a measurement of the company's market risk in relation to the market portfolio, which determines the level of risk that the investor are compensated through the cost of capital. A beta >1 indicates that the value of the company's shares increases more than 1% if the market portfolio increases by 1%. The higher the beta, the higher the risks/volatility investors require compensation for through higher expected returns.

[99] (Nettavisen, 2017)
[100] Cf. chapter 2.2.8
[101] (e24.no, 2017)
[102] (St.prp. nr. 88 (2006-2007))

The equity beta of publicly traded stocks can be calculated on the basis of historical data on the returns of the stock relative to a representative market index.

6.1.5.1 Beta estimation

The first step in finding the equity beta is to estimate the average equity beta for a defined time period. An estimation is made through a regression analysis using Stata. In order to determine the beta, at least three factors has to be considered (Gjesdal & Johnsen, 1999).

6.1.5.1.1 Period

First is the length of the period. In the case of Aker Solutions, the share price has just been quoted for the last 2,5 years. This is because the share was put under a new ticker after the demerger in 2014, cf. chapter 2.2.1. For the other companies, the average equity beta is estimated using a five year time span.

6.1.5.1.2 Daily, weekly or monthly returns?

Using stock returns gives a more statistically correct estimate as one get far more observations. The downside however is that the beta of illiquid shares tend to be underestimated, and overestimated for shares with higher liquidity. This is because liquidity fluctuations makes the daily development of the share prices more or less volatile than the underlying relationship with the overall market over time.
A way to better reflect the true relationship may then be to use weekly or monthly returns. With a time period of 5 years, using monthly returns are adequate (Gjesdal & Johnsen, 1999). For Aker Solutions, a weighted average between the monthly and daily returns since its listing in 29. September 2014.

6.1.5.1.3 Index

The last factor that has to be determined is what proxy one should use as the representative market risk. A market index that follows the stock exchange where the company are listed are often viewed as a representative market risk, as a sufficiently large stock exchange often consists of companies exposed to most asset classes (Gjesdal & Johnsen, 1999). It therefore gives a near perfectly diversified portfolio through indirectly holding all types of assetes.

However, OSEBX-index is more influenced by the development of the oil- and gas prices, as a disproportionately large part of the stocks are related to this sector (Knivsflå, Spring 2017).

A better approach is considered to be to use a global index. The Morgan Stanley Company Index (MSCI) consists of a weighted average of the returns of companies from over 20 developed countries. MSCI are therfore used as a basis for the representative market risk. By performing the regression analysis through Stata, we get these estimated equity betas for the individual companies in the defined industry.

Company	βEq
Aker Solutions ASA	1,403967
Subsea Peers	
Cameron	1,27
Schlumberger (2016)	1,25
Drilquip	1,24
GE	1,03
FMC	1,3997
TechnipFMC (2016)	1,031353
Field design peers	
Wood Group	1,15
Oceaneering	1,35
Technip SA	1,35

Table 43: Beta estimation Aker Solutons and peers

As we can see from the estimates, the equity beta are in general above 1 for all the competitors. This is reasonable as the oil and gas industry on average are more cyclical than the overall market.

It is worth noticing that the equity beta differs somewhat between the companies. We observe that both GE and Wood Group have a lower equity beta. This is as expected, given that both GE and Woodgroup have a substantial amount of their activities related to other industries, and thus are more diversified.

Furthermore we see that Aker Solutions and FMC Technologies have a beta that is fairly equal. Being the most homogenous companies in the group it seems reasonable.

6.1.5.2 Industry beta

The equity beta of the industry can be found by delevering each indivudal company's equity beta to get the unlevered beta. Using Knivsflå's framework, the delivering is based on the operating capital beta (Knivsflå, Spring 2017).

The unlevered beta are found by the formula $\beta_{NOC_t} = \beta_{Eq_t} * \frac{Eq_{t-1}+MIN_{t-1}}{NOC_{t-1}}$, by assuming that the net β_{NFD}[103].

The industry $\beta_{NOC_t}^{Industry}$ can then be found by weighting each beta according to the size of the company's NOC relative to the aggregation of the industry. It can be expressed as[104]:

$$\beta_{NOC}^{Industry} = \frac{NOC_1 \cdot w_1 * \beta_{NOC}^1 + \cdots + NOC_n * w_n * \beta_{NOC}^n}{NOC_1 \cdot w_1 + \cdots + NOC_n \cdot w_n}$$

[103] It probably is somewhat higher in the range +/- 0,05. It will be adjusted for when calculating Aker Solutions beta. This makes the relative evaluations on abnormal returns somewhat inconsistent, but is expedient given that the forecasted β_{NOC} for Aker Solution is based partly on the estimated average of the historical $\beta_{NOC}s$.

[104] The weights that are used are the opening balance, to ensure consistency throughout the estimation of cost of capital and the returns.

The adjusted weight each beta are given for each year are as presented in table 45:

*Adjusted company weight	2012	2013	2014	2015	2016
Aker Solutions ASA	4,72 %	4,71 %	4,54 %	4,04 %	3,53 %
Cameron	20,25 %	20,78 %	20,16 %	17,20 %	15,44 %
TechnipFMC	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %
FMC Technologies	9,00 %	12,06 %	12,02 %	12,25 %	12,28 %
TechnipSA	11,68 %	11,26 %	11,78 %	12,01 %	11,85 %
Oceaneering	6,81 %	6,54 %	6,50 %	7,01 %	6,59 %
Schlumberger	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %
Wood Group	6,65 %	7,54 %	7,43 %	9,73 %	11,47 %
Dril-Quip	2,22 %	2,25 %	2,32 %	2,48 %	2,54 %
General Electric	36,88 %	33,77 %	34,70 %	35,86 %	36,68 %

Table 44: Relative company weights in estimating the industry net operating capital beta.

Assuming that the true $\beta_{NOC}^{Industry}$ is fairly stable in the period, we can use the average and levering with the annual capital-to-equity ratio[105] and then finding the annual $\beta_{Eq}^{Industry}$:

Industry βNOC & βEq					
Year	2012	2013	2014	2015	2016
Aker Solutions ASA	1,07	0,73	0,90	0,81	0,88
Subsea Peers					
Cameron	0,97	0,95	0,88	0,82	0,89
Schlumberger (2016)	0,91	0,92	0,94	0,94	0,94
Drilquip	1,40	1,35	1,41	1,37	1,41
GE	0,57	0,64	0,71	0,96	0,63
FMC	1,01	0,79	0,88	0,92	0,00
TechnipFMC (2016)					
Field design peers					
Wood Group	0,84	0,81	0,99	0,84	0,77
Oceaneering	0,86	0,89	0,98	0,80	0,79
Technip SA	1,04	1,01	1,03	0,99	1,03
Industry βNOC	0,78	0,76	0,82	0,87	0,92
Average:	0,83	0,83	0,83	0,83	0,83
NOC/(Eq.+MIN)	1,49	1,51	1,41	1,30	1,50
Industry βEq	**1,24**	**1,25**	**1,17**	**1,08**	**1,25**

Table 45: Industry net operating capital- and equity betas

[105] Capital-to-equity ratio = NOC/Eq.

The annual industry equity beta ($\beta_{Eq}^{Industry}$) will be used when estimating the annual cost of equity for the industry, cf. chapter

6.1.5.3 Betas for Aker Solutions

The equity beta is estimated by performing a regression analysis on the logaritmic return of Aker Solutions relative to the index. The problem with of having data for only 2,5 years, as Aker Solutions was listed in 2014, is that the beta differs significantly depending on the different factors explained in ch. 6.1.5.1. The calculated beta wil therefore be based on a weighted average of the daily and monthly returns against MSCI, and the monthly return against the OSEBX.[106]

Index	Equity Beta	Weight
MSCI		
3 years - Daily	1,428	0,33
3 years - Monthly	1,195	0,33
OSEBX		
3 years - Monthly	1,589	0,33
Weighted average	**1,404**	

Table 46: Equity beta - Aker Solutions

The problem with using a constant equity beta for the period is that the net operating capital beta will fluctuate depending on the development of the leverage in the period.
Assuming that Miller & Modigliani's first propositions holds, which says that the value of a firm is independent of its financing in a perfect capital market with no transaction costs, taxes, bankruptcy costs, assymetric information or differences in interests rates on financing for the company and the investors, the equity beta will fluctuate with changes in leverage ratios (Gjesdal & Johnsen, 1999). A more reasonable approach would be to assume a constant unlevered beta, and then find the annual equity beta through levering β_{NOC} (Knivsflå, Spring 2017). This even though Aker Solutions, and generally the companies where Aker ASA has larger stakes, has relatively high leverage ratios which indicate some degree of deliberately structuring its finances to optimize the interest tax shield. However, by assuming a constant β_{NOC}, it is found by first estimating the annual β_{NOC_t} through delevering the constant equity beta, and then taking the average over the period 2012-2016.

[106] Alternatively a bloomberg adjustment could have been made, with $beta_{adjusted} = beta_{raw} \cdot 2/3 + 1 \cdot 1/3$. Using a weighted average of the different beta estimations is deemed more appropriate in this case.

Net operating capital beta	2012	2013	2014	2015	2016	Weighted average
Equity Beta	1,40	1,40	1,40	1,40	1,40	1,40
Eq/NOC	0,74	0,51	0,63	0,56	0,61	0,60
Equity BETA	1,40	1,40	1,40	1,40	1,40	1,40
MIN/NOC	0,02	0,02	0,01	0,02	0,02	0,02
Net financial debt beta	0,05	0,04	0,05	0,04	0,04	0,04
NFD/NOC	0,24	0,48	0,36	0,42	0,37	0,39
Net operating capital beta	1,08	0,75	0,92	0,83	0,89	0,88
Weighted average βNOC	**0,880**					

Table 47: Net operating capital beta

By levering the constant β_{NOC} ,the annual β_{e_t} is calculated.

Annual Equity beta	2012	2013	2014	2015	2016	Weighted average
βNOC	0,880	0,880	0,880	0,880	0,880	0,88
NOC/(EK+MIN)	1,316	1,917	1,558	1,735	1,599	1,64
βNFD	0,054	0,041	0,049	0,042	0,043	0,04
NFD/(EK+MIN)	0,316	0,917	0,558	0,735	0,599	0,64
βEquity	1,140	1,649	1,344	1,496	1,381	1,418

Table 48: Annual equity beta

The annual equity beta is used in the CAPM-model for finding the historic cost of equity for Aker Solutions.

6.1.6 Net financial debt beta

The financial debt beta used in the estimation of the β_{NOC} and β_{e_t} is found by using the relationship between the credit risk premium relative to the the market risk premium, and the market related proportion (Knivsflå, Spring 2017).

First the credit risk premium are estimated on the basis of the synthetic credit rating provided in the credit analysis in chapter 6.

Rating	p	Short crp	Additional long-term premium, after tax	Long credit risk premium
AAA	0	0,002	0,004	0,006
AA	0,0002	0,004	0,004	0,008
A	0,0008	0,006	0,004	0,01
BBB	0,0026	0,01	0,004	0,014
BB	0,0097	0,027	0,004	0,031
B	0,0493	0,04	0,004	0,044
CCC	0,1261	0,079	0,004	0,083
CC	0,2796	0,145	0,004	0,149
C	0,5099	0,21	0,004	0,214
D	0,8554	0,276	0,004	0,28

Table 49: Credit rating classificaitons and associated credit risk premiums

By further assuming that a fair estimate is that 15% of the financial debt are market related[107], the implied beta can be found through the formula: $implied\ debt\ beta = \frac{crp}{mrp} * \%market\ related$. From this we can estimate the β_{FD}.

Financial debt beta	2012	2013	2014	2015	2016	Weighted average
Rating Aker Solutions	BBB	BBB	BBB	BBB	BBB	BBB
Long crp	1,01 %	1,01 %	1,02 %	1,02 %	1,05 %	1,03 %
Market risk premium	5,00 %	5,00 %	5,00 %	5,00 %	5,00 %	5,00 %
Market risk related	15,00 %	15,00 %	15,00 %	15,00 %	15,00 %	15,00 %
βFD	0,030	0,030	0,031	0,031	0,032	0,031

Table 50: Financial debt beta

By assuming that clients and customers have good credit rating of BBB[108] on average, and the same relative amount of the receivables are market related, we can find β_{Rec}.

Financial receivables beta	2012	2013	2014	2015	2016	Weighted average
Assumed rating recevables	BBB	BBB	BBB	BBB	BBB	BBB
Short credit risk premium	1,00 %	1,00 %	1,00 %	1,00 %	1,00 %	0,01
mrp	5 %	5 %	5 %	5 %	5 %	0,05
Assumed market risk related	15 %	15 %	15 %	15 %	15 %	0,15
Beta financial receivables	**0,0033**	**0,0033**	**0,0033**	**0,0033**	**0,0033**	**0,0033**

Table 51: Financial receivables beta

Assuming that interest on cash and cash-equivalents is unrelated to changes in the market ($\beta_{cash} = 0$), and assuming $\beta_{investments}$ is equal to that of the market[109], the financial asset beta are found as the weighted beta of the underlying financial assets.

[107] (Knivsflå, Spring 2017).
[108] This seems a fair estimate given that most of the financial receivables are loans given to other companies owned by Aker, such as Akastor ASA, which on average probably has a rating of BBB.
[109] $\beta_{investments} = 1$

Financial asset beta	2012	2013	2014	2015	2016	Weighted average
Beta cash & cash equivalents	0	0	0	0	0	0,00
Cash/FA	0,94	0,95	0,95	0,95	0,94	0,95
Beta receivables	0,00	0,00	0,00	0,00	0,00	0,00
Rec/FA	0,06	0,05	0,05	0,05	0,06	0,05
Beta investments	1	1	1	1	1	1,00
Inv/FA	0	0	0	0	0,01	0,00
βFA	0,0002	0,0002	0,0002	0,0002	0,0065	0,0021

Table 52: Financial asset beta

The net financial debt beta is found by subtracting the weighted β_{FA} from the weighted β_{FD}.

Net financial debt beta	2012	2013	2014	2015	2016	Weighted average
βFD	0,030	0,030	0,031	0,031	0,032	0,03
FD/NFD	1,80	1,35	1,60	1,37	1,48	1,49
βFA	0,000	0,000	0,000	0,000	0,006	0,00
FA/NFD	0,80	0,35	0,60	0,37	0,48	0,49
βNFD	0,054	0,041	0,049	0,042	0,043	0,045

Table 53: Net financial debt beta

The calculations give a fairly stable β_{NFD} around the time-weighted average of 0,045.

6.1.7 Net operating capital beta

The net operating capital beta, β_{NOC} is found as a weighted average of the equity beta and net financial debt beta[110]: $\beta_{NOC} = \beta_{Eq}\frac{Eq}{NOC} + \beta_{MIN}\frac{MIN}{NOC} - \beta_{NFD}\frac{NFD}{NOC}$

This relationship was presented in table 34 above.

6.2 Calculation of Cost of equity and Cost of Minority Interests

The cost of equity is calculated from the CAPM model according to the expression

$k_e = r_f(1-t) + \beta_{Eq}mrp + ilp$

Cost of Equity	2012	2013	2014	2015	2016	Weighted average
Interest rate on 5Y Gov. Bond, 31.des	1,54 %	2,23 %	1,05 %	0,94 %	1,16 %	**1,28 %**
- Tax	-0,43 %	-0,62 %	-0,28 %	-0,25 %	-0,29 %	**-0,34 %**
Risk-free rate, after tax	1,11 %	1,60 %	0,76 %	0,68 %	0,87 %	**0,94 %**
Equity beta	1,160	1,678	1,367	1,522	1,405	**1,443**
mrp	5,00 %	5,00 %	5,00 %	5,00 %	5,00 %	**5,00 %**
Illiquidity premium	0,50 %	0,50 %	0,50 %	0,50 %	0,50 %	**0,50 %**
Cost of Equity	**7,41 %**	**10,49 %**	**8,10 %**	**8,79 %**	**8,39 %**	**8,65 %**
Iliquidity premium minority interests	1,50 %	1,50 %	1,50 %	1,50 %	1,50 %	**1,50 %**
Cost of Equity to minority interests	**8,91 %**	**11,99 %**	**9,60 %**	**10,29 %**	**9,89 %**	**10,15 %**

[110] (Knivsflå, Spring 2017)

Table 54: Cost of equity

Table 55 shows that k_e is assumed to fluctuate during the period around the time-weighted average of 8,65%, depending on the changes in the debt-to-equity ratio[111] used when calculating the annual β_e, and changes in the risk free rate after tax.

6.3 Cost of capital for Net financial debt

Cost of net financial debt is found by calculating the k_{FA} and k_{FD} separately and applying the formula for the weighted cost of net financial debt[112]: $k_{NFD} = k_{FD}\frac{FD}{NFD} - k_{FA}\frac{FA}{NFD}$.

6.3.1 Cost of financial debt

The cost of financial debt is found by applying the synthetic rating of BBB, with a credit risk premium equivalent to the 1.01% long crp estimated through Standard & Poor's rating table, and 5-year risk-free interest after tax. It gives a time-weighted average cost of the debt is 1.74%.

Cost of financial debt	2012	2013	2014	2015	2016	Weighted average
Rating Aker Solutions	BBB	BBB	BBB	BBB	BBB	**BBB**
Risk-free rate, after tax	1,32 %	1,11 %	1,60 %	0,76 %	0,68 %	**1,01 %**
Credit risk premium, long after tax	1,01 %	1,01 %	1,01 %	1,02 %	1,02 %	**1,02 %**
Cost of financial debt	**2,33 %**	**2,12 %**	**2,61 %**	**1,79 %**	**1,70 %**	**2,03 %**

Table 55: Cost of financial debt

From table 56 we see that k_{FD} has fallen slightly in 2015 and 2016, in line with a drop in the risk-free interest rates.

6.3.2 Cost of financial assets

The cost of financail assets is calculated as a weighted average of the cost of holding cash, receivables and investment. The classification is based on the fact that asset classes have different risk characteristics and should be estimated separately (Knivsflå, Spring 2017).
Cash is assumed to have a cost of capital equal to the risk-free interest rate and an addition for the general credit risk premium for placement in a bank. The long bank crp is assumed to be 0,5%, given a credit rating of AA, cf. chapter 5.7.
When calculating the cost of receivables it is assumed that the customers and clients have an average rating of BBB, cf. chapter 6.1.6.2.

Cost of financial assets	2012	2013	2014	2015	2016	Weighted average
Cash	1,47 %	1,96 %	1,13 %	1,05 %	1,25 %	**1,30 %**

[111] Net financial debt / (Equity + Minority interests).
[112] NFD: Net financial debt. FD: Financial debt. FA: Financial assets.

Cash/FA	0,94	0,95	0,95	0,95	0,94	**94,61 %**
Receivables	2,32 %	2,11 %	2,60 %	1,76 %	1,68 %	**2,01 %**
Rec/FA	0,06	0,05	0,05	0,05	0,06	**5,20 %**
Investments	6,11 %	6,60 %	5,76 %	5,68 %	5,87 %	**5,94 %**
Inv/FA	0,00	0,00	0,00	0,00	0,01	**0,19 %**
Cost of financial assets	**1,52 %**	**1,97 %**	**1,19 %**	**1,08 %**	**1,30 %**	**1,35 %**

Table 56: Cost of financial assets

Due to a larger proportion of cash relative to receivables and financial investments, k_{FA} is estimated to be relatively low, with a time-weighted average of 0.79%. In line with k_{FG}, k_{FA} dropped in 2015 and 2016 due to a lower interest rates on government bonds.

6.3.3 Cost of net financial debt

The time-weighted average cost of net financial debt is 2.21%, but declining in the period. The proportion of financial debt in relation to financial assets has decreased gradually, implying a lower k_{NFD} in 2016 than the time-weighted average.

Cost of net financial debt	2012	2013	2014	2015	2016	Weighted average
Cost of financial debt	2,33 %	2,12 %	2,61 %	1,79 %	1,70 %	**2,03 %**
Financial debt/Net financial debt	1,802	1,353	1,603	1,369	1,479	**148,97 %**
Cost of financial assets	1,52 %	1,97 %	1,19 %	1,08 %	1,30 %	**1,35 %**
Financial debt/Net financial debt	0,802	0,353	0,603	0,369	0,479	**48,97 %**
Cost of net financial debt	**2,97 %**	**2,17 %**	**3,46 %**	**2,04 %**	**1,90 %**	**2,40 %**

Table 57: Cost of net financial debt

6.4 Cost of net operating capital

Cost of Net Operating Capital	2012	2013	2014	2015	2016	Weighted average
Cost of equity	7,41 %	10,49 %	8,10 %	8,79 %	8,39 %	**8,65 %**
Eq/NOC	0,742	0,506	0,627	0,557	0,605	**59,64 %**
Cost of non-controlling interests	8,91 %	11,99 %	9,60 %	10,29 %	9,89 %	**10,15 %**
MIN/NOC	0,018	0,016	0,014	0,019	0,020	**1,80 %**
Cost of net financial debt	2,97 %	2,17 %	3,46 %	2,04 %	1,90 %	**2,40 %**
NFD/NOC	0,240	0,478	0,358	0,424	0,374	**38,56 %**
Cost of Net Operating Capital	**6,37 %**	**6,53 %**	**6,46 %**	**5,96 %**	**5,99 %**	**6,20 %**

Table 58: Cost of Net Operating Capital

The k_{NOC} is found as a weighted average of cost of capital of the the different capital bases[113] (Knivsflå, Spring 2017). The time-weighted k_{NOC} in the period 2012-2016 was at 5.94%. The annual cost of net operating capital has remained relatively stable during the period, but with a gradual decline in line with a weakening of risk-free interest rates during the period. This is in accordance with MM1[114], assuming that the weighted average cost of capital (WACC) is constant and unaffected by the company's financial structure. As the level of the risk-free rate

[113] k_{NOC}: $Cost\ of\ Net\ Operating\ Capital$. Found by $k_{NOC} = k_e \cdot \frac{Eq}{NOC} + k_{min} \cdot \frac{MIN}{NOC} + k_{NFD} \cdot \frac{NFD}{NOC}$

[114] Millier & Modigliani's first proposition, cf. 6.1.5.

affects the cost of all the capital bases equally, k_{NOC} should only change in line with change in the risk-free rates.

7 Analysis of profitability

7.1 Strategic advantage

The strategic financial statement analysis is based on $r_e - k_e$[115] as a measure of the company's strategic advantage. This is often referred to as the residual income,,which is the exceeding value created above what is required for investors to be willing to invest in the company.

$$r_{e_t} = \frac{NI_t}{Eq_{t-1}}$$

Return on equity measures the income that accrues to the owners, relative to the equity recognized in the balance sheet. When measuring the returns, the opening balance is used as the capital base to ensure consistency throughout the paper[116].

Aker Solutions' historic strategic advantage for the period 2012-2016 is presented in table 46:

Strategic advantage, Aker Solutions	2012	2013	2014	2015	2016	Weighted average
r_e	19,69 %	23,90 %	31,77 %	24,57 %	10,24 %	**21,12 %**
k_e	7,41 %	10,49 %	8,10 %	8,79 %	8,39 %	**8,65 %**
Strategic advantage	**12,28 %**	**13,41 %**	**23,67 %**	**15,77 %**	**1,85 %**	**12,47 %**

Table 59: Strategic advantage Aker Solutions 2012-2016

As we can see from table 60, the increased during the boom period of the cycle in 2011-2014, and declined sharply in 2015 and 2016. In 2016, Aker Solutions was almost on par with the industry. This indicates that Aker Solutions has struggled with maintain its superior competitive position during the downturn, in accordance with the findings in the qualitative analysis in chapter 3.

[115] r_e: Return on equity. k_e: Cost of equity

[116] Optimally, as cash flows on average accrues in the middle of the year, the capital base should have been estimated by adding half, and most of the revenues are earned on the basis of the work that is done in the period, of the reported net income and changes in equity in the period.

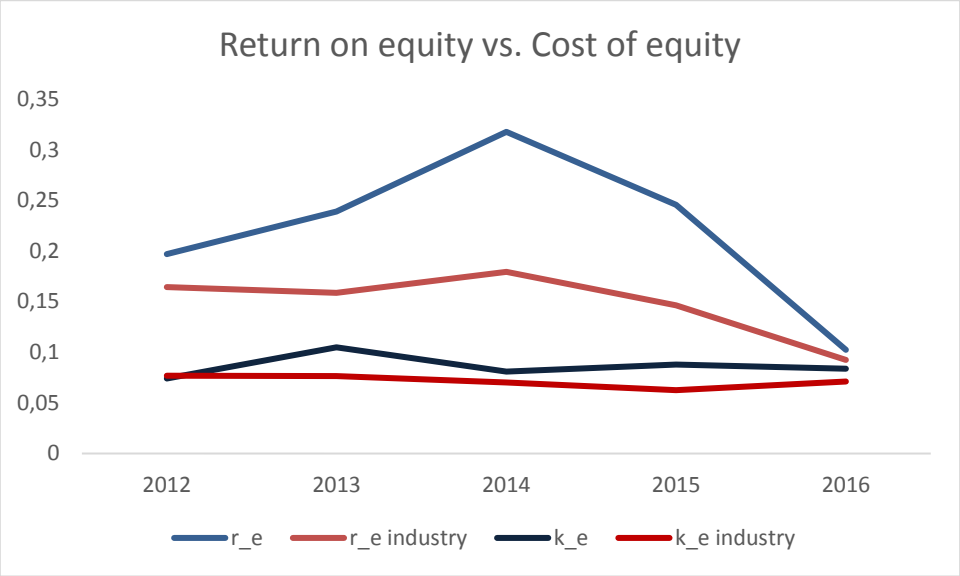


Figure 31: Return on equity and cost of equity for Aker Solutions and the industry

Strategic advantage, industry	2012	2013	2014	2015	2016	Weighted average
r_e industry	16,44 %	15,86 %	17,94 %	14,65 %	9,25 %	**14,05 %**
k_e industry	7,69 %	7,66 %	7,01 %	6,26 %	7,10 %	**7,01 %**
Strategic advantage, Industry	8,76 %	8,20 %	10,94 %	8,39 %	2,15 %	**7,04 %**

Table 60: Strategic advantage Industry 2012-2016

When looking at the residual returns in the industry, it seems that the relative performance of Aker Solutions has been stronger during the cycle than its competitors. A time-weighted average strategic advantage of 12%, versus the industry's of 7% indicate a clear strategic advantage. However, along with the downturn 2015 and 2016 the strategic advantage in terms of residual income has declined substantially and bringing it on par with the industry.

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7.2 Decomposing the strategic advantage

The strategic advantage identified above can be decomposed to clarify where the company creates values beyond the the recquired cost of capital.

First and foremost, it is expedient to distinguish between the values some are created through the operations and through financing. The operating profit relates to the values created through the company's core business, cf. chapter 4.5.1.

By rearranging the formula for the net operating income, the strategic advantage can be expressed as $r_e - k_e = (r_{NOC} - k_{NOC}) \cdot \left(1 + \frac{NFG}{Eq} + \frac{MIN}{Eq}\right) + (k_{NFG} - r_{NFG}) \cdot \frac{NFG}{Eq} + (k_{MIN} - r_{MIN}) \cdot \frac{MIN}{Eq}$.

This expression can be split in an operating advantage and a financing avantage:

1. Operating advantage: $(r_{NOC} - k_{NOC}) \cdot \left(1 + \frac{NFG}{Eq} + \frac{MIN}{Eq}\right)$

2. Financing advantage: $(k_{NFG} - r_{NFG}) \cdot \frac{NFG}{Eq} + (k_{MIN} - r_{MIN}) \cdot \frac{MIN}{Eq}$

7.2.1 Operating advantage

As can be seen from the formula above, the operating benefit can be explained through a part that relates to $r_{NOC} - k_{NOC}$ in isolation, and the benefit gained from financing from other equity owners of the parent company, $(r_{NOC} - k_{NOC}) \cdot (\frac{NFG}{Eq} + \frac{MIN}{Eq})$. The latter is often referred to as a "gearing advantage" (Knivsflå, Spring 2017).The operating advantage is thus split between the return generated from operations directly, and what is gained by leveraging its operations with external capital (gearing):

1.1 From operations: $r_{NOC} - k_{NOC}$

1.2 From gearing. $(r_{NOC} - k_{NOC}) \cdot \left(\frac{NFD}{Eq} + \frac{MIN}{Eq}\right)$

1.1 From operations

Operating advantage, Aker Solutions	2012	2013	2014	2015	2016	Weighted average
r_NOC	15,40 %	13,48 %	20,52 %	14,76 %	9,50 %	**14,21 %**
k_NOC	6,28 %	6,85 %	5,99 %	5,92 %	6,11 %	**6,17 %**
Operating advantage, Aker Solutions	**9,12 %**	**6,63 %**	**14,53 %**	**8,84 %**	**3,39 %**	**8,04 %**

Table 61: Advantage from operations in 2012-2016, Aker Solutions

The strategic advantage from operations can be decomposed on the basis of the returns and cost of capital for the defined industry. It can be divided into an industry advantage and resource advantage.

1.1.1 Industry advantage: $r_{NOC}^{Industry} - k_{NOC}^{Industry}$

1.1.2 Resource advantage: $\left(r_{NOC} - k_{NOC}^{Industry}\right) + (k_{NOC}^{Industry} - k_{NOC})$

1.1.1 Industry advantage

Industry advantage	2012	2013	2014	2015	2016	Weighted average
r_NOC industry	11,15 %	10,80 %	12,81 %	11,54 %	6,32 %	**10,08 %**
k_NOC industry	5,22 %	5,18 %	4,96 %	1,73 %	3,85 %	**3,88 %**
Industry advantage	**5,93 %**	**5,63 %**	**7,85 %**	**9,81 %**	**2,47 %**	**6,20 %**

Table 62: Industry operating advantage

A time-weighted average operational advantage of 6,20% in the industry is in accordance with the the conclusions drawn in the external analysis. Both the Subsea and Field design segments require highly skilled engineers, and their services are key in developing profitable offshore oilfields. In combination, creating substantial entry barriers and pricing power, the industry as a whole are able to generate returns exceeding cost of capital. Already by being a participant in a highly profitable industry, Aker Solutions is positioned to create shareholder value over time. However, as expressed in the external analysis, the decline in oil prices has shifted the pricing power over to the oil companies. Reduced activity and lower prices has put downward pressure on revenues. Less flexible cost base has therefore squeezed the residual return. The downturn in the cycle has materialized in 2016, with lower residual incomes along all the whole industry.

1.1.2 Resource advantage
1.1.2.1 Returns

The returns are calculated from the normalized operating income after tax over the net operating assets/capital.

$$r_{NOC,t} = \frac{Normalized\ Operating\ income,\ after\ tax\ (NOI_t)}{NOC_{t-1}}$$

Aker Solutions has on average during the period managed to outperform the industry in terms of operating returns.

Resource advantage, returns	2012	2013	2014	2015	2016	Weighted average
r_NOC, Aker Solutions	15,40 %	13,48 %	20,52 %	14,76 %	9,50 %	**14,21 %**
r_NOC, Industry	11,15 %	10,80 %	12,81 %	11,54 %	6,32 %	**10,08 %**
Resource advantage, returns	**4,25 %**	**2,68 %**	**7,72 %**	**3,22 %**	**3,18 %**	**4,13 %**

Table 63: Resource advantage from returns 2012-2016

The operating returns relative to the industry can be split in terms of margins and turnover. In this way one can uncover where Aker Solutions are outperforming the industry and generating a higher average operating return.

By following the traditional DuPont-decomposition, returns can be split in operating margins and turnover rate.

$$r_{NOC,t} = \frac{NOI_t}{Revenue_t(R_t)} \cdot \frac{Revenue_t(R_t)}{NOC_{t-1}} = margin_t \cdot turnover_t$$

In order to better reflect the relative performance, the decomposing are made relative to the industry accordning to the following formulas:

Margin advantage: $\left(margin_{NOC} - margin_{NOC}^{Industry}\right) \cdot turnover_{NOC}$

Turnover advantage: $(turnover_{NOC} - turnover_{NOC}^{Industry}) \cdot margin_{NOC}^{Industry}$

1.1.2.1.1 Margins

Margin advantage	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	4,93 %	4,57 %	6,74 %	5,18 %	4,28 %	**5,10 %**
Industry	8,96 %	8,82 %	10,04 %	9,72 %	7,05 %	**8,77 %**
Unweighted margin advantage	-4,03 %	-4,26 %	-3,30 %	-4,54 %	-2,77 %	**-3,67 %**
Turnover, Aker Solutions	3,13	2,95	3,05	2,85	2,22	**2,74**
Margin advantage	**-12,61 %**	**-12,56 %**	**-10,06 %**	**-12,94 %**	**-6,16 %**	**-10,24 %**

Table 64: Margin advantage

Table 65 shows that the normalized profit margin from operations has been around 5% for Aker Solutions, versus around 9% for the industry. The main reason for the difference lies in Aker Solutions having a higher cost base than its competitors. This comes primarily from Aker Solutions being more specialized, with relatively more income generated from engineering services than the average competitor. This yields much higher personell costs. Even though cost from materials, goods and services are somewhat lower, and both depreciations & amortizations and other operating costs being on par with the industry, the net effect is a margin disadvantage.

1.1.2.1.2 Turnover

Turnover advantage	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	3,13	2,95	3,05	2,85	2,22	**2,74**
Industry	1,24	1,22	1,28	1,19	0,90	**1,13**
Unweighted turnover advantage	1,88	1,73	1,77	1,66	1,32	**1,61**
Margin, Industry	8,96 %	8,82 %	10,04 %	9,72 %	7,05 %	**8,77 %**
Turnover advantage	**16,86 %**	**15,24 %**	**17,77 %**	**16,16 %**	**9,34 %**	**14,37 %**

Table 65: Turnover advantage

As mentioned in the internal strategic analysis in chapter 3, Aker Solutions turnover rate is much higher than that of the industry. While Aker Solutions generate almost 3x NOC in annual revenues, the industry generates about 1,15x NOC. By delivering solutions where both topside and subsea installations are integrated, and thus utilizing competences from both business units, Aker Solutions has historically been able differentiate and getting higher prices on both its services and subsea equipment than competitors, at same time as having utilization

rates on par or higher. This has resulted in a much higher turnover rate than the industry average.

1.1.2.2 Cost of NOC

The other part of the operational strategic advantage relates to the difference in cost of capital: $k_{NOC}^{Industry} - k_{NOC}$.

Resource advantage, k_NOC	2012	2013	2014	2015	2016	Weighted average
Industry k_NOC	5,22 %	5,18 %	4,96 %	1,73 %	3,85 %	**3,88 %**
Aker Solutions k_NOC	6,28 %	6,85 %	5,99 %	5,92 %	6,11 %	**6,17 %**
k_NOC advantage	-1,06 %	-1,67 %	-1,03 %	-4,19 %	-2,26 %	**-2,29 %**

Table 66: Resource advantage from Cost of Net Operating Capital

By being a more specialized player, with higher equity betas and higher debt-to-equity levels, leaving higher credit risks and cost of debt, the net effect is a higher cost of net operating capital relative to the industry.

Summary: Resource advantage

Total resource advantage	2012	2013	2014	2015	2016	Weighted average
Returns	4,25 %	2,68 %	7,72 %	3,22 %	3,18 %	**4,13 %**
Cost of capital	-1,06 %	-1,67 %	-1,03 %	-4,19 %	-2,26 %	**-2,29 %**
Total resource advantage	**3,19 %**	**1,01 %**	**6,68 %**	**-0,97 %**	**0,92 %**	**1,84 %**

Table 67: Total resource advantage

From the decomposing above we have found that Aker Solutions both have higher cost of capital and lower profit margins. However, by generating substantially higher turnover on its operating assets, Aker Solutions has a net resource advantage of about 2,11%-points on average in the period 2012-2016.

1.2 From gearing

The gearing advantage is the effect on r_e that comes from financing the operations through external capital, split between net operating debt and non-controlling interests. The effect can be expressed as gearing advantage = $(r_{NOC} - k_{NOC}) \cdot (\frac{NFD}{Eq} + \frac{MIN}{Eq})$.

Gearing advantage, Aker Solutions	2012	2013	2014	2015	2016	Weighted average
Strategic advantage operations	9,12 %	6,63 %	14,53 %	8,84 %	3,39 %	**8,04 %**
Gearing:						
NFD/Eq.	0,323	0,945	0,571	0,761	0,619	**0,664**
MIN/Eq.	0,025	0,031	0,023	0,035	0,034	**0,030**

Gearing Advantage	**3,17 %**	**6,47 %**	**8,63 %**	**7,03 %**	**2,21 %**	**5,44 %**

Table 68: Gearing advantage Aker Solutions

We see from table 69 that when Aker Solutions has been able to generate positive returns from its operations, the effect on return on equity is amplified through gearing. By having higher debt financing than its competitors, Aker Solutions has been able to leverage the significant growth experienced in between 2012-2014. And while it makes the financing more risky in times of downturn in the cycle, it also creates higher shareholder value when they are able to reduce costs and keep a positive net operating income.

7.2.2 Financial advantage

The financial advantage relates to the difference between the estimated cost of financing, and what is paid to the creditors and non-controlling interests respectively. The effect is weighted by the size of gearing the company has. The financial advantage can be expressed as $(k_{NFG} - r_{NFG}) \cdot \frac{NFG}{Eq.} + (k_{MIN} - r_{MIN}) \cdot \frac{MIN}{Eq}$.

Financing advantage - NFD	2012	2013	2014	2015	2016	Weighted average
Cost of Net financial debt	2,60 %	2,83 %	2,17 %	1,94 %	2,22 %	**2,27 %**
Net financial debt rate	2,86 %	2,75 %	1,13 %	2,73 %	6,60 %	**3,59 %**
Net financial debt advantage	-0,26 %	0,08 %	1,03 %	-0,79 %	-4,39 %	**-1,32 %**
NFD/Eq.	0,323	0,945	0,571	0,761	0,619	**66,41 %**
Financing advantage - NFD	-0,08 %	0,08 %	0,59 %	-0,60 %	-2,71 %	**-0,84 %**

Table 69: Financing advantage from net financial debt

From table 68 wee see that the effect on return on equity from a financing advantage/disadvantage is marginal. The effect from costs related to net financial debt is a time-weighted disadvantage of almost 1%-point. This means that Aker Solutions historically has paid out more than what is required in terms of the estimated cost of capital. Such a small effect indicates that Aker Solutions neither has an advantage or a disadvantage related to its financing.

Financing advantage - MIN	2012	2013	2014	2015	2016	Weighted average
Cost of Minority Interests	8,91 %	11,99 %	9,60 %	10,29 %	9,89 %	**10,15 %**
Return on Minority interests	6,02 %	4,55 %	12,82 %	-4,17 %	40,60 %	**14,99 %**
Minority Interest return advantage	2,89 %	7,45 %	-3,22 %	14,46 %	-30,71 %	**-4,84 %**
MIN/Eq.	0,025	0,031	0,023	0,035	0,034	**3,04 %**
Financing advantage - MIN	0,1 %	0,2 %	-0,1 %	0,5 %	-1,0 %	**-0,16 %**

Table 70: Financing advantage from minority interests

The same is true for the minority interests. Even though the average return on minority interests has been significantly higher than the estimated cost of minority interests, the size of their contribution is only marginal due to Aker Solutions corporate structure where most of

the subsidiaries are fully owned by the company. This leaves a gearing of only 0,03 on average and a contribution of -0,17%-points.

Financing advantage	2012	2013	2014	2015	2016	Weighted average
NFD	-0,08 %	0,08 %	0,59 %	-0,60 %	-2,71 %	**-0,84 %**
MIN	0,07 %	0,23 %	-0,07 %	0,50 %	-1,03 %	**-0,16 %**
Total financing advantage	-0,01 %	0,31 %	0,52 %	-0,10 %	-3,75 %	**-1,00 %**

Table 71: Financing advantage

In total, the financing from net financial debt and minority interests leaves a varying contribution to the residual income[117], but with a time-weighted disadvantage of -1%-point.

7.2.3 Summary strategic advantage

After completing the decomposition, the strategic advantage can be expressed by the following formula:

$$Strategic\ advantage = Industry\ advantage + resource\ advantage + gearing\ advantage + financing\ advantage$$

Strategic advantage	2012	2013	2014	2015	2016	Weighted average
Industry operational advantage	5,93 %	5,63 %	7,85 %	9,81 %	2,47 %	**6,20 %**
Resource advantage - operations	3,19 %	1,01 %	6,68 %	-0,97 %	0,92 %	**1,84 %**
Strategic operational advantage	9,12 %	6,63 %	14,53 %	8,84 %	3,39 %	**8,04 %**
Gearing advantage	3,17 %	6,47 %	8,63 %	7,03 %	2,21 %	**5,44 %**
Operating advantage	12,29 %	13,11 %	23,16 %	15,87 %	5,60 %	**13,47 %**
Financing advantage	-0,01 %	0,31 %	0,52 %	-0,10 %	-3,75 %	**-1,00 %**
Strategic advantage (Residual Income)	**12,28 %**	**13,41 %**	**23,67 %**	**15,77 %**	**1,85 %**	**12,47 %**

Table 72: Strategic advantage Aker Solutions 2012-2016

The analysis shows that Aker Solutions has a time-weighted strategic advantage in the period of 12,47%. The main contribution comes from the industry advantage and the advantage of having relatively high debt financing. A positive resource advantage of 1,84% also shows that Aker Solutions has been able to provide a stronger operational performance during the cycle than its competitors. This is mainly due higher turnover rates through differentiation, as explained in above and in the internal analysis in chapter 3.3.

[117] $r_e - k_e$

However, the strategic advantage has declined rapidly in 2015 and 2016, leaving Aker Solutions currently almost at par with the industry. Given the substantial changes in the industry dynamics, as expressed in the strategic analysis in chapter x, the performance during the cycle 2012-2016 may not be representative of the future performance. If Aker Solutions fall short of the cost reductions the larger companies are able to generate through the supply chain integrations, the strategic advantage will most likely be lost in the short term. This becomes even more evident when comparing the strategic advantage of Aker Solutions relative to the industry.

Competetive advantage	2012	2013	2014	2015	2016	Weighted average
Aker Solutions	12,29 %	13,11 %	23,16 %	15,87 %	5,60 %	**13,47 %**
Industry	8,90 %	8,59 %	11,60 %	13,41 %	3,87 %	**9,01 %**
Relative competetive advantage	**3,39 %**	**4,52 %**	**11,56 %**	**2,46 %**	**1,73 %**	**4,46 %**

Table 73: Aker Solutions' competetive advantage 2012-2016

From a difference of 11,56% in 2014, it was only 2,43% in 2016. This is a clear signal that the stronger performance Aker Solutions was able to generate during the period of high growth, is largely dependent upon E&P companies' willingness to invest in development of complex oilfields where Aker Solutions' can differentiate through engineer-to-order customized solutions. The strategic position Aker Solution currently possess may therefore become a strategic disadvantage if the oil price remains lower for longer, and customers valuing standardized solutions and cost efficiency over customization.

8 Forecasting statement

8.1 Framework

In this chapter Aker Solutions financial statements will be forecasted in order to perform a fundamental valuation through a discounted cash flow (DCF)-analysis. The first step in forecasting the financial statements is to consider what main approach to use and the length of the forecasting horizon.

8.1.1 Focused or detailed approach?

The preparation of the forecasted financial statements can often be split between two main approaches: a detailed or focused approach. In the focused approach only the key drivers are projected. In the detailed approach each item is forecasted separately. Given the amount of uncertainty related to forecasting, a focused approach by projecting the key drivers more thoroughly is often viewed as an equally good or even better approach than forecasting each item/account separately (Knivsflå, Spring 2017). However, the approach should be adapted to the specific company. Aker Solutions' income is characterized by being generated by a combination of its assets and capabilities, with no clear separation between each assets' cash flows. A focused approach is therefore viewed as a more adequate way to incorporate the different factors driving Aker Solutions future performance. A focused approach is chosen in this paper.

8.1.2 Forecasting horizon

The forecasting of the financial statements is based on predictions on how the company will evolve until it reaches a "steady state". This is a theoretical concept in which it is assumed that all financial statement elements are changing at a constant rate (Knivsflå, Spring 2017). Even though the assumption is unrealistic, it is useful when valuing an asset as it allows for a closed form estimation of the present value of all future cashflows without having to forecast values up until the time-value of money render it insignificant (Knivsflå, Spring 2017). In this way, by setting a finite horizon when the company reaches steady state, we can forecast the years closer to the present with higher precision, and assume that variables reverse to the long-term growth rate in steady state.

When performing a DCF analysis with the 'Gordon growth' closed solution for the terminal value, one assumes that Aker Solution will operate forever in its current corporate structure.

Given that Aker Solutions' operations mainly relates to the oil and gas industry, one assumes that oil and gas resources will not be depleted, which is unrealistic givens that fossil resources are opt to be depleted at some point in time.[118] This factor is disregarded in the estimations.

The key drivers are estimated in detail over the period 2017-2021. After this period it is assumed that there will be a "mean reversion" where each driver gradually converges toward the steady state over a period of 10 years, even though Aker Solutions operates a highly cyclical industry and where growth rates tends to vary substantially in the different stages of the cycle. Such estimations are therefore most relevant and useful for valuation purposes. Steady state is reached in 2031, assuming a forecasting horizon of 15 years.

8.2 Budgeting

The predictions are made both on the findings and conclusions made in the strategic analysis and expectations on future performance given the current market outlook.

In order to forecast the financial statement, balance sheet and cash-flows, a focused approach is applied using the 7 steps presented in Knivsflå's framework.

This includes forecasting on the basis of 9 key drivers identified in 7 steps:

1) Revenue growth
2) Net operating margins
3) Net operating capital turnover
4) Financial debt and asset ratios
5) Interest rates on financial debt and interest/dividends/capital gains on financial assets
6) Non-controlling interests
7) Return on non-controlling interests

From this both equity and net income are found residually.

[118] The assumption may be less relevant however. Aker Solutions' resilience through strong human and organization capital will probably will make them able to transition into new industries along the general shift towards other energy sources in longer term.

8.2.1 Revenue growth

As mentioned in the chapter 2 and 3, Aker Solutions operations may be split into two operating segments: Field design and Subsea. The segments have different characteristics and are forecasted seperately.

The key drivers at a macro level driving both segments are analysed first. It includes both long-term global GDP growth, the expected short- and long-term development of the oil-price, the CAPEX and OPEX spending among the integrated oil companies, as well as possible growth constraints from the availability of drilling rigs and supply vessels.

8.2.1.1 Macro factors

Nominal GDP

In a long-term perspective, given the global nature of Aker Solutions business, the growth is driven by the nominal growth in the global economy. Empirical research shows that performances of companies have a tendency to reverse to the average of the industry over time, so-called "mean-reversion", driven by competitive factors that make companies unable to sustain superior performances over time. On an even longer time-scale the growth of companies are constrained by the overall growth of the economy (Damodoran, 2012). With a forecasting horizon of 15 years, the expected global nominal GDP growth is considered a fair estimate on the steady state growth rate.

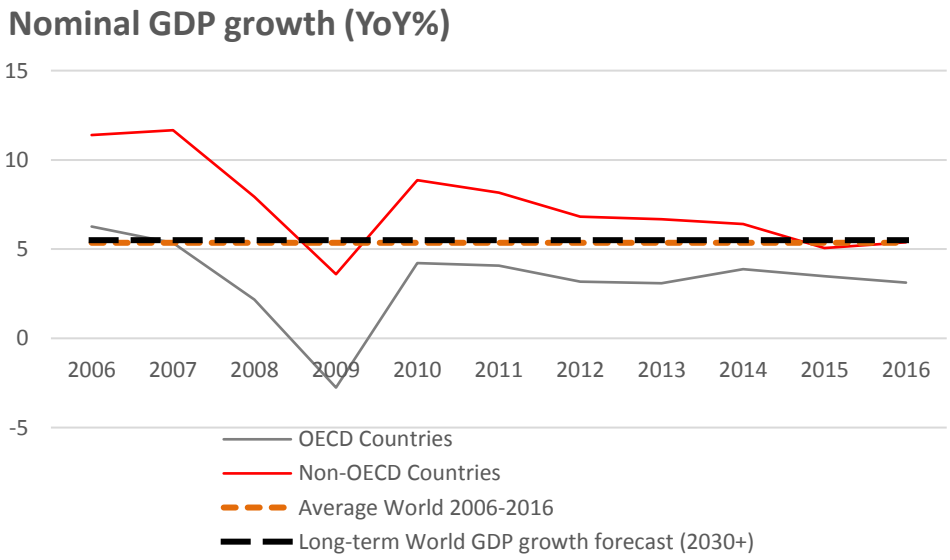


Figure 32: Nominal GDP Year-on-Year growth 2006-2016. (Source: Bloomberg Terminal)

The annual Year-on-Year growth in GDP is presented in figure 35. The average in the period 2006-2016 is 5,35%, just below the estimated long-term GPD growth rate of 5,5%. This is estimated on the basis OECDs forecast of 3% long term real GDP growth, and an inflation rate of 2,5%, equal to Norges Bank long term objective (Forskrift om pengepolitikken, 2001).

Oil price

As explained in introduction and external analysis in chapter 2 and 3, the oil price is a key driver in all the oil-related industries. The future level of the oil price largely dictate the future potential growth and activity in the oilservice industry.

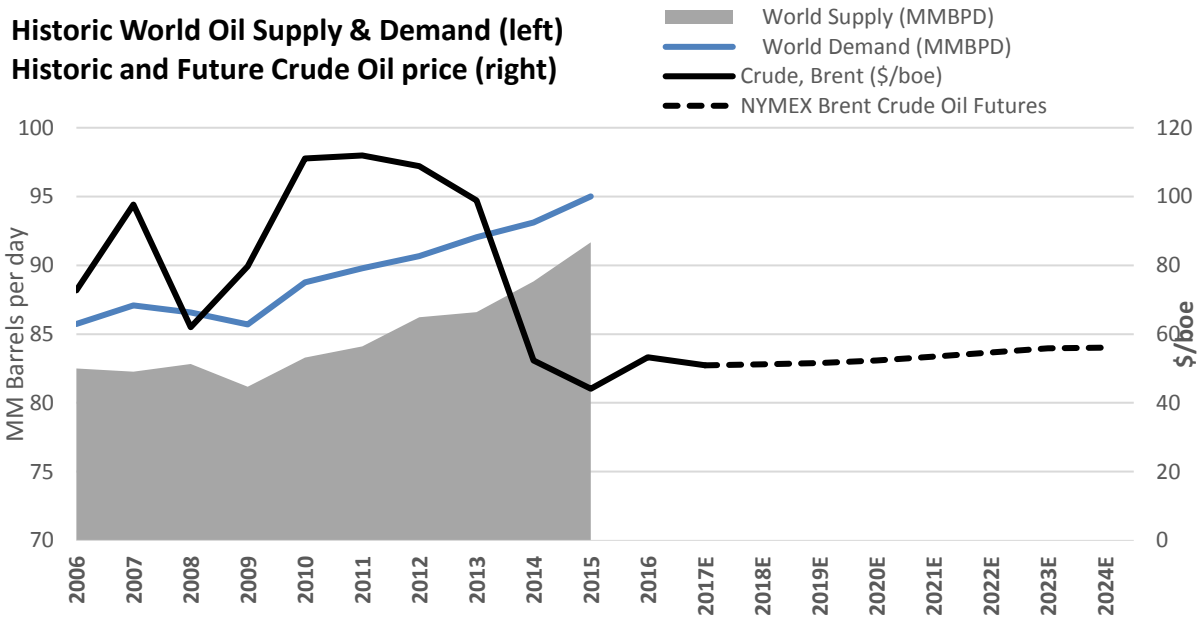


Figure 33: Historic world oil supply and demand, historic spot prices and and future prices per May 25th 2017. (Source: Bloomberg Terminal & CME group[119])

In the years after the the recovery from the financial crisis, but before the decline in 2014, the oil price stayed high at around $100/bbl. The higher oil prices was driven by the agreement among OPEC countries to cut back production. OPEC has sufficient market power to dictate price levels by cutting production, by having a global market of around 40% (Organization of the Petroleum Exporting Countries, 2016). However, strong growth in shale-oil production in the US has put pressure on OPEC's market share. Strong competition among NOCs and Integrated oil companies on keeping production in order to maintain its market share has led to a substantial increase in overall production, closing the gap between supply and demand. Since 3Q 2014, oil prices has remained below the earlier estimated break-even price 60$/bbl for deep- and ultra-deepwater developments. Figure 46 shows that lower oil prices has

[119]NYMEX Brent Crude Oil Futures per 25th May 2017 from http://www.cmegroup.com/trading/energy/crude-oil/brent-crude-oil-last-day_quotes_settlements_futures.html

materialised in a substantial scale-back of E&P spending among the larger integrated oil companies.

The agreement among OPEC and certain non-OPEC countries in 2016[120] to cut daily production by about 1,7 million bbl have accelerated the drawdown of stocks from American oil producers, as oil demand has stayed strong. This have led to a market recovery with oil prices reaching 55 $/bbl. The future development of the oil-price is highly uncertain, but a fair estimate is that oil-prices will remain lower for longer. The NYMEX Crude Oil Future market also prices future deliveries of crude oil in the range of 53-57 $/bbl. In indicates that for future deep- and ultra-deepwater developments to be profitable, the cost efficiency measures implemented along the supply chain in 2015 and 2016 in order to reduce break-even prices has to be sustained.

E&P Spending

When looking at the consensus estimate on E&P spending in 2017 and 2018, it seems that oil companies are reinitiating some of its investments, with an estimated 2-3% increase each year.

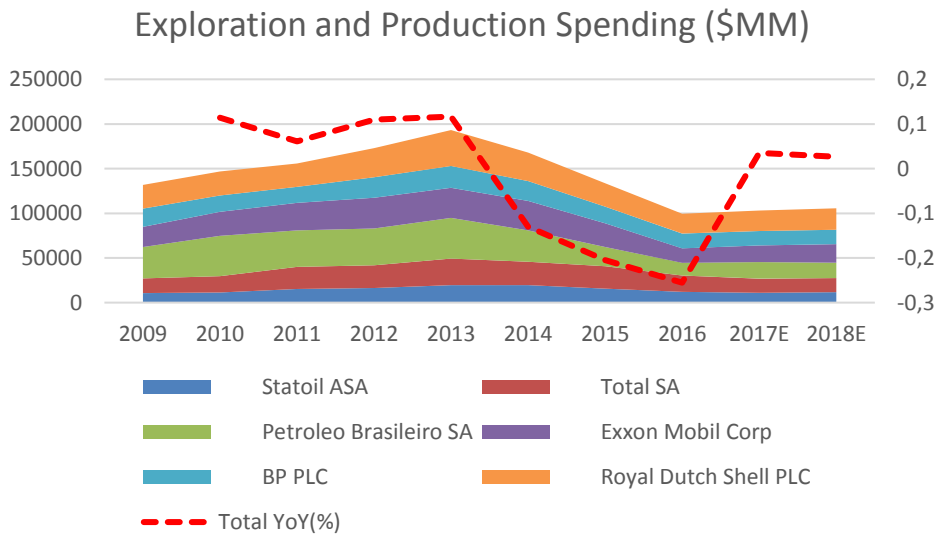


Figure 34: Historic E&P spending 2009-2016 & consensus estimated E%P spending for 2017E-2018E. (Source: Bloomberg Terminal)

It indicates that 2016 is the bottom of the cycle, with markets regaining positive growth, albeit slow for the next 2-3 years. Given that oilservice companies are able to prove a higher cost

[120] (Bloomberg.com, 2016)

effiency, leaving offshore development profitable even at oil-prices below $60/boe and oil prices stabilizing aroung $55/boe, the substantial growth potential from the African and Brazilian markets should boost double-digits growth in a 4-7 years perspective.

Figure 37 shows that Petrobras had the highest spending in 2013, illustrating their willingness to explore the offshore fields in their region. Currently, however, they seem reluctant to increase its spending under the circumstances of the uncertainty on both future oil prices and break-even levels.

On aggregate the E&P spending is estimated to rebound and leave substantial growth in the oil-service industry in the years 2020-2024/2025, before the market stabilizes.

Rig and supply vessel capacity

In general terms, sufficient capacity and availability of drilling rigs, supply vessels and FPSOs are necessary for exploration and development of new oilfields, as well as different types of modifications work on existing fields. In this way the capacity of the different fleets may put constraints on the growth opportunities in the subsea industry.

The current market situation however, with global oversupply of both floaters, jackups, and supply vessels, gives substantial capacity and availability in the short term. It also seems to be sustained for a longer period and is assumed not to put any constraints on future growth opportunities in markets Aker Solutions operate.

8.2.1.2 Segments

New orders and backlog

A good indication on the level of future revenues in the short-term (ca. 1-2 years) is the amount of new orders and the backlog the company generate. New orders are future revenues from contracts signed in the given period. The backlog is the amount of remaining work on existing contracts.

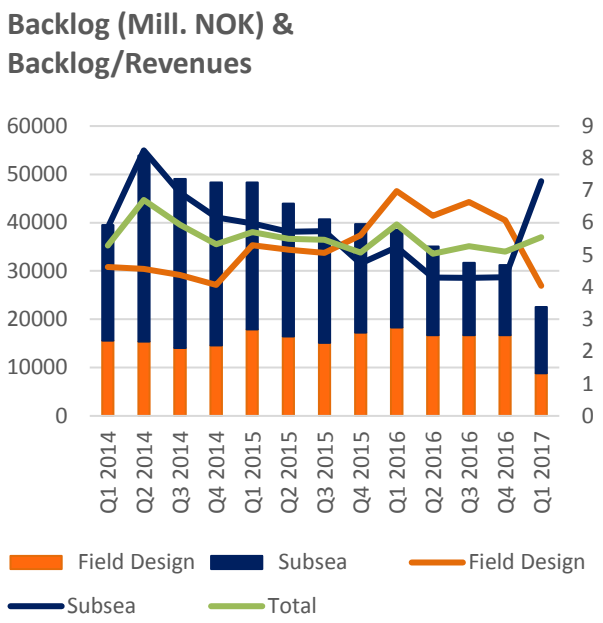


Figure 35: Left: Backlog (Mill. NOK). Right: Backlog/Revenues. (Source: Aker Solutions quarterly report Q1 2017)

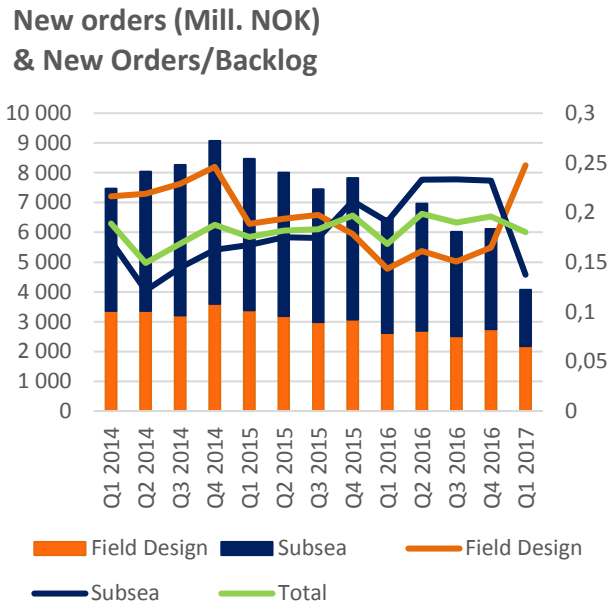


Figure 36: Left: New orders (Mill. NOK). Right: New orders/Backlog. (Source: Aker Solutions quarterly report Q1 2017)

Figure 39 shows that the amount of new orders in the Field design segment has remained fairly stable during the downturn, with some decline in 2016 as well as a sharper drop in Q1 2017. In the Subsea segment however, the downturn has hit Aker Solutions harder in terms of new orders. In Q1 2017 the amount of new orders were about 1/3 of the Q1 2014 level.

The drop in new orders has reduced backlogs gradually as work is billed, leading to a decline in remaining backlog relative to revenues. For field design however, backlogs has increased relative to revenues in 2014-2016, but with a sharp drop in Q1.

From the change in new orders and backlogs, it is evident that Aker Solutions was able to win new contracts for field design services during the downturn, but struggled to retain new construction work for the subsea unit. This is in line with the industry as a whole, cf. introduction and internal analysis in chapter 2 and 3. However, as work on existing contracts are fulfilled and billed at a higher rate than the new orders coming in, it has lead to reduced backlogs and expeted slowdown in recognized revenues in the near future.

That the backlog-to-revenues has gone from around 8 in Q2 2014, right before start of the oil-price decline, to around 4 in Q4 2016 shows that reduced activity has freed up capacity and lowered utilization rates, indicating that Aker Solutions currently has substantial unused

capacity. This is analyzed further in relation to figure 51 below. In Field design the backlog-to-revenues ratio is opposite, indicating that workforce reductions and long-term contracts has lead to increased lead-times.

Field design

In the field design segment, Aker Solutions has a long-term ambition to "maintain market share in home market (NCS), while increasing activity in global markets" (Aker Solutions ASA, 2014). However, since the oil price decline in 2014, the MMO market has been challenging, with global revenue reducitons of about 22% in 2015 and 3% in 2016, cf. chapter 2.1.4. The decline has hit Aker Solutions especially hard, with reduction in workforce capacity of about 30%, from 2014 levels. The reduction in MMO work has been somewhat offset by Aker Solutions winning engineering contracts on the NCS and in the Asia-Pacific market, as well as increased services revenues in West-Africa, as shown by stable new orders in 1Q2014-1Q2017. In 2017 it is expected that the reduction in MMO-activities will be partly offset by increased engineering activity, especially revenues from the project on the Johan Sverdrup oilfield. A stable backlog in 2016, with levels higher than 2015, also indicate relatively stable revenues in 2017-2018. In 2019, even though a sharp reduction backlog in Q1 2017 could indicate further reductions, it is expected that OPEX activities on NCS and in the Asia pacific will increase in line with oil companies' increased cash flow from better margins due to the strong pricing power and the cost-efficency measures along the oilservice value chain. This will lead to a slow, but steady recovery in the MMO market, sparking an increase in total Field design revenues for Aker Solutions. By 2021, it is assumed a significant portion of the deferred MMO activities will be reinitiated. At the same time it is expected that Aker Solutions' strategy of increasing activity in global markets will lead to revenue growth from engeering activities globally. It is therefore expected a sharper increase in Field design revenues in 2021. From 2021 it is estimated that Field design revenue growth gradually returns to the long-term growth of world GDP of 5,5%. This seems fair given that the maturity on installations on the NCS over time will increase MMO-activities and open for substantial activity in the decommissioning subsegment.

It gives the following forecasted field design revenues:

Revenues	2015	2016	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Field design	12612	10576	10413	10524	10942	11061	12109	13179		19163	20142	21250	22418	23651
Growth YoY%	-6,4 %	-16,1 %	-1,5 %	1,1 %	4,0 %	1,1 %	9,5 %	8,8 %		4,8 %	5,1 %	5,5 %	5,5 %	5,5 %

Table 74: Forecasted Field design revenues 2017E-2033E.

Subsea

The future growth in the subsea unit is first and foremost driven by the growth in the global subsea equipment market. As earlier explained, the development in the number of awards for subsea trees can be viewed as a proxy for the future development in the segment.

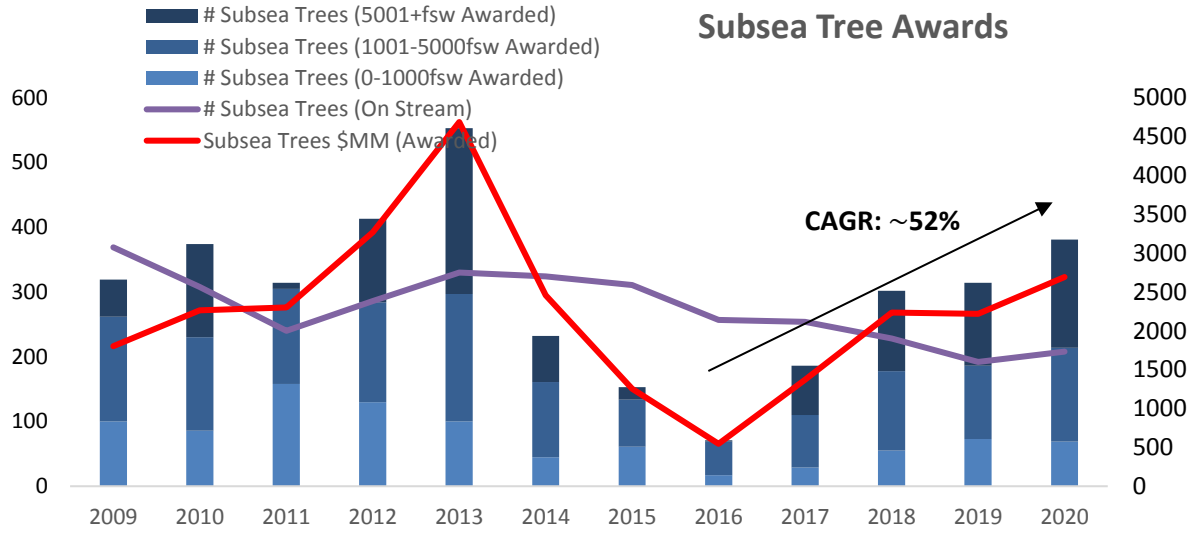
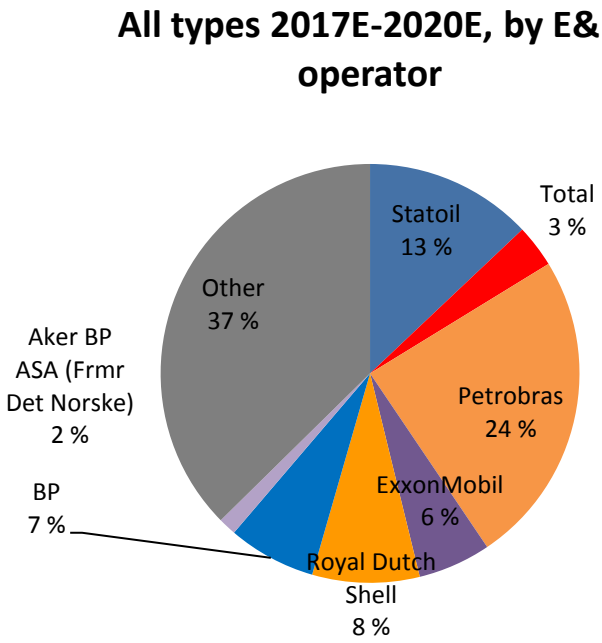


Figure 37: Left: Recorded # subsea tree awards worldwide 2009-2020, by water debt. Right: Recorded subsea tree awards in $MM. (Source: Quest Offshore, Bloomberg Terminal)



A sharp increase in the number of subsea trees awarded for 2017-2020 indicates that 2016 is the bottom of the cycle, materializing in lower revenues in 2017. A CAGR[121] of 52% is a clear indication that oil companies are responding to the cost cuts made in the industry. Especially related to the ultra-deepwater market, which is expected to experience the strongest growth.

[121] CAGR: Cumulative annual growth rate. Calculated as CAGR = $\left(\frac{\#awards\ 2020}{\#awards\ 2016}\right)^{\frac{1}{5}} - 1$

Figure 38: Total registered subsea spending 2017E-2020E, by E&P operator.
(Source: Quest Offshore, Bloomberg Terminal)

The main companies driving the growth will be Petrobras, Statoil and Royal Dutch Shell, with the largest exposure to offshore oil production among the global integrated oil companies. Aker Solutions strong relationship with these companies may give an advantage during the recovery phase, even though oil companies' substantial pricing power increases competition among subsea players. Potentially unadvantageous for Aker Solutions, as both TechnipFMC and OneSubsea through its supply chain integrations are able to cut development costs more convincingly, which is critical factor in the current market.

Given the currently low utilization rates[122] due to the investments in capacity made during the period before the oil decline, the market is expected to recover relatively quickly as availale capacity makes it possible to reach earlier production levels without costly new investments. In 2020 it is expected that the levels in terms of number of delivered subsea trees will reach 2014 levels.

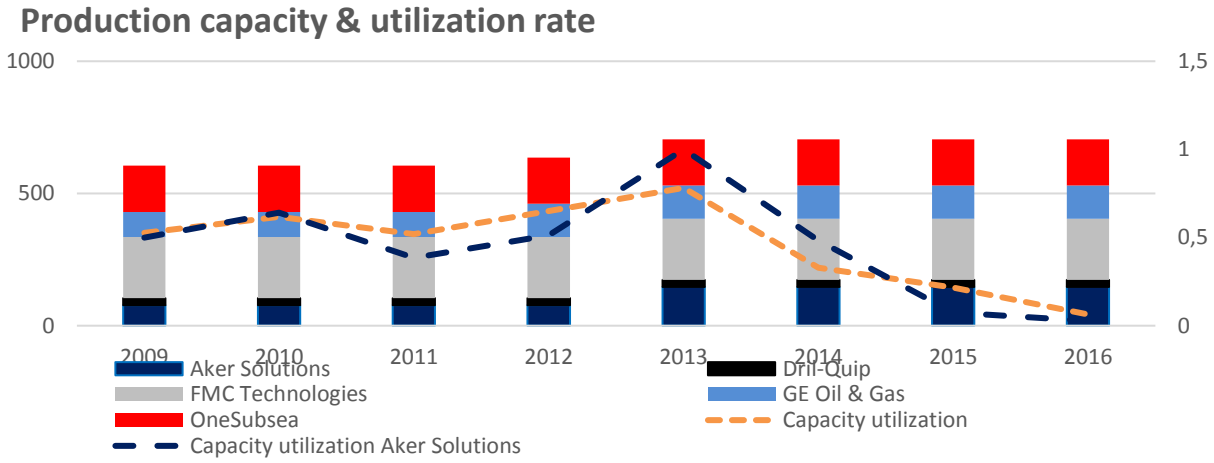


Figure 39: Left: Production capacity. Right: Utilization rates in industry and Aker Solutions. (Source: Quest Offshore, Bloomberg Terminal).

During the recovery phase however, it is expected that oil companies will retain its pricing power, which will limit the revenue growth somewhat and yield lower profit margins than have been seen during the period 2012-2014. From the currently reported numbers on awarded subsea trees, it also seems as if Aker Solutions has lost out on a global basis during

[122] . Utilization rates are estimated on the basis of the highest previous annual number of awards

the downturn. While TechnipFMC has remained stable in terms of market share, OneSubsea (Schlumberger) have gone from ca. 20%

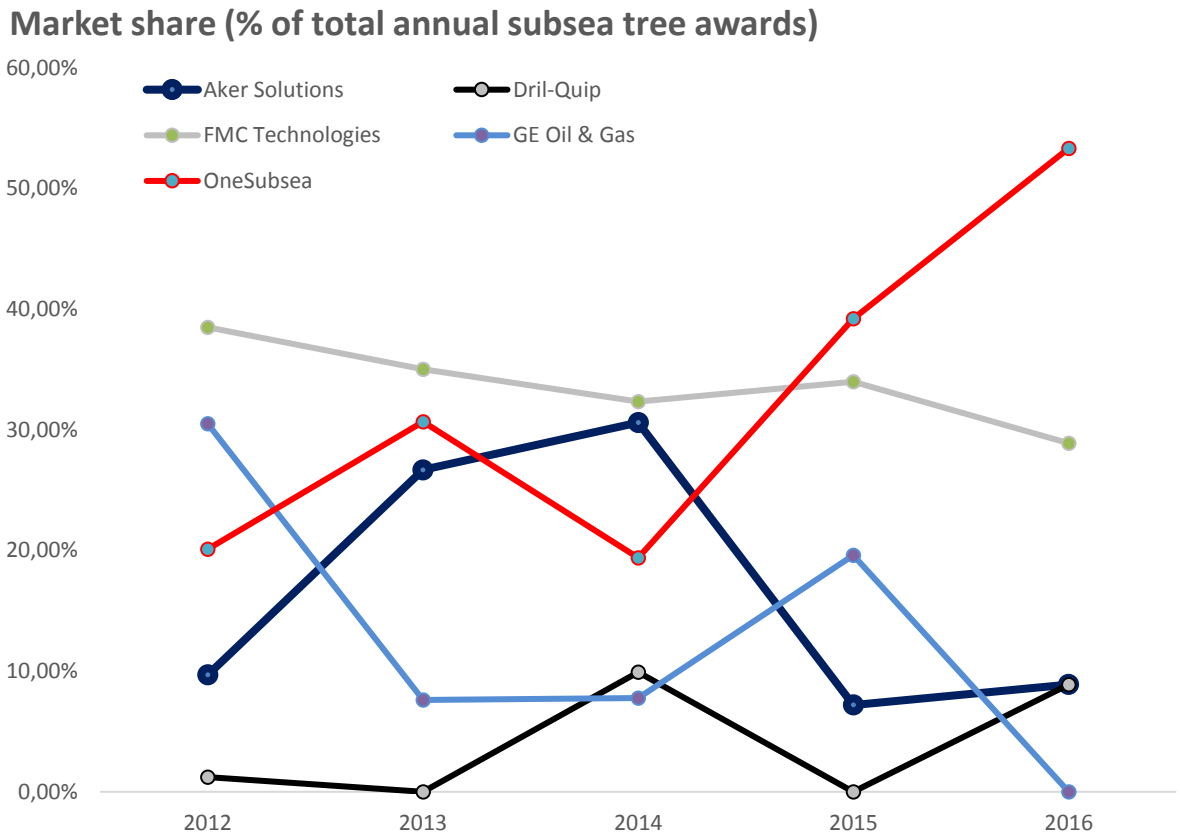


Figure 40: Market share measured in % of total anual subsea tree awards. (Source: Quest Offshore, Bloomberg Terminal)

When interpreting the figure, one has to take into account that the figure only show each companies' portion of the annual awards without adjusting for fluctuations due to customer relationsships and the players following investment activity of oil companies where they are the preferred supplier. That Aker Solutions' market share has gone done must be seen in relation to Statoil and Petrobras CAPEX freezes.

On an overall basis however, by OneSubsea and TechnipFMC winning about 70-80% of all awards in 2015-2016, it seems clear that the strategy of reducing costs by supply chain integrations strategy is more effective in convincing oil companies to reinvest in new subsea developments. It must also be pointed out that GE Oil&Gas won no awards in 2016. This can partly be explained by their most important geographic markets, NCS and Brazil, having little

to no activity in the subsesa market in 2016. Furthermore they have allocated more of its resources towards the US shale-oil market.

Given the development in the subsea market in general, Aker Solutions' current competitive position and the recent development in its reported new orders and backlog, it is expected that Aker Solutions will struggle in the near future in winning important contracts, but with 2017 being the bottom of the cycle in terms of revenues. It is expected a drop of almost 25% from 2016 level, as indicated by the YoY drop in backlog in Q1. In 2018 it is expected that oil companies will resume E&P spending, albeit slower for 2018-2019. During the period 2018-2019 it is also expected that the subsea unit will grow with the market, but not be able to generate the same growth as its peers, cf. chapter 3.2 and 3.3. In 2020, given that Aker Solutions are able to secure contracts from Petrobras for delivery of subsea equipment for the larger developments, it is expected that subsea revenues will grow by over 20%. This will be driven by higher utilization rates balancing the pricing power between the industry players and oil companies.

In the longer term the revenues are expected to gradually converge to long-term growth of 5,5% in the period 2021-2031. This gives the following forecasted revenues and revenue growth for the Subsea business unit:

Revenues	2015	2016	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Subsea	19112	14997	11280	11820	12742	15465	17069	18655		28566	30213	31874	33627	35477
Growth YoY%	-1,1 %	-21,5 %	-24,8 %	4,8 %	7,8 %	21,4 %	10,4 %	9,3 %		5,9 %	5,8 %	5,5 %	5,5 %	5,5 %

Table 75: Forecasted Subsea revenues 2017E-2033E.

The segments' relative share of total revenues is expected to gradually turn towards the levels during the upturn in the last cycle, where the Subsea unit contributed with about 60% of revenues. Due to relative stable Field design revenues in the short term, but slower Subsea recovery, the distribution will be approximately 50/50 in 2017 and 2018, with Subsea still having a slightly higher share, and then a gradual increase in line with subsea growth. The estimated relative share of total revenues is presented in table 77:

% of Total Revenues	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Field Design	0,480	0,471	0,462	0,417	0,415	0,414		0,402	0,400	0,400	0,400	0,400
Subsea	0,520	0,529	0,538	0,583	0,585	0,586		0,599	0,600	0,600	0,600	0,600

Table 76: Field design and Subsea relative share of forecasted annual revenues 2017E-2033E.

8.3.2 Net operating profit

Since the market downturn started in 2014, the company has declared a goal of reducing operating costs by 30% from 2015 level. This involves annual savings of at least NOK 9 billion[123]. In 2016 it was reported that they already completed about 65% of the cost-cuts.

By 1Q numbers the cost estimates are lagging somewhat, but assuming that Aker Solutions will be able to reach the cuts in operating costs guided by the company, the net operating margin for 2017E is 2,39%.

In 2018 the estimated revenue growth is 3%, most which is increased utilization of existing facilities and workforce. Assuming that the company will be able to sustain the cost-effiency measures put in place in 2015 and 2016, and keep personell costs fairly stable, the main increase in costs will come from increased materials and services. The total costs are therefore expected to grow slower than revenues, with a growth rate of 2,7%. This yields an increased operating margin in 2018 of 2,67%.

Revenue vs. Cost growth	2017E	2018E	2019E	2020E	2021E	2022E	...	2029E	2030E	2031E	T+1	T+2
Revenue growth	-15,00 %	3,00 %	6,00 %	12,00 %	10,00 %	9,10 %		5,50 %	5,50 %	5,50 %	5,50 %	5,50 %
Cost growth	-13,32 %	2,70 %	5,09 %	10,55 %	10,45 %	9,12 %		5,50 %	5,50 %	5,50 %	5,50 %	5,50 %

Table 77: Revenue growth vs. cost growth

In 2019 and 2020, the operating margin is expected to increase gradually in line with increased capacity utilization driving down the fixed costs per NOK in revenues. From 2021 and onwards, new investments will drive up both personell and depreciation/amortization costs. This gives a cost inflation somewhat higher than the increased revenue each year, and gradually moving towards the long-term overall growth rate of 5,5%.

It gives the following forecast for Net Operating Income:

	2017E	2018E	2019E	2020E	2021E	2022E	...	2029E	2030E	2031E	T+1	T+2
Revenues	21693	22344	23684	26526	29179	31834		47729	50354	53124	56046	59128
Op.costs (incl. Op.tax)	21174	21747	22855	25266	27907	30454		45701	48214	50866	53664	56615
Net operating margin	2,39 %	2,67 %	3,50 %	4,75 %	4,36 %	4,34 %		4,25 %	4,25 %	4,25 %	4,25 %	4,25 %
Net operating Income	**518**	**597**	**829**	**1260**	**1271**	**1380**		**2028**	**2140**	**2258**	**2382**	**2513**

[123] (Aker Solutions ASA, 2016)

Table 78: Forecasted total operating costs (incl. tax on operating income) and net operating income 2017E-2033E

8.3.3 Net operating capital - Net operating assets turnover

Net operating capital is estimated on the basis of the turnover rate[124]. Given estimated revenues in 2017 the turnover rate is 1,83x NOC, substantially lower than in the period 2011-2016. CAPEX cuts in 2017 also indicate that NOC will decrease slightly due to annual depreciation exceeding CAPEX. When the built-in capacity far exceeds the forecasted activity, and is sufficient for covering the expected growth during 2018-2020, the growth in NOC will be slow. A gradual increase in turnover rates, implying higher utilization rates, will over time make need for new investments. It will increase the CAPEX among the industry players in 2021. It is estimated that Aker Solutions gradually will increase its capacity in 2021-2031 to meet the long-term growth in the Brazilian and Asia-Pacific markets, as well as a stable increase in activity from the NCS and UK. The forecast builds on the expectation of a turnover rate stabilizing at 2,6x NOC, much lower than during the last cycle. A lower turnover rate in the longer term is expected due to a more balanced pricing power relative to customers, yielding lower prices.

The forecasted Net operating capital is presented in table 80:

	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Revenues	21693	22344	23684	26526	29179	31834		47729	50354	53124	56046	59128
Turnover	1,83	1,93	2,02	2,20	2,40	2,44		2,60	2,60	2,60	2,60	2,60
NOC	**11577**	**11725**	**12057**	**12158**	**13047**	**13687**		**19367**	**20432**	**21556**	**22742**	**23992**
NOC g (YoY%)	-2,26 %	1,28 %	2,84 %	0,83 %	7,31 %	4,91 %		5,50 %	5,50 %	5,50 %	5,50 %	5,50 %

Table 79: Forecasted turnover rates and NOC 2017E-2033E.

8.3.4 Financial debt and financial assets

Aker Solutions' financial debt relates to long- and short-term borrowings, as all derivates are closely linked to its operations and classified as operating liabilities. The debt structure presented in the credit risk analysis, cf. chapter 5.4, shows larger upcoming repayments in 2017 and 2019. This is included in the forecast. After 2019, it is estimated that Aker Solutions will fund necessary capital investments largely through long-term debt, but gradually decreasing the debt-to-NOC ratio to the historic average of 56%.

[124] Turnover: $\frac{Revenues_t}{NOC_{t-1}}$

	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Net Operating Capital	11577	11725	12057	12158	13047	13687		19367	20432	21556	22742	23992
FD/NOC	0,55	0,55	0,54	0,58	0,60	0,59		0,56	0,56	0,56	0,56	0,56
Financial debt	6367	6449	6511	6991	7828	8097		10804	11399	12025	12687	13385
FA/NOC	0,15	0,16	0,16	0,17	0,17	0,17		0,17	0,17	0,17	0,17	0,17
Financial assets	1737	1817	1929	2006	2218	2337		3364	3549	3745	3951	4168
Net Financial Debt	**4631**	**4631**	**4582**	**4985**	**5610**	**5760**		**7440**	**7849**	**8281**	**8736**	**9217**

Table 80: Forecasted Net Financial debt 2017E-2033E

The financial assets mainly relates to Aker Solutions cash pool. A smaller part to loans to other companies in the Aker ASA's portfolio, primarily Akastor ASA. The financial investments are insignificant as Aker Solutions seeks to avoid tying up capital outside its operations.

Aker Solutions increased its cash pool in 2012-2015, but spent a fair amount on restructurings in 2016. This is estimated to continue in 2017. In March 2017, Aker Solutions also bought the Norwegian MMO company Reintertsen through an asset purchase paid in cash of 215 Mill. NOK[125]. Given these factors, and lower operating income in 2017 and 2018, the cash pool is estimated to stay at below 2016 levels in 2017 and 2018. In 2019-2022 it will gradually increase with the anticipated market recovery. The financial asset-to-NOC level in the longer term is set equal to the average during the cycle in 2011-2016.

8.3.5 Financial income and costs

The forecasted financial income and costs are based on the respective interest rates. Given the competitive nature of fully functional capital markets, the best estimation would be to assume that returns will equal cost of capital. The interest rates/return on financial assets are set equal to the forecasted cost of capital presented in chapter 9.6.

	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Financial debt_ t-1	6621	6367	6449	6511	6991	7828		10241	10804	11399	12025	12687
Interest rate_t, after tax	3,6 %	3,7 %	2,6 %	3,0 %	3,1 %	3,4 %		4,4 %	4,4 %	4,4 %	4,4 %	4,4 %
Financial costs	**241,5**	**235,3**	**166,3**	**193,0**	**217,0**	**262,8**		**447,1**	**471,7**	**497,6**	**525,0**	**553,9**

[125] (Aker Solutions ASA, 2017)

Table 81: Forecasted financial costs, 2017E-2033E

	2017E	2018E	2019E	2020E	2021E	2022E	...	2029E	2030E	2031E	T+1	T+2
Financial assets_t-1	1752	1737	1817	1929	2006	2218		3189	3364	3549	3745	3951
Financial asset returns_t, after tax	2,0 %	1,7 %	1,9 %	2,3 %	2,4 %	2,7 %		3,7 %	3,7 %	3,7 %	3,7 %	3,7 %
Financial income	**35,4**	**29,9**	**34,8**	**44,4**	**49,0**	**59,8**		**118,0**	**124,5**	**131,4**	**138,6**	**146,2**

Table 82: Forecasted financial income, 2017E-2033E

8.3.6 Minority interests and its share of profits

The forecasted minority interests is based on its share of net operating capital. Historically only a very small part of Aker Solutions' subsidiaries were owned by external investors, amounting to about 1%. A 1% share of NOC is used in the long-term forecast, mainly due to Aker Solutions strategic aim of streamlining its business through fully controlled operating units. The net income to minorities fluctuated substantially in the period 2011-2016. Average return in the period was about 1% above cost of capital, but close to the average forecasted cost of capital to minority interests, respectively 11,96% vs. 11,82%. It is assumed that the forecasted return will equal to cost of capital each year.

Minority interests	2017E	2018E	2019E	2020E	2021E	2022E	...	2029E	2030E	2031E	T+1	T+2
MIN_t-1	138	116	117	121	122	130		184	194	204	216	227
mir_t	10,5 %	10,3 %	10,6 %	10,8 %	11,3 %	11,8 %		12,3 %	12,3 %	12,3 %	12,3 %	12,3 %
Net Inc to MIN	**14,5**	**11,9**	**12,5**	**13,1**	**13,8**	**15,4**		**22,6**	**23,8**	**25,1**	**26,5**	**27,9**

Table 83: Forecasted net income to minority interests, 2017E-2033E

8.4 Forecasted financial statements and free cash flow

The forecasted financial statements are based on the presented forecasts above. Assuming no dirty surplus and and a net OCI of zero, the net paid dividends are found residually as the change in equity less net income to equity holders of the parent company.

The biggest challenge in forecasting the financial statements lies in the uncertainty related to several of the items. Both revenues and margins are dependent upon Aker Solutions being able to secure contracts in a highly competitive market. The future activity in the industry as a whole, driven by volatile oil prices and the willingness of investing among oil companies, are furthermore difficult to determine with any degree of precision. The uncertainty in the estimates will be analysed in chapter 10.5.

However, the forecasted income statement shows a challenging short-term market with substantially lower revenues and net income than previously experienced through 2012-2015. The activity is expected to recover from 2019-2022 and then gradually stabilize over a period of 10 years, raching a long-term steady state with annual growth equal to the long-term year-on-year growth in world GDP of 5,5%.

Forecasted Income Statement												
	2017E	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**…**	**2029E**	**2030E**	**2031E**	**T+1**	**T+2**
Field Design	10413	10524	10942	11061	12109	13179		19163	20142	21250	22418	23651
Subsea	11280	11820	12742	15465	17069	18655		28566	30213	31874	33627	35477
Other	0	0	0	0	0	0		0	0	0	0	0
Operating Revenues	21693	22344	23684	26526	29179	31834		47729	50354	53124	56046	59128
Op. costs (incl op.tax)	21174	21747	22855	25266	27907	30454		45701	48214	50866	53664	56615
Net Operating Income	518	597	829	1260	1271	1380		2028	2140	2258	2382	2513
Net financial income	35	30	35	44	49	60		118	125	131	139	146
Net financial costs	242	235	166	193	217	263		447	472	498	525	554
Net MIN	14	12	12	13	14	15		23	24	25	26	28
Net Inc to equity holders of the parent company	**298**	**379**	**685**	**1098**	**1090**	**1162**		**1677**	**1769**	**1866**	**1969**	**2077**
Net paid dividends	304	233	306	1402	835	678		1065	1124	1186	1251	1320
Δ Equity	**-7**	**146**	**379**	**-303**	**255**	**484**		**612**	**645**	**681**	**718**	**758**

Table 84: Forecasted income statement, 2017E-2033E

Forecasted Balance Sheet												
	2017E	**2018E**	**2019E**	**2020E**	**2021E**	**2022E**	**…**	**2029E**	**2030E**	**2031E**	**T+1**	**T+2**
Net Operating Assets	11577	11725	12057	12158	13047	13687		19367	20432	21556	22742	23992
Financial assets	1737	1817	1929	2006	2218	2337		3364	3549	3745	3951	4168
Capital Employed	13314	13542	13986	14164	15265	16024		22732	23982	25301	26692	28160
Equity	6830	6976	7355	7051	7306	7790		11734	12379	13060	13778	14536
Non-controlling interests	116	117	121	122	130	137		194	204	216	227	240
Financial Debt	6367	6449	6511	6991	7828	8097		10804	11399	12025	12687	13385
Capital Employed	13314	13542	13986	14164	15265	16024		22732	23982	25301	26692	28160
Net Operating Assets	11577	11725	12057	12158	13047	13687		19367	20432	21556	22742	23992
Equity	6830	6976	7355	7051	7306	7790		11734	12379	13060	13778	14536
Non-controlling interests	116	117	121	122	130	137		194	204	216	227	240
Net Financial Debt	4631	4631	4582	4985	5610	5760		7440	7849	8281	8736	9217

Table 85: Forecasted balance shee, 2017E-2033E

Forecasted Statement of Cash Flows												
	2017E	2018E	2019E	2020E	2021E	2022E	…	2029E	2030E	2031E	T+1	T+2
Net Operating Income	518,5	596,6	828,9	1260,0	1271,4	1380,3		2028,5	2140,1	2257,8	2381,9	2513,0
Δ Net Operating Assets	-267,5	147,7	332,6	100,5	888,9	640,4		1009,7	1065,2	1123,8	1185,6	1250,8
FCFO	786,0	448,9	496,4	1159,5	382,5	739,9		1018,8	1074,9	1134,0	1196,4	1262,2
Net financial income	35,4	29,9	34,8	44,4	49,0	59,8		118,0	124,5	131,4	138,6	146,2
Δ Financial Assets	-15,4	80,8	111,8	76,9	211,9	119,0		175,4	185,0	195,2	206,0	217,3
FCFCE	836,8	398,0	419,4	1127,1	219,6	680,6		961,4	1014,3	1070,1	1129,0	1191,1
Net financial costs	241,5	235,3	166,3	193,0	217,0	262,8		447,1	471,7	497,6	525,0	553,9
Δ Financial Debt	-254,1	81,2	62,3	479,8	837,3	268,9		563,3	594,2	626,9	661,4	697,8
Net Income to MIN	14,5	11,9	12,5	13,1	13,8	15,4		22,6	23,8	25,1	26,5	27,9
Δ MIN	-22,2	1,5	3,3	1,0	8,9	6,4		10,1	10,7	11,2	11,9	12,5
FCFE	304,5	233,4	306,2	1401,7	835,0	677,7		1065,2	1123,7	1185,5	1250,7	1319,5

Table 86: Forecasted statement of cash flows, 2017E-2033E

9 Future cost of capital and forecasted strategic advantage

In this chapter the future cost of capital are estimated for the forecasted period. The budgeted cost of capital are found using the relative weights of the equity, minorities and net financial debt in the forecasted balance sheet. Since the cost of capital should be estimated using fair value, an iterative process of converging the different valuation estimates through updating the value weights is performed in chapter 10.3. When analysing the forecasted profitability however, the budgeted weights are used order to ensure consistency in the respective returns and cost of capital. An analysis of the forecasted profitability is performed to evaluate the forecasts and ensure consistency with the strategic analysis.

9.1 Future cost of equity

The calculation of the cost of equity is based on the CAPM model. The formula for calculating cost of equity is $k_e = r_f(1-t) + \beta_e mrp + ilp_e$, as explained in chapter 6.1.

9.2 Risk-free rate after tax

Government bond rate

When calculating the future risk-free rate the 10 year Norwegian Government Bonds will be used as a basis, even though the 5 year bond was used in the historical analysis. A longer holding period is assumed for investors when forecasting. In addition the longer risk-free rate is often viewed as better when forecasting due to its lower volatility relative to shorter rates. As random variations are disregarded in the forecasts, lower volatility is preferable. The flatness of the yield-curve in the past few years also leaves a limited liquidity premium when using a longer risk-free rate, assuming that the difference in short- and long-term rates aren't fully explained by the expectations on future development in the short rates (Gjesdal & Johnsen, 1999). This means that the importance of whether 5-, 10- or 30-year government bond rates are used as the basis for the risk-free rate is less important.

By assuming that Aker Solutions reaches steady state in 15 years, which leaves a duration of the budgeted cash flows closer to the 10y Norwegian government bonds than the 1y and 5y, and the fact that the Norwegian government does not offer 30y bonds, a the 10y bond is viewed as adequate. Norwegian government bonds are used because the interest rate must be related to the currency of the budgeted cash flows, in this case NOK (Damodoran, 2012).

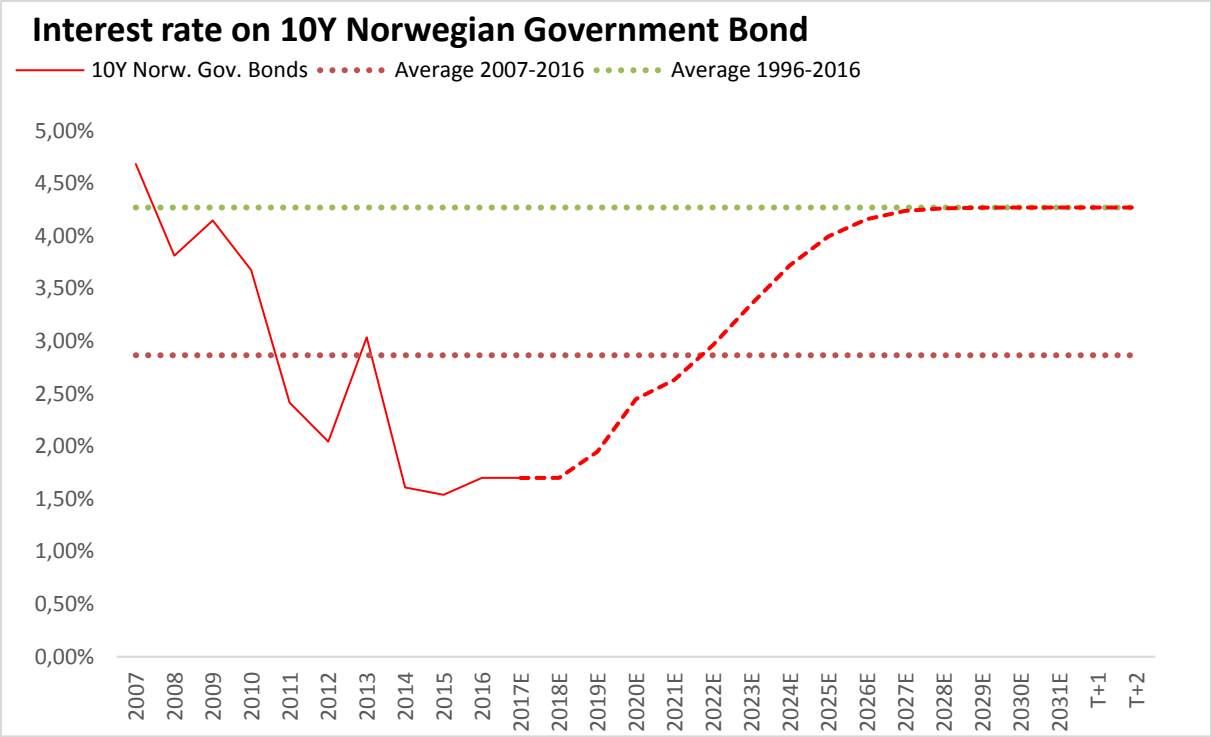


Figure 41: Historic and forecasted rate on 10y Norwegian Government bonds (Source: **(Norges Bank, 2017)**)

Figure 44 show that the historic 10y interest rate declined substantially through financial crisis in 2007-2009 and the European banking crisis in 2010-2012. Since 3Q 2014 the declining oil prices has put pressure on the Norwegian economy, forcing Norges Bank to lower the key policy rate even more. Currently the 10y rate is 1,7%. Norges Banks' estimate for the 10y rate is that the current rate of 1,7% is expected to persist until 2018, and gradually increase to 2,45% in 2020 (Norges Bank, 2017).

The 10y rate in the longer term is more difficult to predict, as it is highly dependent upon the future activity in the Norwegian economy. The average of the last 10 years is just below 3% and the last 20 years is 4,27% (Norges Bank, 2017). Assuming that the 20y average of 4,27% is more representative of the interest rates in the longer term, the risk-free rate is expected to increase to this level during the period 2021-2031.

Risk free rate	2017E	2018E	2019E	2020E	2021E	2022E	…	2031E	T+1	T+2
Risk-free rate	1,70 %	1,70 %	1,95 %	2,45 %	2,63 %	2,96 %		4,27 %	4,27 %	4,27 %
Corporate tax rate	24 %	23 %	23 %	23 %	23 %	23 %		23 %	23 %	23 %
Tax	0,41 %	0,39 %	0,45 %	0,56 %	0,61 %	0,68 %		0,98 %	0,98 %	0,98 %
Risk-free rate, after tax	**1,29 %**	**1,31 %**	**1,50 %**	**1,89 %**	**2,03 %**	**2,28 %**		**3,29 %**	**3,29 %**	**3,29 %**

Table 87: Future risk free rates 2017E-2033E

The Norwegian corporate tax rate is currently 25%. However, in the government budget report for 2017, the corporate tax rate is set to 24% in 2017 and an expected 23% in 2018 (Finansdepartementet, 2016). Further changes are not indicated. From 2019 and onwards, the corporate tax rate is set to 23%.

This gives a future long-term risk-free rate after tax is of 3,29%.

9.3 Market risk and illiquidity premiums

As explained in chapter 6.1.3, the market risk premium can be calculated in different ways. Both the chosen method and the relevant historic timeframe for estimating the market risk premium may lead to substantially different estimates as it fluctuates over time (Gjesdal & Johnsen, 1999). Letting the future mrp be the same as the historic long-term arithmetic mean mrp and the consensus estimate of 5% in the Norwegian market, may therefore be the best estimate. In the forecasts the market risk premium is set to a constant 5%.

For the illiquidity premium, the same factors as those expressed in chapter 6.1.4 apply. For the equity to shareholders of the parent company, the illiquidity premium is set to 0,5%. For the non-controlling interests, and additional 1,5% is put on cost of equity.

9.4 Equity Beta

The future equity beta, just as the estimated historic β_{e_t}, is calculated by levering β_{NOC}. It's assumed that the β_{e_t} fluctuate with the financial risks / leverage of the company, cf. chapter 6.1.5.

The first step is to calculate the future β_{NFD}. The annual implied β_{NFD_t} is calculated through the relationship between the estimated credit risk premium, the market risk premium and the proportion of market related risk. The credit risk premium are found through estimating the annual synthetic rating of Aker Solutions using Standard & Poor's credit rating classifications table on the basis of the forecasted ratios.

Synthetic rating	2015	2016	2017E	2018E	2019E	2020E	2021E	2022E	…	2031E	T+1	T+2
Current ratio	B	B	B	B	BB	BB	BB	BB		BB	BB	BB
Interest coverage	AA	A	BBB	BBB	AA	AA	AA	AA		A	A	A
Equity-ratio	B	BB	BB	B	B	B	B	B		B	B	B
Net Operating Income / NOC_t-1	A	BBB	B	B	BB	BBB	BBB	BBB		BBB	BBB	BBB
Average rating	**BBB**	**BBB**	**BB**	**BB**	**BBB**	**BBB**	**BBB**	**BBB**		**BBB**	**BBB**	**BBB**

Table 88: Forecasted synthetic rating for Aker Solutions, 2017E-2033E

The increase in the equity ratio in 2016 are expected to persist during the downturn, but decrease as the market recovers. The opposite are expected for the interest coverage ratios and net operating income. Lower profitability outweighs the effect of higher equity-ratios, and the net effect is a downgrade from BBB to BB during 2017-2018. It leaves a higher credit risk premium and higher financial debt beta. When the market recovers, the synthetic rating is expected to stay at BBB.

NET FINANCIAL DEBT BETA	2017E	2018E	2019E	2020E	2021E	2022E	…	2031E	T+1	T+2
Financial Debt Beta	0,071	0,072	0,032	0,032	0,032	0,032		0,032	0,032	0,032
FD/NFD	1,360	1,375	1,392	1,421	1,402	1,395		1,452	1,452	1,452
Financial Asset Beta	0,050	0,002	0,002	0,002	0,002	0,002		0,002	0,002	0,002
FA/NFD	0,360	0,375	0,392	0,421	0,402	0,395		0,452	0,452	0,452
Net Financial Debt Beta	**0,078**	**0,098**	**0,044**	**0,045**	**0,045**	**0,045**		**0,046**	**0,046**	**0,046**

Table 89: Forecasted Net financial debt, 2017E-2033E

The financial asset beta is found by using the same assumptions as in chapter 6.1.6, respectively a $\beta_{cash} = 0$, rating of BBB for the receivables ($\beta_{rec} = 0{,}0033$) and $\beta_{inv} = 1$. The weights are the same as when calculating k_{FA} below, using the opening balance[126] when weighting the financial debt and asset betas.

β_{NFD} is higher in 2017 and 2018 due to a lower synthetic rating of BB. In the long term β_{NFD} is expected to stay at 0,046. The β_e is then calculated by levering the constant β_{NOC} of 0,895, the same as the average in 2012-2016.

EQUITY BETA	2017E	2018E	2019E	2020E	2021E	2022E	…	2031E	T+1	T+2
Net Operating Capital Beta	0,880	0,880	0,880	0,880	0,880	0,880		0,880	0,880	0,880
Net Financial Debt Beta	0,078	0,098	0,044	0,045	0,045	0,045		0,046	0,046	0,046
NFD / (Eq + Min)	0,698	0,667	0,653	0,613	0,695	0,754		0,624	0,624	0,624
Equity Beta	**1,440**	**1,401**	**1,425**	**1,391**	**1,460**	**1,510**		**1,400**	**1,400**	**1,400**

[126] The opening balance is used consistently for all cost of capital calculations throughout this paper.

Table 90: Forecasted Equity beta, 2017E-2033E

The equity beta is expected to stay at just above 1,4 througout the forecast, consistent with the observed historic equity beta over the last years, calculated using Stata. This is also in accordance with the oilservice industry players' returns generally being more volatile than the overall market, and that of comparable peers to Aker Solutions with largely the same financial structure, such as FMC technologies (now TechnipFMC), cf. chapter 6.1.5.2.

9.5 Future Cost of equity

The CAPM-model gives the following forecasted cost of equity:

COST OF EQUITY	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
Risk-free rate, after tax	1,29 %	1,31 %	1,50 %	1,89 %	2,03 %	2,28 %		3,29 %	3,29 %	3,29 %
Equity Beta	1,44	1,40	1,43	1,39	1,46	1,51		1,40	1,40	1,40
Market Risk Premium	5,00 %	5,00 %	5,00 %	5,00 %	5,00 %	5,00 %		5,00 %	5,00 %	5,00 %
Illiquidity premium	0,50 %	0,50 %	0,50 %	0,50 %	0,50 %	0,50 %		0,50 %	0,50 %	0,50 %
k_e, after tax	**8,99 %**	**8,81 %**	**9,13 %**	**9,34 %**	**9,83 %**	**10,33 %**		**10,79 %**	**10,79 %**	**10,79 %**

Table 91: Future cost of equity, 2017E-2033E

The estimated cost of equity is somewhat lower during the downturn, and increases gradually to level of 10,91% in the longer term. .

COST OF MINORITY INTERESTS	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
k_e, after tax	8,99 %	8,81 %	9,13 %	9,34 %	9,83 %	10,33 %		10,79 %	10,79 %	10,79 %
ilp_MIN	0,015	0,015	0,015	0,015	0,015	0,015		0,015	0,015	0,015
k_MIN	**10,49 %**	**10,31 %**	**10,63 %**	**10,84 %**	**11,33 %**	**11,83 %**		**12,29 %**	**12,29 %**	**12,29 %**

Table 92: Future cost of minority interests, 2017E-2033E

For the minority interests the long-term cost of capital is 12,41%, with a difference from the cost of equity being the illiquidity premium of 1,5%

9.6 Future cost of net financial debt

The cost of financial debt is given by the risk-free rate after tax and the credit risk premium. The credit risk premium is based on the credit rating described above in chapter 9.4.

COST OF FINANCIAL DEBT	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
Risk-free rate, after tax	1,29 %	1,31 %	1,50 %	1,89 %	2,03 %	2,28 %		3,29 %	3,29 %	3,29 %
Rating	BB	BB	BBB	BBB	BBB	BBB		BBB	BBB	BBB
Credit Risk Premium, after tax	2,36 %	2,39 %	1,08 %	1,08 %	1,08 %	1,08 %		1,08 %	1,08 %	1,08 %
k_FD	**3,65 %**	**3,70 %**	**2,58 %**	**2,96 %**	**3,10 %**	**3,36 %**		**4,37 %**	**4,37 %**	**4,37 %**

Table 93: Future cost of financial debt

Assuming that the customers on average has a credit rating of BBB during the forecasted period, and a cost of cash equal to the risk-free rate plus the average bank credit risk premium, the cost of financial assets closely follows the risk-free rate, as most of the financial assets consists of the non-employed cash pool for the purpose of having excess liquidity as a buffer for fluctuations in revenues and operating income.

COST OF NET FINANCIAL ASSETS	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
k_cash	1 %	1 %	2 %	2 %	2 %	2 %		3 %	3 %	3 %
Cash / Financial Assets	0,71	0,95	0,95	0,95	0,95	0,95		0,95	0,95	0,95
k_rec	2 %	2 %	3 %	3 %	3 %	3 %		4 %	4 %	4 %
Financial receivables / Financial assets	0,25	0,05	0,05	0,05	0,05	0,05		0,05	0,05	0,05
k_inv	6,29 %	6,31 %	6,50 %	6,89 %	7,03 %	7,28 %		8,29 %	8,29 %	8,29 %
Financial investments /Financial assets	0,04	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00
k_FA	**1,75 %**	**1,36 %**	**1,55 %**	**1,94 %**	**2,08 %**	**2,33 %**		**3,34 %**	**3,34 %**	**3,34 %**

Table 94: Future cost of net financial assets

The future cost of net financial debt,k_{NFD}, is found as $k_{FD} - k_{FA}$.

COST OF NET FINANCIAL DEBT	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
k_FD	3,65 %	3,70 %	2,58 %	2,96 %	3,10 %	3,36 %		4,37 %	4,37 %	4,37 %
FD/NFD	1,36	1,38	1,39	1,42	1,40	1,40		1,45	1,45	1,45
k_FA	2,02 %	1,72 %	1,92 %	2,30 %	2,44 %	2,69 %		3,70 %	3,70 %	3,70 %
FA / NFD	0,36	0,38	0,39	0,42	0,40	0,40		0,45	0,45	0,45
k_NFD	**4,23 %**	**4,44 %**	**2,84 %**	**3,24 %**	**3,37 %**	**3,62 %**		**4,67 %**	**4,67 %**	**4,67 %**

Table 95: Future cost of net financial debt

9.7 Future cost of net operating capital

The cost of net operating capital is the weighted average of cost of equity, minority interests and net financial debt each year. During the forecasted period k_{NOC} is increasing to the long-term level of 8,59%. The gradual increase is mainly due to increases in the risk free rate, which affects both k_e, k_{min} and k_{NFD} equally.

COST OF NET OPERATING CAPITAL	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1	T+2
k_e	8,99 %	8,81 %	9,13 %	9,34 %	9,83 %	10,33 %		10,79 %	10,79 %	10,79 %
Equity / Net Operating Capital	0,58	0,59	0,60	0,61	0,58	0,56		0,61	0,61	0,61
k_min	10,49 %	10,31 %	10,63 %	10,84 %	11,33 %	11,83 %		12,29 %	12,29 %	12,29 %
MIN / Net Operating Capital	0,01	0,01	0,01	0,01	0,01	0,01		0,01	0,01	0,01
k_NFD	4,23 %	4,44 %	2,84 %	3,24 %	3,37 %	3,62 %		4,67 %	4,67 %	4,67 %
NFD / Net Operating Capital	0,41	0,40	0,40	0,38	0,41	0,43		0,38	0,38	0,38
k_NOC	**7,05 %**	**7,08 %**	**6,66 %**	**7,04 %**	**7,20 %**	**7,46 %**		**8,45 %**	**8,45 %**	**8,45 %**

Table 96: Future cost of net operating capital

9.8 Analysis of the forecasted strategic advantage

The strategic advantage can be expressed as the residual income, or $r_e - r_k$ over time. The analysis of the forecasted strategic follows the same decomposition as performed in the strategic financial statement analysis in chapter 7.2.

	2017E	2018E	2019E	2020E	2021E	2022E	2031E	T+1	T+2
r_NOC	4,38 %	5,15 %	7,07 %	10,45 %	10,46 %	10,58 %	11,05 %	11,05 %	11,05 %
k_NOC	7,05 %	7,08 %	6,66 %	7,04 %	7,20 %	7,46 %	8,45 %	8,45 %	8,45 %
Strategic advantage from operations	**-2,67 %**	**-1,93 %**	**0,41 %**	**3,41 %**	**3,26 %**	**3,12 %**	**2,60 %**	**2,60 %**	**2,60 %**
Gearing	0,732	0,695	0,681	0,639	0,724	0,786	0,651	0,651	0,651
Gearing advantage - operations	**-1,96 %**	**-1,34 %**	**0,28 %**	**2,18 %**	**2,36 %**	**2,45 %**	**1,69 %**	**1,69 %**	**1,69 %**
Operational advantage	**-4,63 %**	**-3,26 %**	**0,69 %**	**5,59 %**	**5,62 %**	**5,57 %**	**4,29 %**	**4,29 %**	**4,29 %**
Financing advantage	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %
Strategic advantage (r_e - r_k)	**-4,63 %**	**-3,26 %**	**0,69 %**	**5,59 %**	**5,62 %**	**5,57 %**	**4,29 %**	**4,29 %**	**4,29 %**

Table 97: Forecasted strategic advantage 2017E-2033E

Table 98 shows that Aker Solutions strategically will have disadvantage in 2017 and 2018, but that the strategic advantage will increase through the market recovery and stabilize at around 4,06%.

Empirical research suggests that on average, the strategic advantage tends to gradually return to the mean of the industry over time due to competitive forces (Knivsflå, Spring 2017). In

general, where higher profitability attracts new entrants, the industry advantage should diminish over time and stabilize at the cost of capital. In industries with substantial entry barriers however, the industry advantage may be able to persist over time. As explained in the external industry analysis, cf. chapter 3.2.4, the barriers of entry related to the required engineering sophistication and know-how to design and manufacture subsea equipment, and the necessary engineering capabilities to develop economically functional field designs, are factors that may defend Aker Solutions being able to sustain a strategic advantage[127] over time . The lack of substitutes, at least in the deepwater- and ultradeepwater segments, are a factor that make it likely that the industry[128] in general will maintain a strategic advantage in the future. A positive long-term strategic advantage of 4,06% is therefore consistent with the strategic analysis in chapter 3. It is also reasonable that Aker Solutions through their unique combination of engineering capabilities in both Field design and Subsea, and their ability to provide integrated solutions, will be able to win important contracts that bring revenues along all of its business units when the market recovers.

	2017E	2018E	2019E	2020E	2021E	2022E	2031E	T+1	T+2
r_e	4,35 %	5,55 %	9,82 %	14,93 %	15,45 %	15,90 %	15,08 %	15,08 %	15,08 %
r_k	8,99 %	8,81 %	9,13 %	9,34 %	9,83 %	10,33 %	10,79 %	10,79 %	10,79 %

Table 98: Forecasted return on equity and cost of equity, 2017E-2033E

[127] $r_e > k_e$

[128] Referring to both the Subsea production systems segment and offshore engineering/design.

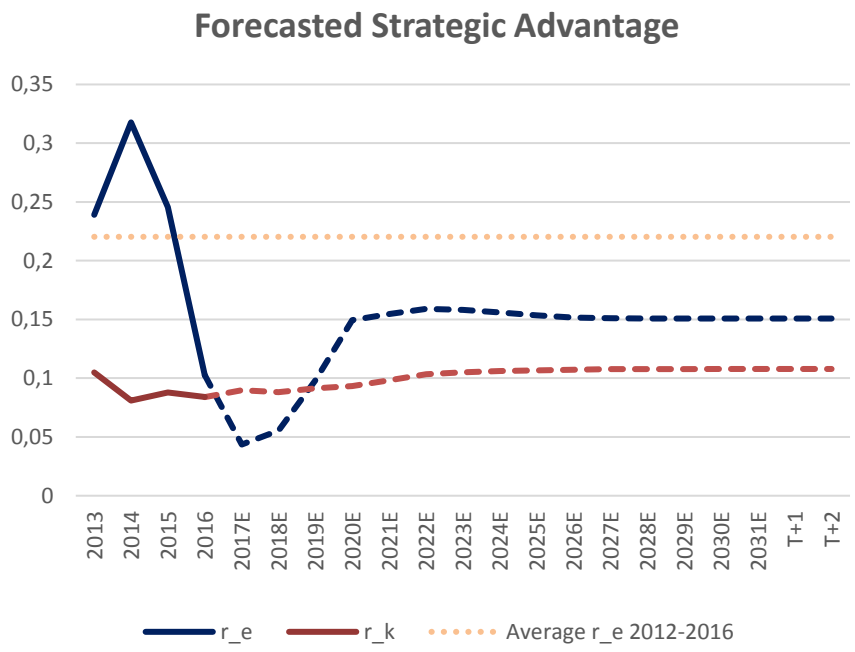


Figure 42: Forecasted Strategic advantage

The forecasted strategic advantage is lower than observed in 2012-2016, with Aker Solutions having an average strategic advantage of 13,4% and the industry 7,69%. Lower oil-prices in the future, pressuring prices and increasing price sensitvitiy among oil companies, and thereby lowering the players' profit margins in the long term, and substantial internal competition in the short term, makes it likely that the strategic advantage both in the short- and longer term will be is lower than what was observed during the last cycle.

10 Fundamental valuation

In this chapter the fundamental valuation of Aker Solutions' shares is estimated through two main DCF methods: 1) equity method and 2) net operating capital method (Knivsflå, Spring 2017).

In theory, both methods should yield the same result, as they are equivalent when using fair value weights to estimate the cost of capital. When using budgeted weights, the estimates of the two models tends to differ substantially (Knivsflå, Spring 2017). In order to arrive at the fair value of Aker Solutions' shares, an iterative process of updating the weights is used to converge the different valuation estimates. An analysis of the uncertainty in the fair value estimate is performed in chapter 10.5.

10.1 Equity method

The fair value of equity can be calculated directly using one of four different models that are mathematically equivalent, but split in different components (Knivsflå, Spring 2017).
The four models are:

1) The dividend model (NPD)
2) The free cash flow to equity model (FCFE)
3) Residual income to equity model (RI_e)
4) Change in residual income to equity-model (ΔRI_e)

All the abovementioned models[129] are applicable, except the dividend model given the uncertainty on when Aker Solutions will resume its dividend payments. In this paper the FCFE-model is used as the basis. The RI_e is used as a supplement to control the results from the discounted FCFE.

[129] Dividend model, FCF model, Residual Income model, and change in RI model.

10.1.1 Free cash flow to equity model

The value of equity is found through the the following formula using the discounted free cash flow to equity model:

$$V_{Eq} = \sum_{t=1}^{T} FCFE_t \cdot d_{e_t} + \underbrace{\frac{FCFE_T \cdot (1 + g_{FCFE})}{(k_{e_t} - g_{FCFE})} \cdot d_{e_T}}_{\text{TERMINAL VALUE}}$$

Where,

$$d_{e_t} = \frac{1}{(1 + k_{e_1}) + (1 + k_{e_2}) + \cdots + (1 + k_{e_t})} = Annual\ discount\ factor$$

$$g_{FCFE} = \frac{FCFE_{T+1} - FCFE_T}{FCFE_T} = Steady\ state\ growth\ of\ FCFE$$

The FCFE-method gives an initial estimated share price of 40,77 NOK/share.

FCFE-method	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1
Free Cash Flow to Equity holders of the parent company	304	233	306	1402	835	678		1186	1251
k_e	8,99 %	8,81 %	9,13 %	9,34 %	9,83 %	10,33 %		10,79 %	10,79 %
Discount factor	0,918	0,843	0,773	0,707	0,643	0,583		0,233	0,211
Net present value of FCFE_t	279,4	196,8	236,6	990,5	537,2	395,2		276,6	263,4

Value forecasted FCFE_t 2017E-2031E	5574,80
Terminal value	5519,31
V_E	11094,11
# Shares (Mill.)	272,04
Estimated share price	**40,78**

Table 99: FCFE-method. Valuation through discounting the free cash flow to equity holders of the parent company

10.1.2 Residual income model

The equivalent price per share is found through the residual income model, where the value of equity are found through the following formula:

$$V_{Eq} = Eq_0 + \sum_{t=1}^{T} RI_{e_t} \cdot d_{e_t} + \frac{RI_{e_T} \cdot (1 + g_{RI})}{(k_{e_t} - g_{RI})} \cdot d_{e_T}$$

Residual Income-method	Book_0	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1
Recorded Equity	6837	6830	6976	7355	7051	7306	7790		13060	13778
r_e-k_e		-4,63 %	-3,26 %	0,69 %	5,59 %	5,62 %	5,57 %		4,29 %	4,29 %
Residual Income_t		-316,8	-222,9	48,2	411,1	396,6	407,2		531,0	560,2
Discount factor		0,918	0,843	0,773	0,707	0,643	0,583		0,233	0,211
Net present value of RI_t		-290,6	-188,0	37,2	290,5	255,2	237,5		123,9	118,0

	31.12.2016
Net present value of RI_t 2017E-2031E	1784,76
Terminal value	2472,29
V_e	11094,11
# Shares (Mill.)	272,04
Estimated share price	**40,78**

Table 100: Valuation through book value of equity and discounting the residual income to equity holders of the parent company.

Table 101 shows that the net present value of the forecasted strategic advantage is about 36%[130] of the estimated value. This means that a significant part of the present equity value are based on future residual income, leaving a higher equity value than the equity currently recognized in the balance sheet, cf. P/B-analysis in chapter 11.1.

[130] 36,259%= (1612,83+2276,41)/10726,30

10.2 Net operating capital method

The net operating capital method is a more indirect method of estimating the value of equity, as the value are found residually as the difference between the value of net operating capital and the value of net financial debt and minority interests. This can be expressed as $V_{Eq} = V_{NOC} - V_{NFD} - V_{min}$.

In this paper the value are found using the discounted free cash flow from operations (FCFO) model as the basis. The RI_{NOC} model is used for controlling the estimations.

When estimating the value of equity through the FCFO-model, V_{NOC}, V_{NFD} *and* V_{min} are found separately.

10.2.1 FCFO-model

10.2.1.1 Value of net operating capital

	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1
Free Cash Flow from Operations	786	449	496	1160	383	740		1134	1196
k_NOC	0,07051	0,07079	0,06659	0,0704	0,072	0,0746		0,08451	0,08451
Discount factor	0,934	0,872	0,818	0,764	0,713	0,663		0,324	0,299
Net present value of FCFO_t	734,2	391,6	406,0	886,0	272,7	490,8		367,3	357,3

Net present value of forecasted FCFO_t 2017E-2031E	7101,54
Terminal value	13130,72
V_NOC	**20232,26**

Table 101: Discounted FCFO - Free cash flow from operations

10.2.1.2 Value of net financial debt

	2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1
Free Cash Flow to Net Financial Debt	445	205	181	-254	-457	53		-65	-69
k_NFD	0,04233	0,04437	0,02839	0,03243	0,0337	0,0362		0,046667	0,046667
Discount factor	0,959	0,919	0,893	0,865	0,837	0,808		0,544	0,519
Net present value of FCFNFD_t	426,7	188,3	161,7	-220,0	-382,8	42,9		-35,6	-35,8

Net present value of forecasted FCFNFD_t 2017E-2031E	367,57
Terminal value	4501,91
V_NFD	**4869,48**

Table 102: Discounted free cash flow to net financial debt

Given that the interest rates on financial debt and income are set equal to cost of capital, the value of net financial debt is equal to the amount recognized in the balance sheet. The same applies to the minority interests.

10.2.1.3 Value of minority interests

		2017E	2018E	2019E	2020E	2021E	2022E	...	2031E	T+1
Free Cash Flow to Minority Interests_t		37	10	9	12	5	9		14	15
k_min		10,49 %	10,31 %	10,63 %	10,84 %	11,33 %	11,83 %		12,29 %	12,29 %
Discount factor		0,905	0,820	0,742	0,669	0,601	0,537		0,190	0,170
Net Present value of FCFMIN_t		33,2	8,6	6,8	8,1	2,9	4,9		2,6	2,5
Net present value of forecasted FCFMIN_t 2017E-2031E	96,94									
Terminal value	41,06									
V_min	**138,00**									

Table 103: Value of minority interests through discounting free cash flow to minority interests.

10.2.1.4 Value of equity

Given the estimates on V_{NOC}, V_{min} and V_{NFD}, the estimated price is 55,96 NOK/share.

NOC-method	
V_NOC	**20232,26**
V_min	**4869,48**
V_NFD	**138,00**
V_e	**15224,78**
# Shares	272,044
Share price	**55,96**

Table 104: Estimated share price by NOC-method

The same price is found through the RI_{NOC} model.

10.2.2 Residual income from operations-model

RI from Operations-method	Book_0	2017E	2018E	2019E	2020E	2021E	2022E	2031E	T+1
Recorded NOC_t	11845	11577	11725	12057	12158	13047	13687	21556	22742
r_NOC-k_NOC		-2,67 %	-1,93 %	0,41 %	3,41 %	3,26 %	3,12 %	2,60 %	2,60 %
Residual Income from Operations_t		-316,8	-222,9	48,2	411,1	396,6	407,2	531,0	560,2
Discount factor		0,934	0,872	0,818	0,764	0,713	0,663	0,324	0,299
Net present value of RI-Operations_t		-295,9	-194,5	39,4	314,1	282,7	270,1	172,0	167,3

	31.12.2016
Net present value of RI_t 2017E-2031E	2238,69
Terminal value	6149,03
V_NOC	**20232,26**
V_min	**138,00**
V_NFD	**4869,48**
V_e	**15224,78**
# Shares	272,04
Share price	**55,96**

Table 105: Valuation through book value of NOC and discounting the residual income from operations.

From the equity-method the share price is 40,78 NOK/Share, versus a share price of 55,96 NOK/share from the net operating capital-method. The difference comes from using budgeted weights when calculating cost of capital. In the next chapter, a value convergence is performed to reach a final estimate on the share price.

10.3 Value convergence

The average share price from the initial estimates is 48,37 NOK/share. A total difference of 15,18 NOK/share gives a difference in % from the average of 15,7% [131]. The reason for the different estimates from the equity- and NOC methods is that the cost of capital is weighted on the basis of the recognized equity in the balance sheet. As both models reach a value substantially above the recognized equity in the balance sheet, the cost of net operating capital, which is a weighted average of $k_e, k_{min}\ and\ k_{NFD}$, is underestimated. This problem can be solved through updating the forecasted value weights with an average of the estimated V_e, V_{min} and V_{NFD}[132] for each step. The process is iterative until the value of the equity and net operating capital methods are equal, as shown in table 107 and 108:

	Step 0	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Estimated share price:										
Equity-method	40,78	41,32	41,57	41,52	41,53	41,53	41,53	41,53	41,53	41,53
NOC-method	55,96	39,53	41,92	41,45	41,54	41,53	41,53	41,53	41,53	41,53
Difference:	-15,18	1,79	-0,35	0,07	-0,01	0,00	0,00	0,00	0,00	0,00
Estimated Market Cap										
Equity-method	11094,1	11240,5	11308,9	11295,9	11298,3	11297,8	11297,9	11297,9	11297,9	11297,9
NOC-method	15224,8	10754,1	11405,0	11277,1	11301,8	11297,1	11298,0	11297,8	11297,9	11297,9
Difference:	-4130,7	486,4	-96,1	18,7	-3,5	0,7	-0,1	0,0	0,0	0,0
Average share price	48,4	40,4	41,7	41,5	41,5	41,5	41,5	41,5	41,5	41,5
Difference in % from average	-31,39 %	4,42 %	-0,85 %	0,17 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %

Table 106: Value convergence in 9 steps

	Step 0	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
Equity-method	41	41	42	42	42	42	42	42	42	42
NOC-method	56	40	42	41	42	42	42	42	42	42

Table 107: Estimated share price by Equity-method and NOC-method when updating the value weights when calculating cost of capital.

[131] 15,7%=(15,18/2)/48,37

[132] Given the assumptions $r_{min} = k_{min}$ and $r_{NFD} = k_{NFD}$, the DCF to minority interests and net financial debt equals the value recognized in the balance sheet. The effect therefore comes from $V_e > Eq_{balance\ sheet}$.

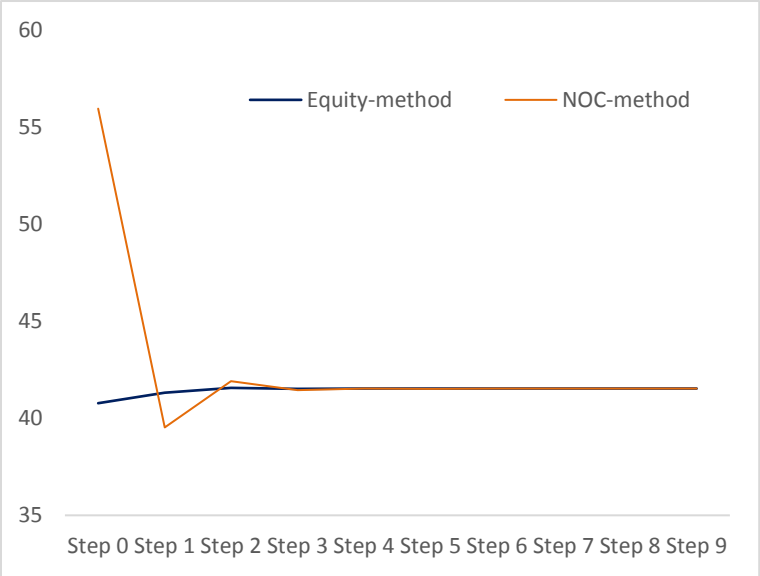


Figure 43: Value convergence

By converging the share price estimates from the equity- and NOC-methods, the fair value share price per 31.12.2016 is **41,53 NOK/share** in step 5.

10.4 Time adjustment

In order to find the value per 31.05.2017, the estimated share price is adjusted by the time-value of the period 31.12.2016-31.05.2017. The share price is adjusted through the formula:

$$V_{eq_{31.12.2016}} \cdot \left(1 + k_{e_{2017}}\right)^{\frac{5}{12}} = V_{Eq_{31.05.2017}}.$$

This gives the following fair value estimate of Aker Solutions ASA's share price per 31.05.2017:

Price per share - Aker Solutions ASA	
Share price 31.12.2016	41,53
k_e 2017, step 9	9,07 %
Share price (NOK) 31.05.2017	**43,05**

Table 108: Price per share 31.05.2017

10.5 Uncertainty in the estimated value

The valuation of Aker Solutions is based on several assumptions, some of which being highly conditional on qualitative, discretionary assessments. Preparations of future estimates will therefore always involve a significant amount of uncertainty. An analysis of the uncertainty is made through adjusting for bankruptcy risk, a sensitivity analysis on how the change in different key value drivers affect the share price estimate and simulations to evaluate the distribution of the share price given the assumptions made and the inheren probabilities of different outcomes. It gives an indication of how robust the estimate is and how the underlying uncertainty affects the final fair value estimate.

10.5.1 Risk of bankruptcy

The first step is to examine how bankruptcy risk will affect the estimated value. The preparation of the estimated value if based the assumption of continuing operations. Provided that there is a bankruptcy risk, and that if the risk materializes it involves a full realization/liquidation of the company's assets, the estimated value must be adjusted for the expected loss in case of bankruptcy. The adjustment for bankruptcy risk can be derived from the following simple model (Knivsflå, Spring 2017):

$$V_{Eq} = (1 - p) \cdot V_{Eq}^{C} + p \cdot (1 - lgd) \cdot V_{Eq}^{C}$$

Where,

p: probability of default within 1 year

lgd: loss given default

V_{Eq}^{C}: Value of equity given continuing operations

It is assumed that the loss given default is 100%, which means that it is nothing left to equity owners after creditors have received their share in case of liquidation of the company's assets. The probability of default is calculated on the basis of the synthetic rating of BB for 2017 found in Chapter 9.4. This gives a probability of default of 0.97% according to Standard & Poor's credit risk table.

The value of equity given continuing operations is based on the estimated share price as of 31.05.2017 found in Chapter 10.4. The bankruptcy risk-adjusted share price is 42,63 NOK/share.

Default risk	
Price per share under continuing operations	43,05
Probability of continuing operations	99,03 %
Loss given default	100,0 %
Probability of default	0,97 %
Price per share	42,63

Table 109: Price per share adjusted for default risk

10.5.2 Sensitivity analysis

The estimated share price is based on expectations on how the future will evolve, which to a large extent is based on discretionary assessments. The estimates' inherent uncertainty is therefore a factor that has to be taken into account in the investment recommendation. A sensitivity analysis is applied to assess the impact of changes in key forecasting drivers. The sensitivity analysis is performed by changing the individual variable and keeping the remaining variables constant.

The estimate is controlled for the most important drivers/variables associated with the forecasted financial statements and future cost of capital. In relation to the forecasted financial statements both revenue growth, net operating margins and turnover will be evaluated. On the basis of these three factors a bull and a bear case is presented. The market risk premium, risk-free interest rate and β_{NOC} is then assessed. Lastly, a monte-carlo simulation is used to create a distribution of the share price with the aforementioned drivers as stochastic variables.

10.5.2.1 Key forecasting drivers

10.5.2.1.1 Revenue growth

Table 109 shows the sensitivity of the estimated share price to changes in revenue growth.

Share price sensitivity to changes in revenue growth						Fair value					
Change in revenue growth (%-points)	-50,00 %	-35,00 %	-20,00 %	-10,00 %	-5,00 %	0,00 %	5,00 %	10,00 %	20,00 %	35,00 %	50,00 %
2017E-2021E	23,9	25,3	29,1	34,3	38,1	43,0	49,3	57,1	79,0	134,2	231,3
% change from fair value	-44,5 %	-41,3 %	-32,4 %	-20,3 %	-11,4 %	0,0 %	14,5 %	32,7 %	83,6 %	211,7 %	437,4 %
Steady state Revenue Growth	1,0 %	2,0 %	3,0 %	4,0 %	5,0 %	5,5 %	6,0 %	7,0 %	8,0 %	9,0 %	10,0 %
Price per share	35,84	36,79	38,00	39,57	41,69	43,05	44,70	49,33	57,33	74,30 -	
% change from fair value	-16,76 %	-14,53 %	-11,72 %	-8,08 %	-3,17 %	0,00 %	3,84 %	14,59 %	33,17 %	72,59 %	

Table 110: Share price sensitivity to changes in revenue growth

A 5%-point change in revenue growth each year in the period 2017-2021 will leave an 14,5% increase in the upside case and an 11,4% lower share price in the downside case. It illustrates the potential upside if Aker Solutions' growth turns out to be higher than expected. This is not unlikely, as the base case is built on the assumption that Aker Solutions will lose some of its market share and not be able to experience the same growth as its main competitors.

The sensitivity of the steady state growth rate is prominent. For example, a small 0,5%-point higher growth rate will give an increase in the current share price of 3,84%. Given that the long-term growth rate is assumed to follow the global GDP growth, which may be an underestimation as Aker Solutions operations in the future will turn more towards emerging markets (Brazil and the Asia-pacific region). In these markets the average growth rate will presumably be higher than the world average in the long-term.

9.1.1.1.1 Net operating margins

Share price sensitivity to changes in net operating margins						Fair value					
Change in net operating margin (%-points)	-15 %	-10 %	-5 %	-2 %	-1 %	0	1 %	2 %	5 %	10 %	15 %
2017E-2021E	-	-	21,9	34,2	38,6	43,0	47,5	52,0	65,8	89,1	112,7
Difference in %	-	-	-49,21 %	-20,52 %	-10,42 %	0,00 %	10,38 %	20,85 %	52,80 %	107,02 %	161,85 %
Net operating margin in Steady state	2,25 %	2,75 %	3,25 %	3,75 %	4,00 %	4,25 %	4,50 %	4,75 %	5,25 %	6,25 %	7,25 %
Price per share	-	20,98	28,36	35,72	41,69	43,05	46,71	50,36	57,53	72,06	86,58579
Change in % from fair value		-51,27 %	-34,13 %	-17,04 %	-3,17 %	0,00 %	8,50 %	16,99 %	33,65 %	67,40 %	101,13 %

Table 111: Share price sensitivity to changes in net operaing margins

The net operating margin is one of the most important assumptions, determining how much of the revenue that is left after subtracting operating costs (incl. tax on operating income). The sensitivity is measured by letting the the net operating margin for the period 2017-2021 and steady state change in terms of %-points. 1%-point increase implies that 0,01 is added to the net operating margin from the base case. The importance of this assumptions is evident, as for example a 1%-point higher net operating margin annually in the period 2017-2021 gives a 10,56% higher share price. In the steady state, the sensitivity to the net operating margin is even more prominent. A net operating margin at the level of the historical average in the period 2011-2016 of 4,7% will give a share price close to 50 NOK/share.

9.1.1.1.2 Turnover

Share price sensitivity to changes in turnover rates							Fair value					
Change in %			-50 %	-25 %	-10 %	-5 %	0	5 %	10 %	25 %	50 %	100 %
2018E-2021E	-	-		23,4	36,5	39,9	43,0	45,8	48,4	54,7	62,6	72,5
Difference in %	-	-		-45,73 %	-15,28 %	-7,24 %	0,00 %	6,44 %	12,40 %	27,14 %	45,51 %	68,50 %
Turnover rate in steady state	*1,638*		*1,69*	*1,95*	*2,34*	*2,47*	2,6	*2,73*	*2,86*	*3,25*	*3,9*	*5,2*
Price per share	-		18,26	27,29	37,73	40,52	43,05	45,35	47,44	52,64	59,18	67,46727
Change in % from fair value	-		-57,58 %	-36,61 %	-12,36 %	-5,87 %	0,00 %	5,33 %	10,20 %	22,27 %	37,47 %	56,72 %

Table 112: Share price sensitivity to changes in turnover rates

The turnover rate decides the size of the net operating capital, cf. chapter 8.3.3. A higher turnover rate means that Aker Solutions is able to generate more revenues from its assets, which may be because of a higher prices or higher efficiency in terms of utilization rates and generated activity from its assets. The sensitivity in the turnover rate is measures by percentage change from the base case. A 5% increase in the turnover rate annually in the period 2018-2021 gives a 6,44% increase in current share share price. As it illustrates, the turnover rate is an important assumption, but less so than revenue growth and the net operating margin.

Bull vs. bear case

To illustrate the uncertainty involved in estimating the drivers of the forecasted financial statement, a bull and a bear case is presented. The bull case is when the company performs better than expected, while bear case is when the company performs worse than expected.

In the bull case revenue growth is assumed to be 5%-points higher each year in the period 2017-2021[133], and 5%-points lower in the bear case. Net operating margin is 1,5%-points higher in the bull case, 1,5%-points lower in the bear case. The turnover rate is +/- 10%.

Bear	Base	Bull
31,49	43,05	58,51
-26,86 %	0,00 %	35,91 %

This gives substantially different outcomes. As earlier mentioned, given that Aker Solutions is able to keep its market share in the subsea market in the short term, win important contracts in Brazil when the market recovers, expand its MMO business in the Asia-Pacific, and potentially get a stronger position in the African market, it is likely that revenue growth on average may be 5%-points higher than estimated in the base case. If they at the same time avoid cost escalations, which will increase its operating margins, the bull case may materialize. In this case, given that the assumptions related to the cost of capital and steady state stay put, the current share price is estimated to be 58,51 NOK/share. This gives an upside of 35,91% relative to the estimated fair value.

In the bear case however, Aker Solutions experience lower revenue growth and net operating margins. This could be the case of they lose even larger shares of the market and their strategy of growth in international markets fails. That they will reach their target of 30% cost cuts from 2015 level are furthermore not unlikely to be an overoptimistic estimation. In the bear case the current share price is 31,49 NOK/share, which leaves a downside of 25,86% relative to the base case. Both these cases are possible future outcomes that must be taken into account when reaching a recommendation on whether to invest in the company.

[133] The estimations are made by letting 2021 be the year that determines the gradual mean-reversion to the steady state level (from 2022-2030). The steady state level is the same as in the base case.

10.5.2.2 Cost of capital

When calculating the cost of capital there are several assumptions that may affect the estimated share price significantly. The three most important variables is the market risk premium, the risk free rate and the equity beta.

10.5.2.3 Market risk premium

Change in %points	-3%	-2%	1%	-0,50%	0	0,50%	1%	2%	3%	5%
Mrp	*2,00%*	*3,00%*	*6,00%*	*4,50%*	*5%*	*5,50%*	*6,00%*	*7,00%*	*8,00%*	*10,00%*
Value per share	213,7	93,0	59,1	49,8	43,0	37,8	33,7	27,6	43,0	17,6
Difference in %	419,89%	126,26%	43,69%	21,26%	0,00%	-7,92%	-17,94%	-32,80%	-51,10%	-57,13%

Table 113: Share price sensitivity to %-point changes in market risk premium

The market risk premium drives the cost of equity, and indirectly the cost of net operating capital. The effect of changes in the mrp is also amplified by the equity beta of Aker Solutions being around 1,4, depending on the capital structure, cf. chapter 9.4. A mrp of 5,5%[134] each year[135] gives a 7,92% lower current share price, while a mrp of 4,5% gives a 21,26% increase. The most extreme case, with a market risk premium of just 2% gives a 419,89% increase in the share price. This illustrate the importance of the assumption made in relation to the market risk premium.

10.5.2.4 Risk free rate

					Fair value					
Δ Basis points	-300	-200	-100	-50	0	50	100	200	300	500
2020E 10y rate	-0,55%	0,45%	1,45%	1,95%	2,45%	2,95%	3,45%	4,45%	5,45%	7,45%
Price per share	44,8	44,2	43,6	43,3	58,5	42,8	42,5	41,9	41,4	40,3
Difference in % from fair value	4,15%	2,73%	1,35%	0,67%		-0,67%	-1,33%	-2,63%	-3,90%	-6,37%
Steady State 10y rate	1,27%	2,27%	3,27%	3,77%	4,27%	4,77%	5,27%	6,27%	7,27%	9,27%
Price per share	68,7	56,6	48,7	45,7	58,5	40,7	39,7	35,9	33,3	29,5
Difference in % from fair value	59,55%	31,54%	13,11%	6,06%		-5,42%	-7,84%	-16,68%	-22,68%	-31,55%
All years										
Price per share	71,7	58,2	49,4	46,0	58,5	40,5	39,1	34,9	32,0	27,7
Difference in % from fair value	66,58%	35,28%	14,67%	6,78%	0,00%	-6,04%	-9,08%	-18,82%	-25,60%	-35,71%

Table 114: Share price sensitivity to different basis point changes in risk free rates

[134] As were the estimation for the Norwegian market by Fernandez et. al. in their research paper published last year, cf. chapter 6.1.3.

[135] The changes is implemented for the whole forecatsted period including steady state, as the mrp is assumed to be constant.

The risk free rate is in the base case based on the expected development in the interest rate on 10 year Norwegian government bonds. Given the turmoil in financial markets since 2008, and rates being much lower than historical levels, the level of the future 10y rate is highly uncertain. The significant impact changing interest rate would have on the estimate can be illustrated by lowering the steady state risk free rate by 200 basis points[136], just below the average of the period 2007-2016, cf. chapter 9.2. It would give a share price of 56,6, a 31,54% increase from the base case. The level of the risk free rate is therefore an important assumption.

10.5.2.5 Equity beta

Change in %		-50 %	-35 %	-20 %	-10 %	-5 %	0	5 %	10 %	20 %	35 %	50 %
	Equity beta	*0,702*	*0,913*	*1,124*	*1,264*	*1,334*	*1,405*	*1,475*	*1,545*	*1,685*	*1,896*	*2,107*
Value per share		126,1	78,9	57,1	48,1	44,6	43,0	38,8	36,4	32,4	27,8	24,2
Difference in %		206,78 %	91,94 %	38,99 %	17,12 %	8,50 %	4,75 %	-5,53 %	-11,32 %	-21,08 %	-32,43 %	-41,07 %

Table 115: Share price sensitivity to changes in equity beta

The future equity beta is estimated from delevering the β_{NOC} which in turn is based on levering the historic equity beta. The historic equity beta is estimated based on an average of three different regressions, cf. 6.1.5. The differences between these regressions were quite significant, ranging from 1,195 on 3 years monthly quotations against the MSCI, and 1,589 on 3 years monthly quotations against the OSEBX. This would, keeping other factors constant, give a share price about 20% higher or 15% lower than the base case where the estimated historic equity beta is 1,405. The equity beta is therefore an important assumption as well.

[136] 1 basis point = 0,01%. 200 basis points = 2%.

10.5.3 Simulation

The static sensitivity analysis shows that the estimated share price is sensitive to changes in the underlying drivers and the assumptions. However, the static sensitivity analysis only evaluates change in a single driver at a time, while keeping all other factors constant. To evaluate the uncertainty when different drivers are changing simultaneously one can use a simulation. A distribution of the share price is made by applying a Monte-Carlo simulation through the Crystal Ball Excel add-in and performing 20.000 simulations. The following assumptions are made:

	Distribution	Mean	Standard deviation	Lower limit	Normal	Upper limit
Revenue growth 2017	Normal	-15 %	5 %			
Revenue growth 2018	Normal	3 %	5 %			
Revenue growth 2019	Normal	6,00 %	5 %			
Revenue growth 2020	Normal	12 %	5 %			
Revenue growth 2021	Normal	10 %	5 %			
Revenue growth T	Normal	5,50 %	1 %			
Net operating margin 2017	Normal	0,0239	1,23 %			
Net operating margin 2018	Normal	0,0267	1,23 %			
Net operating margin 2019	Normal	0,035	1,23 %			
Net operating margin 2020	Normal	0,0475	1,23 %			
Net operating margin T	Normal	0,0425	0,50 %			
Turnover rate 2018	Normal	1,93	0,3226			
Turnover rate 2019	Normal	2,02	0,3226			
Turnover rate 2020	Normal	2,2	0,3226			
Turnover rate 2021	Normal	2,4	0,3226			
Turnover rate T	Normal	2,6	0,26			
Mrp (2017-2032)	Uniform			4 %	5 %	6 %
Risk free rate 2020	Normal	2,45 %	0,50 %			
Risk free rate T	Uniform			2,27 %	4,27 %	6,27 %
Minimum share price		***0***				
Maximum share price		***300***				

Table 116: Assumptions for Monte-carlo simulations

It is assumed that revenue growth, net operating margins and turnover rates follow a normal distribution, with a mean equal to the forecasted numbers. The standard deviation in the revenue growth is assumed to be 5% each year, but a lower 1% in steady state. The standard deviation for the net operating margin is set equal to the historic average in 2011-2016 of 1,23%-point for 2017-2020, and a lower 0,5%-point in steady state. The standard deviation of the turnover rates is set to the historical average in 2012-2016 of 0,3225, and 0,26 in steady state (10% of steady state turnover).

For the market risk premium a uniform distribution from 4%-6% is used. The risk free rate in 2020, assumed to be more certain, is assumed to be normally distributed with mean of 2,45% and standard deviation of 0,5%-points. The steady state risk free rate is uniformly distributed from +/- 2%-point from the expected level of 4,27%.

In order to get a realistic distribution, the share price is capped at 0[137] and 300[138]

It is also important to point out that it is assumed that the variables are independent, meaning that there is no predefined correlation between the variables. This is a simplificiation that may give simulations that are unrealistic, for example a large drop in turnover rates at the same time as high revenue growth.
Performing 20.000 siulations gives the following distribution:

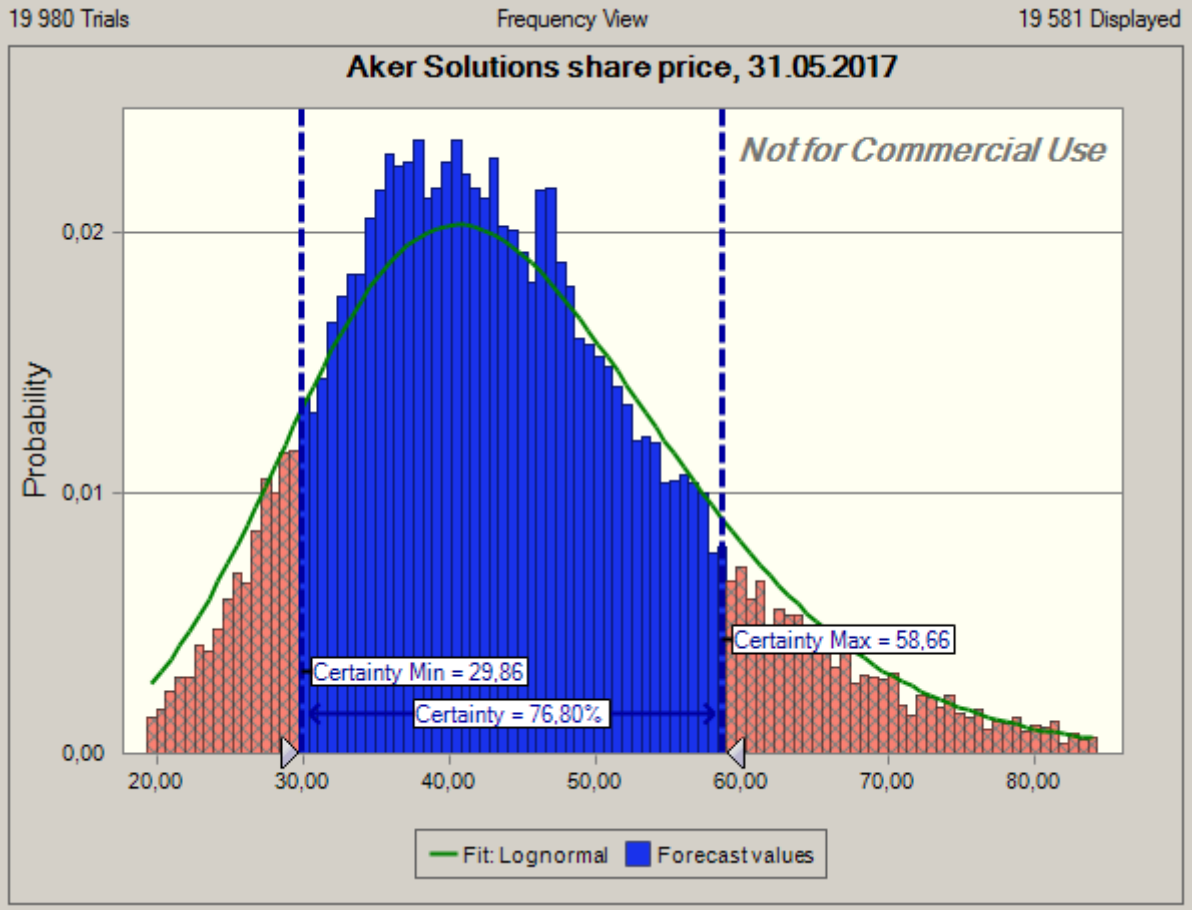


Figure 44: Aker Solutions share price distribution from 20 000 simulations

[137] Assuming liquidation of the company if the share price drops to 0.
[138] A cap at 300 is set because the model include value convergence in 9 steps, cf. chapter 10.3. When the share price reaches values up to 300, the model give no meaningful estimation of the share price.

Statistic	Fit: Lognormal	Forecast values
Trials	---	19 980
Base Case	---	43,05
Mean	44,23	44,26
Median	42,99	42,55
Mode	40,58	0,00
Standard Deviation	13,35	14,40
Variance	178,15	207,22
Skewness	0,5776	3,33
Kurtosis	3,60	49,34
Coeff. of Variation	0,3018	0,3252
Minimum	-25,94	0,00
Maximum	INF	300,00
Mean Std. Error	---	0,10

Figure 45: Statistics from 20.000 simulations

The distribution has a mean of 44,26 NOK/share, which is higher than the estimated share price of 43,05 NOK/share. A median and mode lower than the average indicate a skewed distribution. In this case lightly right-skewed, as expected given that the share price only takes values higher than 0. The standard deviation in the sample is 14,40, which is about 33,84%[139] relative to the mean. In figure 63 the blue-coloured area represents tha outcomes that fall within 1 standard deviation from the mean.

Given the assumptions made, one can with approximately 76% certaintly say that the share price will fall within the range 30-58 NOK/share. At the same time this implies almost a ¼ chance for an up- or downside scenario beyond the bull and bear cases presented earlier. This amount of uncertainty must be viewed in relation to the market price discount on fair value when recommending an investment strategy.

[139] 33,84%=14,4/42,55

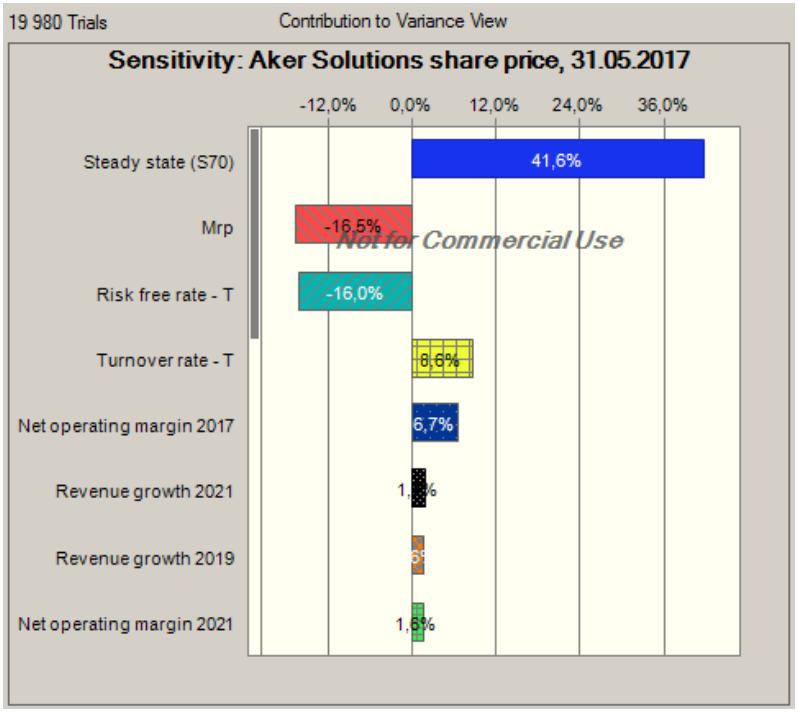


Figure 46: Contribution to variance in the simulation.

From figure 49 we see that the most important contributor to the variance is the net operating margin in steady state[140]. Both the market risk premium and the risk free rate at steady state are other important contributors to the variance in the sample.

[140] Steady state (s70): net operating margin in steady state, T (reached in 2031).

11 Supplementary valuation

In this chapter the fair value estimate from the fundamental analysis will be tested by a relative valuation.

A relative valuation is based on the idea that the value of an asset can be expressed as a comparison with the market's assessment of similar or comparable assets (Damodoran, u.d.). As explained in chapter 1.2, a common method is multiple valuation, where similar companies should trade at similar multiple-levels. The main advantage of this approach is that multiple valuation is fast and easy to calculate. It requires fewer assumptions and less business insight. It has several limitations however, which will be discussed in the analysis.

11.1 Choice of basis and multiplers

11.1.1 Multiple description

In general terms a multiple can be described as $\frac{Value}{Basis} = m$. This can be rearranged such that $basis \cdot m = Value$. By estimating the multiple m from comparable firms, the value of a company can be found by applying this multiple on the relevant $basis$.

There are several different multiples available. The three main types used to calculate multiples based on book value, earnings and sales as the basis.

11.1.1.1 P/B

The price/book multiples describes the relation between the market capitalization and the book value: $\frac{P}{B} = \frac{Market\ capitalization}{Book\ value\ of\ equity} = \frac{Price}{Book\ value\ per\ share}$

The value of equity is found by multiplying the industry P/B multiple by the company's book value of equity. The P/B relationship of a company indicates whether the market is valuing the shares higher than what is recognized in the balance sheet, indirectly determining whether the company will be able to provide future returns higher than cost of capital, as explained in chapter 10.1.2. A P/B<1 can indicate that the company are struggling[141] or that the book value of its assets is too high. The P/B multiple is often a better indication for more capital intensive companies.

11.1.1.2 P/E

The P/E multiple measures the relationship between the market capitalization and net income:

[141] $r_e < k_e$ indicates a strategic disadvantage, cf. chapter 7. The P/B should therefore be seen in relation to r_e.

$\frac{P}{E} = \frac{Market\ capitliazation}{Net\ Income} = \frac{Price}{EPS}$ [142]. Another way to put this relationship is how much the market is paying for one NOK in earnings, indicating the level of expected future earnings growth. Given that earnings and growth rates vary substantially between industries, P/E only makes sense when comparing companies in the same industry. There is several problems with the P/E estimate however. Because the 'basis' is net income, differences in tax rates, depreciation scqedules/methods, capital structure etc. affect the multiple. Such factors must be taken into account when comparing P/E multiples across companies.

11.1.1.3 P/S

The P/S ratio measures the relationship between the market capitalization and revenues: $\frac{P}{S} = \frac{Market\ capitliazation}{Revenues} = \frac{Price}{Revenues\ per\ share}$. It expresses how much the market is willing to pay for one NOK in revenue. A way to interpret this is therefore that if the P/S ratio is much higher or lower than comparable firms, it may indicate the company are over- or undervalued.

Problems with equity based multiple valuations

As earlier explained, the value of equity can be found by multiplying the multiple by its relevant basis $Equity = m \cdot basis$. However, when estimating the equity directly through multiples one does not adjust for differences in capital structure. Different capital structure may leave substantially different multiples. Especially for the P/S multiple, companies with more leverage should have a proportionally lower P/S as they have more assets that generate revenues. Firm-based multiples are therefore calculated and analyzed as well. There are several different methods for calculating firm-based multiples, with Enterprise value[143] being the most common. For the purpose of consistency in the paper, net operating capital is used as the basis. NOC [144] is calculated the same way as previously, cf. chapter 4.5.2. This gives the following multiples:

Firm Price/Book: $\frac{V_{NOC}}{NOC} = \frac{Market\ Cap+MIN+NFD}{Book\ Equity+MIN+NFD} \rightarrow V_{Eq} = \frac{V_{NOC}}{NOC} \cdot NOC - MIN - NFD$

Firm Price/Earnings: $\frac{V_{NOC}}{Net\ Operating\ Income} \rightarrow V_{eq} = \frac{V_{NOC}}{NOI} \cdot NOI - MIN - NFD$

Firm Price/Sales: $\frac{V_{NOC}}{Revenues} \rightarrow V_{eq} = \frac{V_{NOC}}{Rev.} \cdot Rev. - MIN - NFD$

[142] EPS: Earnings per share
[143] Entreprise value: Market Cap + Market value of debt – cash&cash equivalents.
[144] NOC: Net operating capital. NOC = Equity + Minority Interests + Financial debt – Financial assets

11.2 Industry adjustment

The comparable companies used to create syntethic industry multiples are the same as used in the historical analysis. The synthetic industry multiples are calculated from an aggregation of the numbers from the individual companies, adjusted for relative relevance, cf. benchmark estimation in chapter 4.2.3. However, as the adjustment only account for the relative weight, not for lack of homogeneity in capital structure, business operations etc., the synthethic industry as an individual asset can hardly be seen as 'similar' to Aker Solutions, but is a better approximation than an unweighted average. The multiple-valuation will only work as a supplementary valuation, controlling the estimations made in the DCF-analysis.

11.3 Multiple valuation

As 2016 was characterized by a challenging market, 2014 is included in order to evaluate the multiples in a more 'normal' year. Normalized numbers are used in the calculations, in order to reduce variation in multiples due to non-recurring or random[145] effects. The 31.05.2017 multiples are calculated from the market price 31.05.2017, but the same 'basis' as 31.12.2016. The current multiple is therefore not directly comparable to that of 2014 and 2016, as it is more retrospective.

Given the findings in the strategic analysis, where Aker Solutions is found to have a potential strategic advantage in relation to its ability to provide integrated solutions which is expected to be in demand as new deep- and ultradeepwater oilfield is developed, but a strategic disadvantage in its lack of size and ability to cut costs through supply chain coordination and integration, its expected that Aker Solutions currently will trade at a discount relative to peers. Especially TechnipFMC and Schlumberger currently have a stronger position in the subsea market. The problem is that they both are characterized by their size and diversified portolio of business units, which would make their multiples less comparable to that of Aker Solutions. The same goes for General Electric.

[145] Random items such as currency gain/losses etc.

Company	VNOC/NOC			VNOC/NOI			VNOC/S			P/B			P/E			P/S		
Date	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
	31/12	31/12	31/05	31/12	31/12	31/05	31/12	31/12	31/05	31/12	31/12	31/05	31/12	31/12	31/05	31/12	31/12	31/05
TechnipFMC PLC	2,74	1,20	0,97	20,18	23,26	18,81	1,86	1,31	1,06	3,66	1,21	0,97	19,46	22,90	18,25	1,62	1,24	0,99
Oceaneering International Inc	2,50	1,48	1,62	19,83	59,69	65,48	2,27	1,75	1,92	3,53	1,82	2,07	16,71	55,42	62,95	37,63	1,25	1,42
Schlumberger Ltd		0,47	0,47		34,06	33,54		1,12	1,10		0,26	0,25		17,47	16,78		0,43	0,41
John Wood Group PLC	1,27	1,58	1,38	13,90	26,95	23,52	0,81	1,30	1,13	1,38	1,88	1,57	11,85	24,27	20,36	0,63	1,03	0,86
Dril-Quip Inc	2,24	1,60	1,26	17,27	25,83	20,42	3,64	3,95	3,12	2,13	1,52	1,23	18,04	27,53	22,27	3,81	19,61	15,80
General Electric Co	1,69	2,17	1,90	33,59	47,35	41,39	2,79	2,98	2,60	1,78	3,11	2,62	31,77	37,65	31,70	2,59	2,37	2,00
Synthetic industry	**2,60**	**1,29**	**1,13**	**32,04**	**31,97**	**27,92**	**3,05**	**1,69**	**1,48**	**2,57**	**1,38**	**1,17**	**30,94**	**27,72**	**23,40**	**2,83**	**1,38**	**1,16**
Average	2,09	1,42	1,27	20,95	36,19	33,86	2,27	2,07	1,82	2,49	1,63	1,45	19,57	30,87	28,72	9,26	4,32	3,58
Median	2,24	1,53	1,32	19,83	30,50	28,53	2,27	1,53	1,53	2,13	1,67	1,40	18,04	25,90	21,31	2,59	1,24	1,20
Aker Solutions ASA - consensus	1,45	1,37	1,38	7,31	14,88	14,96	0,49	0,64	0,64	1,81	1,64	1,66	5,23	15,76	15,90	0,34	0,44	0,44
Fair Value - Aker solutions ASA		1,38	1,41		14,93	15,31		0,64	0,66		1,65	1,71		15,85	16,44		0,44	0,46
Relative Valuation																		
V_NOC	29073	15278	13346	71187	34901	30487	100650	43233	37766									
NFD	4744	4869	4869	4744	4869	4869	4744	4869	4869									
MIN	216	138	138	216	138	138	216	138	138									
V_Equity	24113	10270	8338	66227	29893	25479	95690	38226	32758	16015	9615	7980	66758	42472	16677	93174	43903	29660
#shares	271,4	271,5	272,0	271,4	271,5	272,0	271,4	271,5	272,0	271,4	271,5	272,0	271,4	271,5	272,0	271,4	271,5	272,0
Price	88,9	37,8	30,6	244,0	110,1	93,7	352,6	140,8	120,4	59,0	35,4	29,3	246,0	156,4	61,3	343,3	161,7	109,0

Table 117: Multiples for industry peers and Aker Solutions

From the estimates it's evident that the estimated price vary substantially between different multiples. It should be noted that when estimating the value of Aker Solutions on the basis of the comparable firms, company-specific expectations related to Aker Solutions are not included in the estimate. The value may therefore be substantially over- or underestimated relative to the fair value. Furthermore the valuation is made on the assumption that the consensus estimate of comparative companies reflect the true value of these companies. If the market price is over-/underestimated, this will impact the syntethic industry multiples. Another factor is that both financial debt, financial assets and non-controlling interests are based on recognized value in the balance sheet. These items may be traded at different levels, which ideally should be included and may affect the estimations.

The estimated share price from the relative valuation is presented in table 98. These numbers will be explained separately.

Share price Average of equity- and NOC-methods	31.12.2014	31.12.2016	31.05.2017
P/B-methods	73,93	36,62	29,99
Synthetic industry multiple	2,58	1,34	1,15
P/E-methods	245,02	133,25	77,48
Synthetic industry multiple	31,49	29,84	25,66
Average	**159,47**	**84,94**	**53,74**

Table 118: Average share price from P/B-methods, P/E-methods and average of P/B- and P/E-methods

11.3.1 Book-value

From the P/B multiples the estimated share price of Aker Solutions ASA per 31.05.2017 is 29,99 NOK/share and 36,62 NOK/share 31.12.2016. This implies that the DCF-analysis include a substantial premium relative to the industry.

The P/B multiples in the industry has generally stayed above 1, indicating future growth, but fallen gradually as the growth expectations has followed the oil price decline. It can be seen by the synthetic industry P/B ratio has declining from about ca. 2,60x book value in 2014 to 1,13x (1,17x by equity-method) in 2016. The difference between the companies illustrates the difference in operational and capital structure. Schlumberger and General Electric's P/B ratios differs substantially from the industry average, as expected due to their business involving operations in several other industries. The average and median is somewhat higher than the weighted industry P/B, mainly because TechnipFMC and Schlumberger, with lower P/B ratios, drags down the industry estimate. Given their average capital intensity being much higher it seems reasonable. It can also possibly explain why Aker Solutions currently trades at a premium relative to the industry. The most comparable companies in terms of assets and scope of operations, but less so in capital structure, is Oceaneering and Wood Group. These companies trade at multiples relatively close to Aker Solutions, which may indicate that the fair-value estimate from the DCF-analysis prices Aker Solutions relatively fairly in terms of P/B, and that the estimated share price form the synthetic industry P/B is too low.

11.3.2 Earnings

The P/E-estimated share price is 84,94 NOK/share per 31.12.2016 and 53,74 NOK/share per 31.05.2017. It implies that the estimated fundamental value include a discount relative to peers. As the P/E multiples in the industry is higher than that of Aker Solutions it seems that the market expects higher earnings growth in the industry than what is included in the fair-

value estimate. Aker Solutions trading at a discount is therefore in line with the strategic analysis, where Aker Solutions is expected to be less competitive in generating revenues in the near future and a higher cost base squeezing margins. However, the P/E discount may as well be explained by Aker Solutions' relatively higher earnings in 2016 due to its more stable field design contracts, which naturally lowers the P/E ratio when calculated on the basis of the current earnings rather than next years'[146]. It must also be pointed out that the P/E-estimated share price of Aker Solutions is fairly close to the bull case presented in the sensitivity analysis in chapter 10.5.2, which seems reasonable given that the industry on average is expected to experience higher revenue growth and stronger margins than Aker Solutions in during the recovery phase in 2017-2021.

11.3.3 Sales

Aker Solutions trades a substantially lower P/S ratio than peers, which in general could indicate that they are undervalued. A more reasonable explanation may be that Aker Solutions had relatively higher earnings in 2016 due to its previously strong backlog. In addition they have a higher leverage ratio, which naturally gives higher revenues relative to equity and a lower P/S-ratio. Dril-quip is for example close to 100% equity financed, yielding a much higher P/S ratio due to its capital structure. The difference in capital structure makes the P/S ratio less relevant in this case and it is therefore taken out of the valuation.

11.3.4 Fair value, relative value and market consensus

Aker Solutions ASA share price	31.12.2014	31.12.2016	31.05.2017
Relative valuation	159,47	84,94	53,74
DCF-estimated fair value	-	41,52	43,05
Market consensus	41,55	41,37	41,65

Table 119: Aker Solutions share price from relative valuation, fundamental valuation and market consensus (Source market consensus: Bloomberg Terminal).

From the relative valuation it seems that the fair value estimate include a discount relative to peers. Given the findings in the strategic analysis, this seems reasonable as the peers on average are more diversified and not as vulnerable to the downturn in the industry as Aker Solutions. In addition TechnipFMC and Schlumberger both currently has a stronger strategic position in the subsea market, cf. chapter. 3.2. The relative valuation therefore supports the findings in the fundamental valuation. Furthermore the fair value share price from the DCF-

[146] In practice P/E is often calculated as forward-P/E, where expected earnings is trailed for the next fiscal period. The 31.05.2017 estimate is backward looking, as it used earnings from 31.12.2017.

analysis is fairly close to market consensus, especially the 31.12.2016 estimate. This implies that given the assumptions made in the fundamental valuation, Aker Solutions is currently priced close to fair value.

12 Investment recommendation

The main purpose of the fundamental valuation is to estimate the fair value of Aker Solutions per 31.05.2017 in order to assess whether Aker Solutions is priced at fair value in the market. On the basis of the market price relative to fair value, in addition to the findings in the strategic analysis and the evaluation of the inherent uncertainty in the estimate, a recommendation is made on whether a well-diversified investor should buy, hold or sell shares of Aker Solutions.

As presented in table 99, the market price per 31.05.2017 was 41,65 NOK/share, versus an estimated fair value of 43,05 NOK/share. The difference amounts to a discount of 3,36%[147].

The relatively small discount must be seen in relation to other factors.
From the external analysis we have that the oil price is an important driver, and where currently low oil prices favours players who are able to cut costs and reduce break-even prices on new developments. The current rivalry is intense, and both TechnipFMC and Schlumberger are considered to be better posititioned in the market. The challenging market therefore leaves Aker Solutions in a strategically unfavourable position in the shorter term. This may be some of the reason for the relative valuation showing that Aker Solutions is trading at a discount relative to peers.

In the longer term, Aker Solutions potential strategic advantage related to its strong engineering capabilities through providing integrated solutions, and strong customer relationships, is expected to yield abnormal returns over time, but lower than during the last cycle.

Low credit risks limits the downside, but given that Aker Solutions strategy of growth internationally doesn't materialize the downside is substantial. However, if they are able to maintain market share in the shorter term and increase it through winning important contract in Brazil and the Asia-Pacific region in the longer term, the upside case is attractive.

From this it is no clear indication of a mispricing in the market. The discount of 3,4% is relatively small given the substantial uncertainty in the estimate. Both the increasing oil price

[147] 3,36%=43,05/41,65

volatility, which makes the the overall activity in the market uncertain, and the uncertainty related to the key assumptions in the estimate, are factors that must be taken into account. A neutral strategy seems most reasonable given the limited discount in the market.

For a well-diversified investor it is recommended to **hold** shares of Aker Solutions ASA.

13 Overview of abbreviations

1Q	=	First quarter
$/bbl	=	US Dollars per barrel
β	=	Beta
β_e	=	Equity beta
β_{cash}	=	Beta cash & cash equivalents
β_{FA}	=	Financial asset beta
β_{FD}	=	Financial debt beta
β_{inv}	=	Beta financial investments
β_{NFD}	=	Net financial debt beta
β_{NOC}	=	Net operating capital beta
$\beta_{NOC}^{Industry}$	=	Industry Net operating capital beta
β_{rec}	=	Beta financial receivables
CAGR	=	Compound annual growth rate
CAPEX	=	Capital expenditures
CAPM	=	Capital Asset Pricing Model
Corr	=	Correlation
CE	=	Capital employed
Crp	=	Credit risk premium
EPCI	=	Engineering, procurement, Construction and Installation
Eq.	=	Equity to shareholders of the parent company
DCF	=	Discounted cash flow
DW	=	Deepwater
E&P	=	Exploration and production
EPCI	=	Engineering, procurement, construction & installation
FEED	=	Front-end engineering and design
FA	=	Financial assets
FCFCE	=	Free cash flow from capital employed
FCFE	=	Free cash flow to equity holders of the parent company
FCFO	=	Free cash flow from operations
FD	=	Financial debt
FID	=	Final investment decision
FPSO	=	Floating Production, Storage and Offloading vessel

GE	=	General Electric
GDP	=	Gross National Product
GoM	=	Gulf of Mexico
HSE	=	Health, safety and the environment
IRM	=	Inspection, repair and maintenance
k_e	=	Cost of equity
k_{cash}	=	Cost of cash & cash equivalents
k_{inv}	=	Cost of financial investments
k_{NOC}	=	Cost of Net Operating Capital
k_{rec}	=	Cost of financial receivables
ilp	=	Illiquidity premium
ilp_{MIN}	=	Illiquidity premium for non-controlling interests
Inv	=	Investments
ME	=	Measurement error
MIN	=	Minority interests / Non-controlling interests
mir	=	Return on minority interests / non-controlling interests
MM	=	Millions
MM1	=	Miller & Modigliani's first proposition
MMO	=	Maintenance, Modifications and Operations
mrp	=	Market risk premium
MSCI	=	Morgan Stanley Company Index
NCS	=	Norwegian Continental Shelf
NFD	=	Net financial debt
NOC	=	Net Operating Capital
NPV	=	Net present value
Op. Inc	=	Operating income
Op. tax	=	Tax on operating income
OPEC	=	Organization of the Petroleum Exporting Countries
OPEX	=	Operating expenditures
OCI	=	Other Comprehensive Income
R&D	=	Research and development
Rec	=	Receivables
r_f	=	Risk free rate

Rev.	=	Revenues
SPS	=	Subsea Production System
Std	=	Standard deviation
SURF	=	Subsea, umbilicals, risers & flowlines
SW	=	Shallow water
SWOT	=	Strengths, weaknesses, opportunities and threats
t	=	Tax
UDW	=	Ultra-deepwater
UK	=	United Kingdom
VRIN	=	Valuable, rare, inimitable, non-substitutable
VRIO	=	Valuable, rare, inimitable, organized
WACC	=	Weighted average cost of capital

14 References, figures and tables

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