

Norwegian Maritime equipment suppliers 2017

KEY PERFORMANCE INDICATORS AND FUTURE EXPECTATIONS

Preface

2017 has been a very challenging year for the Norwegian maritime industry. We have asked Menon Business Economics to review the current situation and to get their view on the future, based on the results reported by the companies after year end 2016 and from interviews with leading personnel in the same companies.

This is the fourth year the Federation of Norwegian Industries has ordered such a publication, and the current report is clearly the document with the most pessimistic view on the industry. It is noted that the situation for the industry is even more challenging than foreseen only one year ago. We see a continued change in the composition of the orderbooks with low focus on offshore vessels, over-capacity in the market for ships, and extensive layoffs in many segments of our industry.

The report describes the changes that have occurred in the market and gives interesting insight into how the companies have adapted to the new market situation. It is difficult to find reasons to celebrate the results in 2017, but we are comforted by the obvious belief amongst the players that 2018 will be the year the industry starts growing again. We trust the companies have done what they could to adapt to a slower order-intake and are ready for an upturn which surely must come. Our industry has repeatedly proven that it is able to adapt to changing market conditions, and we believe that the industry once again will rebound.

We complement Menon Economics for their diligent work.

Oslo, 23 October 2017

Lars Gørvell-Dahl

Director, Maritime Department, Federation of Norwegian Industries



Summary and conclusion

Norway is home to a world leading cluster of maritime companies that deliver high-class shipping services globally, new and innovative ships, leading technological, legal and financial services and world-class maritime equipment. In 2016 Norwegian ship equipment suppliers' **turnover was NOK 62 billion, they achieved a value creation of NOK 17 billion and employed 18,000 people.** The industry is a significant part of the Norwegian maritime cluster and very important for the innovative power of the industry. The suppliers are also very internationally oriented, **they exported 90 percent of their goods and services for a total value of NOK 45 billion.**

The adaptability of Norwegian suppliers has been put to a serious test during the last three years as their main market (offshore oil and gas) has seen dramatically declining demand in the wake of falling oil prices. **2016 saw the largest fall in turnover this decade at 18 percent. Employment is also falling rapidly with more than 2 500 people losing their jobs in the supplier industry during 2016.** Profitability is for the first time negative at minus one percent. But, while many companies are struggling, we see that the small- and mid-sized companies are performing somewhat better than the larger companies.

Companies participating in the survey behind this report suggest that 2017 will be another weak year, with turnover estimated to fall by another 10 percent. Profitability will probably stay low in 2017, but in the interviews the companies indicate that they expect to be doing better than in 2016. After several years of falling activity and profitability the financial situation is difficult for many companies in the industry. In such a situation, it is positive **that the future outlook for 2018 is more positive than what we have experienced the last few years.** Six out of ten companies expect turnover to increase in 2018, while only 5 percent suggest that turnover will fall by more than 10 percent. This is much stronger than what we saw in last year's report. Still, orderbooks have fallen during the last twelve months and this is usually a valid indicator for the level of future activity – which indicates to us that 2018 will be weaker than 2017. One explanation for these somewhat contradictory views would be that companies believe that order books now have reached their lowest point and that they will grow going forward. While we see some early indications of growth in both the offshore oil and gas markets and traditional shipbuilding markets, demand is expected to stay weak in 2018. Most of the growth will then have to occur in other markets or in non-maritime markets.

The Norwegian maritime industry has always been in a state of flux. Changing demand patterns, combined with new technological developments and suppliers selling to competitive international markets, means that the companies rapidly need to adjust to new market demands. **In 2016 we see an increasing diversification of markets.** Deliveries to offshore oil and gas markets have fallen from two-thirds of the total turnover in 2014, to 43 percent this

year. Traditional markets are still important, but the largest growth has been in other specialized market applications including fisheries, aquaculture, ferries, and the cruise segments. A quarter of turnover in 2016 was from these markets, a share that has increased and that we expect will increase further in response to increasing market demands.

Two important forces that will continue to influence the industry in the coming years are **the increased pressure on developing environmentally friendly solutions and the increased effect of digitalization and new production processes**. 70 percent of the companies in this year's survey believe that the rate of change in the industry will increase in the coming years. While most companies believe that the technological change will positively effect growth and profitability, less than 4 percent believe it will influence them negatively. This lack of focus on the potential damaging effects of digitalization is possibly worrying. In some industries, we see that digitalization creates a concentration on a few companies with leading positions while many SMBs are struggling to compete. Despite this, one thing is clear; Digital solutions are here to stay. However, the supplier industry is adapting by hiring more people with digital competence which should be a good sign.

Contents

Preface	3
Summary and conclusion	5
1. The equipment suppliers play a key role in the Norwegian maritime industry – one of Norway’s biggest and most important industries	9
1.1. Ship equipment is divided into five main product groups	10
1.2. Focus is only on the companies’ maritime activity	11
2. Equipment manufacturers are still an important part of industrial production in Norway, but activity is falling sharply	13
2.1. 1 000 companies created 18 000 jobs and a turnover of NOK 62 billion.....	13
2.2. 90 percent of the equipment is exported	14
2.3. Activity keeps falling in 2016	14
2.4. Profitability is negative for the equipment suppliers in 2016	15
2.5. Value creation grew during the offshore boom, before falling back sharply after 2014	16
2.6. 2017 will be another year with lower activity.....	17
2.7. The after-market is important for the profitability level	18
3. The future outlook is more promising – will 2018 be the year that the suppliers will grow again?	19
3.1. Companies believe that activity could increase in 2018.....	19
3.2. A reduced order book could suggest that 2018 will be more difficult than expected.....	20
3.3. The importance of the offshore segment has fallen in the last two years.....	20
3.4. Oversupply will limit growth in both offshore- and traditional markets, but this year we see the first positive signals in these markets	22
3.5. Digitalization and environmentally friendly solutions will be important drivers going forward.....	23
3.5.1. Norwegian suppliers are leading the way with environmentally friendly solutions	24
3.5.2. The digitalization of suppliers and the technological development is rapidly changing both production processes and the product itself.....	25
4. Appendix.....	27
4.1. Data registry and survey data.....	27
4.2. Delimiting the maritime industry.....	27
4.2.1. Maritime equipment suppliers – definition and subdivision into groups	28
4.3. The industry’s geographic footprint: Value creation by county	28
4.4. Key performance indicators for the industry in 2016.....	29
4.5. Key variables (2015-2016) distributed into subgroups and main groups.....	30

1. The equipment suppliers play a key role in the Norwegian maritime industry – one of Norway’s biggest and most important industries

Maritime equipment suppliers are part of one of Norway’s biggest and most important industries: the maritime industry. It is important to look at equipment suppliers within a larger context since the development experienced by equipment producers is and will continue to be dependent on the strength of this entire industry. The maritime industry in Norway is strong and has a long history. In 2016 the industry was behind collective value creation of close to NOK 150 billion in Norway and employed around ninety thousand people¹. The industry is competitive in the global arena and generated a third of Norway’s exports (excluding oil and gas). During the last 20 years, the Norwegian industry has increasingly focused on serving the offshore oil and gas market. In 2014 the oil price started to decline rapidly and so did demand for deliveries of services and new vessels to this market. As a result, value creation fell by approximately 20 percent in 2016. Still the industry plays a key role for the Norwegian economy. The industry is also represented along Norway’s entire coastline, and in certain coastal communities it totally dominates value creation within the local economy.

Norway is one of the world’s leading maritime nations. Despite Norway being home to only one thousandth of the world’s population, the country is a major power within the international maritime industry. Norwegian-controlled shipping companies own around six percent of the value of the world’s fleet of ships, and Norwegian companies are leading in many fields. In ship financing, in legal institutions, in certification, and in the construction of ship equipment and drilling equipment, Norwegian companies are among the best known. In addition, Norwegian companies are responsible for a constant flow of innovations in ship design, propellers, equipment, and services. Many of these innovations contribute to improving the environment and climate.

One of the reasons for the Norwegian maritime industry’s international success is that the companies have had a high growth in productivity – in other words, they are managing to produce more with fewer employees. This has led to higher levels of productivity, but also increased wage levels. In fact, the average wage level in the Norwegian maritime industry is fifty

¹ Preliminary numbers for 2016











percent higher than the average for Norwegian companies. This productivity trend can again be explained by two other characteristics of the industry in Norway: it is knowledge-based and innovation-driven. It is the people who possess the knowledge and create the innovations. Knowledge is developed and distributed in the interaction between the players, and innovations are created and implemented within that same interaction. In the research project called "A knowledge-based Norway", the interaction between experience-based skills and research-based knowledge was identified as one of the industry's most important competitive advantages (Reve & Sasson, 2012). Operational skills

from working at sea are a key factor in this interaction.



1.1. Ship equipment is divided into five main product groups

In this report, we will describe and analyse maritime equipment and design services that are developed for maritime applications. We divide ship equipment into five groups as described and illustrated in the figure below. We will also present some separate statistics about deliveries to offshore rigs. For more detail about delimitation and division of these groups, see the methodology section of the report.

SHIP EQUIPMENT

 <p>Mechanical equipment • Cranes, winches, propellers, engines etc</p>	
 <p>Electrical and electronic equipment • DP, software, specialised hardware, bridge equipment, sensors etc</p>	
 <p>Design • Ship design</p>	
 <p>Other operating equipment • Paint, lubricant, cables, chains, life-boats etc</p>	
 <p>Trade • Agents, wholesalers and distributors</p>	

DRILLING AND OFFSHORE EQUIPMENT FOR SHIPS AND RIGS

 <p>Drilling and offshore equipment for ships and rigs • Drilling packages and related equipment, etc.</p>	
--	---



1.2. Focus is only on the companies' maritime activity

In the report, the only figures presented will be those related to the maritime part of operations. As the figure below shows, total turnover within the various subgroups would have been much

higher if all operations in the various companies had been included. While companies focusing on mechanical equipment and trade have around 80 percent of their activities directed towards ship equipment, the percentage is much lower for electrical and electronic equipment.

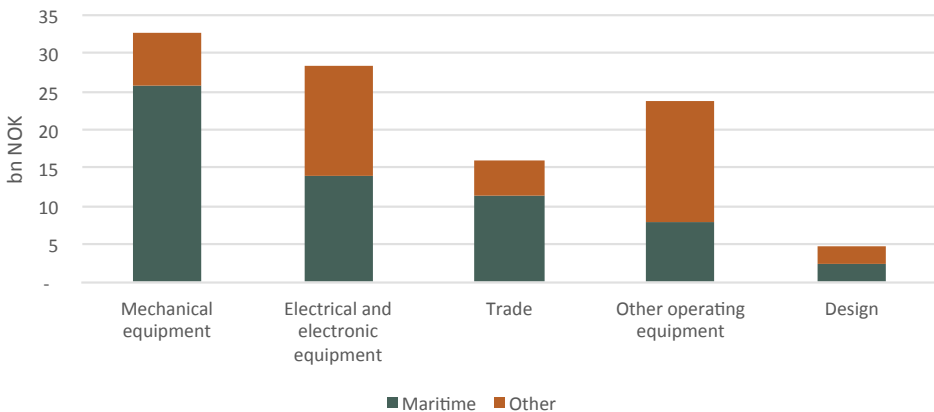


Figure 1: Turnover for ship equipment suppliers broken down into maritime and other turnover 2016. SOURCE: MENON (2017)

2. Equipment manufacturers are still an important part of industrial production in Norway, but activity is falling sharply

Ship equipment producers in Norway are known world-wide for quality and innovative solutions. Norway has been a leading maritime nation for centuries, and ship equipment producers play a vital role when it comes to the innovative power of the Norwegian industry. In 2016, the 1 000 ship equipment companies employed 18,000 people and generated a turnover of NOK 62 billion. The employees are very productive, contributing with NOK 1 million in value added each. Based on this, they are more productive than the average Norwegian worker, thereby contributing significantly to the Norwegian economy.

2.1. 1 000 companies created 18 000 jobs and a turnover of NOK 62 billion

Our data in this report cover more than 1 000 manufacturers, designers, and traders of ship equipment. Some of them focus on the

maritime market, while others only deliver a low percentage of their turnover to this market. In 2016, they generated NOK 17 billion in value added to the Norwegian economy and, on average, each employee contributed close to NOK 1 million to Norwegian GNP. This makes the ship equipment producers an important contributor to Norwegian industrial production and to a key industrial segment, the maritime industries.

40 percent of value creation in the segment is made up of mechanical equipment, making it the largest group. Electrical and electronic equipment comes second in terms of value creation contributing 28 percent of total value creation. Combined, the two biggest segments are behind close to 70 percent of value creation. Traders of ship equipment and producers of other operating equipment each add 13 percent

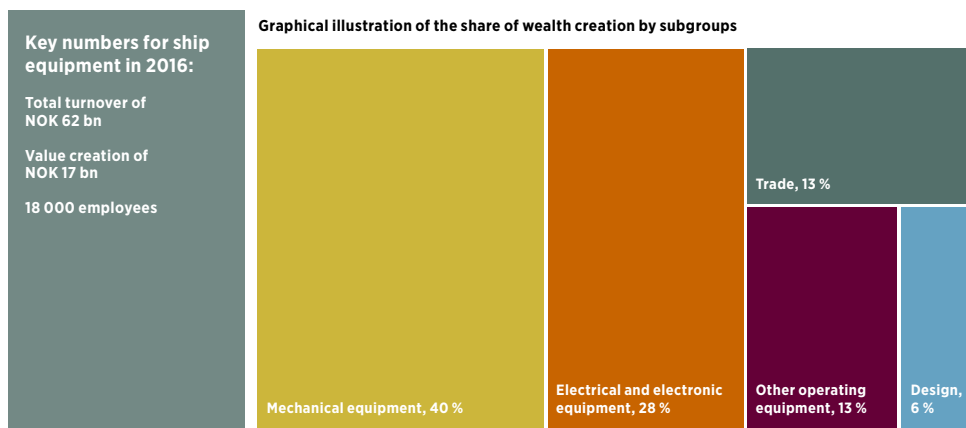


Figure 2: Key performance indicators for manufacturers of all types of ship equipment, 2016. SOURCE: MENON (2017)

of value creation. Designers make up the smallest subgroup contributing 6 percent to overall value creation. They may be the smallest group, but the designers play a vital role for the ship equipment companies. In addition to a value creation of NOK 17 billion among ship equipment producers, manufacturers of drilling equipment generated a value creation of NOK 4.5 billion in 2016.

2.2. 90 percent of the equipment is exported

The market for ship equipment is international. Two thirds of the equipment (NOK 33.6 billion) is sold directly to foreign yards, shipping companies or other maritime companies. In addition, a large share of equipment sold to Norwegian yards and shipping companies is used to create exports, either through foreign orders at Norwegian yards, or as equipment for Norwegian shipping companies supplying services abroad. This indirect export is estimated to be NOK 11 billion in 2016, bringing the total export up to NOK 45 billion. Combined, the real export rate is then close to 90 percent, as illustrated in the figure below. The high export rate has been quite stable for several years, since the market for ship equipment for vessels operating in Norway is small compared to the large world market.

Not included in the export numbers above are drilling equipment producers' exports. In 2016, they exported equipment for a value close to NOK 13 billion. That brings exports from maritime equipment suppliers to NOK 57 billion in 2016, or 10 percent of Norwegian exports excluding oil and gas. In comparison, another important industry for Norway, the tourism industry, generated NOK 52 billion in exports, showing also the relative importance of the industry for the Norwegian economy.

2.3. Activity keeps falling in 2016

Activity among ship equipment producers fell sharply in 2016 for the second year in a row. In last year's report, the equipment manufacturers estimated that turnover would fall by 12 percent in 2016. The result shows that the fall was deeper than anticipated, turnover fell by 16 percent, from NOK 74 billion in 2015 to NOK 62 billion in 2016. This is the largest fall in activity seen in the last ten years. All segments of the industry saw lower activity, but the fall was deepest for mechanical equipment, where turnover fell by 24 percent. Turnover in design and trade fell less than in other groups, with trade falling by 2 percent and design falling by 4 percent.

Two important factors can explain the falling activity in the last two years, oil prices and over-

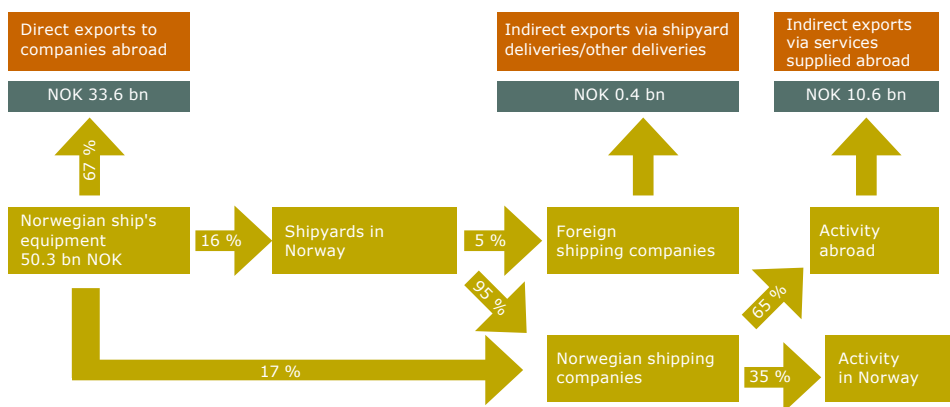


Figure 3: Illustration of direct and indirect exports of ship equipment from Norway in 2016. SOURCE: MENON (2017)

capacity. The large fall in oil prices mid-2014 has had a large impact on the equipment suppliers' turnover. Since the offshore market has grown in importance during the last decade the falling activity offshore therefore affected the activity level for equipment manufacturers strongly. Reduction of new orders offshore in late 2014 started to impact the equipment suppliers' turnover in 2015, but did not show its full effect until 2016. In addition, the shipbuilding market still suffers from overcapacity, and new orders in more traditional markets are at a lower rate compared to pre-financial crisis levels.

On the other side, two other developments have positively affected the equipment producer's activity level and competitive power. Firstly, the weakened Norwegian currency has helped the Norwegian suppliers stay competitive in a

difficult international market. From 2013 to 2016 the Norwegian krone fell close to 30 percent against the USD, and around 20 percent compared to the Euro. That means that Norwegian producers effectively reduced wage costs by 20-30 percent compared to international competitors, making Norwegian labour much more internationally competitive. The second positive development is found in new emerging market applications; this will be discussed in more detail later in this report.

Employment and value creation follows the same trajectory as turnover. Ship equipment suppliers employed 18 000 people in 2016, down from 20 700 in 2015. Value creation fell more sharply than turnover, driven by a continued reduction in operating margins.

	2015	2016	Change from 2015
Turnover (bn NOK)	74	62	-16 %
Value creation (bn NOK)	21	17	-20 %
Employment	20 700	18 000	- 13 %
Operating margin	4 %	- 1 %	- 5 pp

Table 1: Key performance variables in 2016, 2015 and change in variables from 2015 to 2016. SOURCE: MENON (2017)

2.4. Profitability is negative for the equipment suppliers in 2016

In the decade between 2004-2014, operating margins were quite stable at around 7-9 percent. Operating margins fell sharply in 2015, down to 4 percent, before turning negative in 2016. This is the first time in our data series stretching from 2004 that operating margins are negative, at -1 percent. Understandably, this is challenging for the companies in the industry. New innovations and a change towards new growing markets demand investments that are difficult to finance in weak markets. At the same time, the innovative power of the maritime industry is well known, and the companies focus on and are used to a market that is known to be volatile.

Some of the large equipment suppliers have been hit especially hard by the downturn in the market. The biggest supplier of ship equipment,

the Rolls-Royce group, represented by Rolls-Royce Marine and Bergen Engines, posted an operating margin of -30 percent in 2016. Kongsberg Maritime and MacGregor, both top 5 companies concerning turnover, also posted negative operating margins in 2016, but not at the same magnitude as Rolls-Royce. When we exclude the five biggest companies in our figures, operating margins among the smaller companies are also falling sharply, but are still on the positive side of zero.

Looking at profitability in the different sub-groups, we see that profitability is falling for all subgroups in 2016. The two largest subgroups, mechanical equipment, and electrical and electronic equipment, are experiencing negative operating margins in 2016. They are the groups where we see the most negative development of profitability during the last year, together with

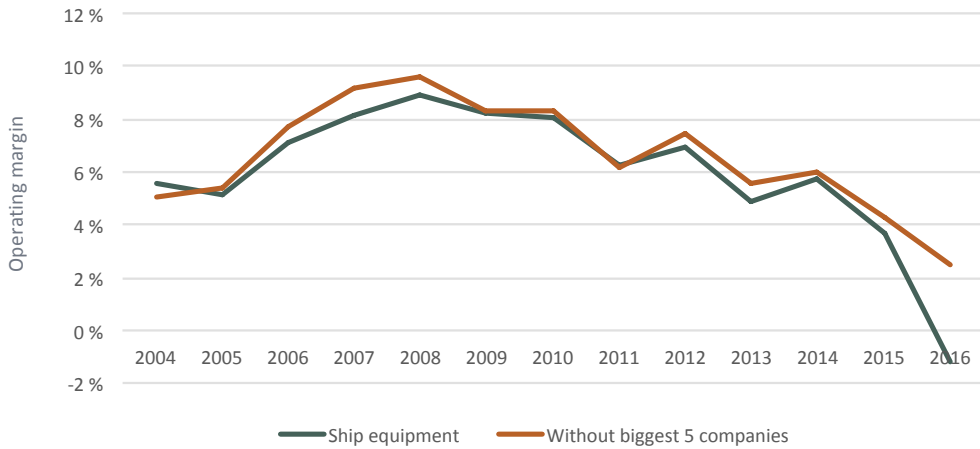


Figure 4: Operating margins (EBIT) among manufacturers of ship equipment, 2004-2016. SOURCE: MENON (2017)

design activities. The low margins in the two largest subgroups are largely due to the negative results of a few of the biggest companies in the industry. By removing companies with above NOK 1 billion in turnover, both groups will have positive operating margins in 2016, electrical and electronic equipment at 3 percent and mechanical equipment at just below 2 percent. The fall in profitability is smallest among the traders of ship equipment, resulting in this sub-

group now having the highest operating margin among the ship equipment suppliers.

2.5. Value creation grew during the offshore boom, before falling back sharply after 2014

Value creation at manufacturers of ship equipment has grown by 77 percent from 2004 to 2016. The development of value creation has gone in cycles throughout these years, with periods of high growth and periods of negative

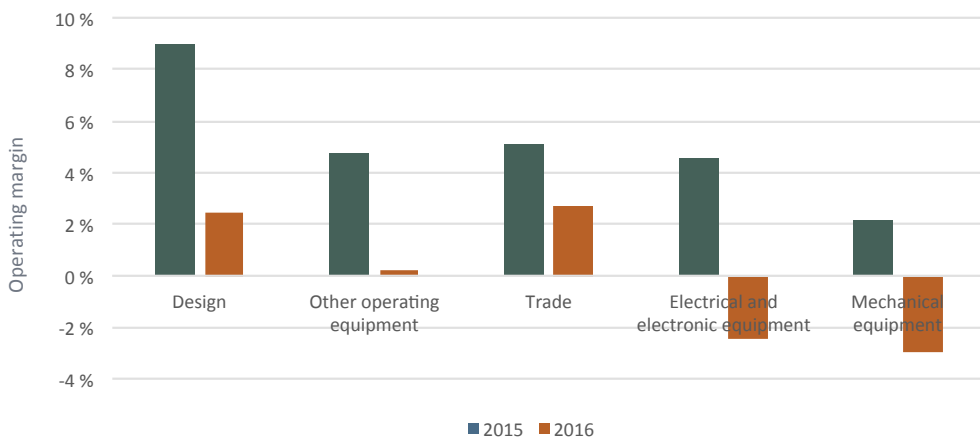


Figure 5: Operating margin (EBIT) among manufacturers of ship equipment and other equipment, 2015 and 2016. SOURCE: MENON (2017)

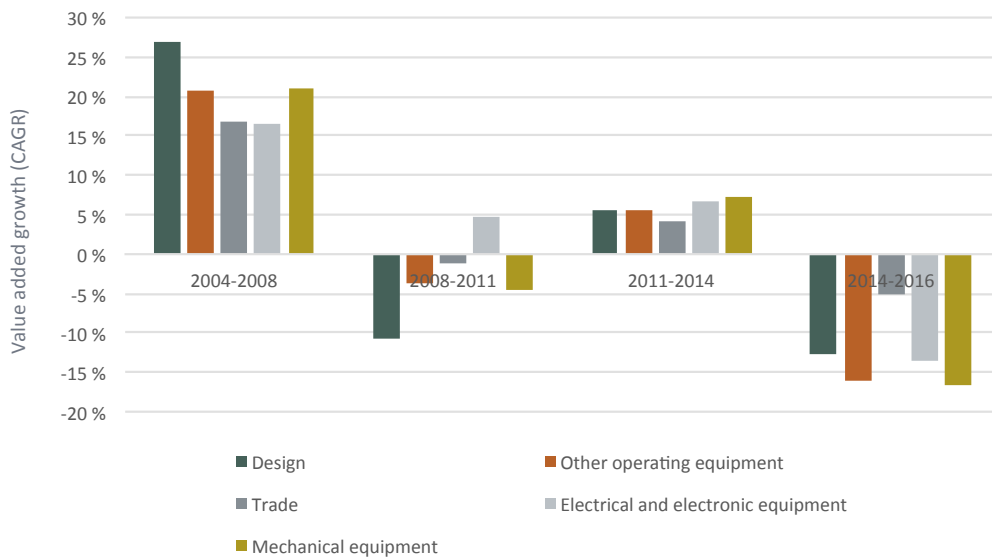


Figure 6: Periodical annual growth in value creation broken down by subgroup, 2004-2016. SOURCE: MENON (2017)

growth. Currently, the equipment suppliers are in a cycle of negative growth with value creation falling by 26 percent from 2014 to 2016.

Looking at growth in value creation by subgroups, the relatively equal overall growth in all subgroups except for trade is apparent. This observation is natural as the subgroups are complementary to each other, with deliveries from all groups needed to make up a complete vessel. The growth in trade is less volatile, and has been lower from 2004 to 2016. In the period from 2004 to 2008, manufacturers of ship equipment experienced tremendous growth, more than doubling value creation. This growth was mainly due to deliveries to a growing off-shore market, where they gained large market shares internationally. The financial crisis then hit the industry in 2008, leading to decreased value creation in the years up to 2011. Worldwide economic recovery coupled with high oil prices led to growth in the years from 2012 to 2014. Since 2014, lower activity within the offshore

oil and gas sector has been the main driver for reduction in value creation.

2.6. 2017 will be another year with lower activity

Revenues are expected to decrease further in 2017, but at a lower rate than in 2016. Based on the survey conducted for this report, we estimate that turnover will fall by another 10 percent (NOK 6 billion) in 2017.² Large companies are again expecting a somewhat larger relative decline in revenues than small companies. The continued relatively good performance of smaller companies is an interesting trend. In an industry where finding new revenue sources is becoming increasingly important, smaller companies seem to be more adaptable.

Profitability is key for the long-term survival of Norwegian ship equipment suppliers. Survey responses are mixed in terms of expected development in operating margins for 2017. 37 percent of respondents expect their company's

² Estimated turnover is based on survey results on companies' own expectations for turnover in 2017 as of September/October 2017, quarterly reports and information gathered in other projects.

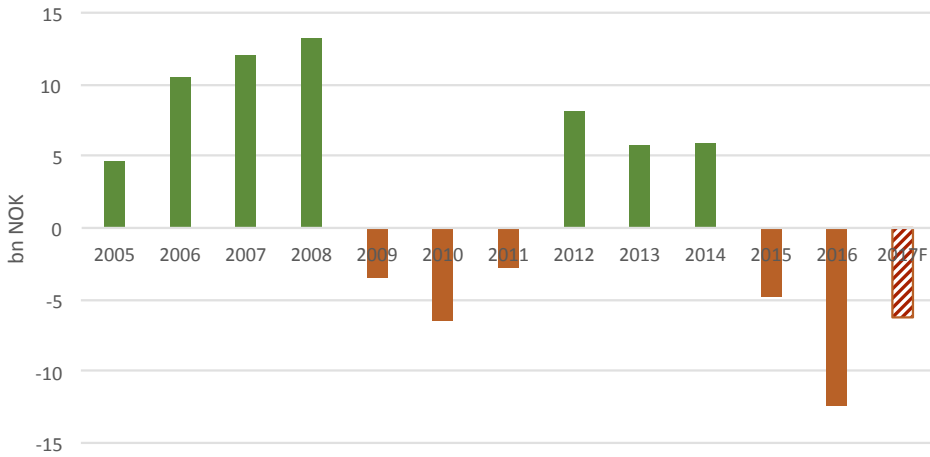


Figure 7: Change in turnover from the previous year for Norwegian manufacturers of ship equipment, 2005-2016. The value for 2017 is estimated. SOURCE: MENON (2017)

operating margin to be largely unchanged in 2017. 36 percent are expecting increased profitability, while 27 percent are expecting a decrease in profitability. Expectations among large and small companies are evenly distributed regarding this question. Based on this, profitability seems likely to stay at low levels also in 2017.

2.7. The after-market is important for the profitability level

The share of sales of spare parts and services increased in 2016. The share of the turnover related to spare parts and service is interesting

for two reasons, firstly, the profit margin on such offerings is often higher than for regular sales of equipment. Secondly, sales are often more stable than for the equipment itself. Most maritime equipment is sold to yards to be utilized in newbuilds, and this market can be highly volatile, while the market for spare parts and service is more stable as the total world fleet is more stable. As expected, the share of turnover from spare parts and services has been increasing as total revenues have gone down since 2014. In absolute terms, the after-market shows stability, with implied revenue from spare parts and services being about the same in 2015 and 2016.

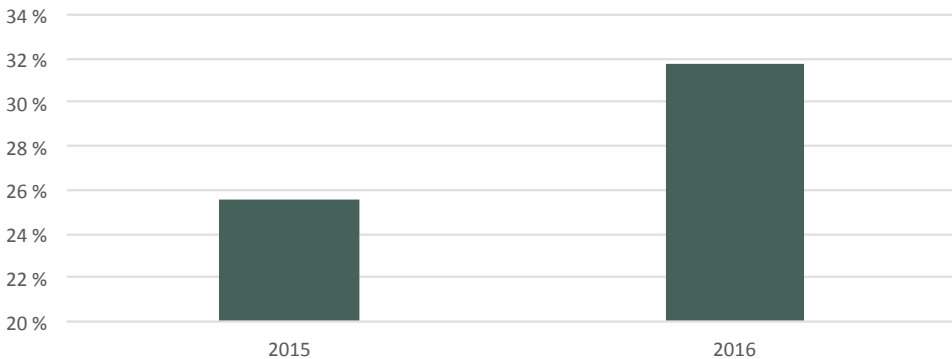


Figure 8: Share of turnover from spare parts and services, 2015-2016. SOURCE: MENON (2017)

3. The future outlook is more promising – will 2018 be the year that the suppliers will grow again?

While orderbooks keep falling, we see a clear shift in the companies' view on future developments compared to last year. Six out of ten companies expect turnover to increase in 2018, while only 5 percent suggest that turnover will fall by more than 10 percent. This is a much more positive indication than what we saw in last year's report. Still, orderbooks have fallen during the last twelve months, and as this is usually a valid indicator for future activity, it indicates that 2018 will be weaker than 2017. One way of combining these somewhat contradictory views would be that companies believe that order books have reached their lowest point now and will grow going forward. In total, we believe that 2018 could be the year when the industry again experiences growth, but unless markets change dramatically, the growth will be weak. While we see some early indications of growth in both the offshore oil and gas markets and traditional shipbuilding markets, demand is expected to stay weak in 2018. Most of the growth will then

have to occur in other markets or in non-maritime markets.

3.1. Companies believe that activity could increase in 2018

When asked how turnover will develop in 2018, six out of ten companies said they expect turnover to increase, while only 14 percent expect turnover to fall. The larger companies are somewhat less positive than the smaller ones, even though the majority of companies are positive also in this group. Overall, this suggests that 2018 might be the year we again will see growth in the market. At the same time, when we look at historical data from previous reports, the companies seem to systematically be slightly too positive in their expectations when it comes to future outlook. Last year, four out of ten companies expected turnover to grow in 2017, compared to 30 percent that expected turnover to fall. This should have given an increase in

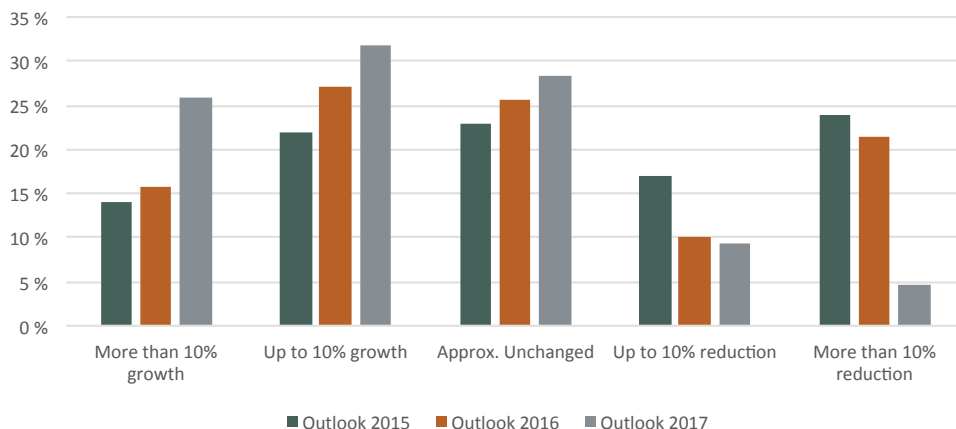


Figure 9: Expected growth in turnover for the next year, 2015-2017. SOURCE: MENON (2017)

turnover in 2017, when our current data for 2017 suggest that actual turnover instead fell by 10 percent.

Still, we see a massive change in future outlook this year compared to the three earlier years we have surveyed the suppliers. The largest change is found in the group of companies that previously were the most negative. While more than 20 percent of companies expected turnover to fall by more than 10 percent next year in 2015 and 2016, the same number is less than five percent in 2017. It is also very positive to see that one out of four companies expects turnover to increase by more than 10 percent in 2018.

3.2. A reduced order book could suggest that 2018 will be more difficult than expected

The overall order book is estimated at NOK 38 billion as of October 2017.³ This represents a further 15 percent drop from an estimated order book value of NOK 45 billion a year ago. Order books are falling faster than turnover. While companies are positive when it comes to the development in activity for 2018, we see that

the suppliers' order books keep falling. Order books are an important indicator of future activity level, and these results seem somewhat contradictory. As mentioned, one way of combining these somewhat contradictory views would be that companies believe that order books have reached their lowest point now and will grow going forward.

3.3. The importance of the offshore segment has fallen in the last two years

Two decades ago, most deliveries from Norwegian equipment manufacturers were directed towards traditional shipbuilding markets. Since then, the importance of the offshore market has grown substantially. In 2014, we reached a peak, as close to two thirds of total turnover were related to the offshore oil and gas market. The same figure in last year's report was just below 50 percent, while the percentage has fallen further, to 43 percent this year. Even though newbuildings in the offshore market have come to an abrupt halt, the after-market is still important for the equipment suppliers. Deliveries to the offshore market will continue to be a market for many years, and will still be a

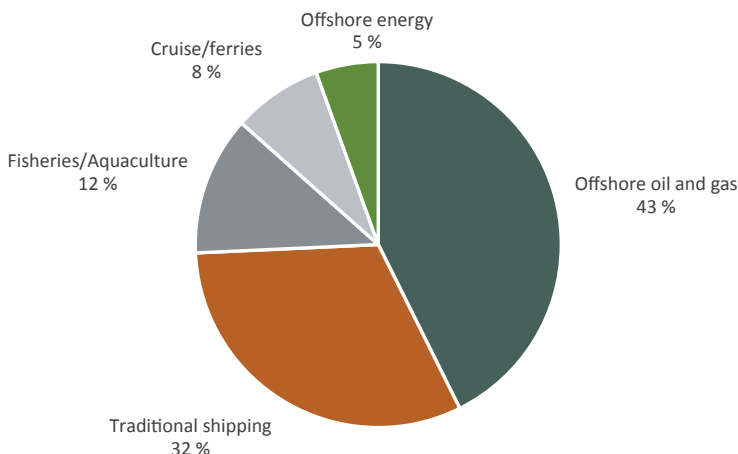


Figure 10: Share of maritime turnover from different market segments, 2016. SOURCE: MENON (2017)

³ Based on survey answers and order books as of Q2 2017.



key driver for Norwegian suppliers of maritime equipment.

Order books at Norwegian yards also give a clear illustration of increased diversification in the Norwegian maritime industry over the last few years. The number of new orders for

offshore vessels has been around 20 vessels annually for Norwegian yards during the last decade. After only seven contracts for offshore vessels were made in 2015, no new contracts have been signed in 2016 or 2017. The yards have been able to compensate by moving into other markets. At the start of 2015, only five

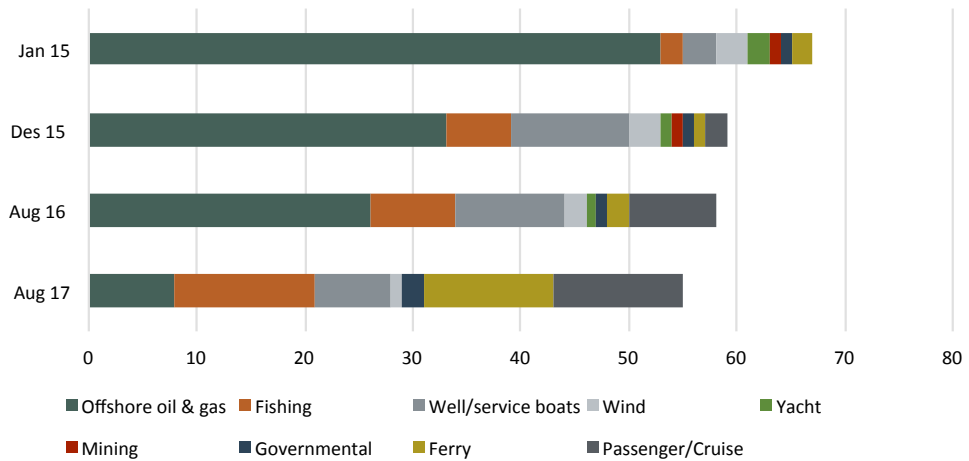


Figure 11: Order book at Norwegian yards January 2015-August 2017. Number of vessels (larger than >40m).
SOURCE: NORSK INDUSTRI

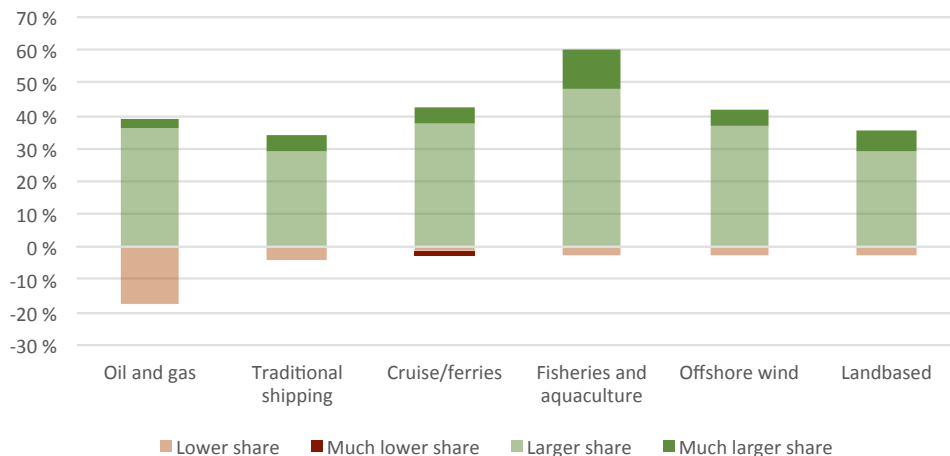


Figure 12: Respondents' expected change in share of revenue from given segment in the next three to five years.

SOURCE: MENON (2017)

contracts for new fishing and well/service boats were signed at Norwegian yards. In August 2017, the order books had grown to 20. New orders of ferries and passenger/cruise vessels have also increased substantially since early 2015. Measured in value, ferries and cruise vessels make up almost half the orderbook at Norwegian yards at the end of the year. In late 2017, it was also announced that Vard will build three new coast guard vessels for the Norwegian ministry of defence. The contract value is several billion NOK, and will provide opportunities for large deliveries from Norwegian suppliers.

Survey responses indicate that companies are expecting new market segments to grow further in the future. The sentiment is especially positive for fisheries and aquaculture with 60 percent of respondents expecting increased share of revenues from this segment over the next three to five years. In general, respondents are optimistic about the future with a large share of respondents expecting positive development in most market segments. Oil and gas stands out as the lone segment where a significant proportion of respondents are expecting the share of revenue

to fall over the next three to five years. At the same time, with offshore markets expected to start recovering in the coming years, slightly below 40 percent of respondents expect an increasing share of revenue from this market in the next three to five years.

3.4. Oversupply will limit growth in both offshore- and traditional markets, but this year we see the first positive signals

With the current huge oversupply in the world market for offshore vessels, it is unlikely that offshore oil and gas market will be the driver for future growth in the short-term perspective. The current low fleet utilisation (below 50%) is shaping the outlook for offshore supply vessels. More than 1,500 vessels (30% of the fleet) are currently registered as being laid up (Danish Ship Finance, 2017). When such a high share of the fleet is inactive, the new building market will be depressed suggesting that the demand for offshore equipment will be low in 2018. Still, we see some positive signals as demand for new-builds are growing in 2017⁴, albeit from very low-levels. Many analysts believe that the

⁴ Investments in offshore vessels have more than tripled in 2017 compared to 2016. But, the activity level is still low at only 10 percent of the investment-level in 2014.

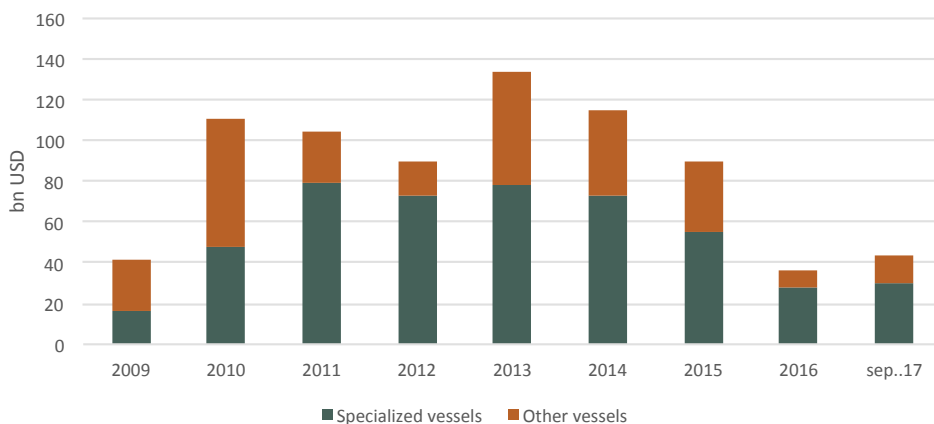


Figure 13: Investments in new-builds at world yards in billion USD 2009-sep.2017. SOURCE: CLARKSON (2017)

general market for offshore oil and gas services will fall even further in 2018, before the market is expected to pick up again.

As described earlier, the dependence of the industry on the offshore markets has been falling sharply since 2014, and we can already see that ship equipment manufacturers are more diversified than they were two years ago. In the survey one out of five respondents say that the offshore markets will be less important in the next 3-5 years. This is the market segment where the highest percentage of companies were negative. Still, four out of ten respondents express a careful optimism and believe this market will grow in the coming years.

In 2016, deliveries to traditional shipping markets made up 32 percent of revenues, showing that this is a key segment for the industry. In 2017, we have seen some positive signs as regards investments in new vessels. Investments in new builds in September 2017 are up by USD 8 billion representing an increase of 59% year-on-year on an annualised basis. This is positive news, but we should remember that growth comes from a low level and capacity has increased dramatically during the last few years. However, this is a positive signal for future growth 2018. Investments in specialized vessels

such as offshore vessels, cruise, LNG/LPG carriers, passenger ferries are all growing in 2017.

The remaining three market applications; fisheries and aquaculture, cruises and ferries and offshore energy (wind) currently make up 25 percent of Norwegian equipment producer's turnover. Currently it looks like all three markets will grow further at a fast pace. Offshore wind is still a small market compared to offshore oil and gas, but the market is growing quickly. Most analysts predict that the market will continue to grow 10-20 percent over the next five-ten years. Costs in this new market have been falling sharply, and in 2017 the first non-subsidized offshore wind park won a tender in Germany, suggesting that these parks could be developed at market rates going forward.

When it comes to fisheries and aquaculture, most analysts believe that also these markets will grow substantially going forward. Many equipment manufacturers are increasingly focusing on these markets to take advantage of the growth possibilities here. The fluctuations of the Norwegian currency will be an important factor for the competitive situation of the industry in this market as well as in the equipment market in general.



UT540 WP - Windfarm Support Operation Vessel (SOV) from Rolls-Royce.

The last market where we expect continued growth are the cruise- and passenger-vessel segments. In the last twelve months, the global orderbook⁶ of cruise and passenger vessels are up by around 25 percent. Investment in cruise vessels now make up almost half the investments in vessels globally, up from 5 percent just four years ago. Now that Norwegian yards have won important contracts in this market, we expect that also Norwegian suppliers will increase deliveries to this growing market. Ferries are another interesting segment for Norwegian yards and equipment producers, where Norway has taken the lead with ferries that run on more environmentally fuels such as LNG, battery and hybrid solutions. Norwegian yards are, together with local suppliers, planning to develop the world's first hydrogen fuelled ferry that might be in operation in 2020.

3.5. Digitalization and environmentally friendly solutions will be important drivers going forward

Two important forces that will continue to influence the industry in the coming years are the

increased pressure on developing environmentally friendly solutions and the increased effect of digitalization and new production processes ("enabling technologies"). Many industry actors are increasingly focusing on environmentally friendly solutions. The Paris Agreement in 2015 is one example, while the Norwegian Shipowners' Association vision of zero harmful emissions from Norwegian controlled vessels is another example of industry players trying to reduce the emissions from maritime activities. IMO and national governments play a key role in developing and implementing rules for the "green sector".

3.5.1. Norwegian suppliers are leading the way with environmentally friendly solutions

Last year, respondents highlighted new regulations and customer demands as key factors for developing more environmentally friendly solutions. Some shipowners are conservative, making regulatory work important as a driver. At the same time, many Norwegian shipping companies are voluntarily investing in environmentally friendly solutions and using it strategically

to develop their services. This year, half of the companies that took part in the survey believed that new and stricter environmental demands would be positive for the profitability of the companies. Only 17 percent of the companies thought stricter environmental demands will effect their company negatively. This is probably a result of Norwegian companies being leaders in their fields, which usually means that their solutions are less harmful for the environment, and that Norwegian suppliers have positioned themselves to take advantage of this trend. Hopefully this will reinforce the suppliers' leading position globally.

While Norwegian suppliers have taken a lead role in developing environmentally friendly solutions, they are still dependent on a stable regulatory environment to support the growth. One example here is the Norwegian company Oceansaver that went bankrupt in 2017. The company was a world leader with its innovative products for ballast water treatment. Still, the company went bankrupt, since implementation of new requirements for ballast water treatment has been postponed several years, thereby limiting the size of the market. Fortunately, another Norwegian company, IMS Group, has bought the

assets and taken over most of the employees and will continue to develop the technology going forward.

3.5.2. The digitalization of suppliers and the technological development is rapidly changing both production processes and the product itself

Norwegian ship equipment suppliers acknowledge that the industry is changing more rapidly than before due to technological advancements. Over 70 percent of respondents believe technological advancements and new business models will increase the pace of change in the industry, while only 6 percent of respondents oppose this view. At the same time companies believe technological advancement will increase their profitability. 63 percent of respondents believe in increased profitability due to technological changes while only 3 percent opposes this view. Increased automation in the production process will increase the competitive strength relative to foreign competitors when the competitors have access to cheap labour.

While new technology will create growth opportunities, an indication of lack of focus on

Yara Birkeland - the world's first autonomous, zero emissions container ship

Yara Birkeland will be the world's first fully electric and autonomous container ship with zero emissions. The ship is planned to start operations in the second half of 2018 and will deliver products from Yaras plant in Porsgrunn to Brevik and Larvik. YARA Birkeland



PHOTO: YARA

will initially operate as a manned vessel, before moving to remote operation in 2019 and fully autonomous operations from 2020. The new zero-emission vessel will be a game-changer for global maritime transport contributing to meet the UN sustainability goals.

Yara Birkeland illustrate how Norwegian suppliers are able to adapt to important forces that will influence the industry in the future: digitalization and new environmental requirements. The Kongsberg Group is responsible for development and delivery of all key technologies onboard Yara Birkeland, showing the ability of Norwegian companies to be at the forefront in both new applications of existing technologies and innovations.

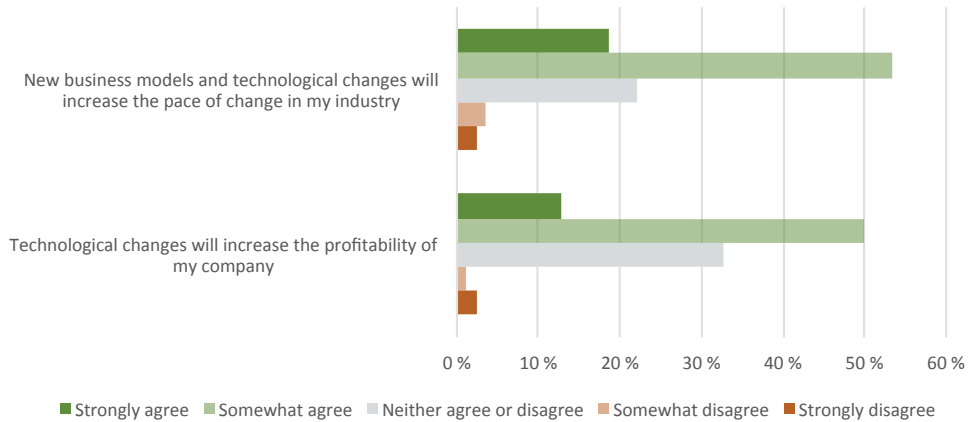


Figure 14: Distribution of respondents' position on given statement. SOURCE: MENON (2017)

Rolls-Royce and Google joins forces – increasingly focusing on developing new digital solutions

Rolls Royce Marine is continuing its focus on developing world-leading solutions from its Norwegian offices. This year, they announced that they will invest NOK 2 billion on R&D within the maritime field the coming years. In Ålesund, they will develop a global fleet management center, a center that can monitor ships from shore, analyze large amounts of data about operations, and thus ensuring optimal operation of ships and equipment they have installed on board. This technology will pave the way for new services to shipping companies and operators.

Rolls-Royce Marine also joined forces with Google this year when they signed an agreement enabling Rolls-Royce to use Google's Cloud Machine Learning Engine. In making this deal, Rolls Royce hopes to combine their specialist maritime knowledge with the latest of machine learning technology, ultimately leading to ground-breaking improvements in the sector. Rolls-Royce will take advantage of Google's machine learning engine to make existing vessels and their crews safer and more efficient.

the potential damaging effects of digitalization can be worrying. In other industries, we see that digitalization can create a few companies with leading positions, while many SMBs are struggling to compete. This is often the case unless they offer specialized, niche products. However, another interpretation of the responses can tell us that Norwegian companies themselves believe that they are well positioned to take advantage of the possibilities that digitalization and new technology creates. Asked if the companies are increasingly hiring digital competence to adapt to the new market situation, 45 percent say that they do this to a large or some degree. Only 8 percent answer that they have not changed their policies in this field. It is a good sign that the supplier industry is adapting to the challenge by hiring more people with digital competence.

4. Appendix

The appendix includes information about the methodology and key performance indicators for the industry. In addition, we have included a short description of the geographic footprint of the industry.

4.1. Data registry and survey data

The report is based on a registry of all Norwegian entities called Brønnøysund Register Centre. Changes from previous editions are related to changes in which companies that are included or excluded. Minor changes in the numbers for 2015 have occurred as a number of firms released their official 2015 figures after the conclusion of the report in 2016. Changes may also occur as some historical maritime shares have been updated based on new information. Official registries changed how they count an employee in 2015. As a result, employment numbers in 2014 and 2015 are not directly comparable. In 2015, we estimated employment based on survey responses, registry data and official statistics on industry codes. However, employment in 2015 and 2016 are directly comparable. Employment numbers estimated for 2015 are therefore replaced by registry data alone in this year's report.

The survey was sent out in September 2017 to 663 respondents and received a total of 88 responses. To assure ourselves that the survey was representative of the selection we analysed, we focused on obtaining responses from all of the largest companies, since these dominate overall activity in the industry. We were largely successful in doing so. Design operations are in some cases only a small share of total operations within an entity reporting to the Brønnøysund registry, but still a major part of overall design operations. Information gathered for this year's report shows that design operations have been overestimated in the past. Discrepancies in numbers for the design operations from previous editions are down to this fact.

In the survey we only want to include the maritime share of the companies' turnover. The reason for this is that a number of companies

such as ABB, Siemens and Jotun are major suppliers of the maritime industry in Norway, but are not viewed as maritime suppliers since most of their activities are aimed at other industries. The maritime share was given by the firms themselves in the questionnaire, either in 2015 or 2016.

The subdivision into the various subgroups was made on the basis of the companies' own valuation (from the questionnaire), or, if this was not available, on the basis of industry codes and/or our own knowledge of the companies. Some of the largest companies have operations spanning the various categories, and for the largest of these, an assessment was carried out as to whether activities needed to be subdivided between the different subgroups. For other companies, this is less of a problem since they have a number of separate firms that can be positioned within the different categories. Based on interviews conducted with design companies, we made large changes in the numbers for this group in this year's report compared with earlier reports. This is due to the difficulty of splitting the design activities from other yard activities.

The export data was mainly gathered through the survey, but also combined with information from earlier surveys Menon has completed.

4.2. Delimiting the maritime industry

The size and significance of any industry are determined by how it is defined, and it is therefore important to have a clear and concise definition which puts clear limits on what is to be included and what is to be excluded. Menon developed the following definition of the maritime industry as part of the research project "A Knowledge Based Maritime Industry" from 2011:

- All businesses that own, operate, design, build, supply equipment or specialist services to all types of ships and other floating entities.

4.2.1. Maritime equipment suppliers – definition and subdivision into groups

This study focuses on maritime equipment suppliers. We have narrowed the definition of maritime equipment manufacturers as follows:

- Specialist equipment suppliers for ships and other floating entities.⁵

Further, we divided the activity in two main groups: “Ship equipment” and “Drilling and offshore equipment for ships and rigs”.

Ship equipment consists of five subgroups:

- **Mechanical equipment** is a relatively extensive group that includes suppliers of cranes, winches, propellers and engines. This is equipment that is used to carry out mechanical operations such as lifting or contributes to propelling ships forward.
- **Electrical and electronic equipment** includes operations that focus on electrical and electronic components. That could include specialist hardware, software, electrical

propulsion systems, bridge equipment or DP (dynamic positioning) systems⁶.

- **The group dealing with design typically includes ship design companies such as Møre Maritime.** The group also includes companies with a rather broader focus such as LMG Marin, which also offers design packages for ships and rigs.
- **Other operating equipment** involves manufacturers of equipment necessary for everyday ship operations. This includes suppliers of items such as marine paint, lubricants, cables, chains and lifeboats.
- The last group under ship equipment is **trade**. This includes companies that buy and sell goods for operating and maintaining ships, or act as dealers for equipment to other players such as shipyards in Norway and abroad.

4.3. The industry’s geographic footprint: Value creation by county

Broken down by county, Hordaland and Møre og Romsdal have the highest value creation by ship

County	Value creation 2016 (bn NOK)	County	Value creation 2016 (bn NOK)
Hordaland	3.5	Østfold	0.5
Møre og Romsdal	2.8	Telemark	0.4
Vestfold	1.8	Nordland	0.3
Akershus	1.7	Sogn og Fjordane	0.1
Buskerud	1.5	Troms	0.1
Rogaland	1.3	Nord-Trøndelag	0.1
Oslo	1.0	Finmark	0.0
Vest-Agder	0.7	Oppland	0.0
Sør-Trøndelag	0.7	Hedmark	0.0
Aust-Agder	0.6		

Table 2: Value creation by ship equipment suppliers broken down by county, 2016. SOURCE: MENON (2017)

⁵ Some of the equipment is also installed on rigs and/or FPSOs. An FPSO (Floating Production, Storage and Offloading) unit is a floating, mobile platform used in the offshore oil and gas industry for processing and storing petroleum during production at an oil field. As a rule, FPSOs are normally designed like a ship, but units such as Sevan cylindrical-hulled vessels and spar buoys are also considered to be FPSOs.

⁶ Dynamic positioning (abbreviated “DP”) systems are systems for keeping ships or other vessels such as rigs or FPSOs in the same position above the seabed without the use of anchors, and instead utilizing propellers and thrusters.

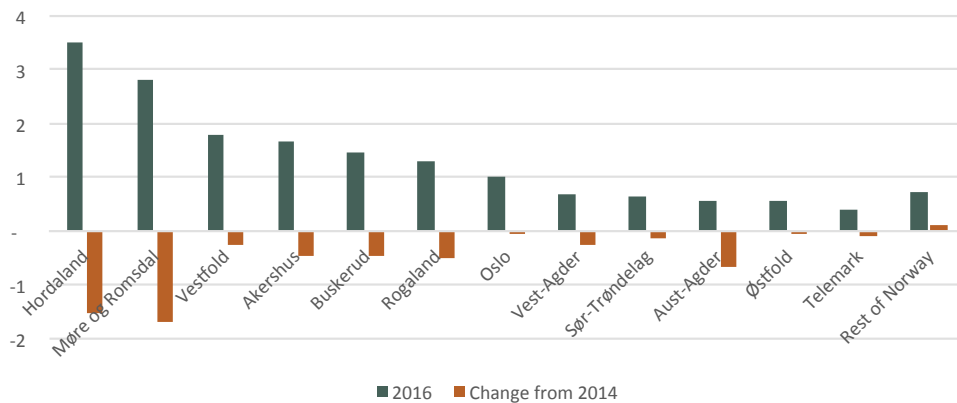


Figure 15: Value creation in 2016, by county, and change in value creation from 2014. SOURCE: MENON (2017)

equipment suppliers. Hordaland is home to several large companies, including the Frank Mohn companies (now part of Swedish Alfa Laval) and Bergen Engines (part of the Rolls-Royce group). In Møre og Romsdal, the Blue Maritime Cluster houses several big equipment producers, most notably Rolls-Royce Marine and Brunvoll. Vestfold comes third due to Kongsberg Maritime being located in the county. The two biggest counties have also suffered the biggest losses in the last two years. Since 2014, value creation has

been reduced in both Hordaland and Møre og Romsdal by about NOK 1.5 billion.

In 2016, ten counties had a value creation of more than NOK 500 million from the industry. This shows that the industry is significant throughout large parts of Norway, although Western Norway dominates with about 50 percent of overall value creation.

4.4. Key performance indicators for the industry in 2016

Subgroup	Turnover (bn NOK)	Value creation (bn NOK)	Operating margin	Employment
Design	2.5	1.0	2%	905
Other operating equipment	8.0	2.3	0%	2 503
Trade	11.2	2.2	3%	2 277
Electrical and electronic equipment	14.0	4.7	-2%	4 687
Mechanical equipment	25.8	6.9	-3%	7 664
Ship equipment	61.5	17.1	-1%	18 037
Drilling equipment	13.3	4.5	-1%	3 257
Total for all equipment suppliers	74.8	21.6	-1%	21 294

Table 3: Key performance indicators for manufacturers of all types of maritime equipment in 2016. SOURCE: MENON (2017)

4.5. Key variables (2015-2016) distributed into subgroups and main groups

Subgroup	Employment			Turnover (bn NOK)			Value creation (bn NOK)		
	2015	2016	Change	2015	2016	Change	2015	2016	Change
Design	957	905	-5%	2.6	2.5	-4%	1.2	1.0	-11%
Other operating equipment	3 001	2 503	-17%	9.0	8.0	-12%	2.8	2.3	-20%
Trade	2 491	2 277	-9%	11.5	11.2	-2%	2.5	2.2	-11%
Electrical and electronic equipment	5 268	4 687	-11%	16.7	14.0	-16%	5.7	4.7	-18%
Mechanical equipment	9 026	7 664	-15%	34.0	25.8	-24%	9.0	6.9	-24%
Ship's equipment	20 715	18 037	-13%	73.9	61.5	-17%	21.2	17.1	-20%
Drilling equipment	5 412	3 257	-40%	34.2	13.3	-61%	9.9	4.5	-54%
Total for all equipment suppliers	26 127	21 294	-18%	108.1	74.8	-31%	31.1	21.6	-31%

Table 4: Key performance indicators for manufacturers of all types of maritime equipment in 2015 and 2016.

SOURCE: MENON (2017)

All pictures credit Rolls-Royce except where noted

NORSK INDUSTRI

FEDERATION OF NORWEGIAN INDUSTRIES

Næringslivets Hus, Middelthuns gate 27

P.O. Box 7072 Majorstuen, 0306 Oslo

Norway

Tel. +47 23 08 88 00

post@norskindustri.no

norskindustri.no

twitter.com/NorskIndustri



Norsk Industri