

NORWEGIAN MARITIME EQUIPMENT SUPPLIERS 2021



Key performance indicators and
future expectations



Innhold

Summary	04
Delimitation	08
THE MARITIME EQUIPMENT SUPPLIERS	10
Maritime equipment suppliers employ more than 34 000 workers with a total value added of NOK 40 billion	10
Many of the maritime equipment suppliers get a substantial percentage of their revenues from non-maritime markets	11
Business size and geographical economic footprint in 2020	12
Relatively low negative impact of the Covid-19 pandemic	14
Revenues from maritime equipment are more cyclical than other revenue	15
A CLOSER LOOK AT THE MARITIME SHIP EQUIPMENT	18
Exports of ship equipment	19
Export barriers	20
Future outlook	21
Development in market segments	25
Expected development in orderbooks	26
Green segments	27
Degree of specialization and substitution between market segments	28
Innovation in the supply chain	31
Norwegian shipyard industry and their role in the maritime cluster	31
APPENDIX	37
Data registry and survey data	37
Delimiting the maritime industry	37

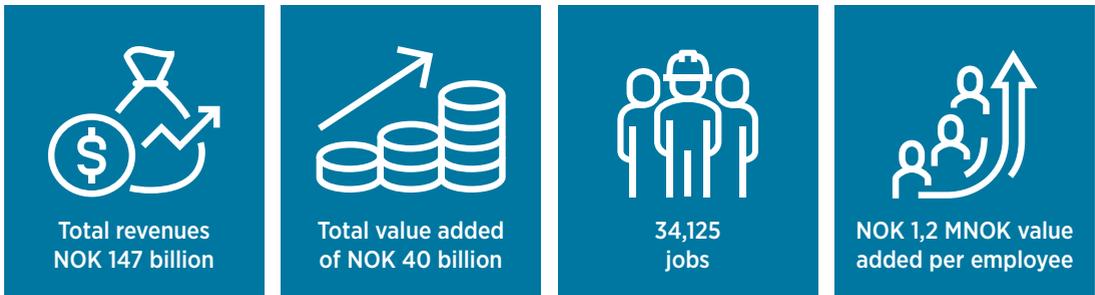
NORWEGIAN MARITIME EQUIPMENT SUPPLIERS, November 2021
By Lars Martin Haugland, Serli Abrahamoglu and Erik W. Jakobsen, Menon Economics

FRONT PAGE PHOTO: Fjord 1, Hadarøy@HAV GROUP | LAYOUT: Minnesota Agency • 2020188

Summary

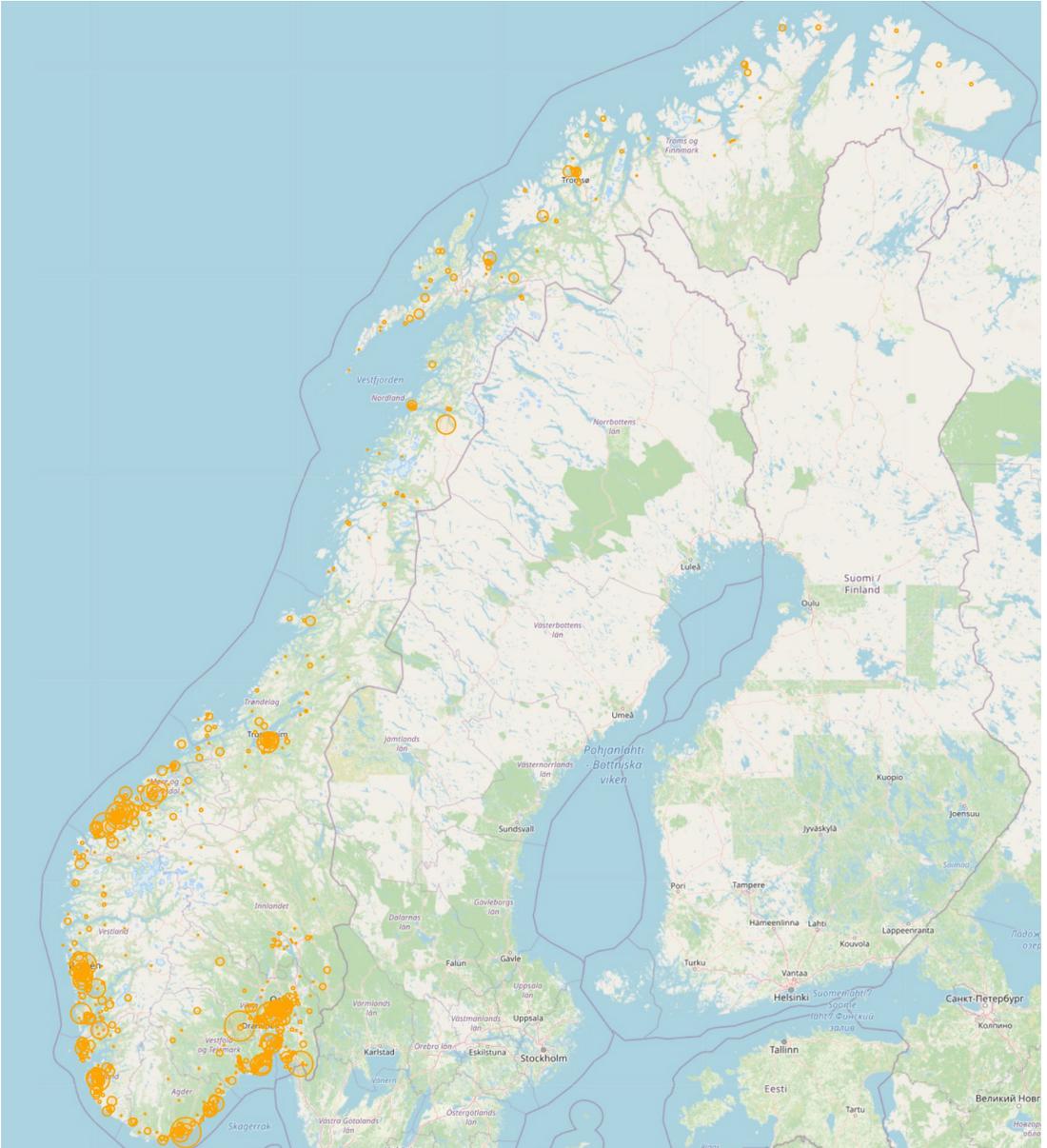
Production of ship equipment and other maritime equipment is one of Norway's few internationally competitive industries that does not rely on natural resources. In 2020, companies producing or selling maritime equipment had a total revenue of close to NOK 150 billion and employed around 34 thousand people. Productivity is higher among maritime equipment suppliers than other Norwegian manufacturing companies as value added per employee is NOK 1,2 million compared to an average of NOK 0,8 million for other manufacturing segments in Norway. For the maritime equipment suppliers, they contribute with a value added of NOK 40 billion in 2020.¹ Compared to the effect of the oil price shock in 2014/2015, the Covid-19-pandemic did not have a big negative effect on the industry in 2020.

Approximately 90 percent of all maritime equipment suppliers are small- and medium-sized businesses, and this group of firms employ 40 percent of all employees in the industry. Besides being an SME, the typical Norwegian maritime equipment supplier is located in rural areas along the coast outside of the big cities in Norway. In the map below, we have summarized the number of employees in 2020 on Norwegian postal codes to visualize the geographical location of firms and the number of employees they employ.



¹These numbers include both maritime and non-maritime activity.

Figure 1: Total number of employees employed by maritime equipment suppliers in 2020, aggregated to Norwegian postal codes. Larger circles refer to a higher number of employees. Source: Menon Economics

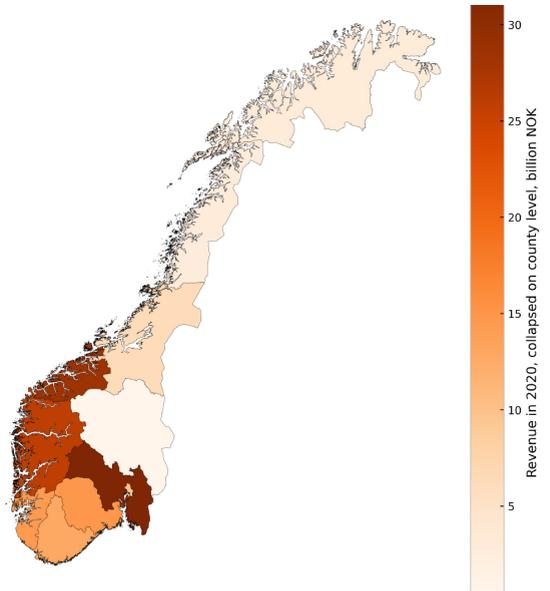


If we take a closer look at the economic activity generated by the maritime equipment suppliers in 2020, it clearly follows the pattern shown in the map above. In total, the economic activity is widespread, and revenues are generated in both central metropolitan areas and more geographically dispersed areas of Norway. Especially, it is the counties around Oslo and the west coast which stand for most of the revenues generated by maritime equipment suppliers. This is shown in the map on the next page.

Figure 2: Operating revenue (bn. NOK) in 2020 from maritime equipment suppliers, collapsed on county level. The numbers include both maritime and non-maritime activity. Darker color indicates higher operational revenues. Source: Menon Economics

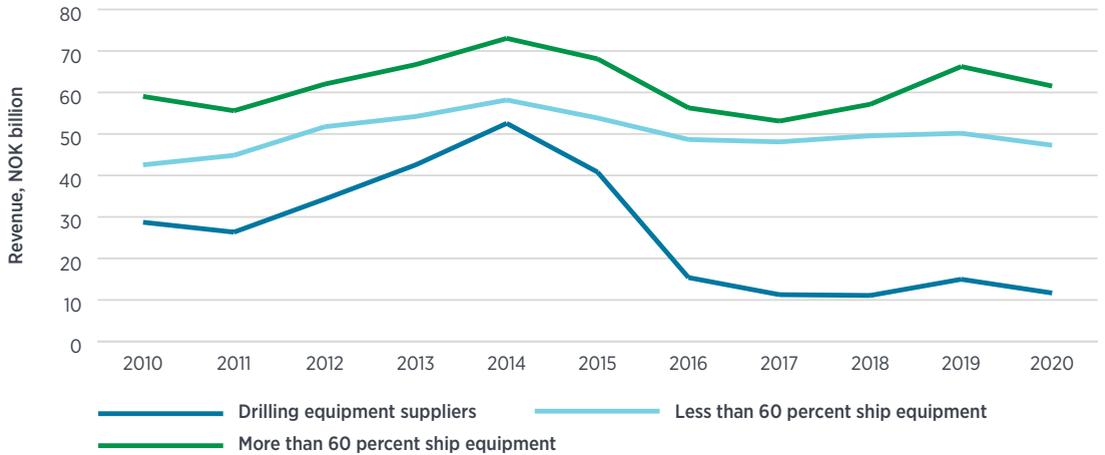
Most maritime equipment suppliers get the bulk of their revenues from production of ship equipment and related after-market services. Still, about 40 percent of the equipment suppliers get less than 60 percent of their revenue from ship equipment, including some large industrial conglomerates such as ABB, Nexans and Jotun.

The companies with a large percentage of their revenues from maritime equipment have more volatile revenues than those that are less reliant on maritime equipment. The downturn after 2014 has been steeper for the highly ship equipment-oriented suppliers, but correspondingly these companies are also the ones who have experienced growth in 2018-2019. This increase is especially related to the increased equipment deliveries to vessels in the seafood industry and passenger freight.



Welder. PHOTO©LANGSETGRUPPEN

Figure 3: Revenue for the maritime equipment suppliers by revenue distributions. Source: Menon Economics



At the start of 2020, the industry was optimistic and looking forward to a strong resurgence. When the last report was published in the fall of 2020, the self-reported outlook by the equipment suppliers revealed a decrease in revenues in 2020 and 2021 due to the coronavirus outbreak. As seen in the figure above, the revenues, especially for the highly ship equipment-oriented suppliers, have declined from 2019 to 2020.

However, the decline has not been as steep as feared, and the majority of the respondents in this year's survey expect growth in the coming years, in both revenues and orderbook.

Hence, given few future major setbacks from the Covid-pandemic, it is likely that the worst is already surpassed. The figure above clearly shows that the downturn from the oil price shock in 2014/2015 has been larger – both in terms of magnitude and in time. For the industry as a whole it has not yet recovered from the levels reported before the oil price shock.

Delimitation

The numbers and figures presented and discussed in this report refer to the companies that design, produce, manufacture and supply maritime equipment. In general, a maritime company is a company that own, operate, design, build, supply equipment or specialist services to all types of ships and other floating entities. Furthermore, as in previous reports, we divide maritime equipment into two main categories, ship equipment and drilling equipment. The following types of equipment are included in the term ship equipment:

- **Mechanical equipment** refers to the production of equipment for carrying out mechanical operations such as lifting or propelling ships forward. The category is extensive, including suppliers of such as cranes, winches, propellers, and engines.
- **Electrical and electronic equipment** refers to the production of equipment focusing on electrical and electronic components, including specialist hardware, software, electrical propulsion systems, bridge equipment or DP systems².
- **The group dealing with design typically includes ship design companies such as Møre Maritime.** The group also includes companies with a somewhat broader focus

such as LMG Marin, which offers design packages for both ships and rigs.

- **Other operating equipment** involves manufacturers of equipment necessary for everyday ship operations, including suppliers of items such as marine paint, lubricants, cables, chains, and lifeboats.
- **Trade** consists of 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.

In last year's report, the focus on how to report on the maritime equipment suppliers was changed. Earlier editions have separated revenues and activity from production and sales of ship equipment and solely focused on this part of operations. With the increased focus on company performance from the many challenging years after the oil price shock in 2014/2015, last year we decided that including all activity from maritime equipment suppliers – ship equipment, drilling equipment and non-maritime activity – is of more interest. We continue with this approach in this year's report, but we are also reporting the economic footprint of activity related solely to ship equipment. This is clearly highlighted in the figures included in this report.

²Dynamic 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, utilizing propellers and thrusters instead.

Categories of ship equipment and examples of producers in each group

MECHANICAL EQUIPMENT

Cranes | Winches | Propellers | Engines | etc



ELECTRICAL AND ELECTRONIC EQUIPMENT

DP | Software | Specialised hardware | Bridge equipment | Sensors | etc



KONGSBERG



DESIGN

Ship design



OTHER OPERATING EQUIPMENT

Paint | Lubricant | Cables | Chains | Life-boats | etc



TRADE

Agents | Wholesalers and distributors

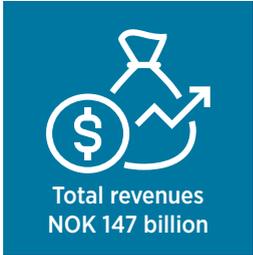


The Maritime Equipment Suppliers

Maritime equipment suppliers constitute a key part of one of Norway's largest industries, the maritime industry. Norway is a major power in the international maritime industry with long and proud traditions. Norwegian-controlled shipping companies own around six percent of the world's fleet in terms of value, and Norwegian companies are world-leading in many fields such as ship financing, certification and manufacturing of ship equipment. The maritime equipment suppliers are producing a constant flow of innovations in ship design, propulsion, specialized equipment and system integration, together with services related to physical products.



PHOTO © BERGEN ENGINES



With a heavy focus on developing more environmentally friendly equipment for the future, their international importance is expected to grow going forward.

MARITIME EQUIPMENT SUPPLIERS EMPLOY MORE THAN 34 000 WORKERS WITH A TOTAL VALUE ADDED OF NOK 40 BILLION

In 2020, companies producing or selling maritime equipment had a total revenue of close to NOK 150 billion and employed around 34 thousand people. Productivity is higher among maritime equipment suppliers than other Norwegian manufacturing companies as value added per employee is NOK 1,2 million compared to an average of NOK 0,8 million for other

manufacturing segments in Norway. For the maritime equipment suppliers, they contribute with a value added of NOK 40 billion in 2020. Compared to the effect of the oil price shock in 2014/2015, the Covid-19-pandemic did not have a big negative effect on the industry in 2020.

MANY OF THE MARITIME EQUIPMENT SUPPLIERS GET A SUBSTANTIAL PERCENTAGE OF THEIR REVENUES FROM NON-MARITIME MARKETS

In total, ship equipment represents about 50 percent of the companies' total revenues, as many of the companies also produce equipment and provide services for other industries. The shares vary between companies from a sole focus on ship equipment to companies primarily operating in other markets. On aggregate, ship equipment accounts for 47 percent of revenues in 2020, while drilling equipment makes up 6 percent of revenues. In 2015, drilling equipment made up 32 percent of total revenues. Hence, drilling equipment has faced a dramatic decline during the last five years. Non-maritime equipment and services accounts for the remaining 47 percent.

It is important to state that the typical ship equipment company has a higher percentage of revenues from ship equipment than shown by these numbers, as a few large suppliers skew the distribution towards non-maritime equipment. As seen in figure 4 to the right, 60 percent of the maritime equipment suppliers earn more than the weighted average of 47 percent from sales and production of ship equipment.

Figure 4: Above: Revenue distribution on activity types for the maritime equipment suppliers. Below: Percentage of companies with more/less than 47 percent of revenues from ship equipment. Source: Menon Economics

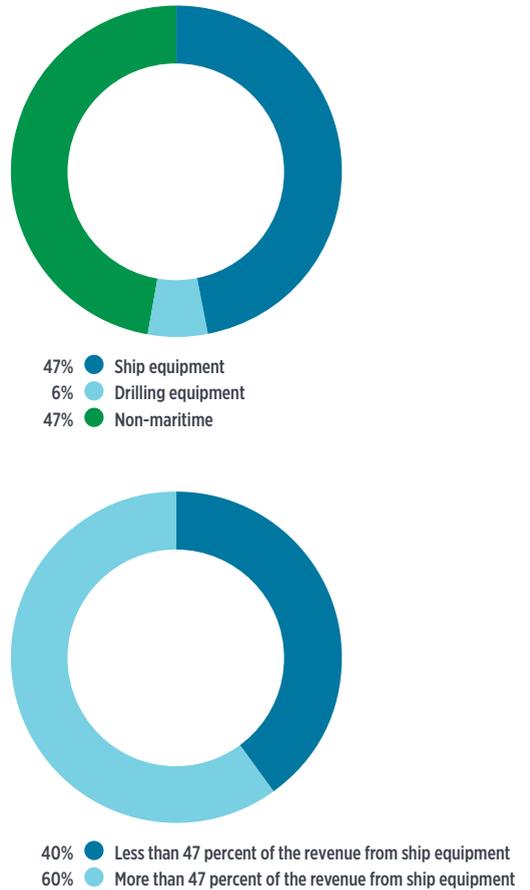
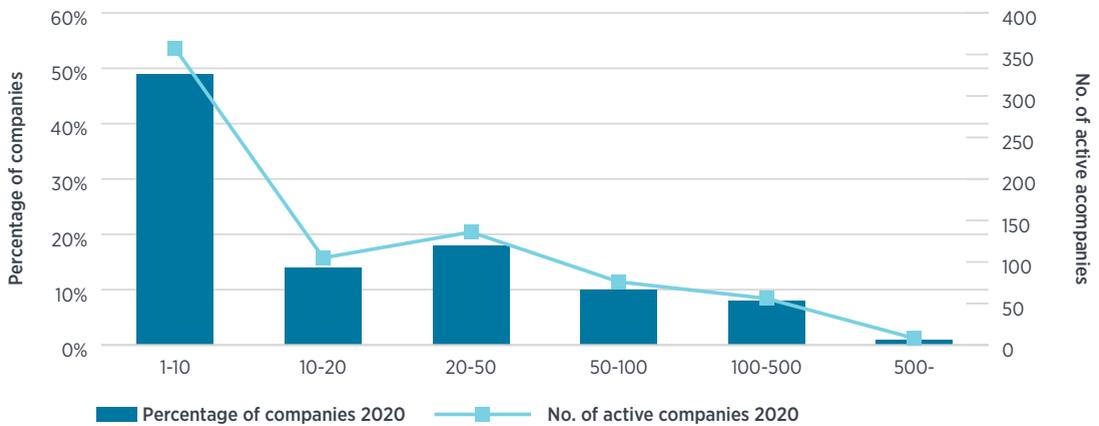


Figure 5: Percentage of companies employing a given number of workers. Source: Menon Economics



BUSINESS SIZE AND GEOGRAPHICAL ECONOMIC FOOTPRINT IN 2020

Approximately 90 percent of all maritime equipment suppliers are SME (small- and medium-sized businesses), and this group of firms employ 40 percent of all employees in the industry. Besides being an SME, the typical Norwegian maritime equipment supplier has their offices and production sites in rural areas along the coastline outside of the big cities in Norway.

The typical ship equipment supplier employs fewer than ten people, as illustrated in the figure above. Almost half of the companies belong to this group, while 80 percent of the companies employ less than 50 people.

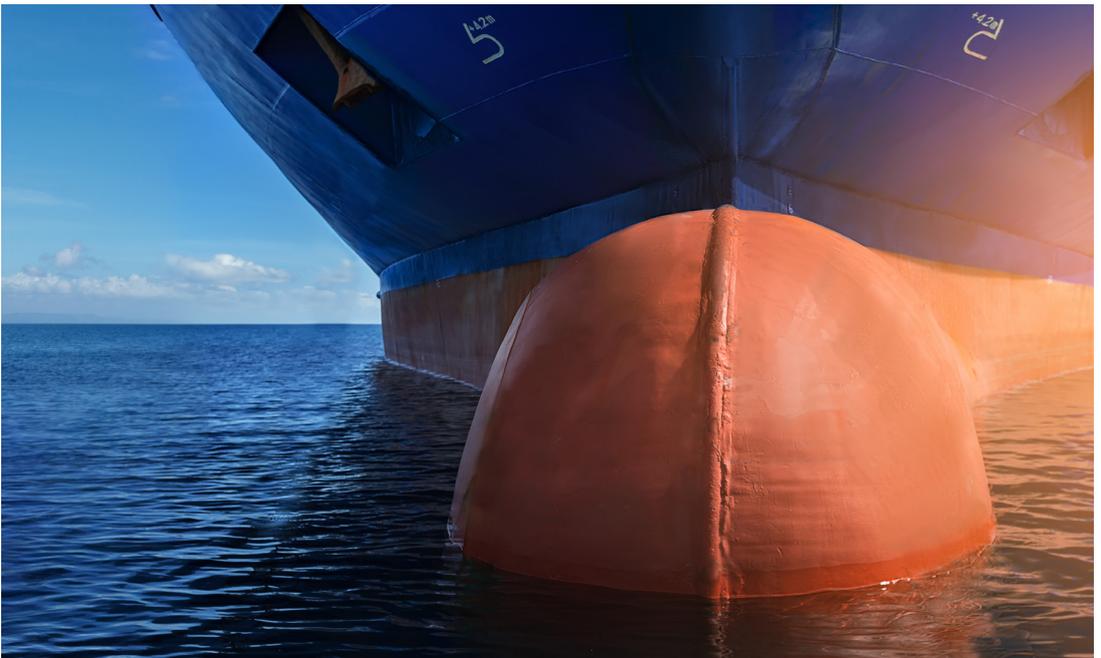
In the map on page 5 (fig. 1), we have aggregated the number of employees in maritime equipment firms in 2020 on Norwegian postal codes, based on their location of offices and production sites. This map gives us an understanding of where the equipment suppliers are located and the number of employees they employ.



PHOTO©JETS GROUP

Statistics Norway (SSB) rank municipalities on a centrality index ranging from 1 to 6, where 1 is the most central and 6 is the least central. In 2020, about 20 percent of the jobs in the maritime equipment suppliers are located in the most central areas of Norway. This is significantly lower than the average for Norwegian businesses, where 36 percent of jobs are found in these areas. Moreover, equipment suppliers have a larger share of its employment located in areas categorized in the mid to the lower end of the index (category 3-5) – about 55 percent of the jobs in the maritime equipment industry are in these areas while the same figure for the entire Norwegian economy is 35 percent.

If we decompose the economic activity generated by maritime equipment suppliers to the 11 counties in Norway in 2020, it clearly follows the pattern shown in Figure 2 (page 6). The economic activity is widespread, and revenues are generated in both central metropolitan areas, dominated by large companies, and not so central parts of Norway, dominated by SME. Especially, it is the counties on the west coast and around Oslo which stand for most of the revenues generated by maritime equipment suppliers.



Jotun Hull Skating Solutions is a revolutionary solution utilizing proactive cleaning to deliver an always clean hull in the most challenging operations. PHOTO@JOTUN.

RELATIVELY LOW NEGATIVE IMPACT OF THE COVID-19 PANDEMIC

After the oil crisis price shock in 2014, the downturn was steep and long-lasting for the maritime equipment suppliers. Following three years of continued negative development in value added and employment, activity rose in both 2018 and 2019.

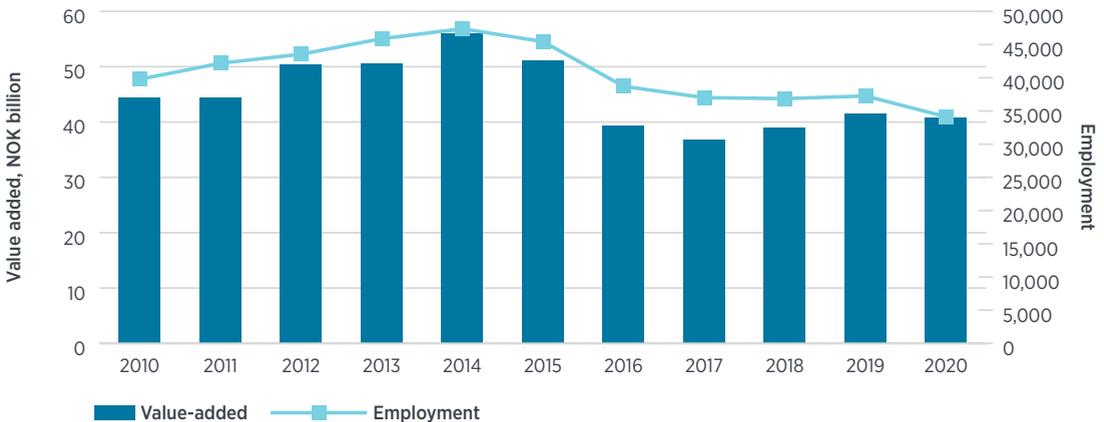
At the start of 2020, the industry was optimistic and looked forward to a strong resurgence. When the last report was published in the fall of 2020, the self-reported outlook by the equipment suppliers revealed a decrease in revenues in 2020 and 2021 due to the coronavirus outbreak. However, these expectations did not come true, at least not with the same magnitude as expected. For the industry as a whole, both employment and value added did somewhat decline, but compared with the oil price shock in 2014, it seems like the coronavirus outbreak was a small brush in the sea. Actually, productivity



PHOTO©LANGSETGRUPPEN

rose between 2019 and 2020 as value added per employee increased from 1,1 million NOK in 2019 to 1,2 million NOK in 2020. This relatively low negative impact of the pandemic should be interpreted in relation to heavy expansionary monetary and fiscal policies induced during the outbreak, such as reduced oil tax, lower interest rates, and better redundancy schemes.

Figure 6: Value added and employment for the maritime equipment suppliers. Numbers include both maritime and non-maritime activity. Source: Menon Economics



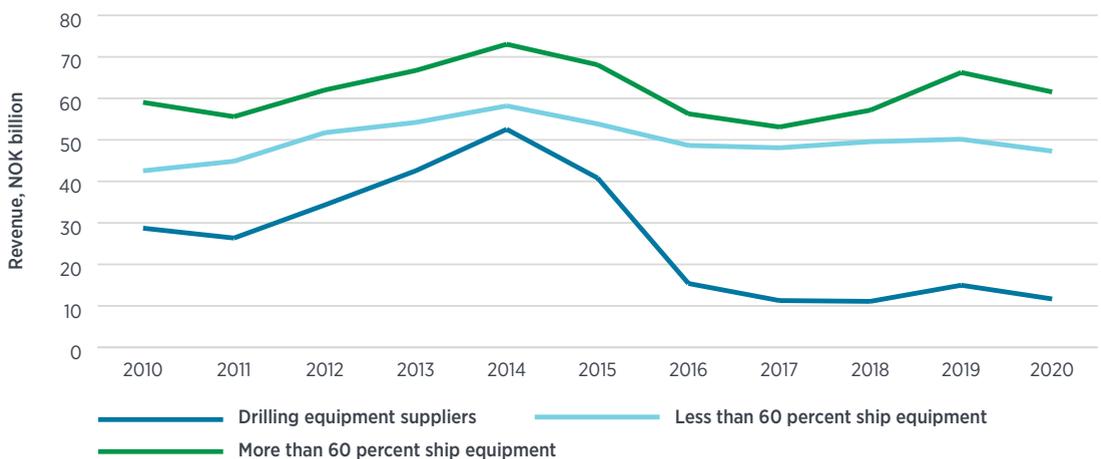
REVENUES FROM MARITIME EQUIPMENT ARE MORE CYCLICAL THAN OTHER REVENUE

As shown previously, the maritime equipment suppliers differ in their reliance on maritime equipment as a source of revenue. The companies with a large percentage of their revenues from maritime equipment have more volatile revenues than those that are less reliant on maritime equipment. This is shown in the figure below, which illustrates the development of revenues for companies with more or less than 60 percent of their revenues from ship equipment deliveries. After the oil crisis in 2014, the downturn was steeper for the highly ship equipment-oriented suppliers, but correspondingly these companies are also the ones that experienced highest growth in revenue in 2018 and 2019. This growth is related to increased deliveries to vessels in the seafood industry and passenger freight.

At the start of 2020, the industry was optimistic and looked forward to a strong resurgence. When the last report was published in the fall of 2020, the self-reported outlook by the equipment suppliers expected a decrease in revenues in 2020 and 2021 due to the coronavirus outbreak. The revenues, especially for the highly ship equipment-oriented suppliers have declined from 2019 to 2020. However, the downturn was not as steep as after oil price shock in 2014, and in 2020 the expectations were more negative than how it turned out to be.

As previously shown, maritime equipment suppliers are mostly located outside of the larger cities. Activity levels in the ship equipment industry are therefore of great importance to ensure productive employment opportunities in sparsely populated areas of Norway. These jobs provide a better wealth distribution through higher wages than alternative jobs in the manufacturing industry, and a higher value added to the economy.

Figure 7: Revenue for the maritime equipment suppliers by revenues distribution. Numbers include both maritime and non-maritime activity. Source: Menon Economics

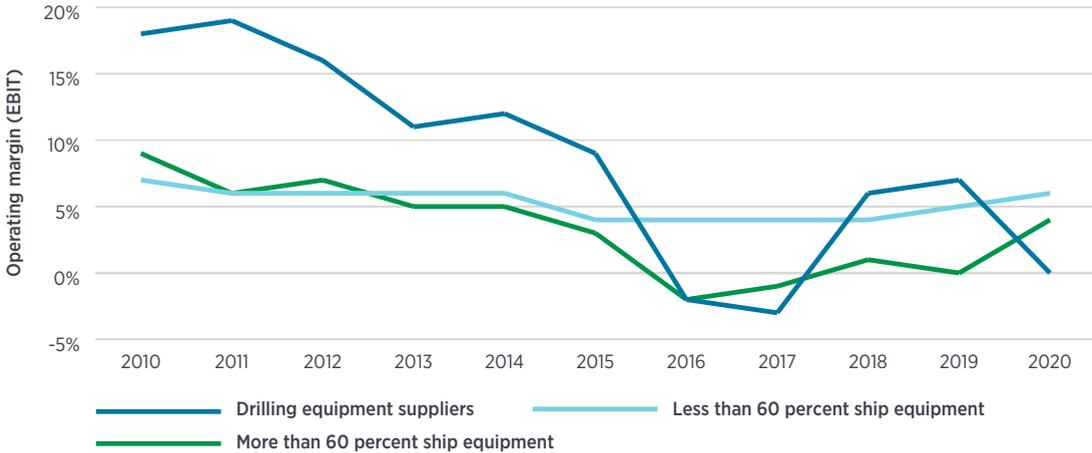


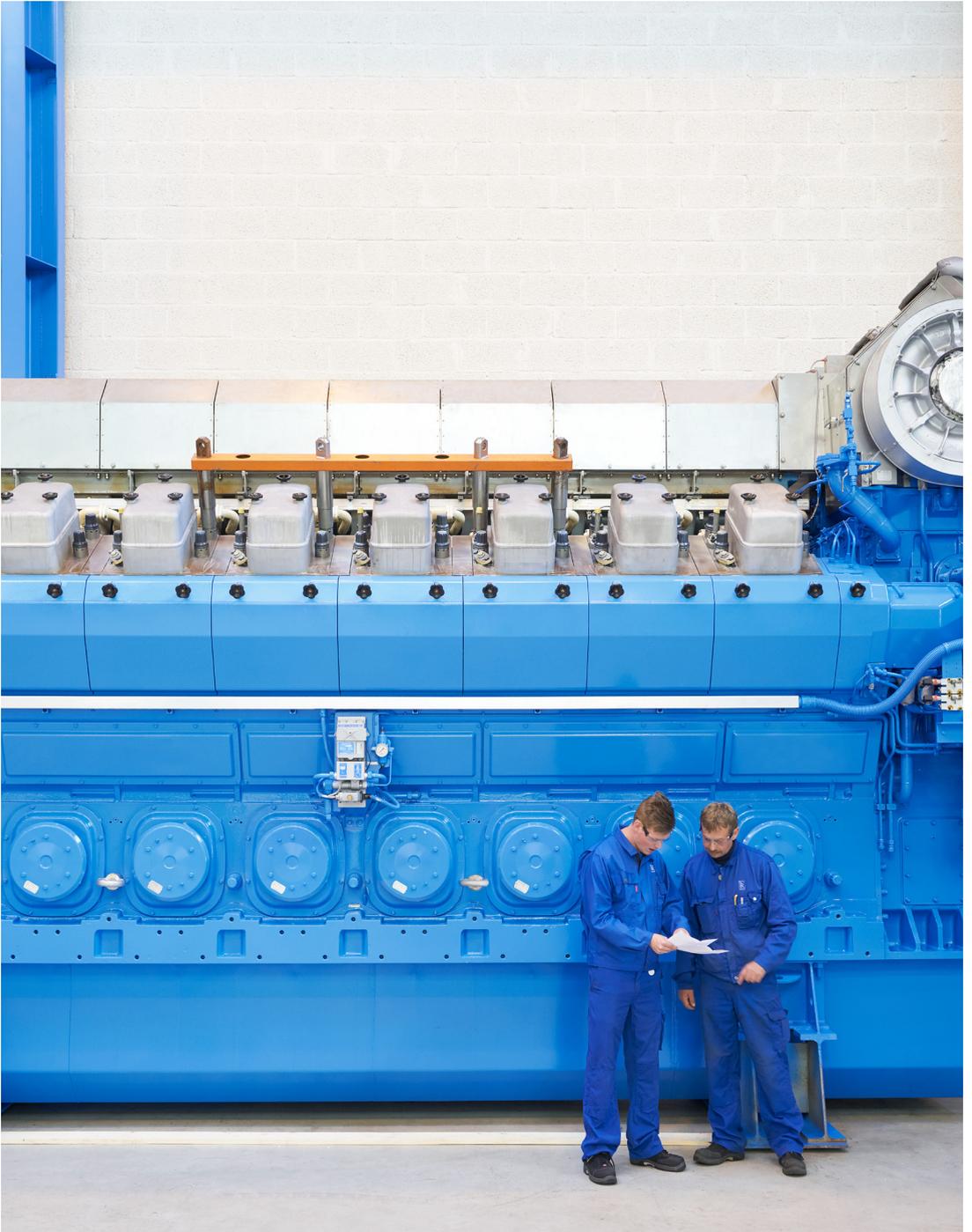
The long-term survival of the ship equipment industry in Norway is, naturally, reliant on being profitable. Since 2016, profit margins for the ship equipment suppliers have been historically low. This is shown in Figure 8. The companies that are most reliant on revenues from ship equipment are generally the ones with the poorest operating margins. The combined performance of suppliers with more than 60 percent of revenues from ship equipment showed negative operating margins in 2016 and 2017 before being at a value around one percent in 2018 followed by a negative profit margin in 2019. In 2020 the equipment suppliers' margins have increased to around 3,5 percent.

Lastly, the drilling equipment manufacturers have by far the most volatile operating margins. During the offshore boom operating margins stayed above 10 percent before plummeting to sub-zero levels in 2016 and 2017. With a dramatic drop in demand, these companies have scaled down their activity and costs to regain profitability. In 2018 and 2019 operating margins have come back up to 6 and 7 percent respectively. However, in 2020 the operating margins have decreased again, which largely can be attributed to the fall in oil price in 2020.

The companies with a lower share of revenues from ship equipment have more stable operating margins, fluctuating between 4 and 6 percent from 2015 to 2020. This is, at least partly, due to higher diversification, which implies that fluctuations in different markets counteract each other.

Figure 8: Operating margins (EBIT) for the maritime equipment suppliers by revenues distribution. Numbers include both maritime and non-maritime activity. Source: Menon Economics





PHOTO©BERGEN ENGINES

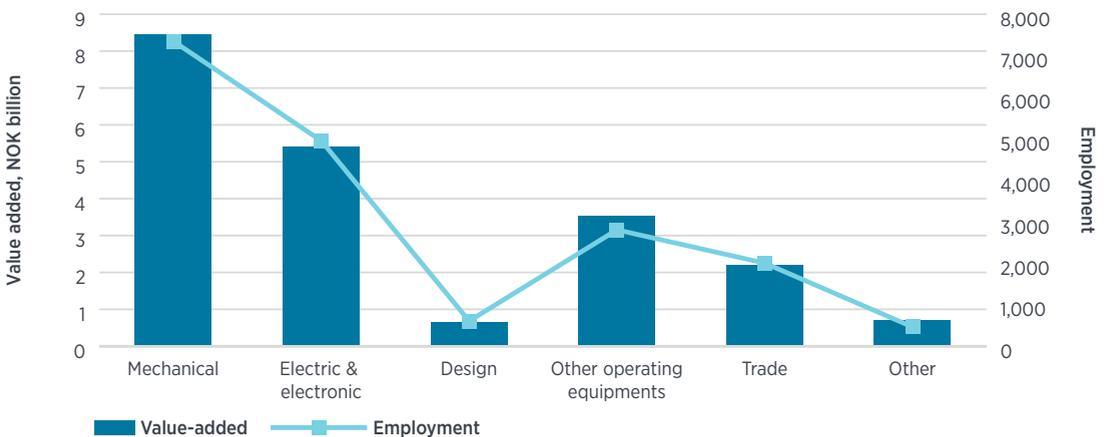
A closer look at the maritime ship equipment

The ship equipment supplier segment consists of manufacturers, designers, and traders of ship equipment. As seen earlier in this report, many companies produce equipment for both ships and other industries. In the following section, we separate the revenue from ship equipment and focus solely on this business segment.

Almost 50 percent of the value added and revenues from the Norwegian maritime equipment suppliers are derived from activities in the maritime sector. These activities can be attributed to a wide range of ship equipment.

Of the ship equipment produced in Norway, mechanical equipment, such as cranes and propellers, constitute almost half of the value added among the manufacturers. Electronic and electronic equipment make up another third of value added among the manufacturers, while the remaining portion of manufacturing is spread across producers of other equipment like marine coatings, cables and life-saving gear. In addition, we find that specialized design companies, in-house design and traders contribute close to NOK 3 billion in value added.

Figure 9: Value added and employment by types of ship equipment, 2020. Numbers include only maritime activity. Source: Menon Economics

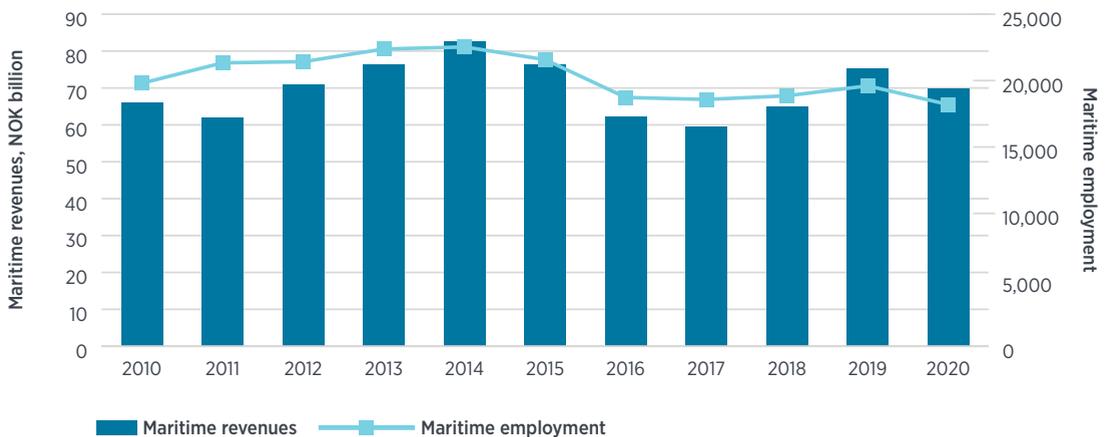


Following three years of continued negative development in revenues and employment after the oil price shock in 2014, activity related to ship equipment rose in 2018 and 2019. In 2020, both the revenues and number of employees declined due to the coronavirus outbreak. However, the decline in ship equipment production was quite small compared to the downturn in 2015-2017. It indicates that the pandemic did not hit the maritime equipment industry as hard as the oil price shock in 2014. There are several explanations for this development, such as heavy expansionary monetary and fiscal policies induced during the outbreak, such as reduced oil tax, lower interest rates, and better redundancy schemes, combined with growth in passenger freight and fisheries and aquaculture segments. Furthermore, the industry as whole has reduced its dependency towards the oil and gas markets since 2014. Despite several years with growth and relatively low negative impact of the Covid-pandemic, the overall revenues are still below the peak levels from 2014.

EXPORTS OF SHIP EQUIPMENT

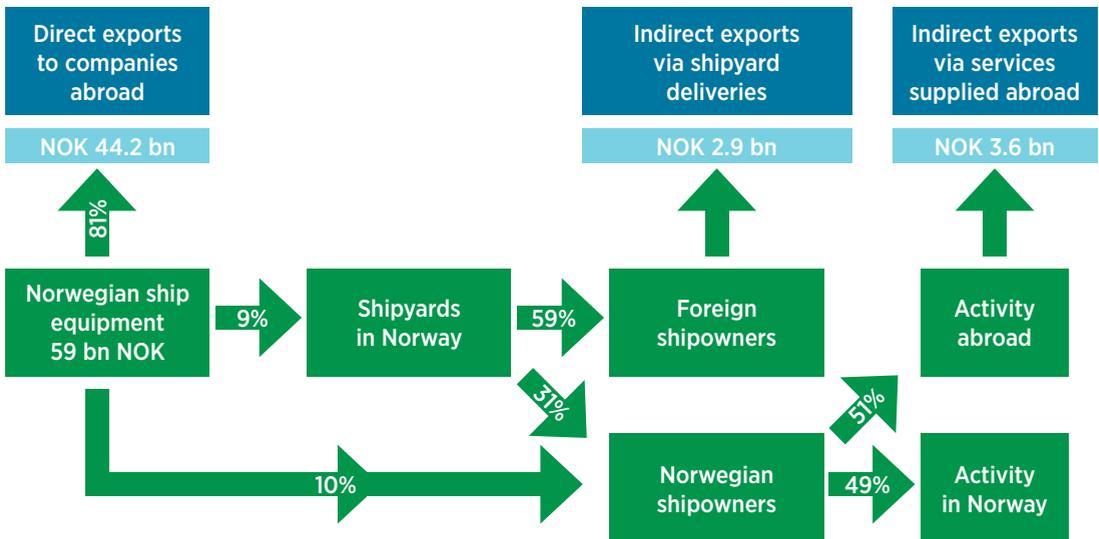
The market for ship equipment is international, and for some types of equipment, global. 81 percent of ship equipment, corresponding NOK 44 billion³, is sold directly to foreign yards, shipowners, or other maritime companies abroad. In addition, a large share of equipment sold to Norwegian yards and shipowners is used as components in other exported products. This can either be through orders by foreign shipowners at Norwegian shipyards, or as equipment for Norwegian shipping companies supplying services abroad. The process is illustrated in the figure on the next page. Norwegian manufacturers are facing fierce competition from other countries with lower labor costs. Nevertheless, the sector has managed to maintain a high export intensity over several years, even increasing somewhat over the last year. The continued demand for Norwegian equipment abroad is an indication of the domestic manufacturers' ability to maintain competitive in the world market.

Figure 10: Maritime revenue and employment from 2010 – 2020. Numbers include only maritime activity. Source: Menon Economics



³ Traders of ship equipment are left out to avoid potential double counting.

Figure 11: The value chains of the ship equipment industry – with direct and indirect exports, 2020.⁴



EXPORT BARRIERS

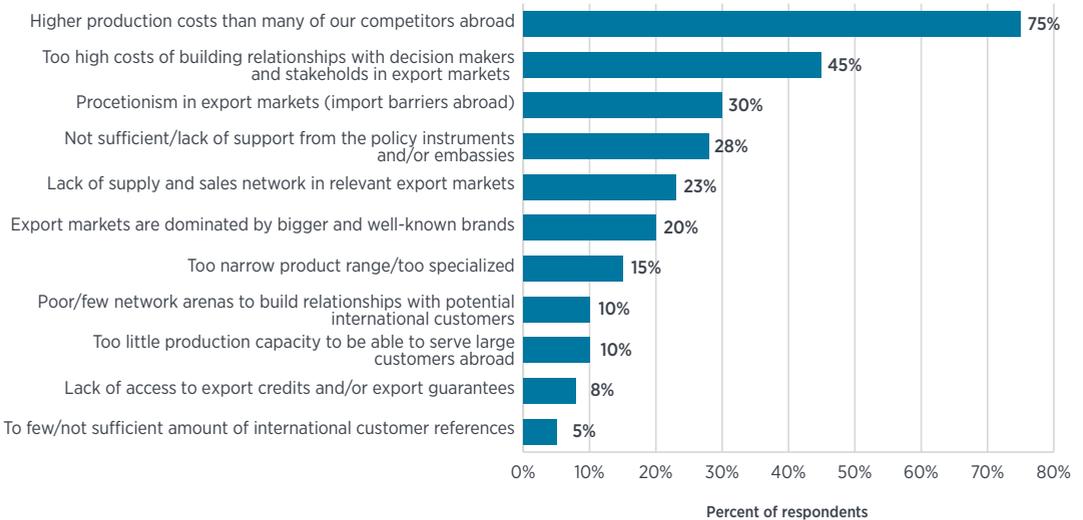
Norwegian maritime equipment suppliers are facing fierce competition from competitors in different geographical markets and different ocean industries (market segments). The respondents had the opportunity to check the factors that they regard as barriers to their success in export markets (multiple answers possible). These results are shown in Figure 12. More than 70 percent of the respondents answered that they have higher production costs compared to their competitors abroad. This result is in line with other studies of competitive disadvantages (and hence export

barriers).⁵ In addition, almost 45 percent of the respondents find it too costly to build and maintain relationships with the export markets they would like to enter. Some other important export barriers for equipment producers are protectionism in export markets (i.e., import barriers they face abroad), insufficient policies to support Norwegian export and lack of sales network in the destination markets. Less than one in ten companies regard lack of access to export credits/guarantees as an important barrier, and also very few companies experience the lack of network arenas for building relationships as an obstacle.

⁴The data is based on the survey conducted in conjunction with this report. The split between Norwegian and foreign shipowners is based on an earlier survey conducted with yards in the Møre-region. There is some uncertainty around this estimate, as the Møre yards might not be representative of all yards in Norway.

⁵Three Menon reports have in various ways documented cost challenge: a) Norsk verftsindustri – aktivitet, konkurranse-situasjon og rammebetingelser (Menon-rapport 66/2021); GCE Blue Maritime Cluster – Global Performance Benchmark 2021 (Menon-rapport 86/2021); Omstillingsbehov i Møre og Romsdals eksportnæringer (Menon-rapport 148/2020).

Figure 12: What are the biggest barriers to export for Norwegian equipment suppliers? Multiple answers possible. N=40.
Source: Menon Economics

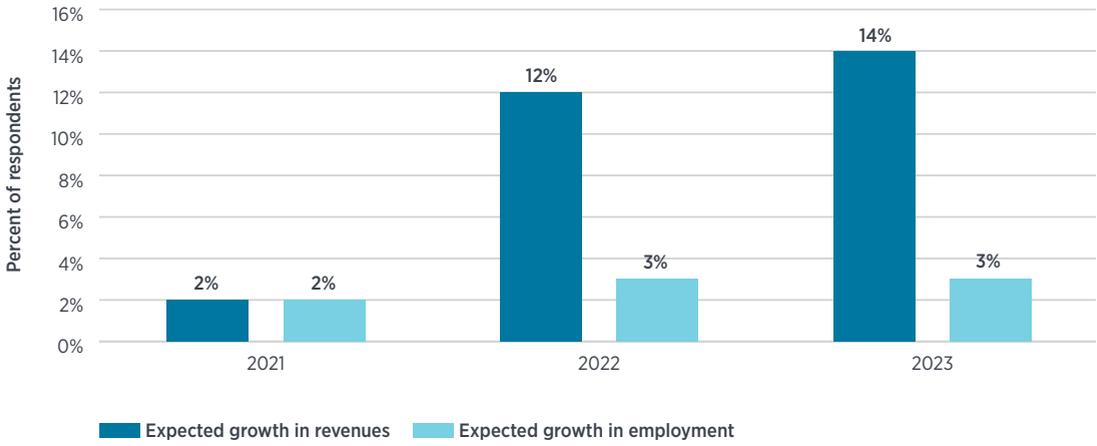


FUTURE OUTLOOK

As a result of the global pandemic, and worldwide shutdown in economic activities, the expectations of maritime equipment producers were turned downwards in 2020. We asked in this year’s survey about the expectations of equipment suppliers in terms of revenue and employment when looking two to three years ahead. The results presented in this chapter will be based on the answers we received in this year’s survey and should be interpreted as respondents’ own outlook, not necessarily on behalf of the entire industry.

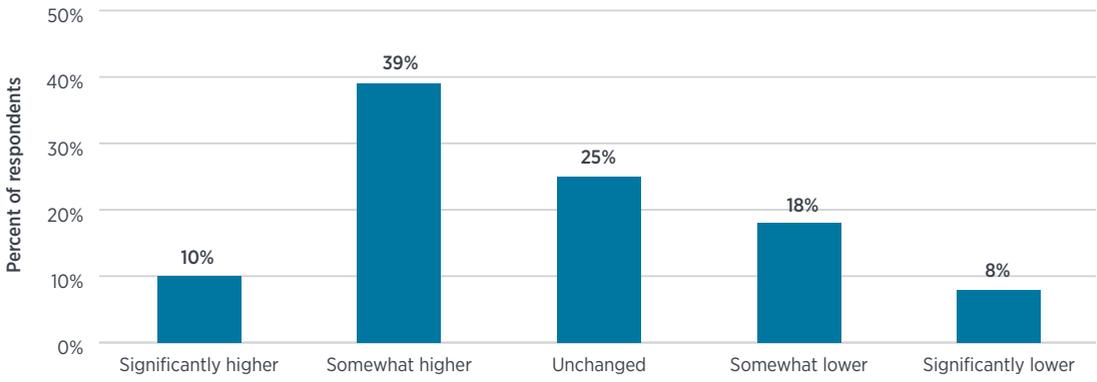
As shown in Figure 13 on the next page, we can see that the expectations both in terms of employment and revenues in 2021 compared to 2020 have turned positive on average. Survey respondents expect a 2 percent growth in revenues and 2 percent in employment in 2021. The expectations for 2022 compared to 2021 are even higher, where revenue growth is expected to be at 12 percent and employment growth at 3 percent.

Figure 13: Expected aggregated growth in revenues and employment among the respondents. N=50. Source: Menon Economics



Similar to revenues, the expectations for change in profitability between 2020 and 2021 are mostly positive. As seen from Figure 14, almost half of the respondents expect a higher profitability in 2021 compared to 2020. However, 1 in 4 equipment suppliers expect a lower operating result.

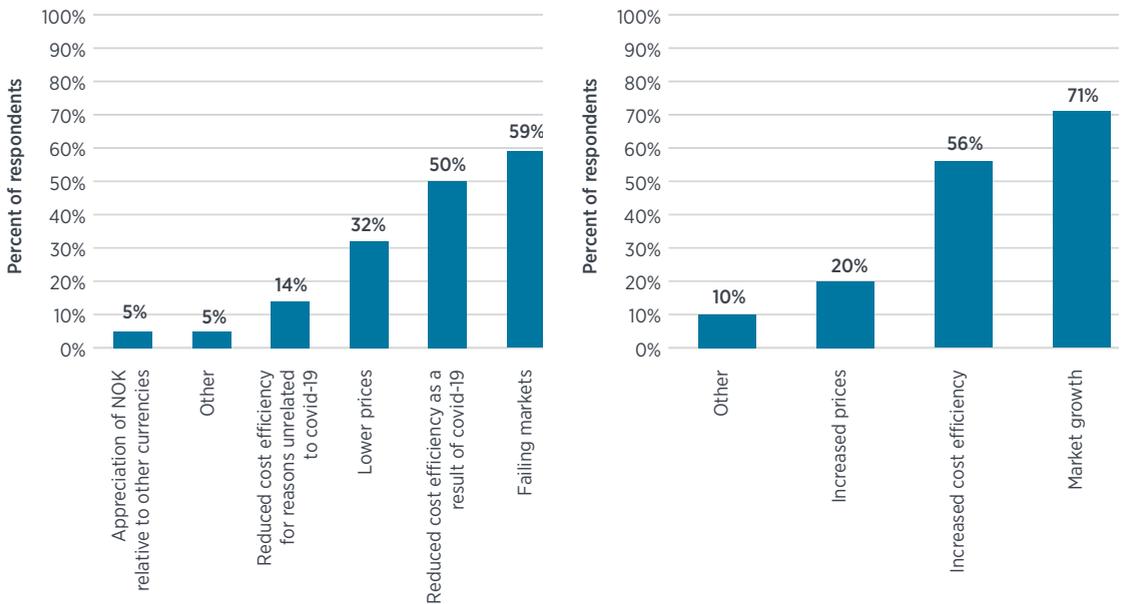
Figure 14: Expected change in operating profits from 2020 to 2021 among the respondents. N = 84. Source: Menon Economics



These expectations have been assessed in our survey. From the sample of maritime equipment suppliers that expect weaker profitability in 2021 (compared to 2020), 60 percent of the respondents in this group point out failing markets (multiple answers were possible). Half of the respondents that expect lower profitability states that the most important reason for decline is reduced cost efficiency as a result of Covid-19. For this subgroup, the respondents point out that delays from subcontractors, followed by delays in own production and difficulties with access to foreign temporary labor explain the reduced cost efficiency. 32 percent of respondents with a lower profitability expectation point out lower prices as an explanation.

On the positive side, there is a bigger share of respondents that expect an increase in terms of profitability from 2020 to 2021. 71 percent of the respondents with positive expectations indicate that market growth will increase their profitability. Thereafter, 56 percent of the respondents with positive expectations point out that increased cost efficiency will contribute to higher profitability.

Figure 15: To the left: Reported reasons for expected reduced profitability in 2021, compared to 2020. N = 41. To the right: Reported reasons for expected increased profitability, N = 22. Multiple answers possible. Source: Menon Economics

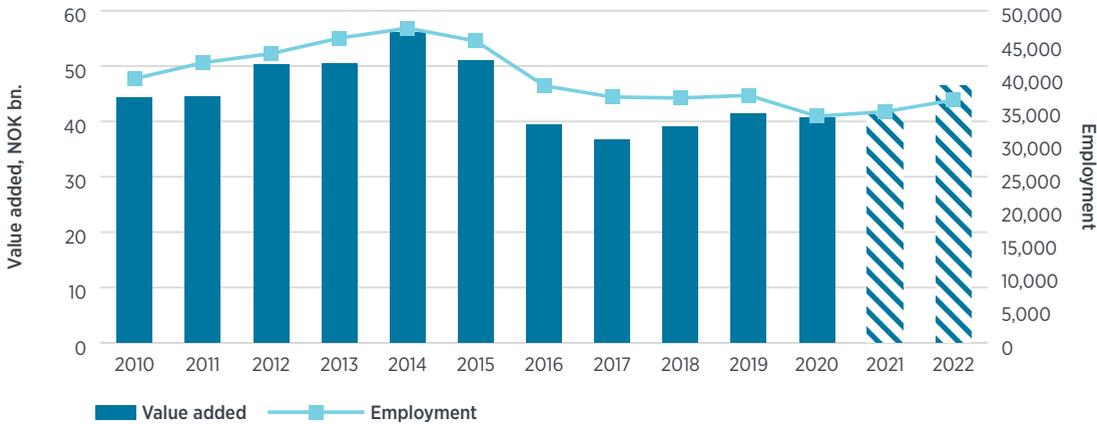


These expectations presented in this section can be utilized to make a market prognosis towards 2023 for both employment and value added among the maritime equipment suppliers. As expectations and outlook about 2021 and 2022 on average are positive among the equipment suppliers, and current available economic and financial figures move in the same direction, we expect that the industry will experience growth towards 2023. However, the expected growth is not big enough to get the industry back to the levels previous to the oil price shock in 2014.



Langsetgruppen
Langset Mek,
Sunndal.
PHOTO@JENS H
LYNGSTAD

Figure 16: Value added and employment for the maritime equipment suppliers, including estimates for 2021 and 2022 in both value added and employment. Numbers include both maritime and non-maritime activity. Source: Menon Economics



DEVELOPMENT IN MARKET SEGMENTS

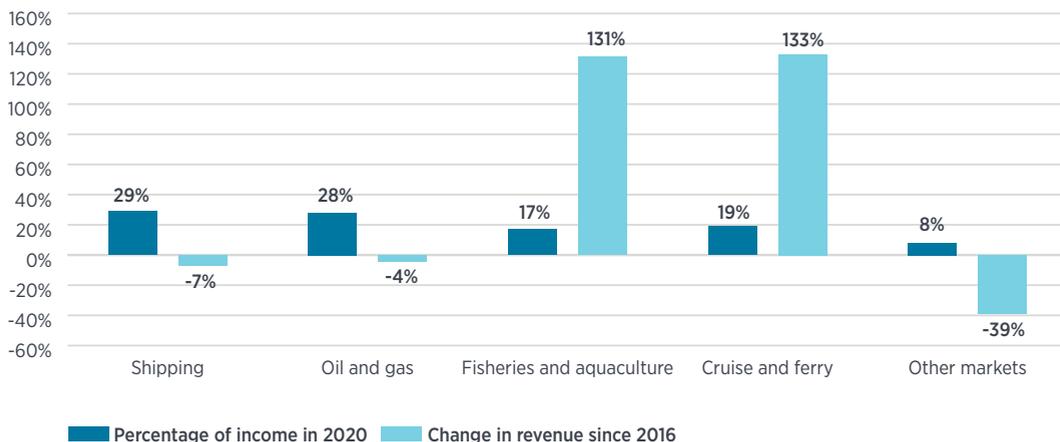
We have gathered information on the division of revenues from different ocean industries (market segments) from numerous surveys conducted between 2016 and 2021 among maritime equipment suppliers. In these surveys, the companies have done self-assessment of own segment distribution between markets.

Figure 17 shows the percentage of income from each market segment for ship equipment and the change in revenue since 2016. Increased revenue generated from deliveries to the seafood industries and passenger vessels contributed to stabilising the income in 2017, before surpassing the falling revenues from the shipping and offshore vessels segments in 2018. In 2019, income from all market segments rose simultaneously, contributing to a higher overall growth rate. This growth was dampened significantly by COVID-19 pandemic in 2020. Especially the cruise and ferry segments were affected negatively as a result of long-lasting international travel restrictions.

As we can see, shipping (deep-sea and short-sea freight) and offshore oil and gas account for more than half of the revenues while the continued growth in seafood industry and passenger freight has greatly increased in importance over the past years. Other type of vessels than the above-mentioned account for 8 percent of the revenue in 2020 and they have seen a decline in revenue compared to the levels in 2016.

Looking closer at the equipment producers who are the drivers of the increased revenue from deliveries to offshore and shipping segments in 2020, we can observe a large portion of growth coming from technologies contributing to lower emissions from existing ships (“refit” or “retrofit”). Driven by the IMO 2020 regulations, income from exhaust cleaning systems grew sharply in 2019 and 2020, while demand for battery packages, especially for offshore vessels, also increased substantially.

Figure 17 Estimated revenue share in 2020 and revenue growth from 2016 to 2020 for different segments/vessel types. Source: Menon Economics



EXPECTED DEVELOPMENT IN ORDERBOOKS

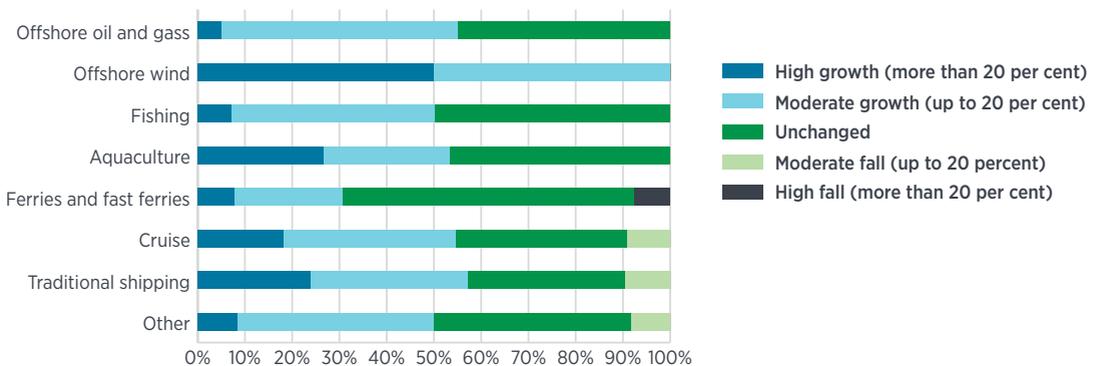
In this year's survey we have asked the maritime equipment suppliers about the segment composition of their current orderbook, and how they expect it to develop over time. The respondents were only allowed to share their outlook for the segments they serve today. This outlook is presented in Figure 18.

What strikes first is that all maritime equipment suppliers that deliver to offshore wind expect an increase, where half of these expect an increase of more than 20 percent. This is in line with our expectations too, given the heightened importance of investment in green energy production combined with the expertise Norwegian maritime cluster has built up in offshore segment over the years through the oil and gas sector. Meanwhile, a significant share of the equipment suppliers who deliver to offshore oil and gas sector expect the orderbooks to remain unchanged.

In terms of fishing and aquaculture, the expectations are quite similar. While almost half of the respondents expect the orderbooks to remain the same in these segments, half believes that they will increase. It is worth noting that 26 percent of the respondents that operate in the aquaculture segment expect a growth of more than 20 percent in their orders.

Around half of the respondents who deliver to segments in terms of traditional shipping and cruise expect an increase. This might be a sign of recovery after the shock caused by the pandemic. Nevertheless, around 10 percent of respondents in these segments expect a moderate fall (up to 20 percent) which is probably the lingering effects of the pandemic.

Figure 18: Expected change in orderbooks by segments towards 2023, where each segment includes answers from respondents that currently operate in that segment. Source: Menon Economics



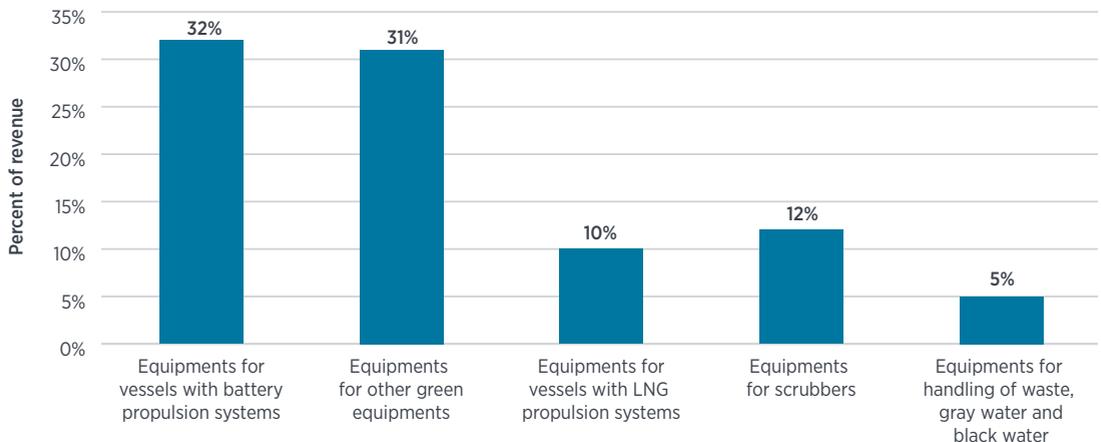
GREEN SEGMENTS

The equipment suppliers consider green technology a huge business opportunity in the future. Green transition is driven by three main forces: regulations and policies, expectations of cargo owners and consumers, and access to investors and capital (DNV, 2021). On a global scale, IMO is seen as the biggest regulator. In 2020 the sulphur cap came into effect, which limits the sulphur content in fuel used to 0,5 percent and even lower in designated areas such as the North Sea. Moreover, IMO requires newbuilds to have a minimum energy efficiency level per mile, specified through the EEDI-scheme. On a regional level, the European Union's target for 55 percent reduction in greenhouse gases by 2030 and net zero emission target by 2050 introduces serious measures also for the shipping sector.

The Norwegian government has also introduced a 50 percent reduction target for greenhouse gas emissions from domestic shipping and fishing activities. The government aims to achieve this goal through carbon pricing, introduction of regulations for different ship segments and financial support schemes.

In this year's survey, the respondents have revealed their share of revenue which has been generated through green maritime activities in 2020. Of all respondents, 33 answered that they do have generated revenue through green maritime activities. This corresponds to 60 percent of our total sample and is presented in the figure below, where revenues from green activities are divided on different types of technologies and products.

Figure 19: Share of green equipment in operating revenue 2020. N = 33. Source: Menon Economics





The Jotun HullSkater is executing the inspection and proactive cleaning. The HullSkater is an advanced underwater robotics installed during docking, remotely operated by a Jotun Skate Operator. PHOTO©JOTUN

From the sample of maritime equipment suppliers who have reported green revenue in 2020, an average of 32 percent of their total revenue is generated by deliveries of special equipment to vessels that work on battery propulsion systems. This is followed by other green equipment not specified in the survey and this accounts for 31 percent. Equipment for vessels with LNG propulsion systems make up 10 percent, while equipment for scrubbers make up 12 percent and five percent can be attributed to equipment for handling of waste, gray water, and black water.

Global, regional, and national greenhouse-gas regulations will push the maritime sector to find green solutions that comply with emission caps. Therefore, we expect to see an increase in the share of low-emission vessels in the newbuilds, but also increase in retrofit activities to decrease emissions on the existing fleet. This gives Norwegian maritime equipment suppliers a unique opportunity to increase their global share in supply of green maritime equipment.

DEGREE OF SPECIALIZATION AND SUBSTITUTION BETWEEN MARKET SEGMENTS

The traditional understanding of the maritime cluster is a complete and generic supply chain which offers products to all types of market segments, with the implication that the commonalities and relations within the maritime cluster is more important than the specialization and adaptation to market segments the maritime cluster supplies. However, after the collapse of the offshore market in 2015 and the following vertical decoupling between the shipping companies and the ship industry side (yards, equipment and ship design), the maritime industry has become more diversified and more connected to various ocean industries, like aquaculture and tourism (cruise).

Some of the Norwegian maritime equipment suppliers produce a broad range of equipment. While some of these products are generic and can be utilized in all types of vessels, such as

paint or lifeboats, some products are tailor-made for certain types of vessels that carry out a certain type of operation.

In this year's survey, we have tried to assess the degree of specialization in two ways; by asking the firms to decompose their revenues on different ocean industries (i.e., market segments described above), and by asking them to specify how specialized their products are. On degree of specialization, we allowed the respondents to choose more than one statement to cover a broader range of their production portfolio. The results are presented in Figure 20 below.

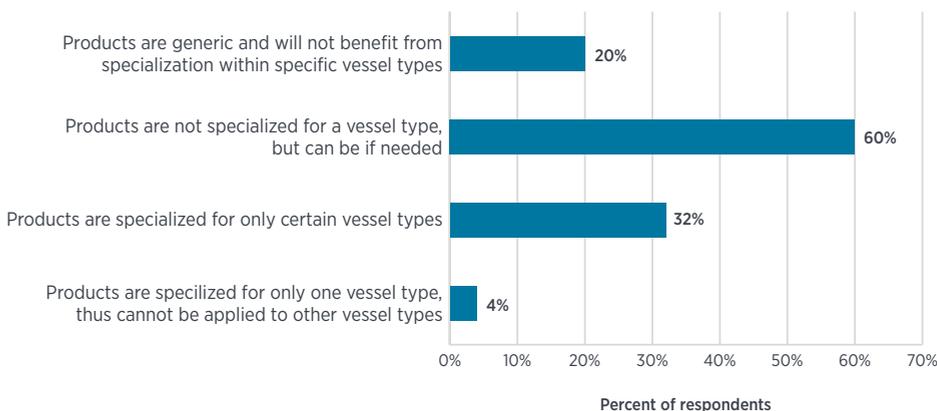
As shown in the figure, only 4 percent of the respondents produce very specialized equipment that can be used only in one vessel type. We should note, however, that the respondents might have thought of specialization within a market segment (for example different types of fishing vessels). Hence, it might be that a higher share of

the equipment is segment-specific. The fact that 32 percent of the respondents answer that their products are specialized for a certain set of vessel types, may be interpreted as an indication that at least one third of the equipment are specialized to a specific market segment.

An overwhelming share of 60 percent of the respondents produce somewhat generic products that could be specialized if needed, but in default fits a broad set of vessel types. Producing somewhat generic products gives the firms more flexibility and better opportunities to respond to rapid/unforeseen changes in market segments.

While only 20 percent of the respondents answer that their equipment can be used in any type of vessel and is completely generic, it seems reasonable to conclude that most products are neither entirely generic nor entirely segment specific.

Figure 20: How generic are the products equipment suppliers produce? N = 50 (multiple answers possible). Source: Menon Economics



For most of the respondents, the innovation takes place within their own company

INNOVATION IN THE SUPPLY CHAIN

There is no doubt that maritime equipment suppliers are highly productive and innovative. In this year's report we have asked the companies about where the innovation takes place. This will enable us to get a better understanding of the degree of interaction within the maritime cluster, and whether the innovation mostly takes place within internal units in the company, between entities in the supply chain or horizontally, between other companies in the maritime cluster.

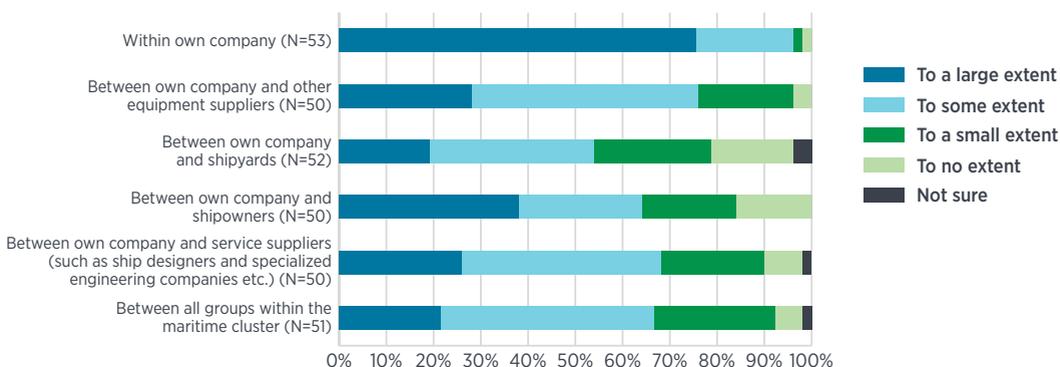
The results from this question are summarized in the figure below. It clearly states that for most of the respondents, the innovation takes place within their own company. In cases where the innovation process is shared with other actors in the cluster, it happens most likely between other equipment suppliers and/or shipowners. The respondents also states that innovation processes in some extent can be shared between own company and shipyards, and this is as

common as with maritime service producers. This is somewhat surprising as previous studies have shown that the Norwegian shipyards to a large extent serve the role as an innovation hub within the maritime cluster.⁶ The overall picture, however, is that there is an extensive degree of cooperation both vertically and horizontally in the ship industry in Norway.

NORWEGIAN SHIPYARD INDUSTRY AND THEIR ROLE IN THE MARITIME CLUSTER

The larger Norwegian yards have gone through challenging times since orders for new offshore vessels abruptly stopped in 2014. Since then, the yards have been successful in finding new business building new types of ships. Several contracts for exploration type cruise vessels have been instrumental in restoring activity. But the challenges experienced by the yards when switching to building a new type of ships have obviously been enormous, resulting in large economic losses. The worldwide cruise

Figure 21: In which arenas do the innovations take place? Multiple answers possible. N=53. Source: Menon Economics



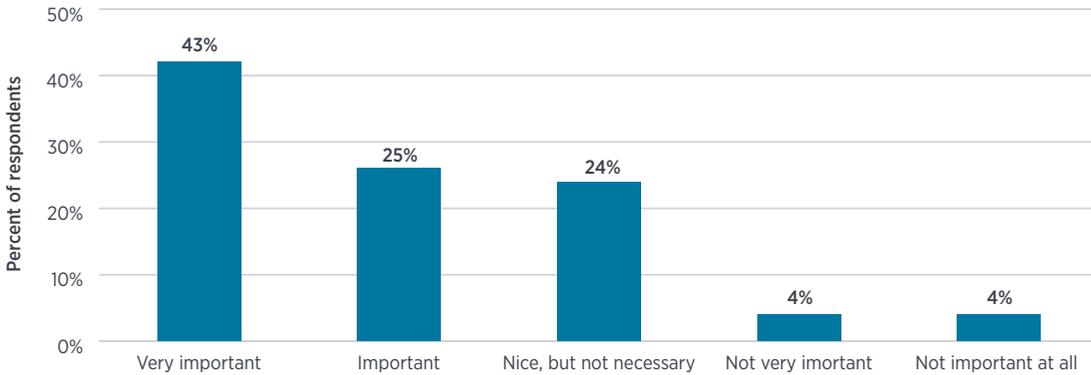
⁶ See for example: Norsk verftsindustri – aktivitet, konkurransesituasjon og rammebetingelser (Menon-rapport 66/2021). Note that this statement was questioned in the report, and some actors in the maritime industry pointed out the same views as presented in this report.

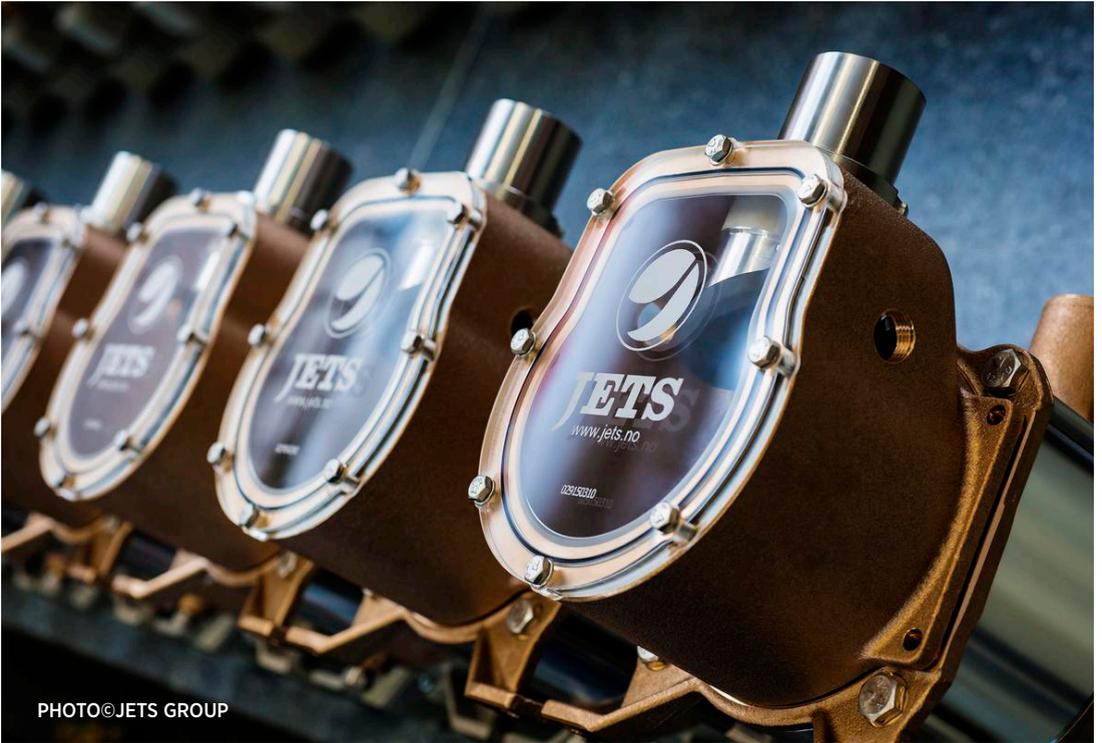
business has been struck hard by corona, and it is uncertain when new orders for cruise vessels will be signed. However, fisheries and aquaculture, and somewhat the ferry segment, have been strong for some years, but it is uncertain for how long this boom will last.

Because of the likely challenging times ahead for the larger yards which largely relied on the cruise segment pre Covid-19, we asked how vital the Norwegian shipyards are for the ship equipment producers. The answer is clear: Almost three-quarters of the respondents state that Norwegian shipyards are “important or very important” for their business. Of the remaining 32 percent most state that the shipyards are “nice, but not necessary” for their business while some respondents state that these yards are not important for their business at all. These results are consistent with former findings on the subject, both presented in last year’s edition of the report and in Menon’s (2021) study of the Norwegian shipyard industry.

Menon Economics has done an extensive analysis of Norwegian shipyards industry in 2021 on behalf of the Ministry of Trade and Industry. As a part of this analysis, we have conducted several interviews with representatives from Norwegian shipyards. In these interviews representatives stated that once a shipbuilding contract is signed, the shipyards are responsible for everything from the purchase of the equipment from subcontractors to testing. Meanwhile, it is the shipping companies, ship designers and equipment suppliers who in all cases discuss and adopt major changes. Shipyards state that they are often overlooked in these decisions that indirectly concern them and hence lack a chance to influence the outcomes. As a result, the shipyards must to a large extent bear the additional costs that the changes entail.

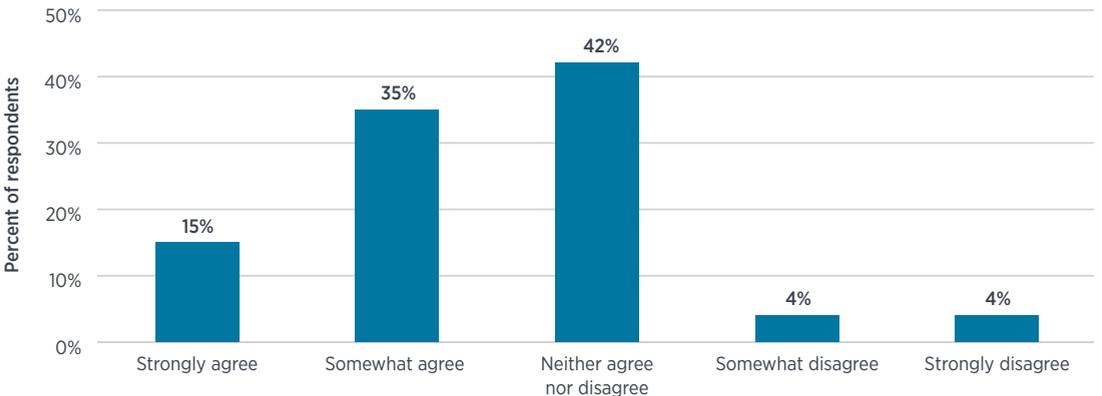
Figure 22: How important are Norwegian shipyards for your business? N=51
Source: Menon Economics





We asked maritime equipment suppliers if they agree with this statement, that shipyards take a disproportionately large share of the responsibility in shipbuilding contracts. The results are presented in Figure 23. As we can see, half of the respondents agree with this statement, while 8 percent disagree. The results are consistent with previous studies.

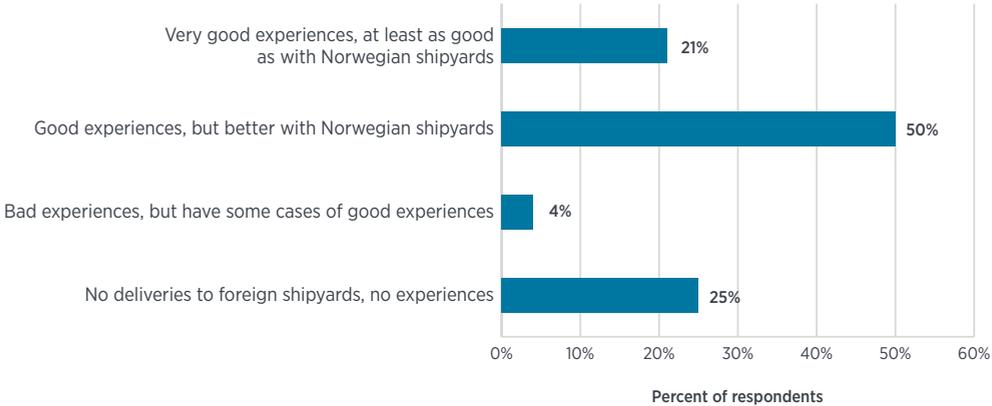
Figure 23: Do the shipyards take a disproportionately large share of the responsibility, including finances, in shipbuilding contracts? N=52 Source: Menon Economics

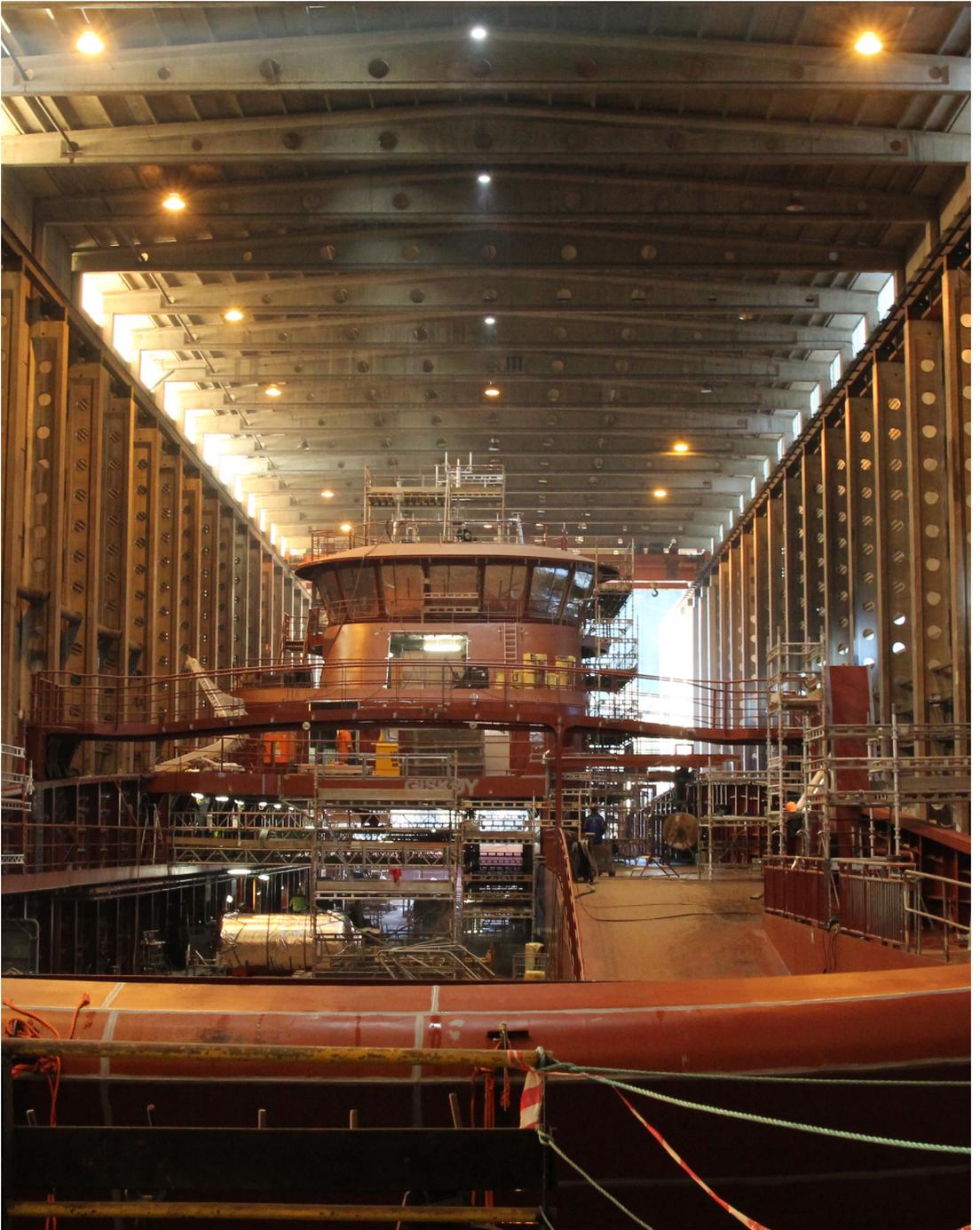


The Norwegian shipyards have met fierce competition from shipyards abroad, and as previously shown, many of the Norwegian maritime equipment suppliers are exporting equipment to foreign yards in shipbuilding contracts abroad. Hence, competition from foreign shipyards is indirectly boosted by Norwegian equipment suppliers. To get a better understanding of the competition Norwegian shipyards face from shipyards abroad, and to what extent Norwegian maritime equipment suppliers are contributing to this competition, we have asked equipment suppliers about their experiences with the shipyards abroad. Good experiences indicate that Norwegian shipyards may find it hard in the future to stay competitive, as shipowners who want to build ships with Norwegian equipment more easily can substitute towards foreign and cheaper shipyards and still get the same quality as if built in Norway.

While 4 percent of respondents had generally bad experiences with the shipyards abroad, 21 percent had very good experiences. However, a significant share of Norwegian maritime equipment suppliers still think cooperation with Norwegian shipyards is better than cooperation with yards abroad: Half of the equipment suppliers that answered the survey have had good experiences with shipyards abroad, however they found working with Norwegian shipyards better.

Figure 24: How were your experiences with foreign shipyards that you have cooperated with? N=56.
Source: Menon Economics





The car ferry "Giskøy" in dock.
PHOTO©HAV GROUP

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

Appendix

DATA REGISTRY AND SURVEY DATA

The report is based on a registry of all Norwegian entities that deliver accounting information to the national Brønnøysund Register Centre. Changes from previous editions are related to changes in companies that are included or excluded in our sample of maritime equipment suppliers. Furthermore, minor changes in the historical numbers can occur due to updated financial information from companies. Changes may also occur as some historical maritime shares have been updated based on new and more precise information. Norwegian official registries changed the way they counted an employee in 2015 by lowering the threshold for firms for when to report employees. As a result, employment numbers before 2015 are not directly comparable to the numbers from 2015 and in general, the employment numbers after 2014 are higher than the numbers before 2014.⁷ However, employment from 2015 and onwards is directly comparable.

The survey was sent out in October 2021 to about 600 respondents and received a total of 53 responses. In addition to responses gathered in this project, Menon has collected information from a large number of companies the GCE Blue Maritime Cluster through a

similar survey in relation to another project in the fall of 2021. These survey responses are used for this project as well, bringing the total number of respondents to 80.

To assure ourselves that the survey was representative for the whole ship equipment industry, we focused on obtaining responses from all the largest companies, since these dominate overall activity in the industry. We were mostly successful in doing so. For non-responders information has been gathered from alternative sources.

The subdivision into the various categories of ship equipment is made by the companies' valuation (from the questionnaire), or, if this was not available, by industry codes and our knowledge of the companies.

Export data is mainly gathered through the survey but also combined with information from earlier studies Menon has completed.

DELIMITING THE MARITIME INDUSTRY

The size and significance of any industry are determined by how it is defined, and a clear and concise definition which puts definite limits on what is to be included and what is to be excluded is of the essence.

⁷ In Menon's database over Norwegian entities, we have tried to correct for the change in registry methodology and hence made the numbers more comparable, but this method is not perfect.

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

The term maritime equipment supplier used in this report refers to the companies that design, produce, manufactures and supply equipment satisfying the definition above. Furthermore, we divide maritime equipment into two main categories, ship equipment and drilling equipment. The following types of equipment are included in the term ship equipment:

- **Mechanical equipment** refers to the production of equipment for carrying out mechanical operations such as lifting or propelling ships forward. The category is extensive, including suppliers of such as cranes, winches, propellers, and engines.
- **Electrical and electronic equipment** refers to the production of equipment focusing on electrical and electronic components, including specialist hardware, software, electrical propulsion systems, bridge equipment or DP systems⁸.

- **The group dealing with design typically includes ship design companies such as Møre Maritime.** The group also includes companies with a somewhat broader focus such as LMG Marin, which offers design packages for both ships and rigs.
- **Other operating equipment** involves manufacturers of equipment necessary for everyday ship operations, including suppliers of items such as marine paint, lubricants, cables, chains, and lifeboats.
- **Trade** consists of 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.

In last year’s report, the focus on how to report on the maritime equipment suppliers was changed. Earlier editions have separated revenues and activity from production and sales of ship equipment and focused solely on this part of operations (ship equipment solely). With the increased focus on company performance from the many challenging years, last year we decided that including all activity from the companies supplying maritime equipment is of more interest. We continue mainly with this definition also for this year’s report and specify clearly when we only focus on the maritime activity.

⁸ 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, utilizing propellers and thrusters instead.



FEDERATION OF NORWEGIAN INDUSTRIES

Næringslivets Hus
Middelthuns gate 27
Majorstuen, Oslo

+47 23 08 88 00
post@norskindustri.no
norskindustri.no