



MENON-REPORT

GCE Blue Maritime

- Global Performance Benchmarking

MENON-PUBLICATION NR. 34/2015
September 2015

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MENON
Business Economics

1. Conclusions and Main Findings

Companies in the Blue Maritime Cluster demonstrated spectacular growth from 2004-2014 with the total value added increasing at, on average, 13 percent annually and reaching 23 billion NOK in 2014. As a result, more than 8000 new jobs were created in the cluster. That said, the growth, by all measures, has slowed down significantly in the period from 2009-2014, and we currently observe a decline. In particular, the total revenues of the cluster companies grew by 240 percent from 2004-2009, by 15 percent from 2009-2014, and are now expected to decline by about 5 percent between 2014 and 2015. Similarly, the annual growth rate in productivity has been a negative since 2009 compared to the unprecedented 92 percent annual growth observed from 2004-2009. The declining growth rates in 2009-2014 were accompanied by volatile and declining operating margins. While there are significant differences in the margin levels across different segments of the cluster, we observe a general decline in the operating margin of about 5 percentage points for the cluster on average in 2008-2014.

Nevertheless, the cluster has shown a much stronger performance in terms of value creation compared to its international counterparts. In particular, the offshore shipping companies benefited from the high demand and premium rates for more advanced ships in 2008-2014. As a result, they both delivered superior returns on the invested capital and increased their market shares slightly from the international rivals. Conversely, the competitive position of Møre shipyards has deteriorated as the offshore segment has grown and attracted larger international competitors such as Hyundai and Samsung Heavy Industries. The international market shares of the ship equipment producers located in the cluster decreased as well.

Benchmarked against companies offering similar products and services in Norway, we see that the members of Blue Maritime have performed well, but there are some signs that they have been falling behind their Norwegian counterparts recently. While the increase in activity is in line with the national benchmark, the development in profitability has been somewhat weaker for companies in Møre, and especially for the equipment producers in the cluster. Looking at productivity, we see the same strong development for the industry in Møre and its counterparts in Norway in the period before 2009. In the last three years, we have seen signs that the national industry has been increasing its productivity again, while productivity growth in Møre has stagnated.

Falling demand and increased competition in combination with signs of overcapacity in the OSV industry and the high financial leverage of Møre, companies are likely to drag down the cluster's performance in the near future as well. In particular, the doubling of the offshore fleet in the last decade combined with the recent decrease in offshore oil & gas exploration and production activities results in excess OSV capacity. The expected decrease in ship utilization rates does not only hurt the ship owners, but also has a negative cascade impact for the whole value system. Order delays and cancellations for shipyards will inevitably propagate to equipment producers – as equipment can account for about 70 percent of a ship's cost – as well as to ship designers and service providers. The substantial use of borrowing to finance operations is likely to magnify the negative effects of the market decline on the bottom line and on returns on invested capital.

These circumstances call for substantial revisions of the companies' strategies directed towards international expansion and, for some segments, diversification out of the offshore oil & gas industry, improved operational efficiency, flexible management of capacity, and increased focus on financial risk management. Whether the cluster will keep its competitive edge in the global markets will be largely determined by how successfully the companies will implement these measures.

The cluster has historically demonstrated a remarkable capability for strategic transformation through both company and cluster based innovation. The collective knowledge that innovation relies on – carried by firms and research institutions and spread among them through buyer-seller relations, cooperation, informal

communication and mobility of people – is strong in the Møre region. In addition, the critical mass that the cluster has gained in the last decade has made it much more robust to adverse shocks than it was ever before.

1.1. Global Performance benchmarks – an overview of our findings

GCE Blue Martime is one of the two first Norwegian business clusters promoted to a Global Center of Expertise. To become a GCE, the cluster has proven that it has established a systematic collaboration between the companies, a collaboration characterized by dynamic relations with high interaction. The GCE-clusters most also be considered to have the potential for growth in national and international markets and together form a strong innovation system. The development the cluster has seen over the last ten years has been impressive, and the cluster’s past performance should hopefully make it ready for the turning tide. The key question that will be answered over the next years is if the cluster will be able to adapt to what seem to be quickly changing market conditions.

In this report, we document the cluster’s strong growth and benchmark its development against competitors nationally and internationally. Below we present some key findings about the status of the cluster today and its strategic challenges going forward.

Figure 1: Key financials for the cluster in 2014. Source: Menon (2015)

	2014	Development (2013/2014)
Turnover	70.7 mrd	7 %
Value added	22.5 mrd	8 %
Operating margin	7.2 %	-13 %
Employment	18 000	0.6 %
Export	N/A	

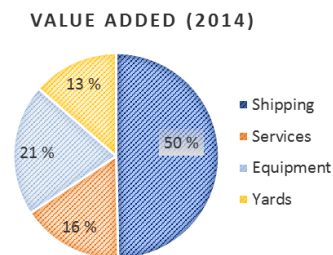


Figure 2: Overview of market development, current market situation and strategic challenges for the cluster going forward. Source: Menon (2015)

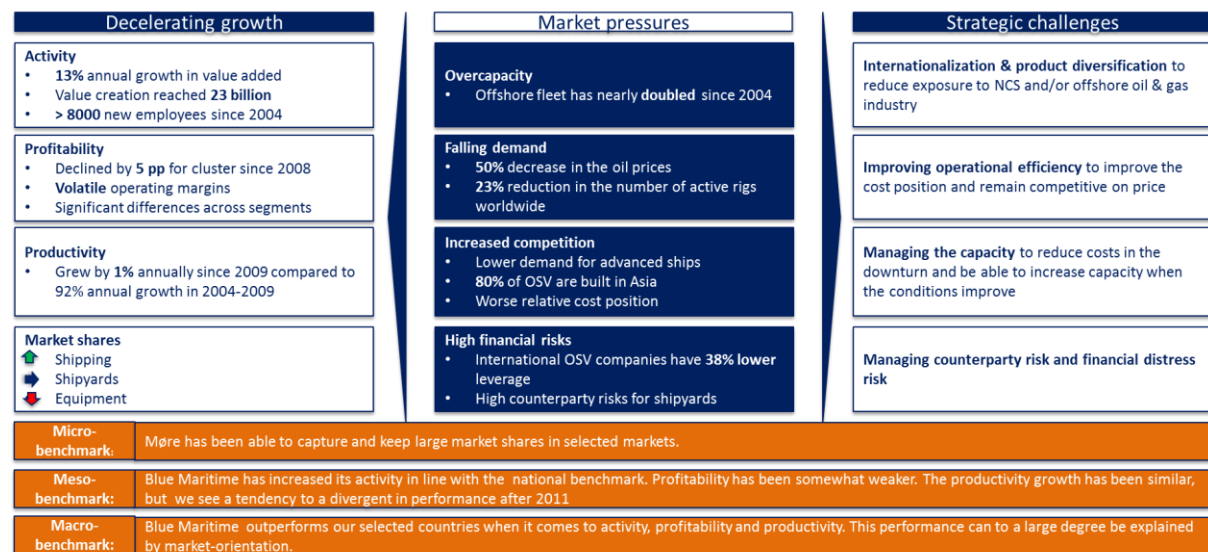


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2. Introduction to the Blue Maritime Cluster – an innovative complete offshore cluster

The maritime cluster at Møre is a world leader in design, construction, equipment and operation of advanced offshore vessels for the global oil and gas industry. In June 2014, due to its unique global market position and its important contribution to Norwegian value creation, the cluster was granted the status of a Global Centre of Expertise. By cluster we mean “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities [common needs] and complementarities” (Porter, 2008: 215). GCE Blue Maritime is comprised of local companies that design, construct, build equipment for and operate offshore supply vessels. The companies in the cluster both share the knowledge commons and have strong operational ties, which contributes to higher value creation in the cluster. As some of the interviewed companies mention, “We jointly develop good projects. You are much more productive when you can talk to your neighbor than when you have to call abroad. Such basic things as common language, culture and business substantially improve our productivity.”

The cluster is a tight vertically structured cluster, with world-leading designers, equipment manufacturers, yards, shipping companies and other specialized service providers. Companies such as Skipsteknisk, Ulstein Design, Havyard Design and Marine Teknisk design the world’s most advanced offshore vessels that perform different operations in some of the most challenging environments at sea. These ships are built on yards all over the world, although the majority are produced by local shipyards such as Kleven, Vard and Ulstein Verft. The shipyards in turn use equipment – motors, propellers, winches, dynamic positioning, etc. – produced locally by Rolls Royce Marine, IP Huse and Brunvoll, all located in the cluster. The shipping companies, including Farstad, Bourbon, Island, Havila and Olympic, operate the ships serving the offshore fields across the globe.

The companies in the cluster are world leading in all the parts of the value system. Norway has one of the largest offshore fleets in the world, with almost a third of it being controlled from the Møre region. Furthermore, the OSV fleet in the region has an exceptionally high proportion of modern and advanced ships. Not surprisingly, it wins contracts around the world, especially so for advanced operations in the most demanding areas. Much of the innovation in the industry is driven by ship design developed in Møre. Ulstein’s X-Box design is a case in point. The shipyards in Møre deliver vessels for the world’s leading shipping companies like Maersk and the equipment producers – Rolls Royce Marine, Brunvoll and IP Huse – are leading in their niches.

In the remainder of this report we will divide the cluster into four separate areas: Shipping companies, Yards, Equipment manufacturers and other specialized services. Since the designers play such a crucial role in the product innovation in the cluster, we will also present some separate numbers for this group, but they will mainly be included together with other companies offering specialized services. A selection of the leading companies within the four areas is shown to the right to illustrate the width of activities in the cluster.

Figure 3: The four segments in the cluster with company

Shipping			
Yards			
Equipment			
Services			

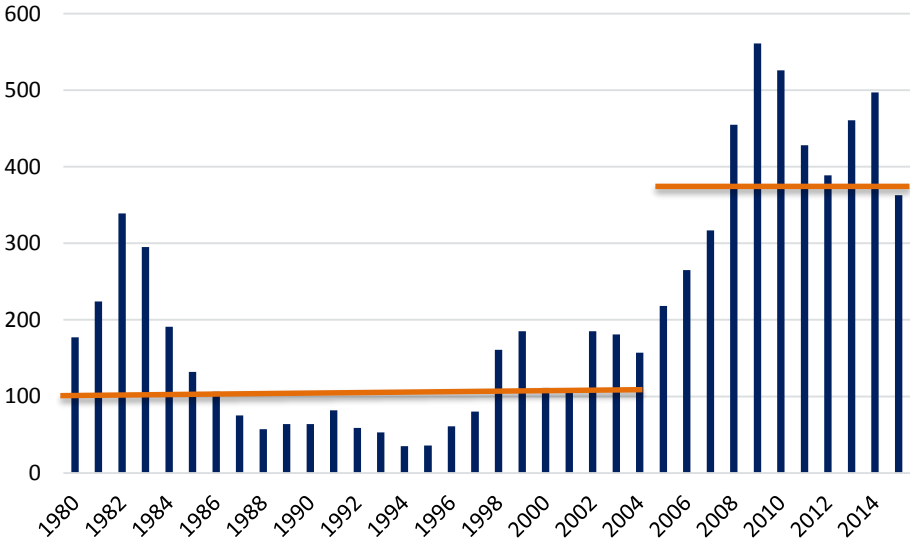
2.1. Future growth prospects for the cluster are under pressure – there is a need to reexamine the growth strategy

From 2004-2014, the value added in the cluster increased by more than 300 percent and employment grew by 8000 persons. Profitability varied during the last ten years, but looking at the period as a whole, the cluster has been able to expand its activity while still keeping a high profitability. The demand factors that have driven the industry forward the last ten years started to turn in the summer of 2014. Since then the oil price has fallen by 60 percent. 2014 probably signals the end of an era of double-digit growth rates, which may force the cluster to diversify into new markets as well as to reinvent itself. This chapter will start with a description of the forces that drive the activity in the cluster and then go on to presenting the development in the cluster over the last ten years.

2.1.1. Growth in jeopardy: Falling demand and increased competition

Overcapacity in the offshore shipping market. In 2005-2014 we witnessed an unprecedented growth in the offshore fleet. While 130 offshore vessels, on average, entered the market each year in 1980-2004, starting from 2005 the capacity grew by 400 offshore vessels annually. The figure below shows the offshore fleet by building year (the orange lines show the average number of vessels built before and after 2004). As a result, the fleet has almost doubled during the last ten years. The main driver for this increase has been the strong growth in offshore oil and gas operations and investments fueled by the soaring oil price. The increased demand for offshore vessels meant increased demand not only for the ships themselves, but also for equipment to be installed on the vessels, design and other specialized services. This trend explains the strong growth in the Blue Maritime Cluster over the last ten years.

Figure 4: World offshore service fleet by building year (1980-2015). Source: Menon/Clarkson World Fleet



The development in the backlog of the ordered offshore vessels (Figure 73-2 below) further indicates the market saturation and thus the expected slowdown in future growth. In 2005-2008 the backlog of orders for offshore vessels quadrupled until it reached its peak in 2008 and remained high at around 1000 vessels a year until 2014. In 2015, we see a drastic decline in the number of orders, which we expect to continue.

Rapid growth in the offshore fleet attracted more competition from South Korean shipyards. The graph to the right shows the development in the share of offshore vessels in the global orderbook (number of vessels). From a modest 6 percent of the total orders in 2005, the offshore market reached 16 percent of the total ship markets measured in the number of ships in 2013, turning from a lucrative niche for Møre shipyards to an attractive market for large South Korean shipyards such as Hyundai Heavy Industries and Samsung Heavy industries. Using the metaphor of W. Chan Kim and Renee Mauborgne (2005), the offshore market has turned from a blue ocean for the specialized Møre shipyards to a red ocean where the intensity of competition eroding both market shares and margins is likely to increase especially as the demand for offshore vessels declines. Indeed, today 80 percent of the offshore fleet is built in Asia, but the Møre cluster has met this competition with innovation and is currently delivering the largest, most advanced vessels in the industry. The yards in Asia on the other hand, have an advantage in building simple, serial produced vessels at low-cost.

Figure 5: Number of offshore vessels in global orderbook 2005-2015. Source: Menon/Clarkson

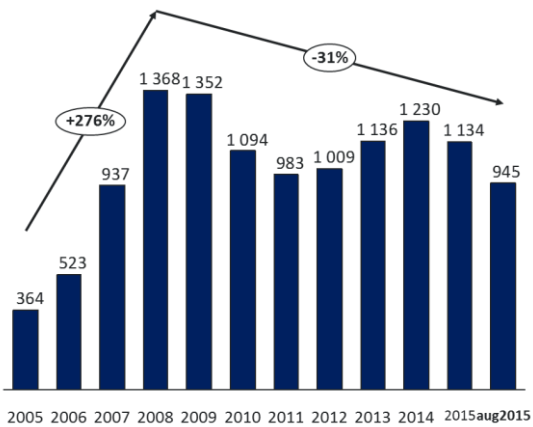
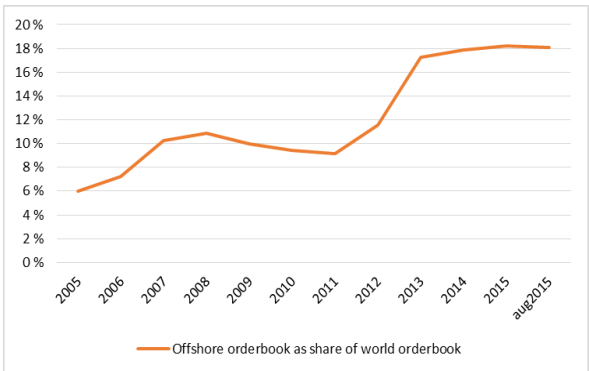


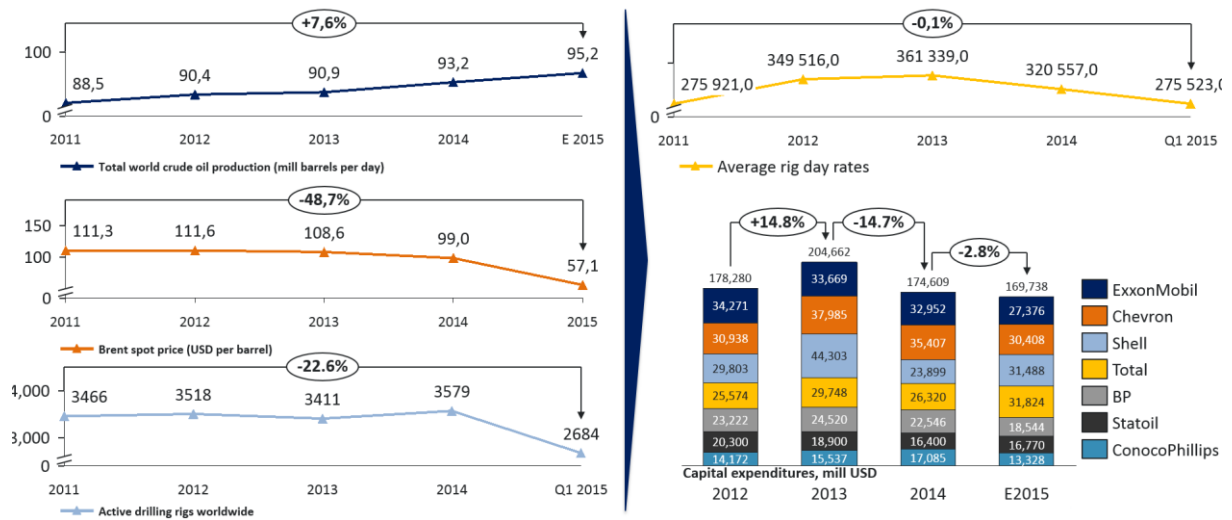
Figure 6: Offshore orderbook as share of world orderbook



Decline in the offshore oil & gas E&P. An increase in oil production in North America, which exceeded the growth in demand particularly in the second half of 2014, has led to a sharp decline in the oil price. While in 2011 the average spot price for Brent oil was 111.3 USD per barrel, in the first quarter of 2015 it was on average 57.1 USD, implying an almost 50 percent decline from the price levels we observed in 2011-2013. This, in turn, has led to reduced offshore drilling activity, which is a major driver of demand for the OSV market. The number of active rigs worldwide decreased by 22.6 percent between 2011 and Q1 2015, according to NOV estimates. While the average rig rates in Q1 2015 were approximately equal to those in 2011, they declined by about 24 percent compared to the peak levels in 2013. Similarly, in response to the market development major oil companies have reduced their capital expenditures, including those on building and refurbishing their rigs, which further shrinks the demand for OSV. In particular, the capital expenditures of the seven largest oil companies – ExxonMobil, Chevron, Royal Dutch Shell, Total, BP, ConocoPhillips and Statoil – decreased by about 15 percent between 2013 and 2014, and based on the companies’ capex in Q1 2015 we may expect a further decrease by about 3 percent this year.

These developments are further illustrated in the figure below.

Figure 7: Developments in the offshore oil & gas market



Source: MENON analysis; NOV; reports of the oil companies; EIA international energy statistics

A decrease in the offshore oil & gas investments by the major oil companies implies not only a decline in demand for PSV and AHTS ships, but also has negative consequences upstream the value chain. As ship owners cancel or delay orders for new offshore ships, both shipyards and ship equipment producers lose revenues. After all, ship equipment accounts for 60-70 percent of the ship production costs. Ship equipment producers are, however, in a relatively better position as they may more readily diversify to serve clients in other markets such as South Korean shipyards and may benefit from the increased demand for aftermarket services as ship owners are likely to bring the underutilized offshore ships for maintenance during the downturn.

The recent exchange rate fluctuations between the USD and NOK can also affect the industry in Møre strongly. In the last twelve months USD has strength itself by 34 percent compared to NOK. Companies with revenue in USD and costs mainly in NOK, will experience a positive effect on their competitive situation because of this change. It will also reduce the relative cost-disadvantage of Norwegian labour compared to utilizing work force in other countries. Making up 20 percent of the turnover this is an important cost-factor for Møre-companies. Still, the Møre companies also buy in-put factors from abroad, something that reduce the effect of the weak Norwegian krone. If the companies mostly buy goods from abroad and sell on the local market, the effect will actually be negative, unless they are able to increase their prices in Norway. These effect is summarized in the figure to the right. The total effect on the cluster will

Figur 1: USD/NOK exchange rate (sep.2010-sep.2015). Source: Datastream.



be positive, but will vary in the different companies¹ and segments depending on the share of revenue and costs coming from abroad. It will also depend on the strategy for handling exchange risk.

Figure 2: Effect of weakening of the Norwegian krone on competitiveness and profitability on company level.
 Source: Menon

		REVENUE	
		USD	NOK
COSTS	USD	0	-
	NOK	+	0

¹ VARD report a positive effect of 8 million NOK from 5 % strengthening of the USD/NOK-rate. That is similar to an increase in the profit margin of 0,06 percentage points. The effect for companies like Brunvoll will be much more positive as they have 30 percent of their costs related to wage costs in Norway.

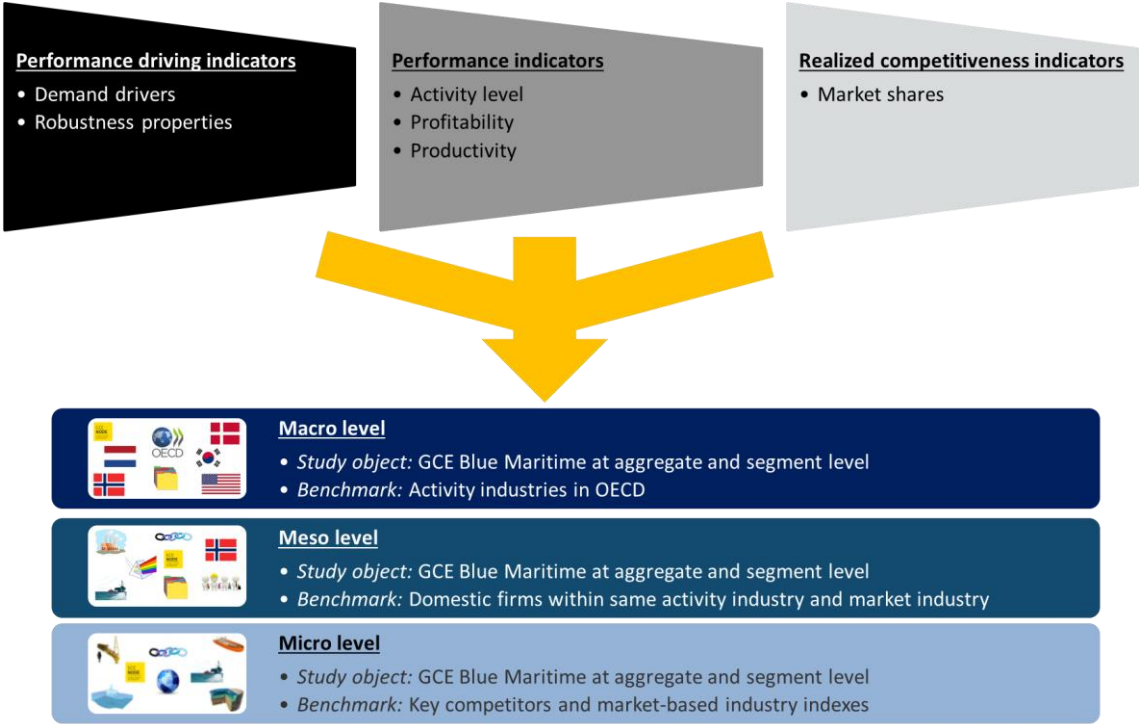
2.2. Methodology for Global Performance Benchmarking

Menon has developed a framework for a global performance benchmarking, involving three levels of benchmarking: macro, meso and micro. The macro level involves benchmarking against companies in the same industry codes in other countries, while meso involves benchmarking against domestic firms conducting similar activities and operating within similar markets. At the micro level, we benchmark against international firms operating in the same markets. Within these levels, the cluster is assessed along the following six dimensions: activity level, profitability, productivity, market shares, demand performance drivers, robustness and performance properties.

The explanatory indicators are relating to demand drivers for the cluster and the cluster robustness properties. These are mainly described in chapter 3. The explanatory indicators are decisive for the development in the performance indicators, compromising activity level, profitability and productivity. The explanatory indicators do in turn explain the development in the realized competitiveness indicators, which in our case primarily is measured as market share capturing. Recent studies conclude that there is a positive correlation between market share and return on investments (ROI).

We apply our global performance indicators at a *macro level*, a *meso level* and a *micro level*. At the macro level, GCE Blue Maritime is benchmarked against firms in different OECD countries that conduct similar activities. These companies might not be oriented against the same market though. At the meso level, the whole cluster and the different segments of the cluster are analyzed separately, and benchmarked against domestic firms that both execute similar activities and operate in similar markets, as well as the representative domestic business sector. At micro level, the different companies are benchmarked towards the cluster’s major competitors and indexes consisting of the major competitors. Not all segments are benchmarked equally because of differences in available data. Our methodology is illustrated in the figure below.

Figure 8: Methodology



3. The last ten years have seen a strong increase in activity for the cluster

In 2004 the Blue Maritime Cluster employed just below 10,000 people and created less than 7 billion NOK in value added. By 2014, 8000 new employees had joined the cluster and the value added has more than tripled. The growth in activity level has without doubt been high, even though it has slowed down during the last few years. The cluster has also seen an impressive productivity growth and profit margins have been relatively high. The high profit margins and increase in activity level are in itself a testament to the cluster's competitiveness in a global industry with competitors on all continents. 2014 was the best year in the cluster's history, while 2015 probably will mark a small reduction in the activity level.

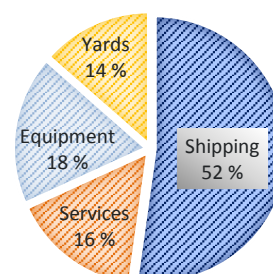
3.1. 2014 was one of the best years in the cluster's history

In 2014, the companies in the cluster generated a turnover equal to NOK 70 billion and a value added of 23 billion. The value added in the cluster equals around 15 percent of the total maritime cluster in Norway. More than 17 000 people were employed in the cluster, making it the most important employer in the Møre region.

52 percent of the value added is related to the shipping companies, while the remaining value added is almost evenly distributed among the equipment producers, service providers and yards. Looking at employment, the picture looks somewhat different. The shipping companies employ a third of the total 17 000 employees in the cluster, compared to 52 percent of the value added. The remaining employees are divided roughly equally among the yards, equipment manufacturers and service providers. 2014 must be seen as a very good year for the cluster in total, but it also signals a new time period of expected lower activity.

Figure 9: Value added in the cluster divided by four categories. Kilde: Menon (2015)

	2014	Development (2013/2014)
Turnover	70.7 mrd	7 %
Value added	22.6 mrd	8 %
Operating margin	7.2 %	-13 %
Employment	17 148	0,8 %
Export	N/A	



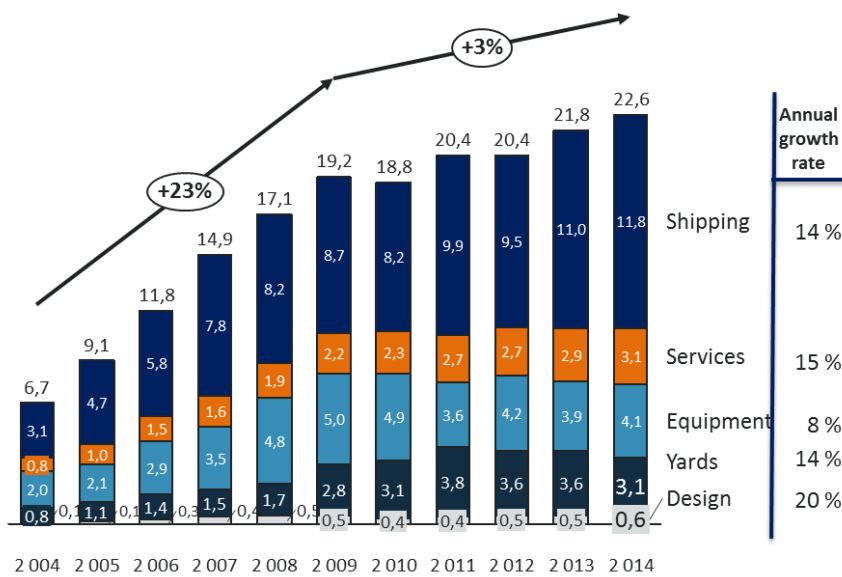
3.2. The activity level has been high in all parts of the cluster

Since 2004, the total value added in the cluster has increased by NOK 17 billion, or 250 percent. All the four sub-groups in the industry have experienced high growth rates, but the growth is not evenly distributed. While shipping companies, services and yards have increased their value added by around 300 percent, the equipment manufacturers have seen a weaker development. The equipment manufacturers grew quickly in the beginning of the period before the financial crisis, but since then, their value added has actually fallen. The development over the last years with weaker profit margins and lower activity level indicates a lower competitive position for this segment relative to other parts of the cluster.

3.2.1. Value added has increased by 13 percent annually over the last year, while turnover has grown by 15 percent annually

Value added is often used as a measure of activity when looking at different industries. This measure has some key advantages compared to measures such as turnover. This is especially important in a cluster such as Blue Maritime where there is a high degree of internal sales. Looking at the development since 2004, we see an enormous growth in value added. The cluster has increased its value added from NOK 7 billion in 2004 to 23 billion in 2014. That is equivalent to a yearly growth rate of 13 percent. The cluster has been able to take advantage of the growing world market and develop high-end solutions that the offshore industry has utilized. We do see a clear shift though from before to after the financial crisis. While the industry grew by 23 percent annually between 2004 and 2009, annual growth since then has fallen to three percent².

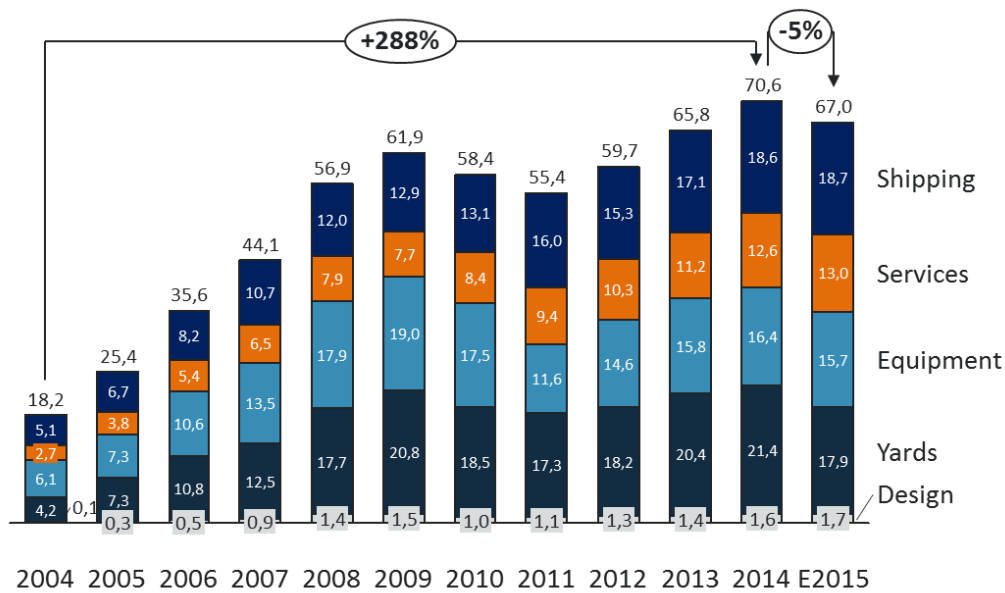
Figure 10: Value added for the different parts of the cluster 2004-2014. Source: Menon (2015)



Turnover has increased at almost the same rate as the value added in the cluster, from NOK 18 billion in 2004 to more than 70 billion in 2014. That equals an annual growth rate of 14 percent. The estimated numbers for 2015 suggest that the turnover for 2015 will fall by five percent. While the shipping companies, service providers and designers experienced a low growth the last year, the turnover for equipment manufacturers and yards fell sharply.

² Rolls Royce Marine has experienced a development that is weaker than the cluster throughout the period. With 17 percent of the value added in the cluster, Rolls Royce has a weak negative effect on the average growth in value added since 2009. While the value added for the cluster grew by 20 percent since 2009, Rolls Royce saw an increase in value added of 1 percent. On an aggregated level, the effect is not very strong. The growth in value creation since 2009 would have been 20 percent excluding Rolls Royce Marine, compared to 17 percent with the inclusion of Rolls Royce.

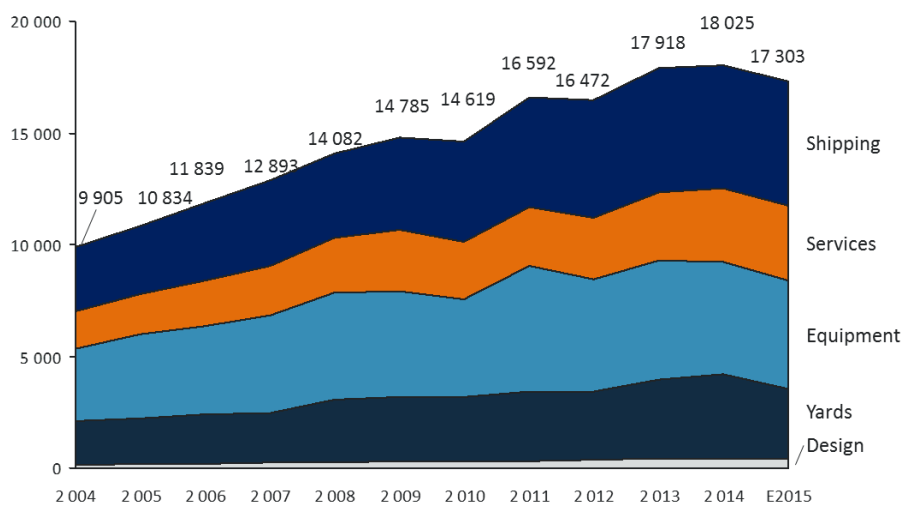
Figure 11: Turnover in the different parts of the cluster 2004-2014 and estimation for 2015. Source: Menon (2015)



3.2.2. Employment has almost doubled over the last ten years. The cluster is expected to employ around 17 500 people at the end of 2015

With more than 18 000 employees in the cluster in 2014, there is no doubt that the maritime industry in Møre plays a key role in the region. Since 2004, employment has increased by more than 8 000 people. Benchmarked against the development nationally and internationally, the cluster has seen a strong development in employment. Preliminary figures for 2015 suggest that the cluster will experience a fall in the number of employees by 700. If this reduction happens, it will be the first major decline in employment during the last ten years.

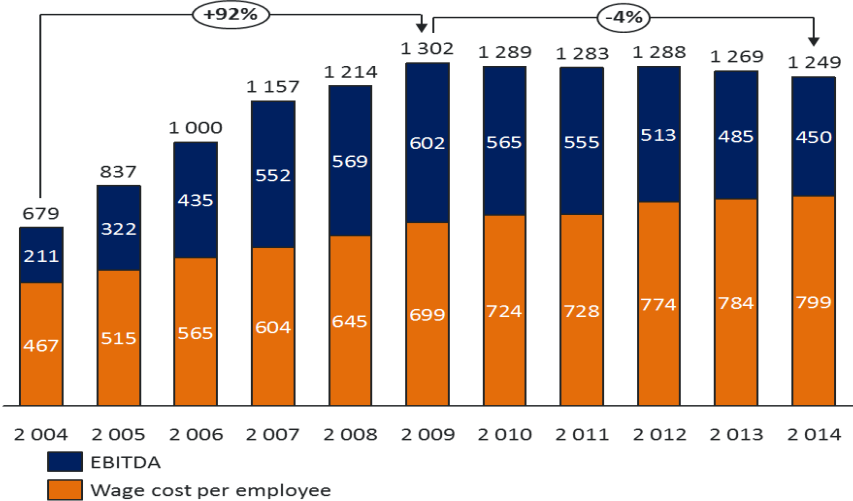
Figure 12: Employment in the different parts of the cluster 2004-2014. Source: Menon (2015)



3.3. The cluster has seen a strong growth in productivity

As the figure below indicates, the growth in value added was very strong in the years before the financial crisis hit in 2007/2008. Since 2009, the value added per employee has actually fallen, suggesting that productivity growth in the cluster has fallen. It is possible to decompose value added into wage costs and EBITDA. While the EBITDA per employee has fallen since 2009, wage cost per employee has risen. This continued growth in wage cost per employee suggests that productivity growth might be higher than a minus four percent.

Figure 13: Value added per employee (2004-2014). Source: Menon (2015)



3.4. The cluster has experienced a high operating margin, but the margin has fallen somewhat since the financial crisis

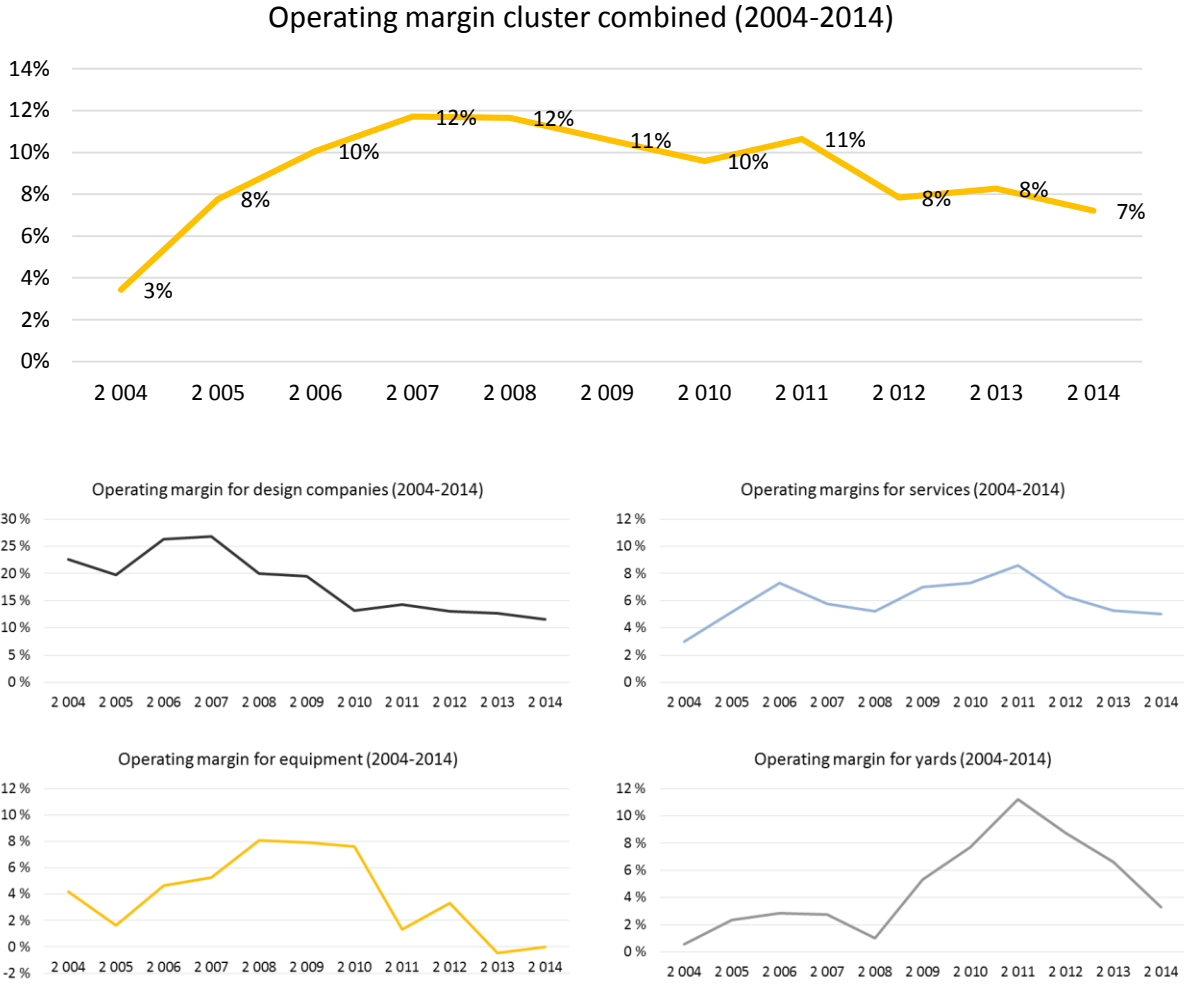
The operating margin is a good indicator on the profitability in the cluster. The Blue Maritime Cluster operates in a global market with competition from companies all over the world. To be able to compete with companies in countries with lower factor costs such as labor costs, the companies in Møre must deliver high value goods and services to the international market. The profit margin can therefore be seen as an indicator of Møre’s ability to leverage its abilities and deliver services that are valued higher than the input-factors. In other words: as in indicator of how competitive the cluster is. It is important to mention that there are also other factors such as market orientation and temporary supply shortages that also can explain periods of higher than normal profitability.

The operating margin in Møre has been above eight percent in the whole period since 2005. The operating profit varies widely within the cluster, and development over the last years has also been very different. Looking at the overall profitability, we see a clear increase in profitability before the financial crisis. Since then, the profit margin has fallen by five percentage points from 12 percent in 2007/2008 to seven percent in 2014. Overall, the profit margin has been highest for shipping companies (the reason for this will be highlighted in later sections), while equipment, services and yards have seen much weaker profit margins.

Looking at the two most recent years, we see that it is the equipment producers who have experienced the weakest results. It is important to highlight that the numbers for the equipment manufacturers are dominated by the development in one single company: Rolls Royce Marine. The company has delivered weaker financial results in recent years. A look at the remaining equipment producers indicates that the remaining companies

have been able to deliver much stronger results. The profitability in the different segments is discussed in more detail in later chapters.

Figure 14: Operating margins for the cluster and its segments



The operating margin as a measure of profitability

The *operating margin* is defined as the operating profit’s share of revenues. In other words, the margin is equivalent to the company’s operative net income as a share of its operative gross income, where the term “operative” reflects that the financial income items are excluded. The operating margin is perhaps the most commonly used measure of private profitability, but a weakness is that it focuses on companies “turnover” rather than the value added. For example, a consolidation of companies in an industry will lead to fewer goods and services purchased, since a portion of the previous transactions between the companies is now undertaken within the companies. The consolidation will result in increased operating margin, even though there has not been any direct improvement in profitability in real terms. Yet, changes in the input mix and the degree of outsourcing might cause indirect effects on profitability.

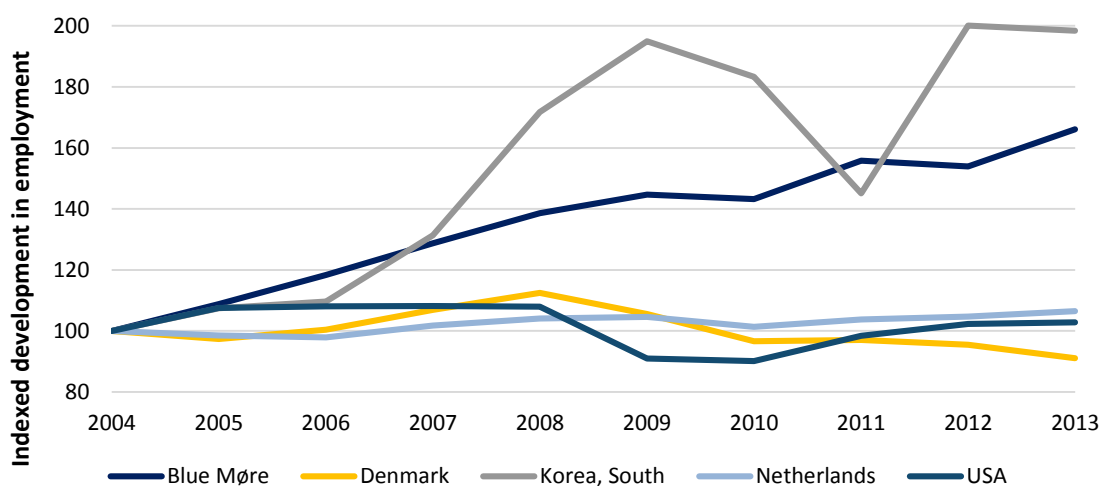
4. Cluster competitiveness – local and global competition

In this chapter we will address GCE Blue Maritime's development in employment and value added compared to firms that engage in similar production activities internationally, and compared to firms that both engage in similar production activities and operate in similar markets domestically. The country-level benchmarks are compiled using broader industry-codes, making them cover a broad part of the maritime industry and even companies offering services to other industries. While the cluster in Møre is mainly focused on the offshore market, the country-level benchmark will include companies offering services and goods to the merchant fleet and other parts of the industry. This market-orientation is probably one of the most important explanatory factors as to why Møre is outperforming the industry in other countries. Still, the companies in Møre and their counterparts abroad are expected to have access to many of the same input-factors. Møre has made a strategic choice to mainly focus on the offshore markets, and compared to the development in other countries, this seems to be a choice that has led Møre into a strong period of growth.

4.1. Activity level: Growth in employment and value added has been higher in Blue Maritime than international macro-benchmarks

The graph below illustrates the development in employment in Møre compared to four other OECD-countries. While the development in the Netherlands, the US and especially Denmark has been weak, South Korea outperforms the cluster in Møre somewhat. The first activity-measure suggests that Møre has outperformed its competitors, except for South Korea.

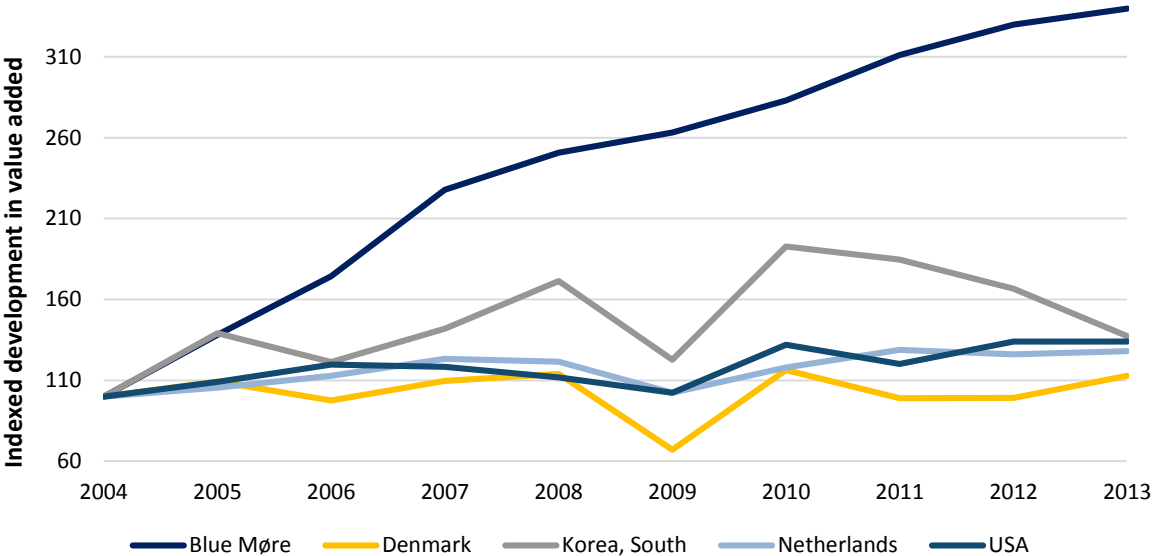
Figure 15: Indexed employment in Blue Maritime except maritime services and country benchmarks. Sources: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



The second benchmark at activity level is the development in value added. Blue Maritime's value added growth has been substantial, as illustrated in the figure below. Here Møre outperforms all the other countries by a clear margin. This suggests that the high employment growth in Korea has mainly happened in areas where the value added per employee has been weak. Combined, the two measures on activity suggest that the cluster in Møre has outperformed other industries with the same input-factors in other countries. The large difference in development makes the findings robust, but it must be stressed that the market-orientation probably can explain

this development. Still, it is highly interesting to know that the cluster will probably be forced to move into new segments where the prospects for future growth might be weaker.

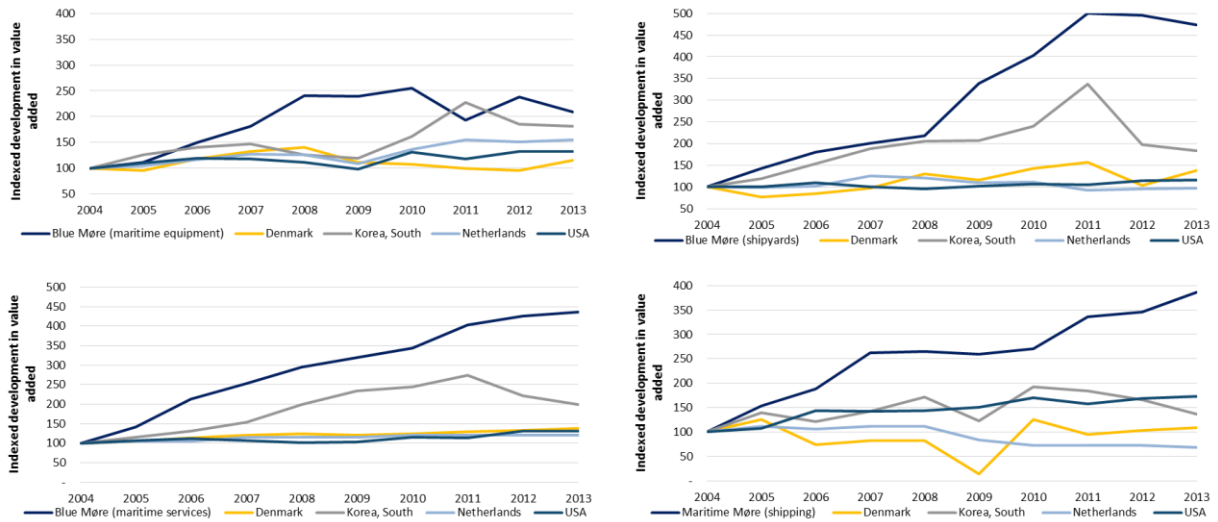
Figure 16: Indexed value added in Blue Maritime except maritime services and country benchmarks. Sources: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



The four following graphs illustrate the benchmark in different segments. The most interesting of the segments are the shipyards and to a certain degree also maritime equipment and shipping. The maritime service benchmark is weak as the international data is based on very broad industry codes. Looking at the shipyards, we see that the yards in Møre have outperformed all the other countries. This performance can probably be explained by the fact that the Møre yards generally focus on building offshore vessels where margins have been higher than in for instance building of merchant vessels.

Møre outperforms the different countries in all four segments, but the equipment manufacturers in Møre have seen little growth since 2007, making them grow only marginally more than South Korea. Of the four segments, equipment is the group that has seen the weakest performance compared to our macro benchmarks.

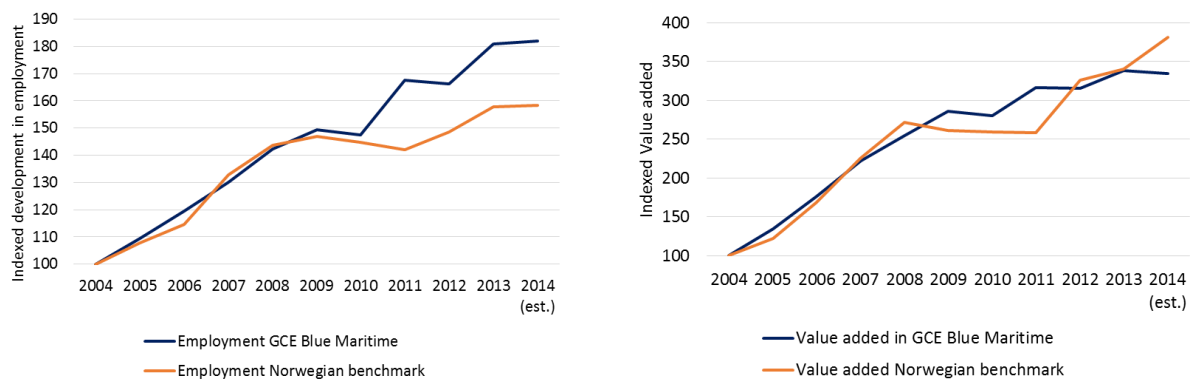
Figure 17: Indexed value added in Blue Maritime at segment level and country benchmarks. Sources: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



4.2. Blue Maritime has experienced a similar development in activity as other maritime companies in Norway

While the cluster has outperformed competitors on the international benchmarks, the development in the cluster as a whole has been only marginally higher than for similar companies in Norway. This is illustrated in the two graphs below. While employment in the cluster has increased more than the national benchmark, the development in value added has been marginally weaker in Møre.

Figure 18: Development in employment and value added (2004-2015) in the GCE Blue Maritime and the national industry reflection. Source: Menon (2015) and Statistics Norway (2015)



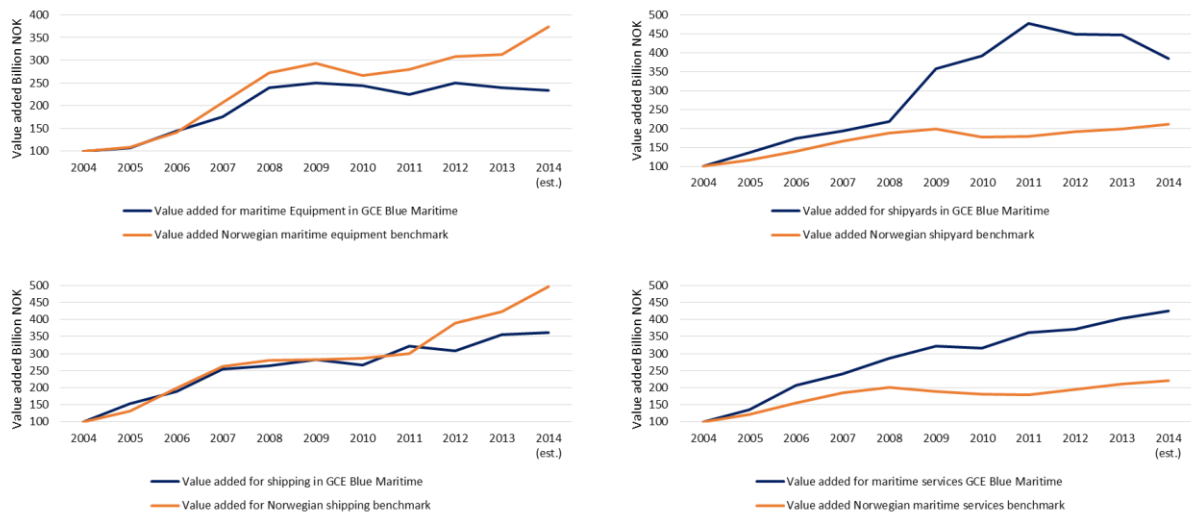
Below, we have shown the development in value added³ for four segments. We see that for three out of the four segments, the Blue Maritime Cluster has seen higher growth rates than the industry elsewhere in Norway. Especially the yards and services segment has outperformed similar companies in Norway. The equipment

³ In the appendix, we have illustrated the development for each of the four segments when it comes to employment. The development is similar to the development in value added.

manufacturers in Møre on the other hand are lagging behind their Norwegian counterparts. It seems like the negative development in their activity in Møre is not seen in similar parts of the industry in the rest of Norway.

The yards in Møre have outperformed their national benchmark, but it should be noted that there is only a small number of yards outside of Møre.

Figure 19: Development in value added for Maritime equipment, shipyards, shipping and maritime services in GCE Blue Maritime and the national industry reflection from 2004 to 2014 (est.). Source: Menon (2015)

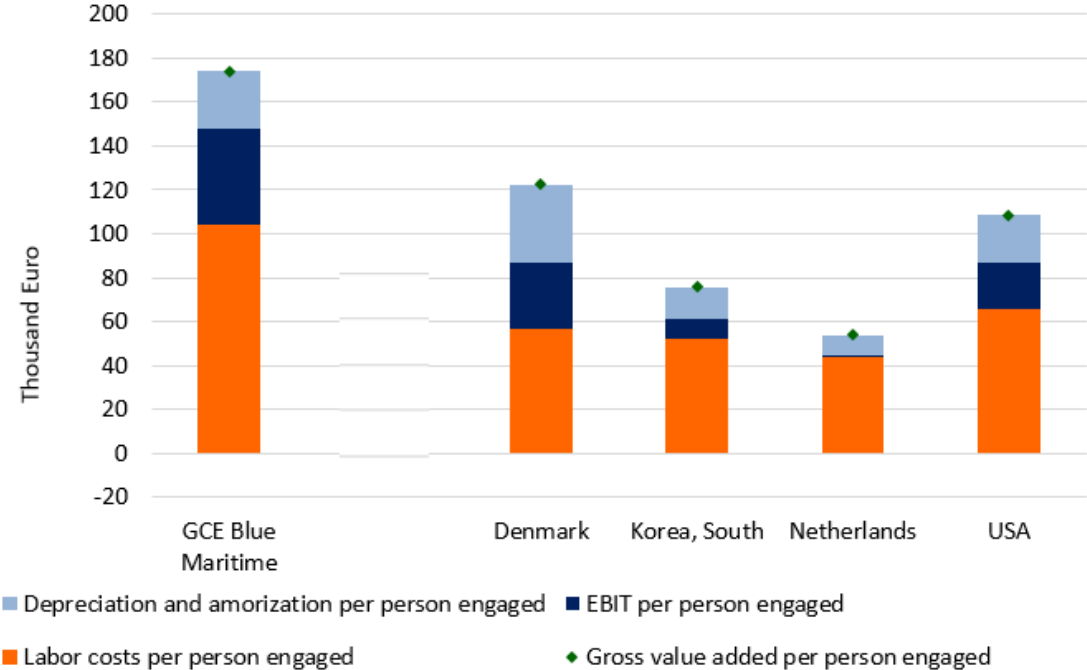


4.3. Labor productivity – value added per employee is relatively high

We will now address GCE Blue Maritime’s development in labor productivity over the period 2004 to 2014. Value added per person engaged is a simple and well-known measure of labor productivity. The measure can be decomposed into three components: labor costs per person engaged, net operating income per person engaged and consumption of fixed capital per person engaged. A relatively high value added per person engaged could be an indication of higher productivity. However, note that this is a single factor productivity indicator, and does not consider the productivity of the capital stock. In addition, when measured in current prices, the price effect is included.

The labor productivity in GCE Blue Maritime is relatively high, as depicted in Figure 20. From the graph we can see that both EBIT per person and average wage cost per employee are higher than for the competitors. To be able to compete over time with higher labor costs, it is important that the employees are more productive than in other countries. The high EBIT per employee suggests that this might be the case for Møre. Blue Maritime’s labor productivity was relatively high across segments in 2014. The productivity was especially high within shipping. Blue Maritime was wage leading across segments. Despite of relatively low capital intensity, it also had relatively high operative profitability per person engaged, except for maritime equipment.

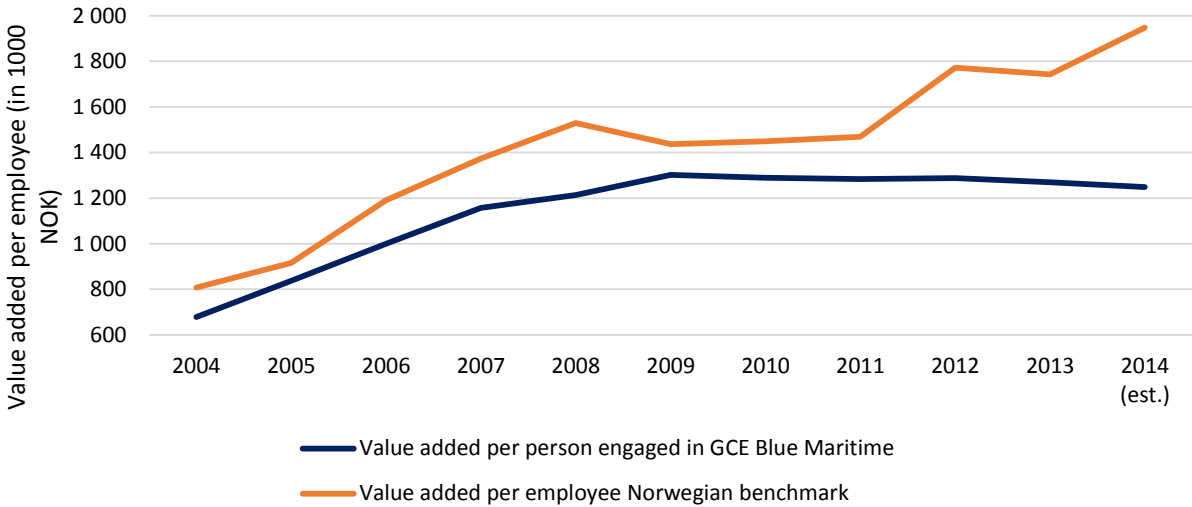
Figure 20: Value added per person engaged in 2013 across GCE Blue Maritime-segments and country specific activity industry reflections. Source: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



4.3.1. Labor productivity locally – The industry in Norway has a higher productivity than in Møre

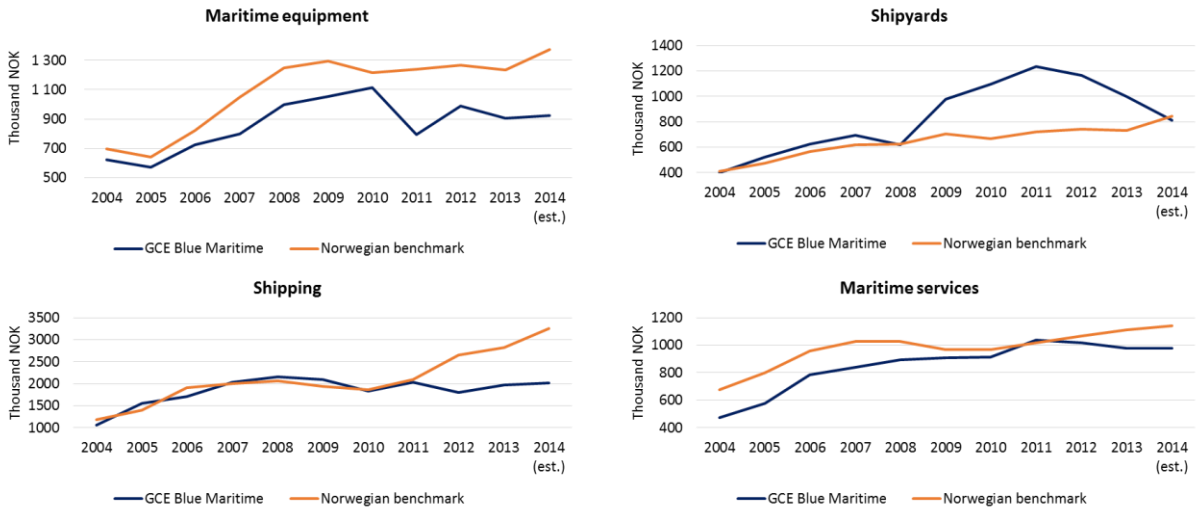
The development in value added per employee in the cluster was very strong before 2011, when it began to stagnate. In the first part of the period, the cluster experienced high productivity growth. This was at a time of rising oil prices and increased activities both on the Norwegian continental shelf and within offshore petroleum production internationally. Despite the strong growth for the cluster in Møre, the cluster has been outperformed by similar companies in Norway. The difference is only marginal for the years until 2009, but after 2011 the Norwegian benchmark has outperformed the cluster in Møre.

Figure 21: Development in gross value added per person engaged across GCE Blue Maritime and the industry reflection from 2004 to 2014. Source: Menon (2015) and Statistics Norway (2015)



As the figure below illustrates, Blue Maritime’s labor productivity was slightly lower than the industry reflection’s across all segments. This is in contrast to the findings in an earlier subsection, where the Møre cluster outperformed its international benchmarks. Shipping comprises the main part of the cluster, and we see a clear division in performance from 2011 until 2014. The offshore shipping companies in Møre and elsewhere in Norway delivered the same value added per employee before 2011. Since then, value added per employee has increased by more than 50 percent for the shipping companies outside of Møre, compared to a stagnation for the companies in the Blue Maritime Cluster. Some of this can be explained by high value added for companies offering seismic services, but the results are stable also even when controlled for this.

Figure 22: Development in gross value added per person engaged for maritime equipment, shipyards, shipping and maritime services for GCE Blue Maritime and Norwegian industry benchmarks from 2004 to 2014. Source: Menon (2015) and Statistics Norway (2015)



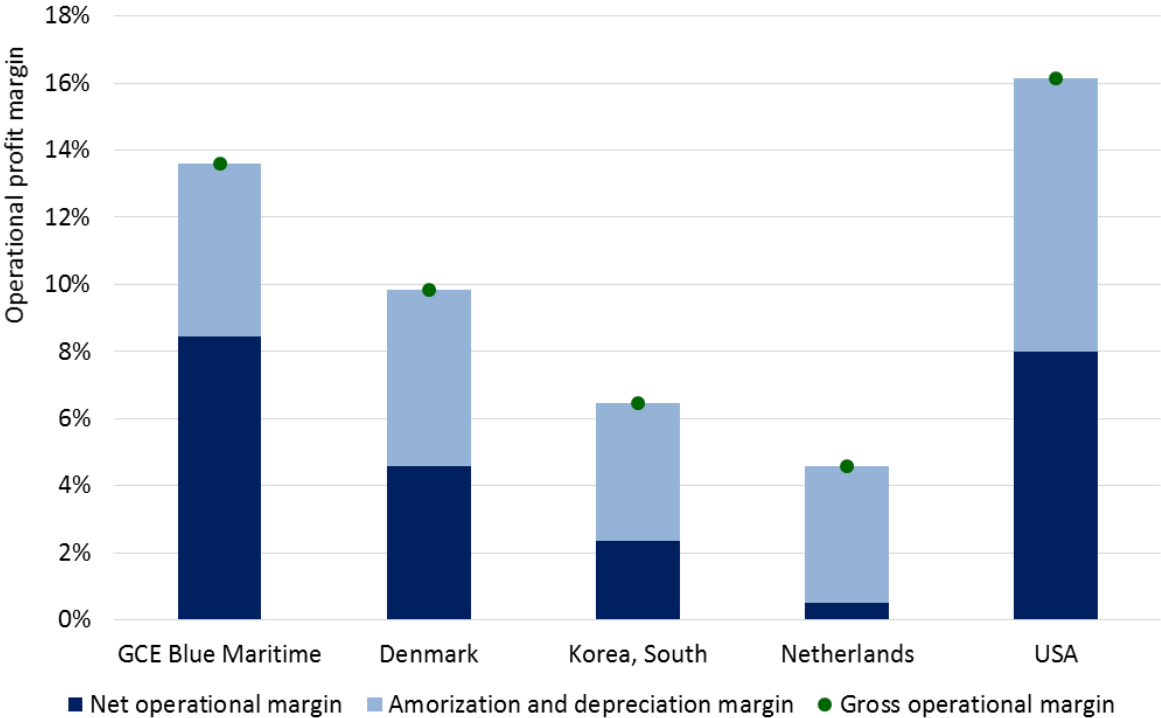
Measures like value added per employee have been criticized by many as a measure for productivity especially for capital intensive industries like the maritime one. In this report we also present the measure “value added

per capital worker” to illustrate that productivity in the industry is high also when taking capital intensity into account. Background information on the development of this measure can be found in the appendix.

4.4. Profitability has been high compared to international benchmarks, but lower than Norwegian competitors

High profitability over time is key for a cluster to develop and increase its activity. As seen in the first chapter, the cluster in Møre has delivered net profit margins⁴ above 8 percent in most years since 2004. The graph below compares the gross margin between the different countries that we have benchmarked against. Again we see that Blue Maritime performs well with an average gross operational margin of close to 14 percent. Only the US has seen higher profit margins with 16 percent.

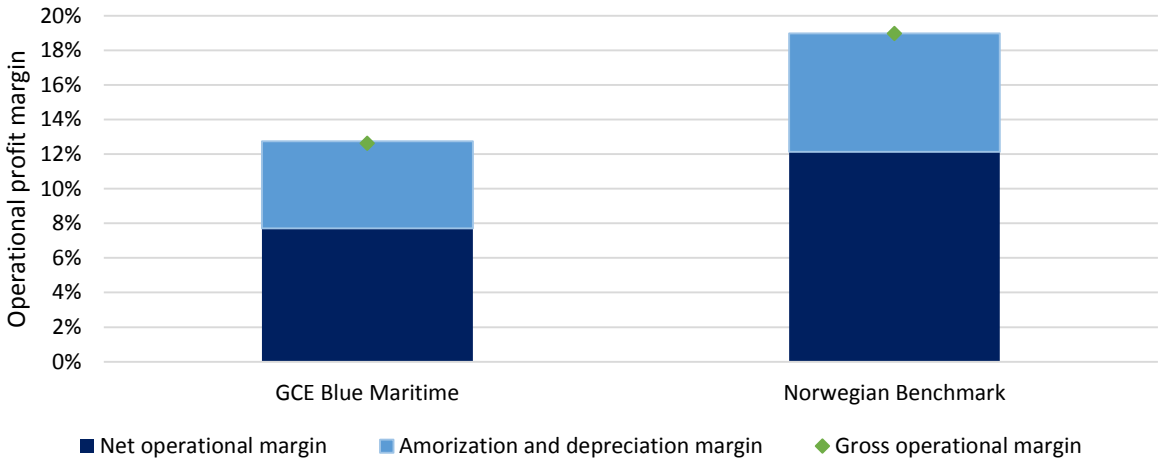
Figure 23: The average gross operational margin for GCE Blue Maritime and the industry reflection from 2012 to 2013. Source: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



When comparing the Blue Maritime Cluster against national industry reflections of firms, we see that the national benchmark has outperformed Møre with a wide margin. This is illustrated in the figure below. The average profitability (2012-2014) in the Møre cluster measured by gross operating margin has been relatively low partly due to lower capital intensity. Breaking down the gross margin at segment level gives insight into the difference in performance.

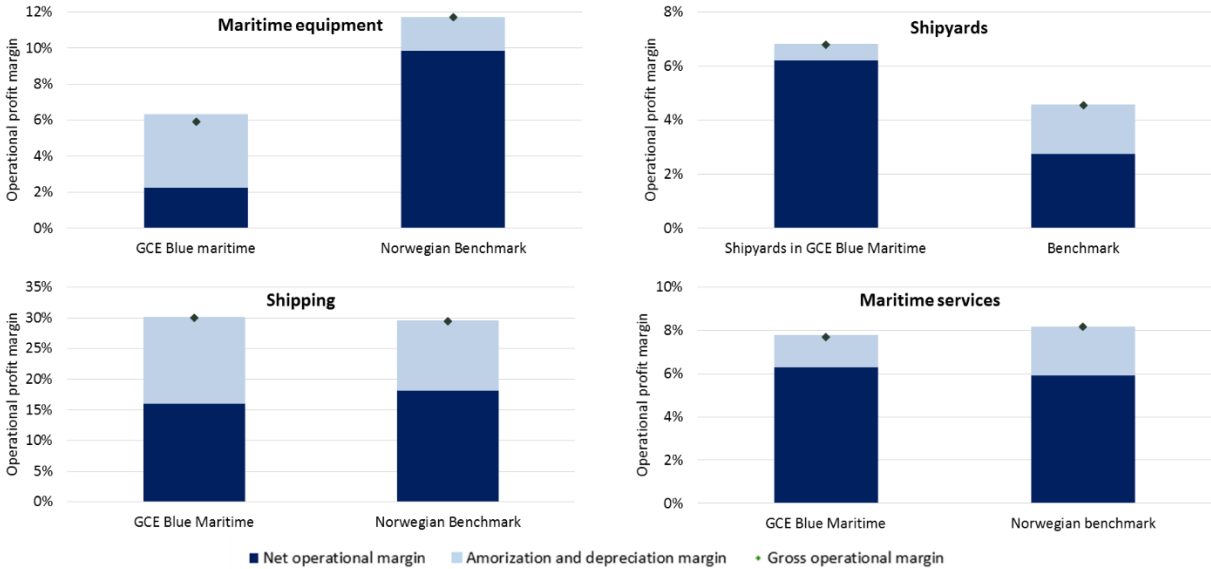
⁴ Also known as EBITDA-margin (EBITDA/Turnover)

Figure 24: The average gross operational margin for GCE Blue Maritime and the national industry reflection from 2012 to 2014. The numbers are estimates. Source: Menon (2015) and Statistics Norway (2015)



Looking at the segment-level, Blue Maritime has similar profitability when it comes to shipping, the most important segment in the benchmark. The cluster underperforms especially in the two segments maritime equipment and maritime services⁵. The underperformance in these two segments explain the difference in the overall cluster performance compared to the national benchmark.

Figure 25: Average operational margin for four different segments in GCE Blue Maritime and the respective industry reflection in from 2012 - 2014 (est.). Source: Menon (2015) and Statistics Norway (2015)



4.4.1. Return on operative assets

Net return on operative assets is a more precise measure than operative profit margin since the former takes capital intensity into account and adjusts for intermediate costs. Figure 26 below shows similar net return on operative assets in Blue Maritime compared to similar firms in Norway. As we see, profitability has been relatively high for Blue Maritime after the financial crisis. The results are seemingly in conflict with what we found when addressing the operational margins above, but this only because Blue Maritime has a lower capital intensity. Thus, the cluster can have lower operational margins than the benchmark and still have a higher operative profitability. The return on operating assets in Møre is very high compared to the international benchmark at country level. More details on this benchmark can be found in the appendix.

Figure 26: Development in return on operative assets for GCE Blue Maritime and industry benchmark from 2004 to 2014 (est.). Source: Menon (2015) and Statistics Norway (2015)

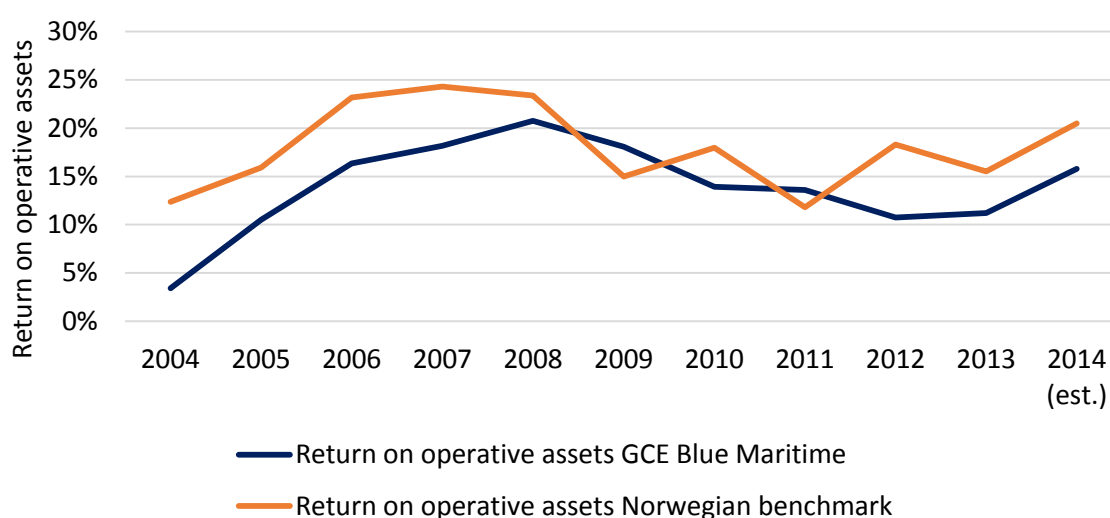
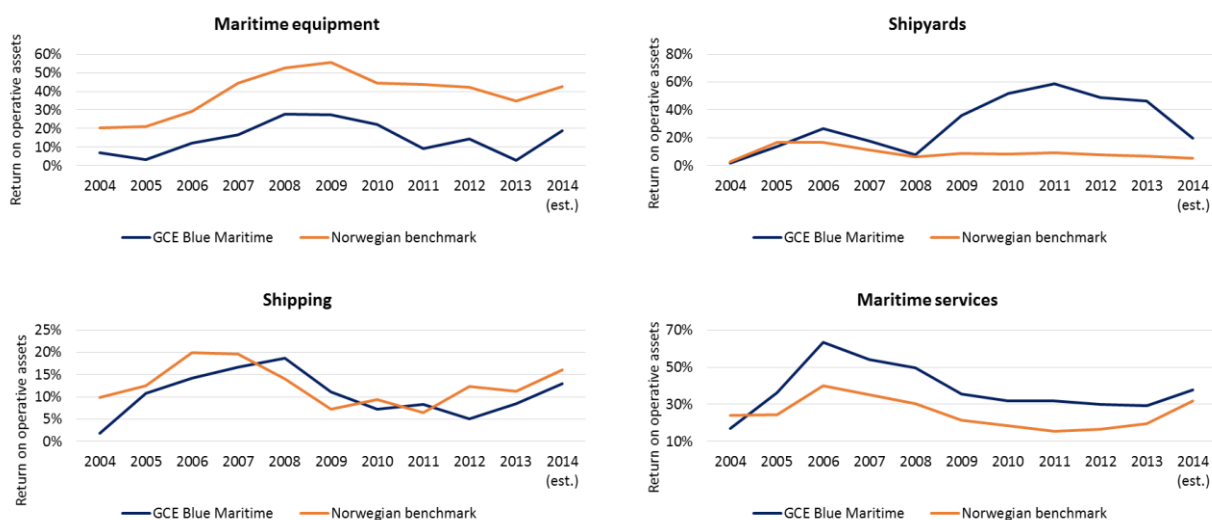


Figure 27 illustrates that the picture varies across segments. Until recently, the operative profitability has been relatively high for shipyards and maritime services and relatively low within maritime equipment. In shipping, the net return per capital input has been more in line with the rest of the industry with a substantial improvement for Blue Maritime in 2014.

Figure 27: Development of return on operative assets from 2004 to 2014 (est.) for maritime equipment producers, shipyards, shipping and maritime services in GCE Blue Maritime and industry benchmarks. Source: Menon (2015) and Statistics Norway (2015)



4.4.1. Total factor productivity

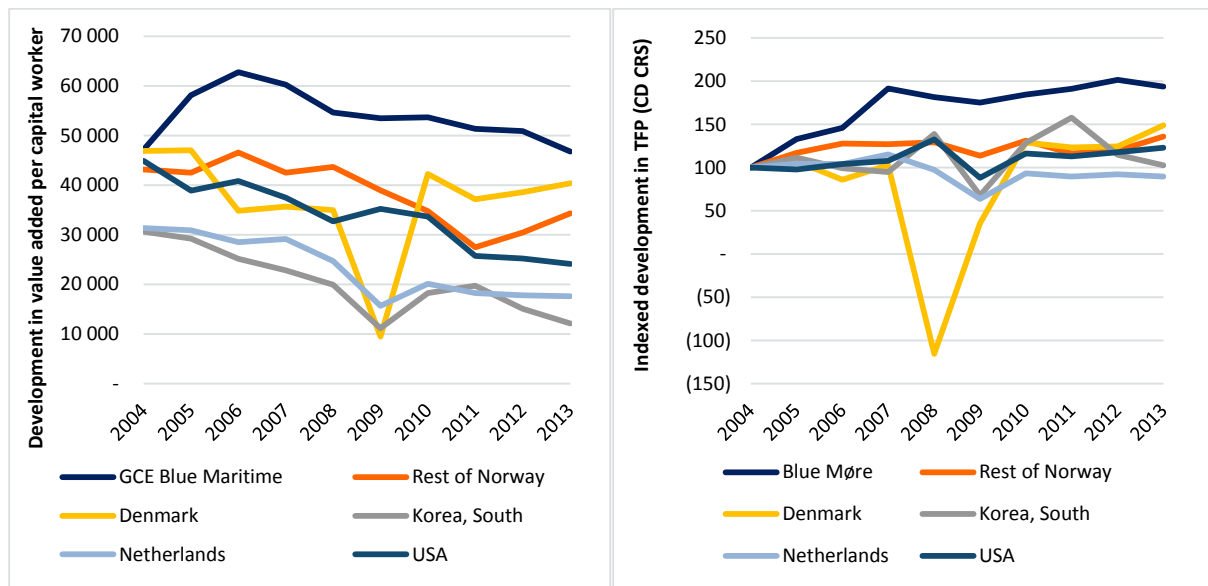
In this section, we will address total factor productivity, which is a group of productivity measures that take both the labor input and the capital input into account. We operate with one wide measure for capital return, which includes price and quality effect in addition to volume effects, and one measure for pure volume productivity.⁶

We start by comparing GCE Møre with international industries that conduct similar activities, but who does not necessarily operate in the same market. Figure 28 shows that the GCE Møre has relatively high return per factor input compared to similar international activity industries. The cluster's volume productivity growth was particularly from 2004 to 2006. The volume productivity growth stabilized after 2007, whereas the wide productivity growth fell after 2006. This implies that the factor prices generally has grown relatively more than the product prices after 2006.⁷

⁶ On the one side, we use wide productivity measure, net value added per capital worker, to address the wide productivity effects, comprising price, quality and volume impulses on the return on the input factors. On the other side, we apply a narrow productivity measure, the technology level with Cobb-Douglas and constant return on scale, to isolate the volume productivity effect. Accordingly, the interpretation of the differences between the two measures will be the price development, and potentially quality improvements.

⁷ Note that the price development on the output side might be somewhat underestimated, since Statistics Norway's data foundation for the deflators does not take offshore orientation fully into account.

Figure 28: a) Wide productivity development (l.h.s.) and b) volume productivity development (r.h.s.) for Blue Maritime and country specific activity industry-reflections. Sources: Menon (2015), OECD Stan (2015) and the national statistic bureaus (2015)



At first glance stagnating volume productivity might not seem that impressive, but the reader should keep in mind that GCE Møre has experienced a tremendous activity growth in the same period. Thus, stagnating average productivity is likely to be a result of hiring of less productive resources rather than a productivity drop among the factor inputs that are already hired. The activity growth is again a result of relatively high firm performance and thereby higher factor return than in the rest of the business sector.

GCE Møre’s performance is also high compared to other offshore suppliers in similar activity industries domestically. Especially the volume development has been better than for its domestic counterparts. The productivity picture varies quite a lot between segments and over time. For maritime equipment, GCE Møre’s development has been rather poor both compared to other domestic producers of maritime equipment and other domestic equipment suppliers in general. Within shipyards, GCE Møre had a relatively high productivity growth after the financial crisis up to 2011, but the productivity has thereafter declined. Furthermore, GCE Møre’s shipping activities had a strong growth up to the financial crisis, but it took some year for the segment to regain its strength thereafter. GCE Møre’s maritime services had a strong productivity growth over the period, but not much more than maritime services in the rest of the country after the financial crisis.

From **Feil! Fant ikke referanseilden.**, we also note that the development was positive from 2013 to 2014, for both GCE Møre and other domestic offshore suppliers. Nevertheless, we know that the development has been poor in 2015, and it is likely to be poor some years ahead. Declining demand accompanied with large redundancies, organizational slack and broken personal business relations is likely to give a drop in productivity in the next couple of years. Yet, the restructuring and measures taken to deal with the oil price crisis might induce productivity growth again in the long run.

5. The cluster's competitiveness - micro benchmarking

To measure the cluster's competitiveness we will in the following part focus on benchmarking the different part of the cluster against leading companies internationally. We will also look at market shares as an indicator of the cluster's ability to compete on the world market. A higher profitability than industry peers internationally will suggest that the cluster has been able to position itself well in the market or that it has been able to utilize its resources more efficiently than competitors. Growing market shares can also be seen as an important indicator that the cluster is competitive on the global market. In several studies market share has been linked to profitability. In the following subchapters we will describe the four segments that make up the cluster separately, and look at some of their features.

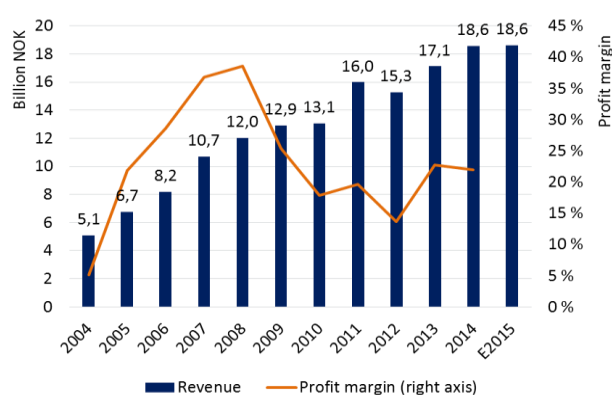
5.1. Shipping companies

Møre is home to a fleet of around 230 vessels making it one of the leading clusters when it comes to offshore shipping in the world. The shipping companies generated NOK 12 billion in value added in 2014. That equals more than half the value added in the cluster; this combined with the fact that a large part of their fleet is built in Møre makes their contribution to the cluster critical. The shipping companies have been growing constantly since 2004, with the exception of a small decline in turnover in 2012. Our benchmarking suggests that the companies have been able not only to follow the growth in the world market, but also increased their market share. Looking at the current market, there is not much doubt that the shipping companies will see falling turnover and lower margins for the next year and maybe also in a longer perspective.

Status today:

Status (2014/2015)	Numbers in billion NOK
Revenue (2015)	17.7
Number of employees (2015)	5 545
Profit margin (2014)	19%
Value added (2014)	11.2
Share of clusters total value added	50%

Figure 29: Development in revenue and profit margin. Source:



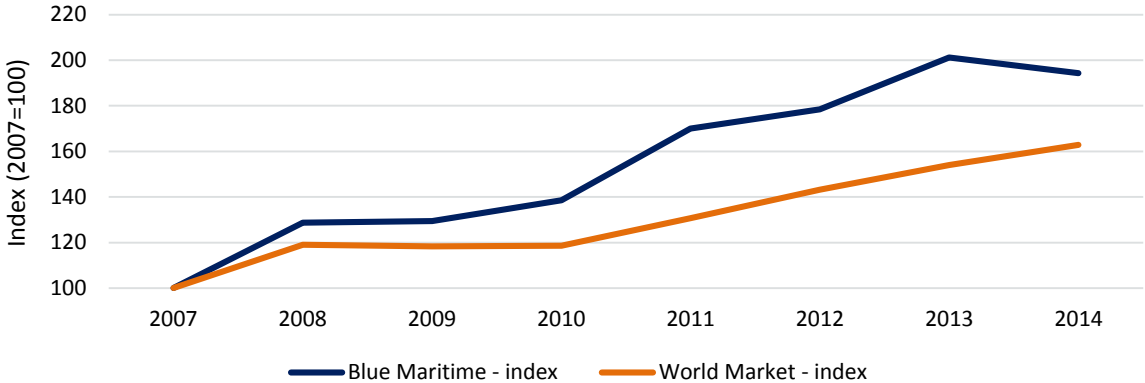
5.1.1. The offshore shipping companies in Møre have increased their market share since 2007

The graph below benchmarks the development in turnover for the shipping companies in Blue Maritime with the global market for offshore supply vessels⁸. The graph illustrates how the companies in Møre have increased their market share somewhat in the period 2007-2014. While turnover in Blue Maritime increased by 94 percent since 2007, comparable companies globally increased their turnover by 63 percent. This is a sign that the Møre companies have been able to keep competitive also in the global market place. The three largest OSV companies

⁸ The turnover here is based on aggregated group numbers and they vary therefore somewhat from the revenue figures reported in Norway. Since the competitive situation is interesting at a group level, we utilize these numbers instead of reported figures in Norwegian entities. For companies such as Bourbon Offshore, the Norwegian group numbers are included.

in the world are Tidewater, Bourbon and Edison Chouest Offshore. In 2014 we estimate that the Blue Maritime shipping companies have a global market share of around 15 percent. The market share will depend on market definition. As the cluster in Møre mainly focuses on offshore supply vessels, we have tried to find comparable companies within this segment for the benchmarking.

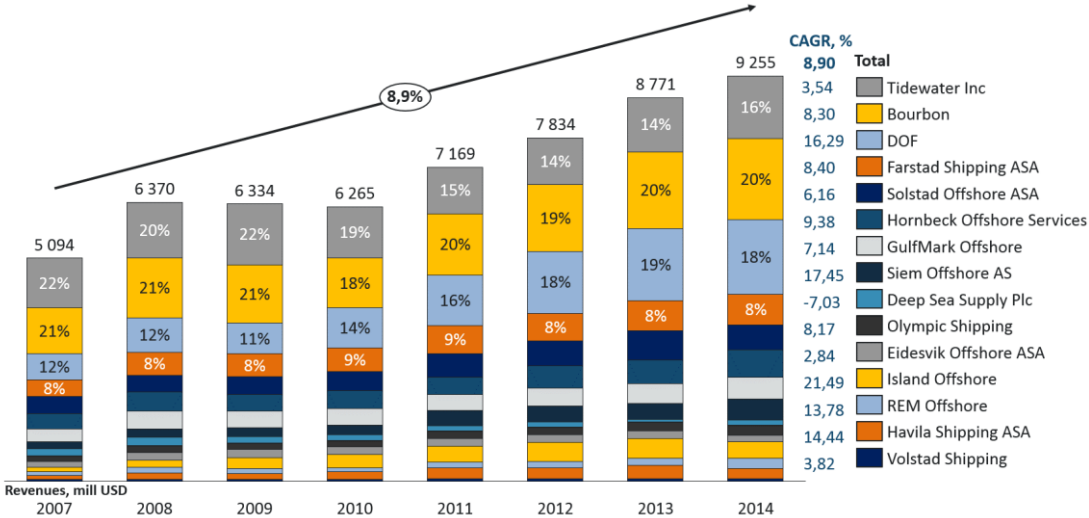
Figure 30: Indexed development in turnover (2007-2014) for Blue Maritime and the market for offshore supply vessels. Source: Menon (2015)



5.1.2. Smaller and more specialized offshore shipping companies taking market shares from larger and more diversified rivals

The market for offshore supply vessels (measured by the total revenues of 15 public OSV companies listed in the figure below as a proxy) grew by approximately 8.9 percent annually in 2007-2014, with total revenues for the selected OSV companies reaching 9.3 billion USD in 2014 compared to 5 billion in 2011. Smaller competitors with younger, larger and more advanced fleets took market shares from the competitors. In particular, the annual revenue growth rates of Island Offshore (21.49 percent), Havila Shipping (14.44 percent) and REM (13.78 percent) exceeded the market average, while Tidewater and Bourbon lost market shares demonstrating average growth rates below the market average – 3.54 percent and 8.4 percent respectively.

Figure 31 :Revenue growth of the benchmarked shipping companies: Source: MENON analysis; annual reports of the companies

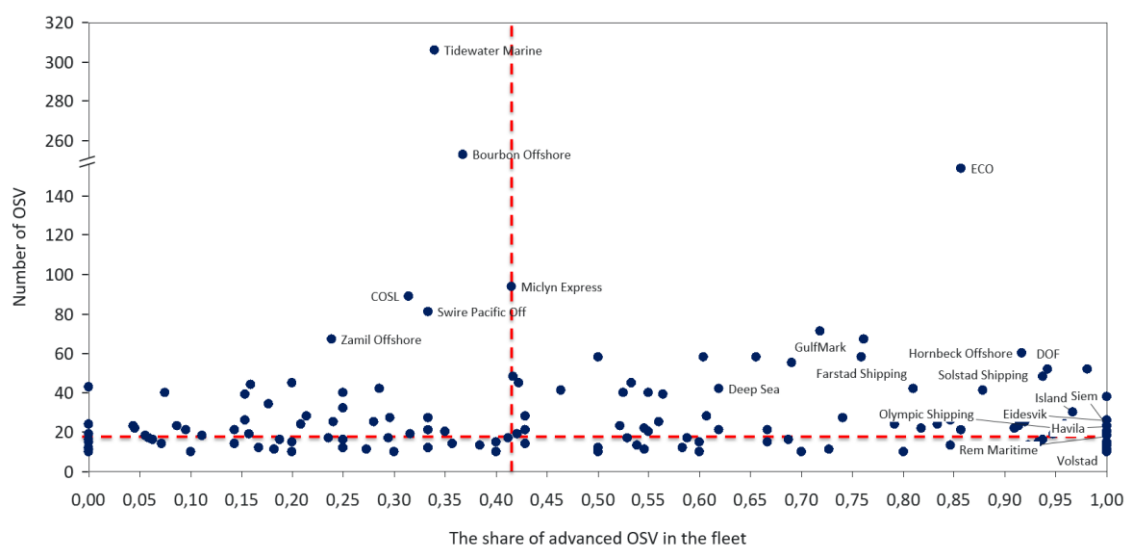


5.1.3. Møre shipping companies are positioned in the more advanced and specialized OSV segments

In order to assess how well the shipping segment of GCE Blue Maritime is positioned with respect to generating superior ROIC and growth in EBIT, we analyze the fleet characteristics of shipping companies in the Møre cluster in relation to those of their international competitors. The two fleet characteristics that we focus on are:

- The number of OSV, which captures any scale advantages
- The share of advanced OSV (defined as OSV with more than 16000 hp) in the fleet, which is aimed at measuring the quality and specialization of the fleet.

Figure 32: Strategic positioning of shipping companies



We gather the OSV fleet data for the entire global population of shipping companies using the Clarkson database. The population includes 2088 shipping companies with from 1 to 306 OSV with the share of advanced OSV in the fleet ranging from 0 to 1. To make the analysis more informative and tractable, we further focus on the 185 shipping companies with 10 or more OSV. The median value for the number of OSV in our sample is 19 ships and the median value for the share of advanced OSV in the fleet is 0,42.

Using the median values as thresholds, we can split the shipping industry into 4 segments:

- Small companies with generic fleet (e.g. FEMCO, Eastern Navigation);
- Large companies with generic fleet (e.g. Tidewater, Bourbon);
- Large companies with advanced, specialized fleet (e.g. Edison Chouest Offshore);
- Small companies with advanced, specialized fleet (e.g. Volstad, REM).

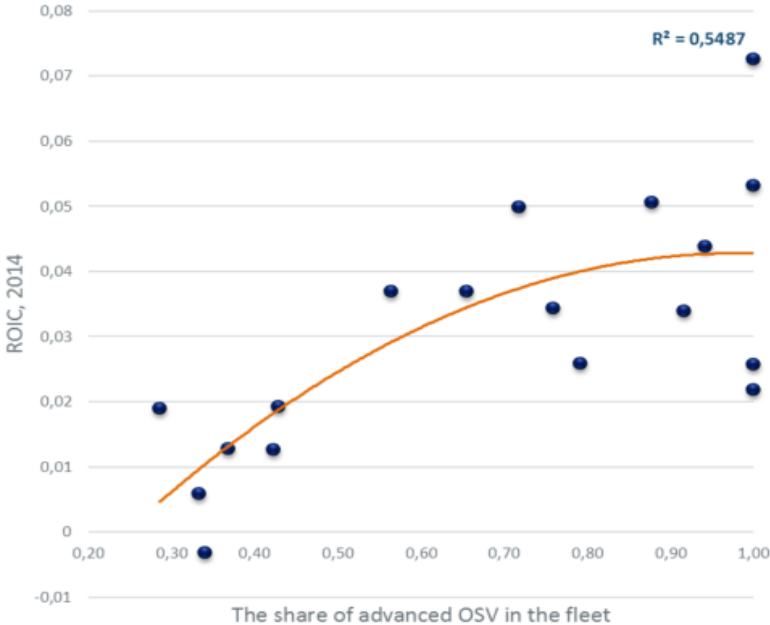
Following this classification, shipping companies in the Møre cluster predominantly belong to two segments: large companies with advanced fleet (e.g. Farstad, Olympic) and small companies with advanced fleet (Volstad, REM, Golden Energy). For illustration, see Figure 15.

5.1.4. Smaller shipping companies with more advanced OSV fleet earned larger return on the invested capital in 2014

A more favorable strategic positioning contributes to both higher returns on invested capital and growth in the operating profits – two major drivers of the firm’s value for investors (both debt and equity holders).

The data that our team gathered for publicly traded shipping companies shows that competitors with more advanced OSV fleet earned higher ROIC (see Figure 16). While companies with a share of advanced OSV in the fleet of less than 42 percent had ROIC ranging from -0.3 percent to 1.9 percent in 2014, those with a larger share of advanced ships in the fleet enjoyed ROIC of between 2.1 and 7.3 percent in the same year.

Figure 33: Correlation between ROIC and the share of advanced ships in the fleet. Source: Menon



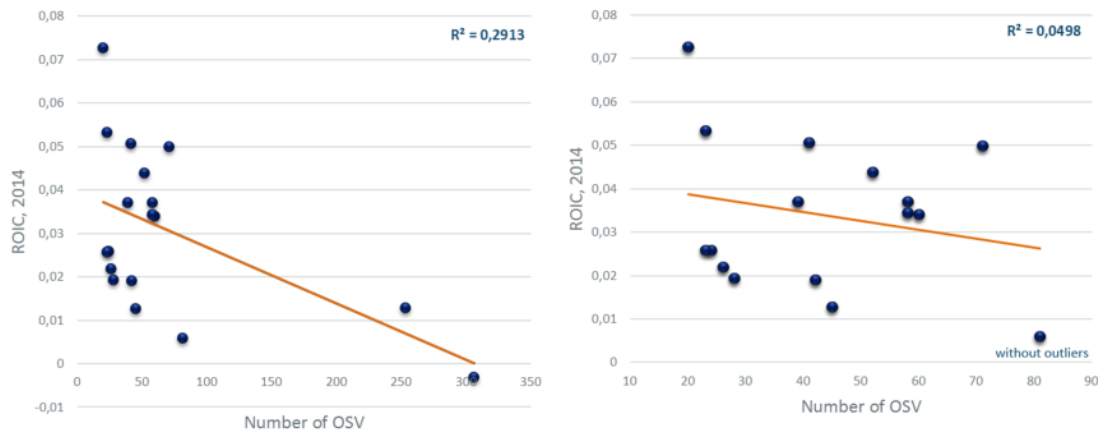
A major driver behind the superior returns generated by shipping companies with more advanced fleet was the substantially higher spot day rates for larger OSV.

Simultaneously, we can see a greater variation in the ROIC for companies with more advanced ships. The variation is likely to be explained by different utilization rates and operating costs.

While the data shows that ROIC increases significantly with the share of advanced ships in the offshore fleet, the scale of operations tend to have a negative impact on the returns on invested capital (See Figure 17 below). In particular, Tidewater and Bourbon – the two largest offshore shipping companies – had an abnormally low ROIC in 2014. Given the substantial difference between these two companies and their competitors in the size of the fleet, one may consider them outliers that skew the general trend. However, the relationship between the size and ROIC remains negative in this period even if we remove Tidewater and Bourbon from the sample.

This evidence suggests that there are significant disadvantages of having larger fleets when the market goes down, which is not surprising given the larger operating leverage associated with having a larger fleet. Furthermore, the more advanced and thus expensive the fleet is, the more negative impact of the size on the returns we may expect in the business cycle downturn. Tidewater, boasting the largest modern fleet of shelf-oriented and deepwater vessels in the industry, is an illustrative example. The company, according to its 2015 annual report, invested more than 5 billion USD in its fleet. To make a decent return on that investment, the company needs favorable market conditions with both higher day rates and utilization rates. However, we may expect an opposite trend, i.e. superior performance of larger players, once the market conditions improve.

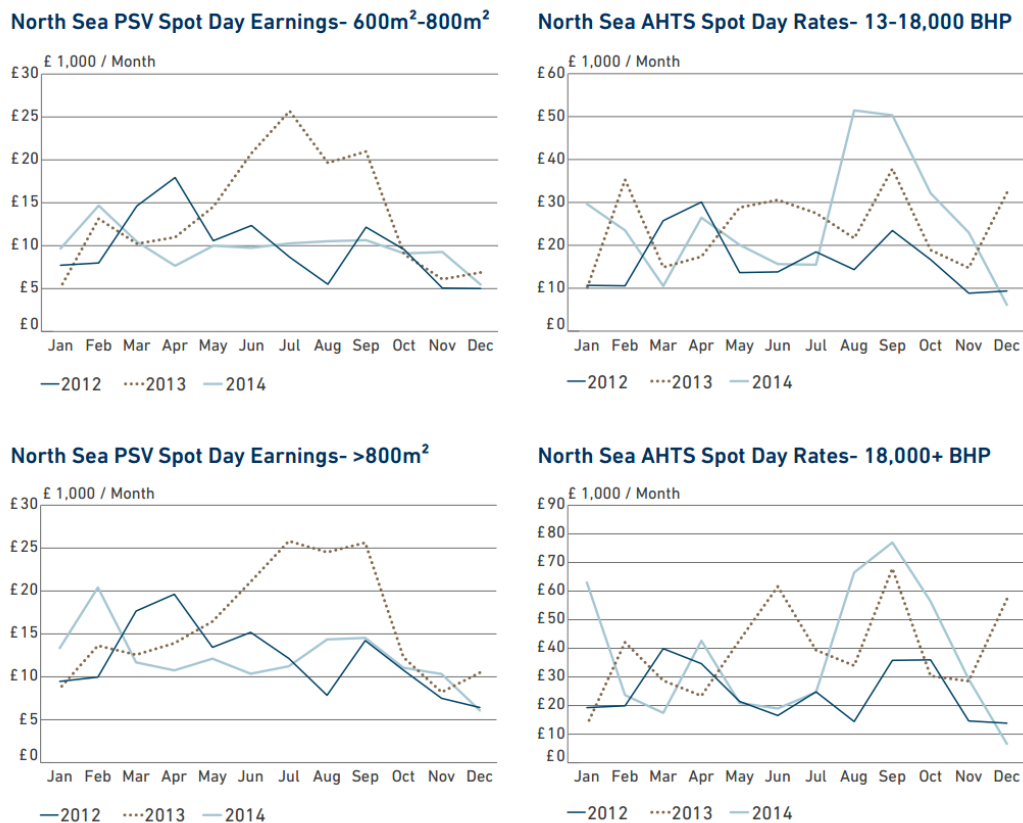
Figure 34: The relationship between scale and ROIC. Source: Menon



5.1.5. The tradeoff between better meeting customer needs and having a more expensive OSV fleet in bad times

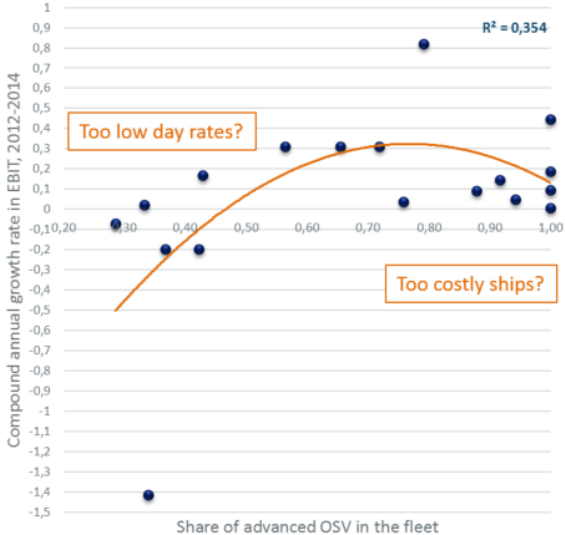
Historically, larger and more advanced OSV enjoyed better spot day rates, especially so in the AHTS segment (See Figure 18 below). However, the operating costs associated with modern larger and are also higher. Hence, OSV shipping companies face the tradeoff between offering the customers larger ships, which supposedly better meet their needs, and keeping the fixed costs low.

Figure 35: Development in spot day earnings rates. Source: The Cleaves Report 2015



The inverted U-shaped relationship between the share of advanced OSV in the fleet and the average annual growth rate in EBIT in 2012-2014 presented in Figure 36 illustrates the tradeoff and its consequences for growth in earnings.

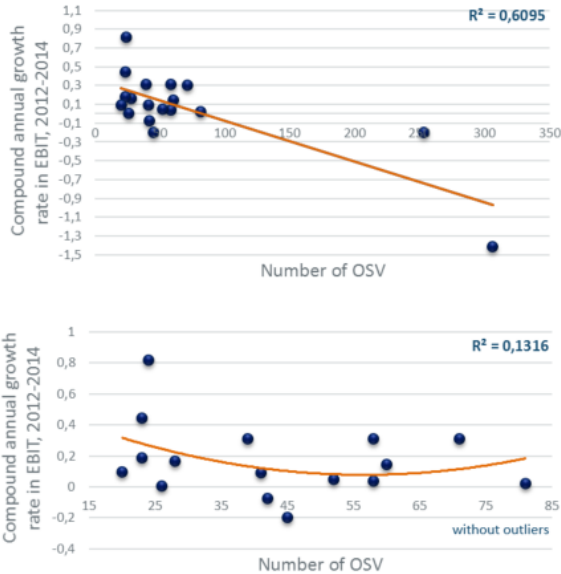
Figure 36: Earnings growth and the share of advanced ships in the fleet. Source: Menon



The data on the EBIT growth that public shipping companies had in 2012-2014 shows that competitors with the share of advanced OSV in the fleet between 55-80 percent enjoyed the highest growth in the operating profits, while those with either too generic or too advanced fleet, on average, demonstrated inferior performance.

Consistent with the earlier findings, the data indicates that higher scale magnifies the negative impact of higher operating leverage on the growth in operating profits (see Figure 37). In particular, Tidewater and Bourbon, the two largest offshore shipping companies, had a negative compound annual growth in EBIT in 2012-2014. If we remove them from the sample, however, a U-shaped pattern appears. It indicates the most disadvantaged position of the firms with 40-60 OSV in the given period.

Figure 37: Scale and growth in operating earnings. Source: Menon

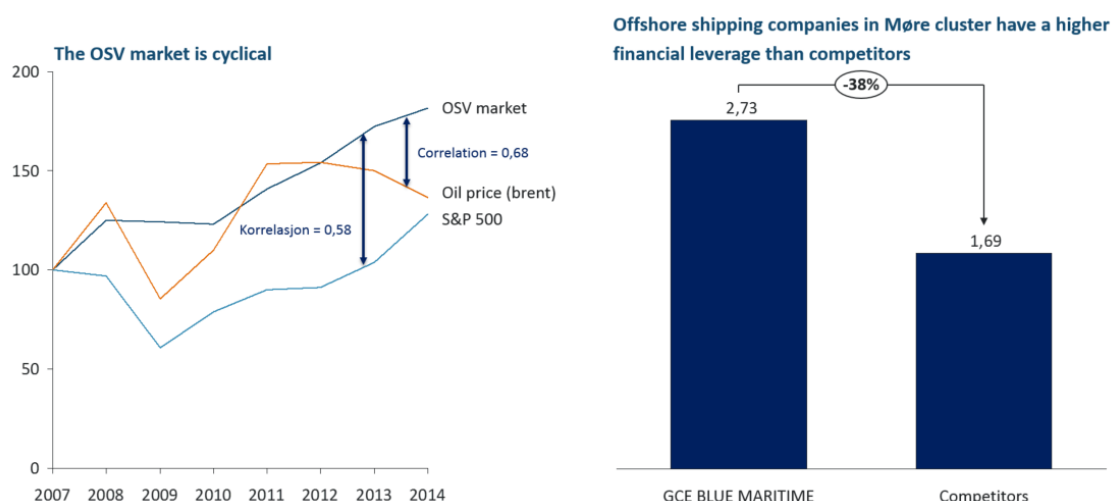


5.1.6. Higher financial leverage compared to international competition is a substantial risk factor for the offshore shipping companies in Møre

In market downturns more leveraged companies, i.e. ones with a higher share of fixed costs in the cost structure, face higher risks of not meeting their financial obligations as the decreased revenues may not be sufficient to cover the fixed costs including the interest payments. The consequences are lower profitability and returns on investments and higher bankruptcy risk. The cost of capital is also likely to increase as a result, making it harder to finance capital projects through, for example, equity offerings.

Given the high correlation between the OSV market and both the oil price (0,68) and the S&P 500 (0,58), the OSV market can be characterized as cyclical, i.e. as a market where revenues closely follow the broader economic trends and the development in the oil price. For cyclical markets excessive financial leverage is an important risk factor. The financial leverage of the offshore shipping companies outside Møre, measured as debt to equity ratio, is about 38 percent lower (see Figure 38).

Figure 38: Higher risk exposure of Møre shipping companies in a cyclical market



5.2. The decline in future growth prospects have lowered the market value of the shipping companies dramatically

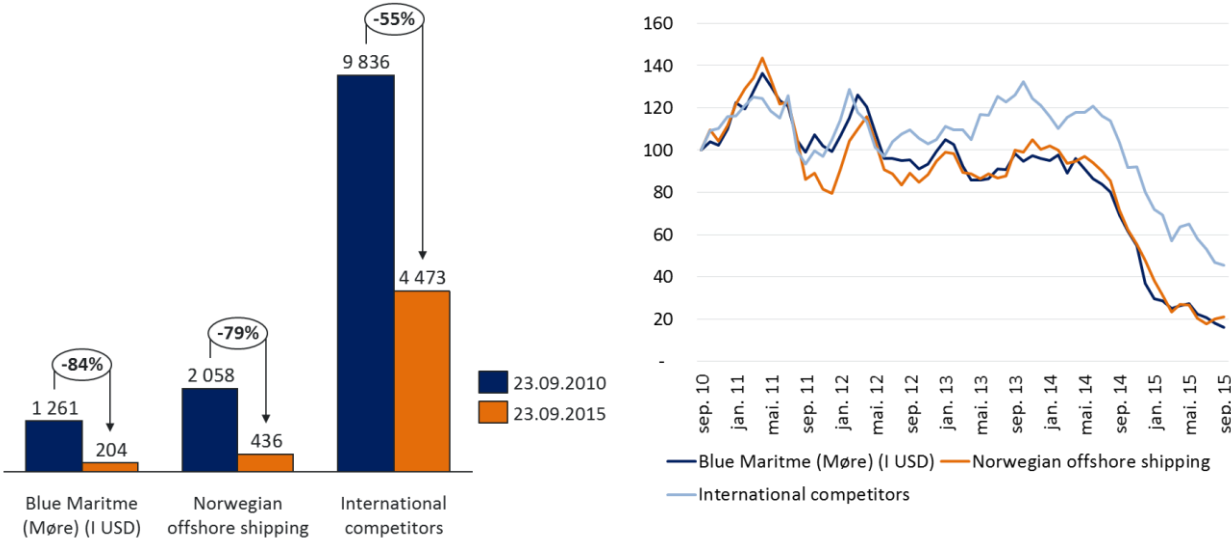
Five years ago, the three stock listed companies Farstad, Havila and Rem Offshore had a combined market value of 1,25 bn USD. During 2015, the value of these stock listed Møre-based companies have fallen by almost 85 percent⁹. This illustrate how the falling oil price and oversupply of OSV-vessels have an enormous effect on future revenues and profit margins. The Møre companies' market value has also fallen marginally more than comparable Norwegian competitors¹⁰. Still, with a fall of almost 80 percent, the development has been weak also

⁹ Measured in NOK, the fall has been 78 percent.

¹⁰ We have benchmarked against four Norwegian offshore supply companies. For the international competitors we have combined the development in 8 leading OSV-companies. We have not included the development in

for these companies. Looking at international competitors, we see a fall in market value of 55 percent, with leading companies such as Bourbon falling less than 50 percent, and Tidewater falling 70 percent (which is still less than the Møre companies).

Figure 3: Left side : Market value for stock listed offshore companies in Møre, Norway and internationally in September 2010 and 2015. Right side: Indexed market value of shipping companies in Møre, Norway and internationally (2010-2015). Source: Menon/Datastream.



5.2.1. Market diversification as a response to the declining domestic demand

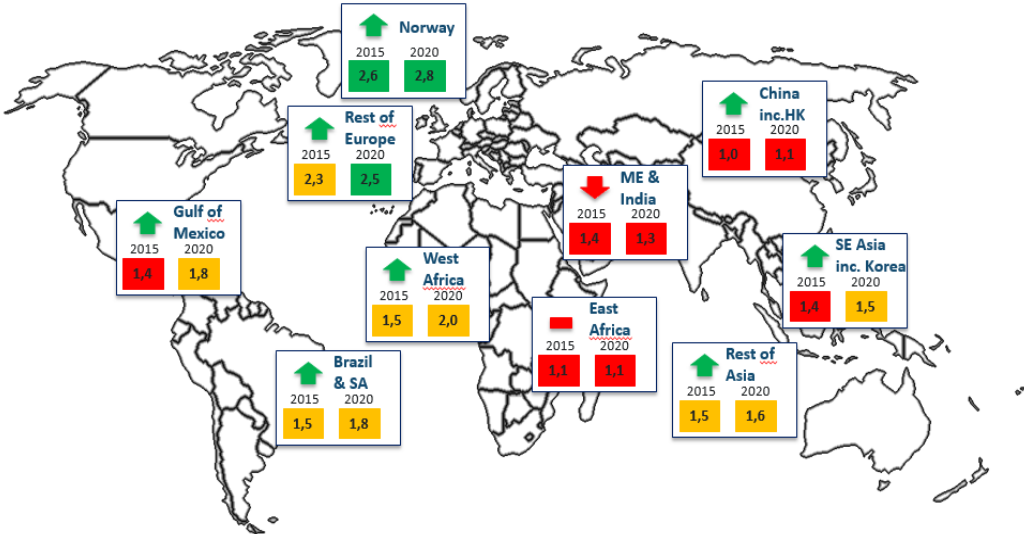
International expansion and shifting the strategic focus from the domestic to foreign markets may be a viable response to the market decline. In order to assess how diversified the operations of the Møre offshore shipping companies are in terms of geographical markets as well as whether they intend to increase their international presence in the future, we surveyed the companies. The two questions we asked were:

1. “Which of the following markets are important for your operations today?”
2. “Which of the following markets will be important for your operations in 2020?”

The answer alternatives ranged from 0 meaning “no operations in the market” and 1 for “not important” to 3 for “very important”. We got responses from 8 offshore shipping companies in the region that are representative of the cluster in total.

Subsea-7 and Technip as these two companies have such a strong focus on the construction market. If we had included these two companies, the international benchmark would have improved its performance even more.

Figure 39: Market focus of the shipping companies in Møre



Norway is currently the most important market for the shipping companies located in Møre. It is expected to become even more so in the next five years. That said, the survey results clearly indicate the intent of companies to expand internationally with a particular focus on other European markets, West Africa, Gulf of Mexico, Brazil and to a less extent to Asian markets. There they will inevitably face competition of much larger international players such as Tidewater and Hornbeck, which have substantially less financial leverage, i.e. higher loan capacity, and strong incentives to deter entry as both have invested much in a modern and more advanced fleet.

5.3. The yards in Møre grow while constantly innovating and specializing

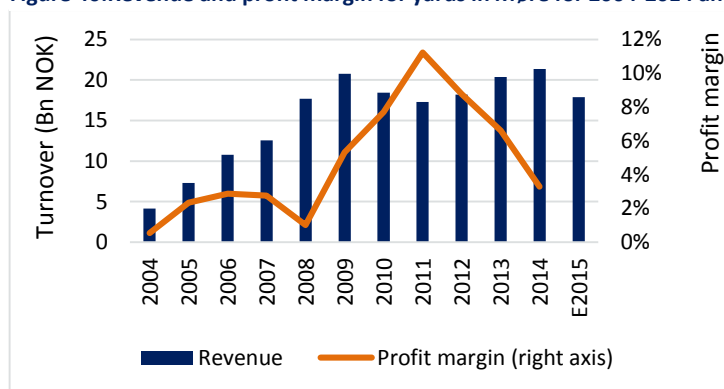
The whole Blue Maritime cluster went through a five-year period of strong growth from 2004-2009, but no other segment had such a strong growth in turnover as the yards. During these five years turnover increased five-fold. After this huge increase in activity level, the yards experienced some years with very high profit margins. In 2011 their profit margin exceeded 10 percent, something that is historically high. The profit margin has since fallen, mainly as a result of new capacity building outside Norway. Vard has established itself as one of the largest OSV-builders in the world, but the company has experienced a lower profitability related to yards located outside of Norway. As the oil price collapsed in the end of 2014, the market for newbuilds has fallen drastically, and the fall in turnover for 2015 will therefore possibly continue into 2016. Vard's stock price has fallen by 75 percent since the top three years ago and 60 percent since over the last 16 months. This number that tells us how the market sentiment has changed quickly and drastically.

5.3.1. Status and development last ten years

Table 1: Key performance numbers for the yards in Møre.

Status (2014/2015)	Numbers in billion NOK
Revenue (2015)	21.4
Number of employees (E2015)	3 774
Profit margin (2014)	3 %
Value added (2014)	3.1
Share of clusters total value added	14 %

Figure 40: Revenue and profit margin for yards in Møre for 2004-2014 and



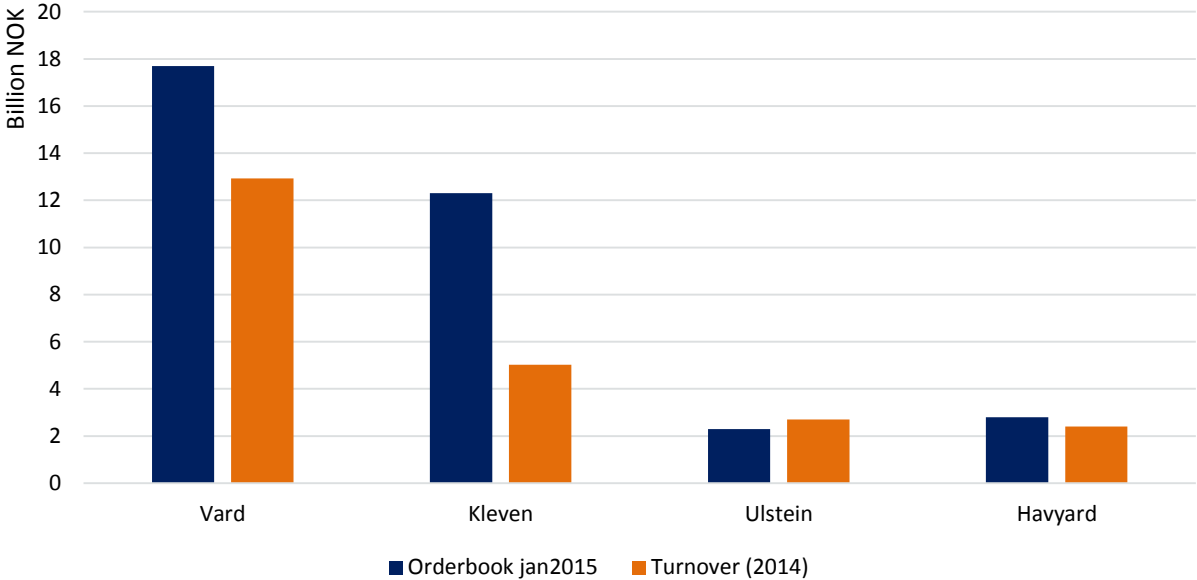
The graph below includes the order book for the four largest yard groups in Norway in January 2015 compared to their turnover in 2014¹¹. The ratio between turnover and order book was at 1,53 in the beginning of the year, a reduction of 11 percent compared to last year. The reduction in itself is somewhat worrying, even though the level is still satisfactory. It is also important to highlight that the situation varies between the yards. Havyard and Ulstein have weaker order books than Kleven and Vard.

Since January 2015 order intake has been very weak, making the order situation deteriorate during 2015. According to data from Norsk Industri, the remaining order book for all Norwegian yards has fallen by 22 percent during 2015. The market for offshore vessels has collapsed, something that probably will reduce order books even further. On a more positive note, orders from the marine industry, especially for well boats, have increased. These vessels are especially important for smaller yards such as Aas Mekaniske Verksted. In a period of lower demand for offshore vessels it is likely that the yards need to look to alternative markets, building vessels for the marine sector, passenger ferries or other specialized vessels. Due to lower demand for offshore vessels, Havyard announced in August 2015 that it will reduce its staff by 100 people. Vard has announced cuts of almost 200, while other yards are considering similar reductions. It is a worrying sign that Havyard is reducing the number of employees in its department for design and shipbuilding, considering the importance of these jobs for the cluster. Vard on the other hand has decided not to make any cuts in the design department in an effort to maintain long-

¹¹ The numbers include all yards in the group, for Vard that means yards located outside of Norway.

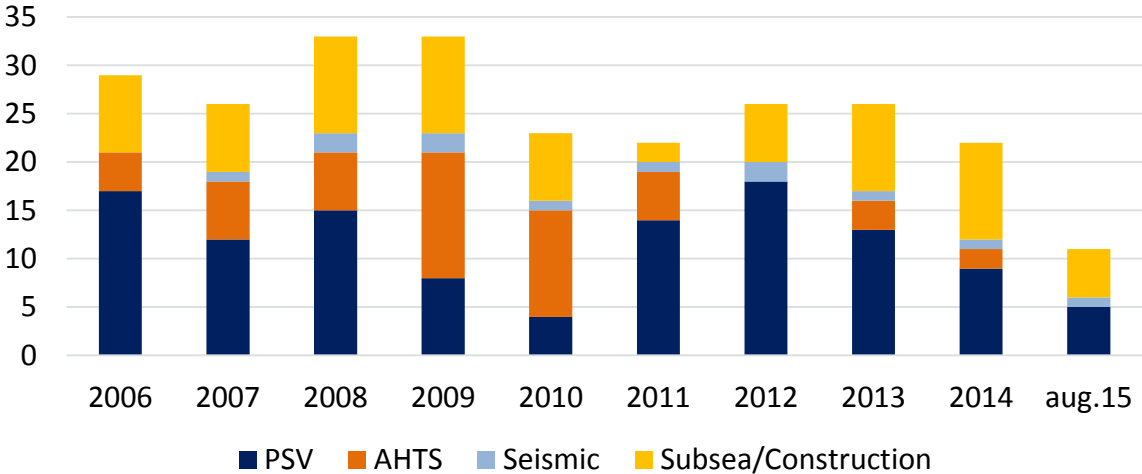
term competitiveness. Being the largest yard group specialized in building offshore vessels in the world, it is likely that Vard will have to make additional cuts either in Norway or at other yards abroad.

Order book January 2015 compared to last year's turnover (numbers at group level)



The yards in the cluster have increasingly focused on delivering vessels to the offshore market. In recent years, the vessels have become larger and more technically advanced. The graph below shows the deliveries of offshore vessels from Norwegian yards in the GCE Blue Maritime Cluster. The reduction in the number of vessels over the years should not be interpreted as a sign of reduced activity, since the number of vessels delivered does not indicate the value of deliveries from the yards. The graph partly illustrates how the yards keep making continued improvements, moving from simple PSVs to more advanced subsea/construction vessels.

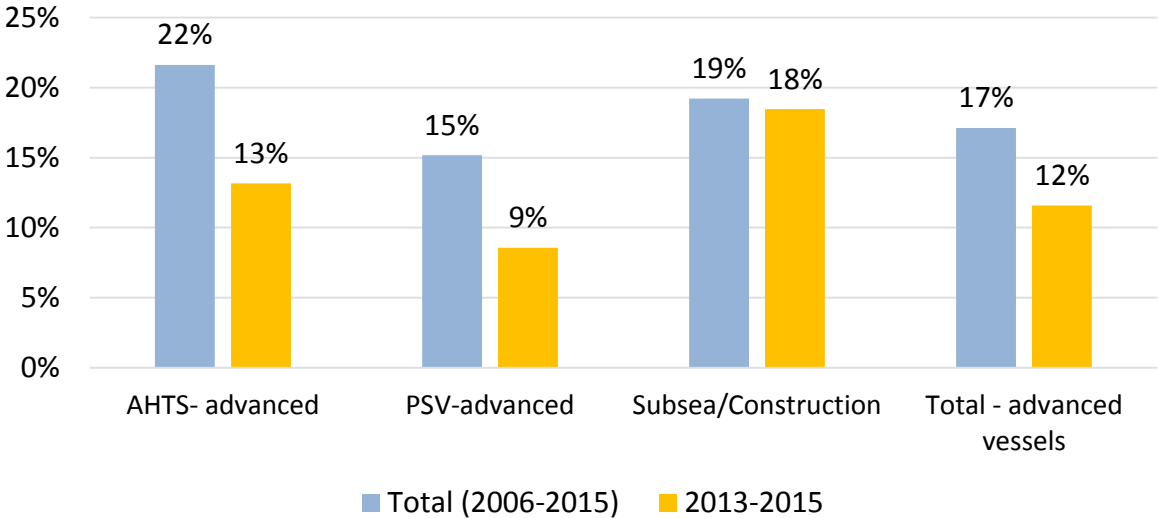
Figure 41: Deliveries of offshore vessels from Norwegian yards in the GCE Blue Maritime Cluster. Source: Menon/Clarkson



Measured in absolute number of offshore vessels delivered the last 10 years, the cluster has lost market shares. In 2006 14 percent of the offshore vessels delivered into the world fleet were built at Norwegian GCE Blue

Maritime yards, while the corresponding number for 2015 was 10 percent. This development hides the fact that value per ship has increased dramatically in the last years. Looking at the advanced part of the fleet, we see the same pattern, but the decline differs between the different segments. For advanced AHTS and PSVs we see a sharper decline in market shares, while we see that the yards are able to keep their market shares within subsea/construction. Again it is important to remember that the vessels delivered have become more advanced and thereby valuable. This probably overstates the fall in market shares. It is also important to keep in mind that the market has grown tremendously since 2006, and a decline in market share does not mean that activity has fallen. As we have seen earlier, activity in the GCE Blue Maritime Yards has increased, but the market has probably grown faster, making the cluster’s market share fall somewhat.

Figure 42: Share of the advanced offshore fleet delivered from GCE Blue Maritime Yards in Norway. Source: Menon/Clarkson



It has not been possible to measure the yards’ performance at micro level as foreign yards in general either are part of large conglomerates with limited financial information available at segment level, or the financial information is private and thereby not available.

5.3.2. In-house design is strategically important for shipyards in Møre

Historically ship design has enjoyed higher EBIT margins than any other activity shipyards perform. Not surprisingly, Hyundai Heavy Industries, one of the world’s largest shipyards, decided to establish its own offshore ship design subsidiary that started working from 2014. In addition to design’s contribution to value creation, it can also be viewed as a major driver for innovation and product development in the industry and a key component of the value proposition from the Møre shipyards to their customers. Some of the surveyed shipyards argue that without in-house design, significantly fewer ships would be built in Norway.

5.3.3. Competitive advantage in adverse market conditions will largely rely on the Møre shipyards' abilities to diversify, manage counterparty and financial risks and improve operational efficiency

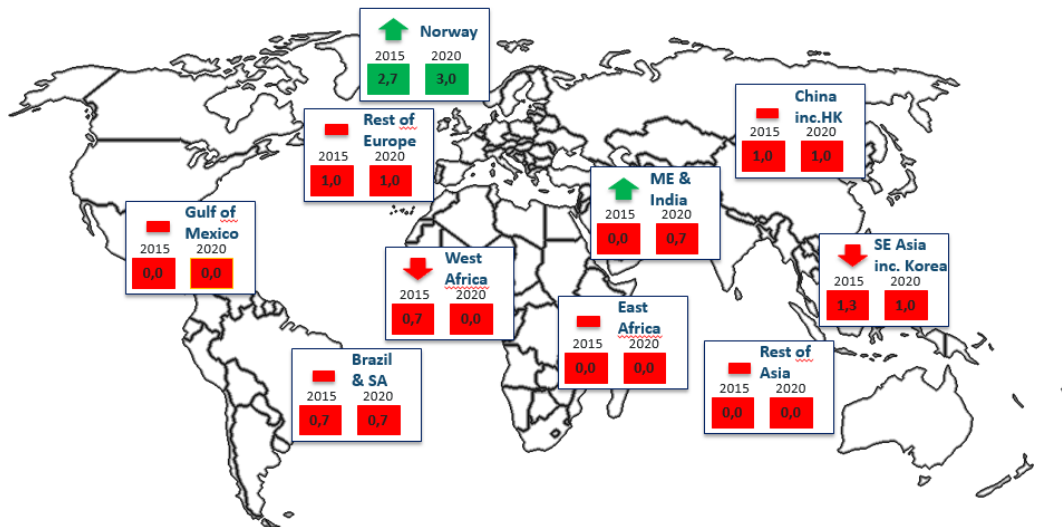
Shipyards located in the Møre cluster are much more exposed to the offshore oil & gas industry than their larger international competitors such as Hyundai Heavy Industries, STX and DSME. Hence, the drastic oil price decline in the second half of 2014 posed a range of strategic challenges for the Møre shipyards.

Decrease in the future demand for OSV. The decline in the oil prices makes E&P companies cut their costs and scale down the offshore activities. This demand-side pressure on the offshore shipping companies combined with the deliveries of many OSV in 2014-2015 will result in a decrease in the future demand for new PSV and AHTS. As the shipyards' order backlog from the offshore oil & gas segment decreases in 2015, their growth and returns on investments will depend on:

- Diversification of the client base via among other things internationalization.
- Diversification out of the offshore oil & gas segment into new business areas that allow to utilize the shipyard's core competencies, but are less dependent on the fluctuations of the oil price. Windmill service ships, icebreakers and ships for aquaculture are examples of such potential segments.
- Provision of maintenance and docking services for shipping companies that are likely to put some of their OSV ships on docks during the industry downturn.
- The advantages of being vertically integrated and selling components and services not only to own projects but also to third parties.
- Maintaining a broad product portfolio and being a "one stop shop" for the customers to have a superior value proposition as competition among the shipyards for new contracts is likely to increase.

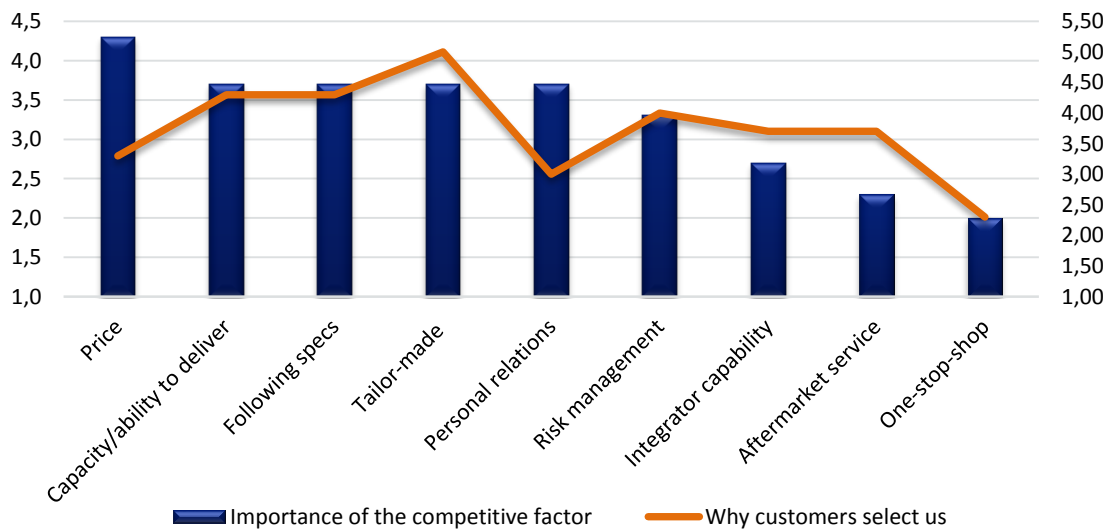
We have surveyed the shipyards in Møre, similarly to the shipping companies, regarding their geographical market focus and plans to internationalize in the next five years. The results reveal that expanding the geographical scope of the client base is currently not on the agenda of the shipyards in Møre. Still, we see a development that a larger proportion of the yard orders are coming from outside of Norway.

Figure 43: Market focus of shipyards in Møre



An additional strategic challenge for shipyards in Møre is the ability to meet customer’s demands. In the survey, we also asked the shipyards to assess the importance of different competitive factors using a scale from 1 (“not important at all”) to 5 (“very important”) as well as reasons why customers select them using the same list of factors and scale.

Figure 44: Match between competitive strengths and customer demands



The survey reveals that while price is the most important competitive factor in the industry, it is definitely not a strategic advantage of Møre shipyards. Neither do they have sufficient focus on building long-term personal relationships with the customers given their importance as a competitive factor, especially so in times of crisis. On the other hand, it appears that the shipyards in the region excel in delivering tailor-made solutions, integrator capabilities and service. Although these parameters are also important, we see a clear need to shift focus more towards operational efficiency and staying competitive on price as well as on building strategic relationships.

Increased counterparty & financial risks. Overcapacity in the OSV shipping industry increases the cancellation risks for shipyards. The negative consequences of contract cancellation for the bottom line and solvency of the shipyards are further aggravated by industry practices. In particular, the commonly used fixed price contracts with delivery in 3 years make it necessary to purchase much of the needed equipment at the time of signing the contract to hedge for a potential increase in the equipment costs. And, since only about 10-20 percent of the contract price is paid to the shipyards during the design phase, the rest needs to be financed through large bank loans. In these circumstances, contract cancellations can potentially render the shipyards unable to repay the loan and interest. Hence, proactive management of counterparty and financial risks becomes critical. Potential tactics to manage such risks include:

- Corporate and bank guarantees;
- Contract structure and downpayments;
- Search for alternative buyers for the ordered ships;
- Adjustment of production schedules.

The need to flexibly adjust capacity. The downturn in the offshore oil & gas related market calls for optimizing capacity utilization through:

- Delaying deliveries;
- Cutting outsourcing and subcontracted labour;
- Diversification.

Simultaneously, there is a need to manage subcontractor relationships in a way that would allow to scale up operations quickly when market conditions improve.

Reducing costs and improving efficiency through the whole value chain. As revenues from the offshore segment are likely to decrease, the ability of the shipyards to remain profitable depends also on value chain optimization, which may include:

- Implementation of project management systems that would ensure smooth work flow from engineering to production as well as across divisions;
- Cost controls, proactive management of suppliers and subcontractors, renegotiation of contract terms. Here, larger shipyards will enjoy larger scale and bargaining power advantages;
- Reassessment of the organizational structure and identification of opportunities to cut the overhead;
- Transferring more activities to low labor cost locations provided that an effective project management system is in place;

Developing mechanisms for competence management and knowledge sharing across projects and shipyards in different locations.

5.4. Equipment manufacturers – one of the locomotives in the cluster is running at a slower pace

The cluster is home to some of the world’s leading equipment manufactures with Rolls Royce Marine in the forefront. Since 2004 the activity level has increased, but after the financial crisis, activity and profitability have fallen sharply. The weak development has led to a decreasing market share on the world market. Still, many of the companies are the leading manufacturers in their area. Excluding Rolls-Royce, the remaining manufacturers have experienced growth during the last five years and still deliver high profit margins.

Through several acquisitions of Norwegian firms, Rolls Royce Marine has grown into the largest equipment manufacturer in the cluster. Rolls Royce Marine stands behind two-thirds of the equipment manufacturers’ revenue in 2014. IP Huse and Brunvoll are the second and third largest companies, each with a share of around five percent each. To understand the equipment manufacturers development, this is a key insight since the total development will be dominated by the development in Rolls Royce Marine. If Rolls Royce was excluded from the report, the equipment manufactures would have experienced a profit margin of four percent, closer to the six percent average for Norwegian maritime equipment manufacturers. The profit margin for the equipment producers in the cluster would actually been around four percent higher on average for the whole from 2004-2014.

Status (2014/2015)	Numbers in billion NOK
Revenue (2015)	16.5
Number of employees (E2015)	5 041
Profit margin (2014)	0 %
Value added (2014)	4.7
Share of clusters total value added	21 %

Looking at the development in turnover, we can see that the equipment manufacturers experienced a sharp increase in revenues and profitability from 2004 until 2009. This development must be seen as a result of the growth in the OSV building market. Most of the revenue for the cluster is related to the offshore market, but the companies also deliver to the merchant and fishing fleet. Since 2010, the profit margin has fallen dramatically. In 2013 the total profit margin was actually negative. The average hides the fact that while Rolls Royce Marine has delivered very weak results over the last years, the other manufacturers have experienced profit margins around 10 percent over the last four years.

Figure 46: Turnover and operating margin for equipment manufactures in Møre 2004-2014 and estimated development for 2015. Source: Menon(2015)

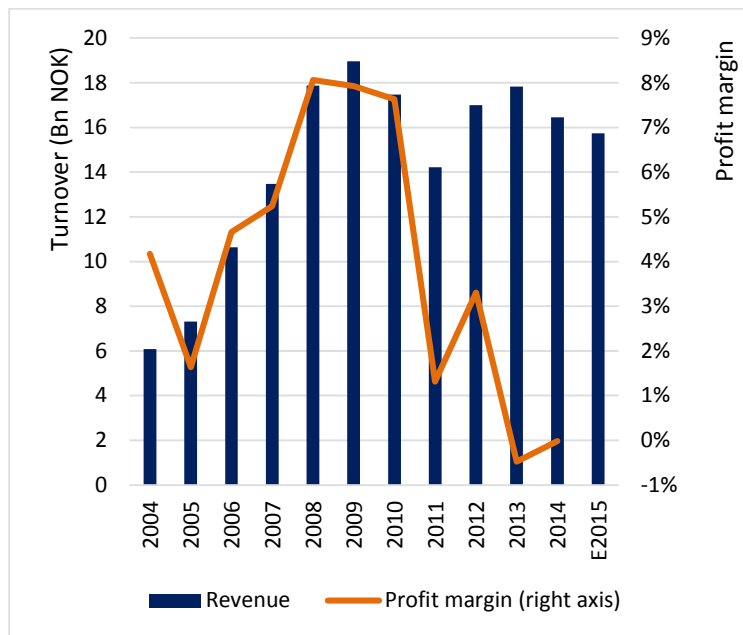
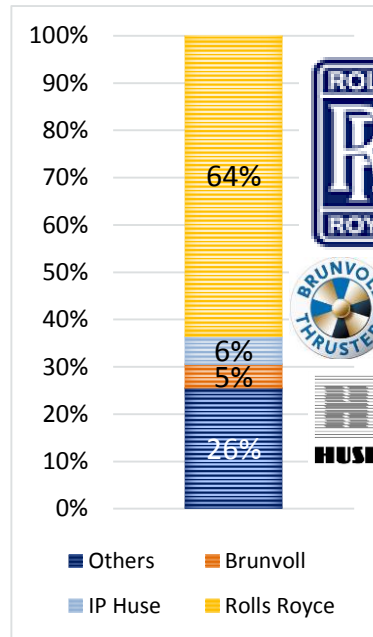


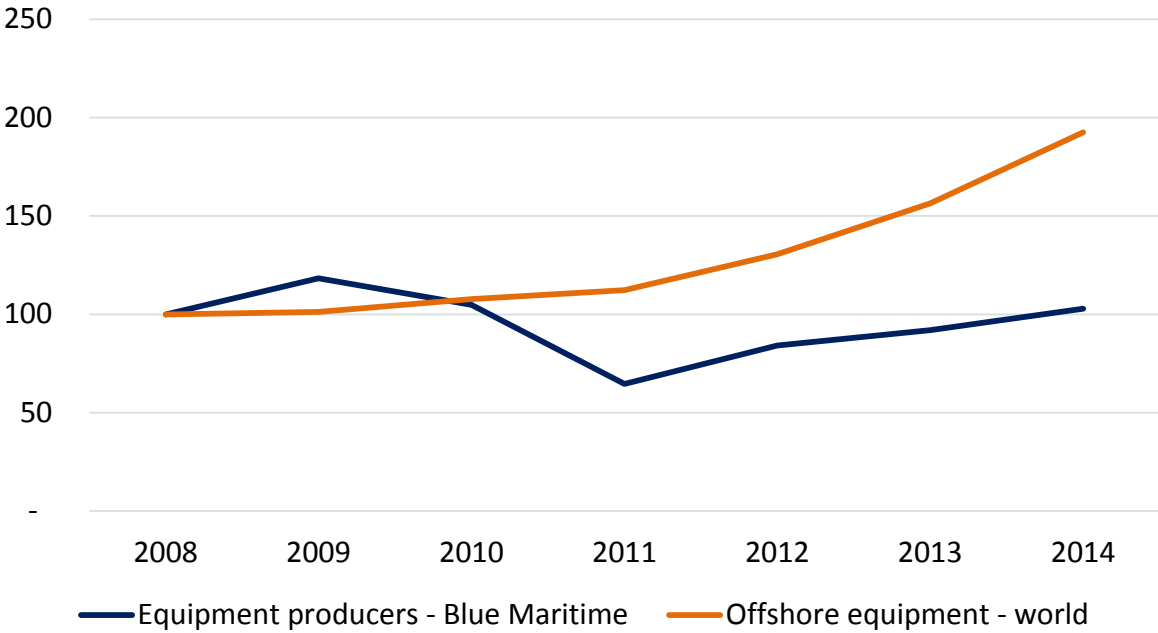
Figure 45: Leading three manufacturers' share of total turnover for Blue Maritime Cluster in 2014. Source: Menon 2015



Leading companies in the group include Rolls Royce, Jets, Brunvoll, IP Huse, Hydra pipe and several others. Rolls Royce claim to be market leading in several niche markets, with a market share of 25 percent of ship designs, 28 percent of engines (medium speed), 60 percent of market for Azimuth thrusters and 70 percent of AHTS winches. The smaller companies such as Brunvoll and IP Huse sell specialized equipment and within their niches they have also captured large parts of the global market.

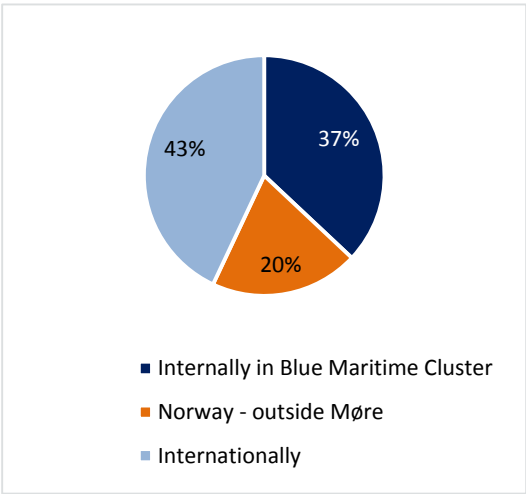
As exemplified by Rolls Royce's product range, the equipment producers offer a wide variety of goods and services and it is therefore difficult to benchmark the group towards a single market. Below, we have benchmarked the manufacturers in Blue Maritime with the development in the world market for offshore equipment. This might not be the perfect benchmark, but development in the activity level for the cluster is so weak that the reduction in market share is obvious. It should be noted that after a large fall in turnover especially after 2010, the activity in this part of the cluster has again increased until 2015. The increase in activity has still been weaker than the overall market. Again, the results on the benchmarking would have been more positive if we had compared the Møre equipment manufactures excluding Rolls Royce Marine with the world market.

Figure 47: Growth in turnover for Blue Maritime Equipment manufacturers compared to world market. Source: Menon/Rystad



According to Møreforskning, 43 percent of the turnover for the equipment manufactures was sold abroad, while 57 percent was delivered to other entities in Norway. Large parts of the deliveries to Norwegian companies will end up in vessels that are built for foreign shipping companies or vessels that will be utilized abroad. This means that dependency on foreign markets is very high. Looking at the estimated market share, we find that the equipment manufacturers in the cluster have lost market shares internationally. They have experienced an increasing activity level since 2004, but the decline the last years is not in line with the overall growth in the market. Again, it must be highlighted that the performance differs between Rolls Royce and the other entities in Møre.

Figure 48: Deliveries from equipment manufacturers

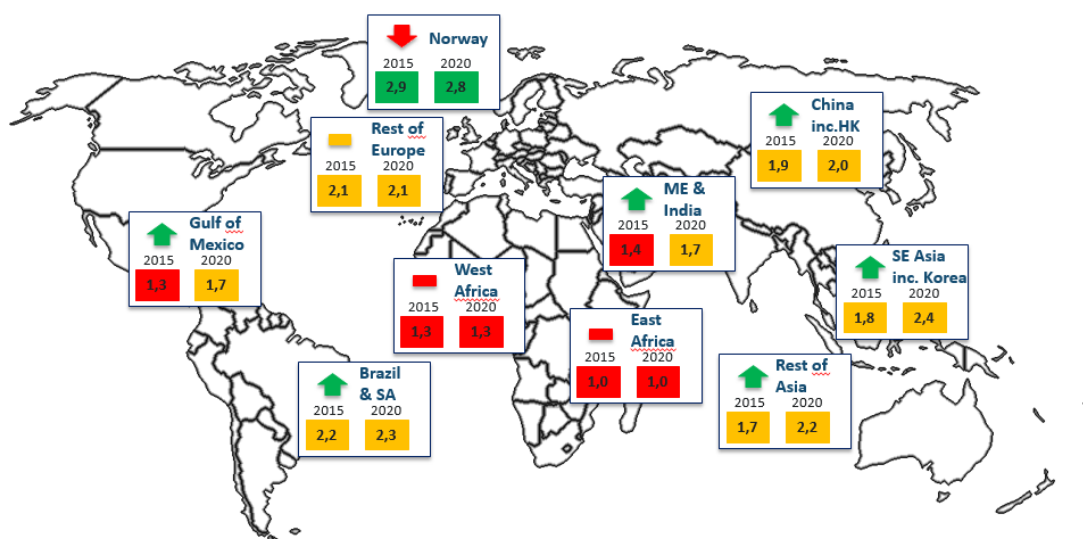


5.4.1. Need to improve the value proposition for customers, operational efficiency as well as decrease exposure to the offshore segment

As a result of the sharp decline in the oil price and the overcapacity in OSV, producers of ship equipment such as Rolls Royce Marine are facing increased pricing pressure from the customers and cancelled orders. Strategic responses to the adverse developments in the offshore oil & gas industry should address the following areas:

Reducing exposure to the offshore oil & gas industry and internationalization. As with the other segments of the maritime cluster, international diversification and reducing exposure to the oil & gas industry may be a viable strategy for the producers of ship equipment. Our survey indicates that ship equipment producers in Møre indeed plan to reduce their exposure to the Norwegian market until 2020 – though it will still remain the most important. The geographical focus is expected to shift to the Americas and to Asian markets.

Figure 49: Shifting market focus of equipment producers



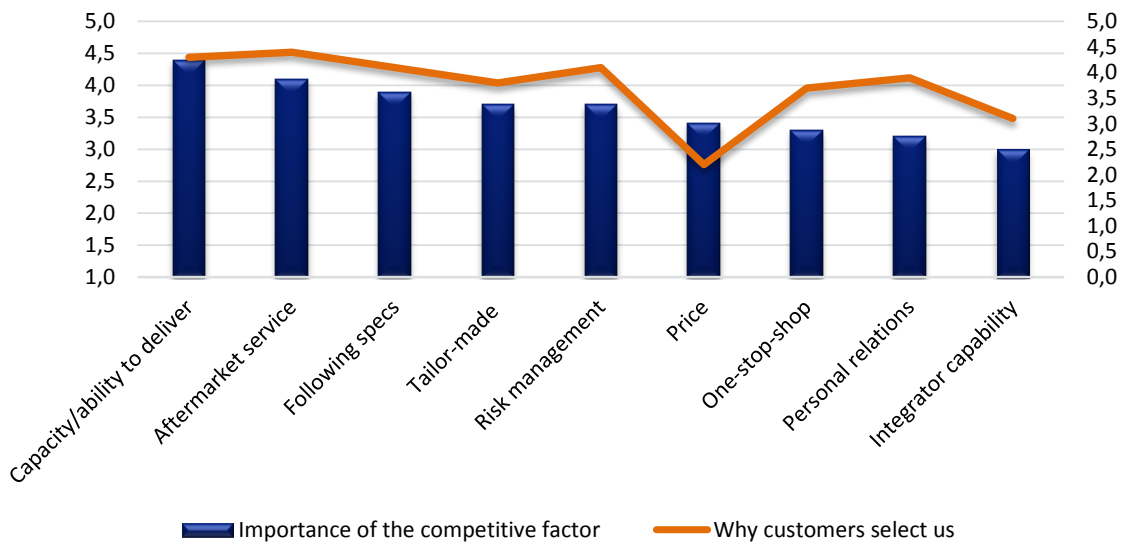
Source: Menon analysis

Increasing the value proposition for customers. This includes but is not limited to:

- Increased focus on the lifetime aftermarket services for the installed equipment;
- Meeting customer demands for less emissions, higher energy efficiency and lower operating costs for the equipment through continuous product innovation;
- Delivering new advanced software-based services that would make installation, integration and condition monitoring easier;
- Strengthening core capabilities in engineering and system integration;
- Focusing on customer relationship management and contracting to alleviate price pressure and avoid contract cancellations.

We have also assessed the competitive strengths relative to customer demands of the producers of ship equipment in Møre. To do this, we used the survey data in the same manner as we did for the shipyards. As in the case of shipyards, the producers of ship equipment in Møre have a strategic disadvantage with respect to prices. However, the buyers of ship equipment are much less sensitive to price than the buyers of ships. By contrast, the production capacity, aftermarket service, the ability to follow spec, deliver tailor-made and reliable products are much more valued by the customers. And it appears that the strengths of the ship equipment producers in Møre match well with the customer needs.

Figure 50: Match between competitive strenghts and market demands



Reducing the costs through:

- Consolidation of production and thus achieving scale economies, like Rolls Royce did by consolidating production of steering gear in Norway;
- Moving more activities to lower cost locations;
- Managing external relationships to flexibly adjust capacity.

5.5. Design and other service providers

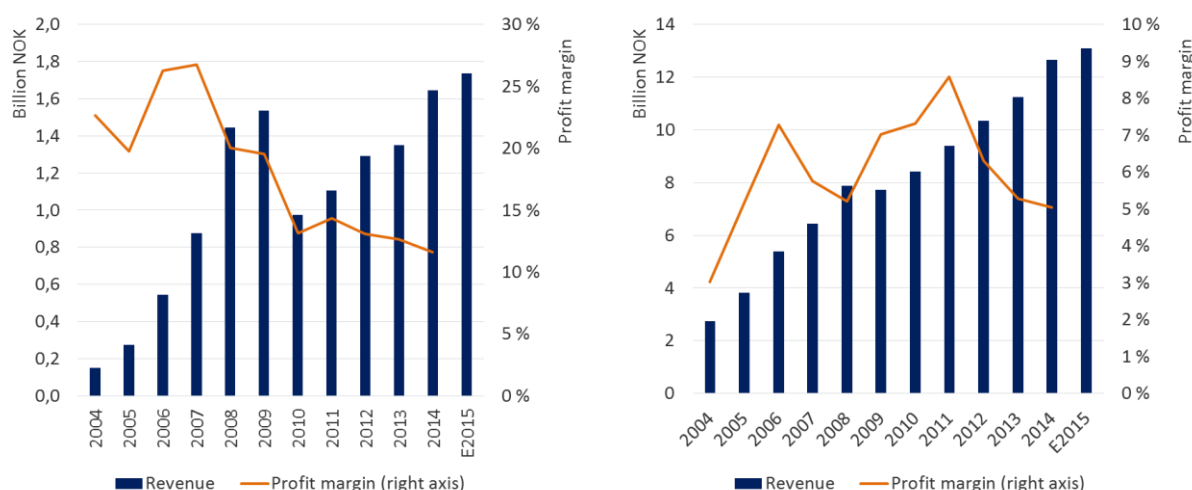
Service providers consist of companies that provide services to other companies in the cluster or directly to foreign companies. Activities include trade, installation and service of ship equipment, ship design and other specialized maritime services. The group is divided into two sub-groups: Design and other service providers. The reason for this division is the special interest in design activities as these activities are important especially important for product innovation in the cluster.

The two tables below summarize some key statistics about the two groups. There is a substantial difference in size for the two groups, with the service providers creating 3.1 billion in value added compared to 0.6 billion for the designers. Still, the designers play a key role in the cluster, as the design process lead to product innovation through the development of new vessels with enhanced functions. The X-bow could be an example of such a design characteristics that gave the cluster a competitive advantage. In addition, they are important for the equipment manufactures as they also deliver equipment packages to yards.

Status (2014) - Design	Numbers in billion NOK
Revenue	1.6
Number of employees	407
Profit margin	12 %
Value added	0.6
Share of clusters total value added	2 %

Status (2014) – Service providers (excluding design)	Numbers in billion NOK
Revenue	12.7
Number of employees	3 273
Profit margin	5 %
Value added	3.1
Share of clusters total value added	14 %

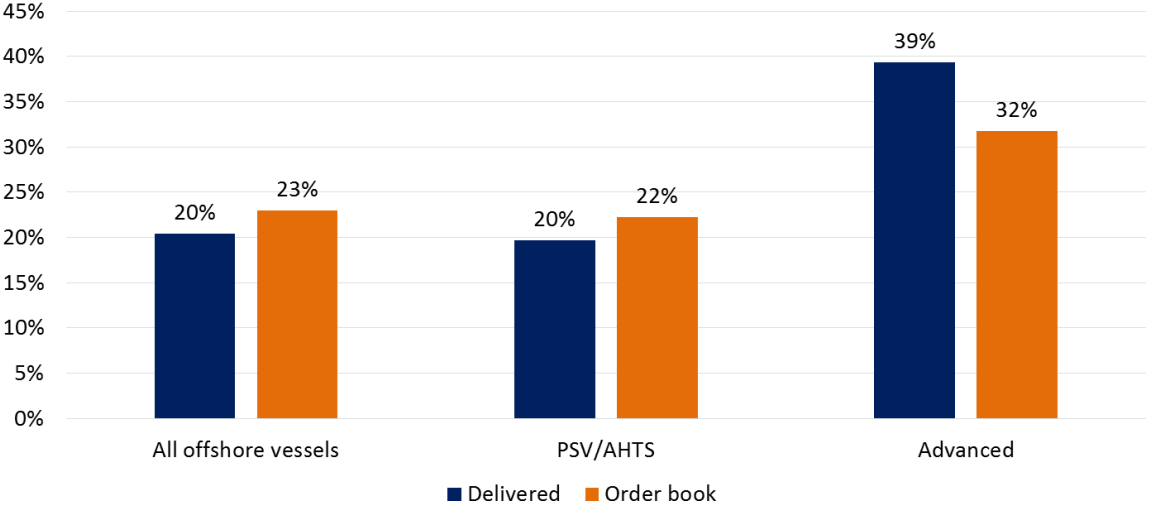
Figure 51: Turnover and profit margin for service providers (left) and designers (right). Source: Menon(2015)



Utilizing the Clarkson worldfleet database, Menon has analyzed the share of the offshore fleet delivered since 2005 with “Møre-design”. With Møre-design we mean design companies with headquarters in the Møre-region. The analysis cover about half the fleet, as a large proportion of the vessels do not specify the design company. Looking at the remaining vessels, show that the design companies in Møre have a substantial part of the global designmarket within offshore vessels. Around 20 percent of the offshore vessels have Møre-design and in the

current order book, this share is increasing to around 23 percent. This is a clear indication that the Møre designers are performing well within this niche market.

Figure 52: Share of delivered offshore vessels with Møre-design (2005-2015) and order book as of August 2015¹². Source: Menon/Clarkson



¹² Close to 50 percent of the offshore fleet does not have information about the design of the vessels. The analysis thereby rests on the remaining vessels with information on design. This creates some uncertainty about the total share, but the change in development should be more independent of this.

6. Concluding remarks

Companies in GCE Blue Maritime experienced a double-digit growth in the recent decade. While much of that growth was fuelled by high oil prices and thus demand for offshore ships, the cluster not merely grew but outperformed both national and international counterparts facing essentially similar market conditions in terms of both productivity and value creation.

Recent changes in the demand side conditions- including falling investments in the offshore oil and gas exploration and production and historically high offshore fleet – as well as the unfavourable cost position and relatively high financial leverage present substantial strategic challenges for the cluster. To reverse the declining profitability and stagnant productivity trends the companies in the cluster may need to revise their strategic positioning as well as improve the operational efficiency.

That said, the offshore market is cyclical meaning that the same factors as those that drag down the cluster's performance in bad times – such as the high share of advanced and expensive ships in the fleet - will contribute to achieving superior returns compared to competitors once the market situation reverses. Furthermore, we should not forget that the cluster has historically demonstrated the capability for strategic transformation through both company and cluster based innovation. The collective knowledge that innovation relies on – carried by firms and research institutions and spread among them through buyer-seller relations, cooperation, informal communication and mobility of people – is strong in the Møre region. In addition, the critical mass that the cluster has gained in the last decade has made it much more robust to adverse shocks than it was ever before.

7. Appenix

7.1. Scope of study

Compared to earlier studies of the cluster mainly conducted by Møreforskning, Menon has made some adjustments that are necessary to compare the cluster with its competitors in Norway and internationally. Menon builds its data on registered company information. We only adjust some variables if there are large discrepancies between data collected through the survey or through interviews. This has some major implications:

- We do not split activities conducted in Møre and in the same companies outside of Møre. For example, we include all yards in the Vard Group, not only yards located in Møre and Romsdal. One exception is Havyard, where we have only included the ship design located in Møre and not the yard activities in Leirvik. We do not differentiate between activities in Norway and internationally either. For example all operating income registered in Norwegian entities for shipping companies is included. Møreforskning has earlier estimated the individual shares of this income and assigned it to the different shipping companies.
- The advantage of this approach is that it enables us to remove an artificial and estimated division between activities conducted in Møre and outside Møre. Seen from a company perspective, the development of the group as a whole is most important, not the stand-alone activities in Møre. The two other major advantages are that our results are based on objective criteria, not survey data that might be misleading; in addition, data need to be comparable in order to evaluate the development in the cluster compared to a national benchmark and international competitors.
- Our analysis rests on a dataset with all Norwegian companies that deliver accounts to Brønnysundsregisteret. For the Møre Cluster, more than 1 000 companies and company departments are included. We have included all maritime companies and departments that have their headquarters in Møre og Romsdal. That also include departments outside of Møre and Romsdal. For companies with headquarters outside the county, we have only included departments that are located in the Møre and Romsdal. As an example, DNV GL is included with their offices in Møre og Romsdal, but offices outside of the county are not included. Vard on the other hand have their head office in the region, and all Norwegian yards are then included.