



Study on Blue Growth and Maritime Policy within the EU North Sea Region and the English Channel

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Annex III E - Sector Analysis - Shipbuilding

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1 Current position of the sector in the region

Shipbuilding is an economic activity that contributes across most of the maritime economic sectors providing them with the vessels necessary to perform their activities. Three main components are identified:

- Shipyards involved in new building activities;
- Repair and maintenance;
- Marine equipment.

1.1 New build vessels

Whereas historically, Northern European shipyards have been active in building all kinds of ships, nowadays, today the majority of commercially used ships (tankers, bulkers, container vessels) is built elsewhere, mainly in Asia (China, Korea, Japan). Yards in the North Sea region as well as other parts of Europe have however been able to maintain a leading position in the higher value vessels, like cruise- and passenger vessels, dredging vessels and offshore vessels. On the other hand with declining demand in the lower value segments, competitors from the Middle-East and Asia are also entering these markets. For instance Mitsubishi Heavy Industry has started to build cruise vessels as well.

The following figure shows the orderbooks by ship type in 2010. For the countries located in the North Sea Basin, it should be noted that the figures presented for Germany, UK and France also include the orders of yards located in other sea basins. Compared with 2011 data the overall volume has declined but at a much slower pace than the overall world order book, showing the lower sensitivity to global market variations.

Table 1.1 Orderbook by Country (January – June 2011)

	Belgium	Denmark	France	Germany	NL	Norway	UK	Total North Sea	World total
No.	1	8	7	37	63	40	14	170	5,550
1,000 GT	1	2	401	1,208	216	163	17	2,008	160,368
1,000 CGT	2	11	389	1,199	317	274	45	2,237	88,674

Source: CESA, Shipbuilding Market Monitoring, N°24

Detailed data on the types of ships built at yards in Northsea countries cannot be derived from central data sources like CESA. However at country level various shipbuilding associations give a picture of the types of vessels being built.

Germany (Northsea and Baltic Sea together) is the largest shipbuilding nation in Europe. In Germany, yards were, more than in other parts of the sea basin, dependent on main freight segments such as container ships, and the decline of the market was felt harder there than elsewhere, with several bankruptcies over the past few years. Of 28 yards operating in 2008, by 2013 eight are liquidated or in the process of liquidation, and most of them were smaller sized yards focused on freight vessels. Some of them may see a new life through acquisition by others. In the summer of 2013 the Chinese company Zhenhua Port Machinery Company (ZPMC) expressed its

intention to invest in the German shipyard JJ Sietas Schiffwerft, which is bankrupt. ZPMC is reportedly interested in the German shipyard for the ship design capabilities of the yard.

A number of yards in Germany have successfully made the shift to the offshore wind segment, for which construction and operating offshore vessels are needed. Also the manufacturing and integration of turbines has been an area in which strategically located yards have shown ability to serve.¹

The largest single yard in Germany is cruise builder In the North Sea Basin shipbuilding industry mainly focuses on the construction of offshore supply vessels and other oil and gas related ships. As described in section 1.1 besides the offshore vessel also dredgers and other sophisticated vessels are built in Western Europe, while bulk carriers and container vessels are build in the Middle East or Asia. Major cruise yard in the North Sea basin, Meyerwerft is also located in Germany. This yard construct the vessels for e.g. AIDA cruises and P&O cruises. Meyerwerft is one of the four specialized cruise yards² worldwide. Also the mega-yacht sector is important for German yards.

In the Netherlands, the share of cargo ships in the total completions over 2012 was small, while the majority (60 out of 95 ships) concerned the “various” category, which includes dredging, offshore, navy and other specialised segments. Another important category is the mega yachts, which cover a high value segment that is growing rapidly and appears less affected by global crisis impacts than the more traditional segments.³ A third important category is the building of inland vessels, logically linked to the inland shipping sector in which the Netherlands is the largest fleet operator in Europe with more than one third of Europe’s operational fleet.⁴

In Belgium, newbuilding activities are virtually absent already for a substantial number of years. French ship newbuilding activities are mainly concentrated in Atlantic rather than Northsea areas.

In the UK, the picture is scattered with still a large number of smaller sized yards active, but overall a limited share in the total newbuild production in Europe.

Norway, finally, is considered the country where the highest quality levels of offshore service vessels can be ordered, naturally a synergy with the oil & gas sector present there (see sector report on oil & gas). Largest ship yard is Aker, which was taken over by Korean-based STX in 2008. The company has yards in Norway as well as Finland, Romania, France, and outside Europe. Its Norwegian facilities were and are still focused on the offshore sector, with products tailored to high value high service requirement markets including Norwegian North Sea oil & gas activities. Early 2013 Italian shipbuilder Fincantieri, well-known for its cruise building activities but active in many other segments, purchased STX OSV, an operating company of STX Europe building vessels for the oil & gas sector.⁵

Apart from the above, in all countries shipyards active in the defence sector can be found, although detailed data on sizes and values are hard to find. It is understood that this specific market is a driver for innovations that after successful implementation can also be transferred to commercial

¹ PwC, 2013, Situation des deutschen Schiffbaus 2013, Presentation to VSM, 3 April 2013.

² Other important cruise yards are STX Europe, Finland, STX France, France and Fincantieri, Italy.

³ Refer also to Ecorys (2013), study on coastal and maritime tourism, for DG MARE

⁴ Data from Scheepsbouw Nederland, www.scheepsbouw.nl

⁵ SEA Europe Shipbuilding Market Monitoring, March 2013.

sectors.⁶ An example is the so-called ‘axe bow’, developed by Damen (NL) initially for naval ships but as it turned out to be reducing the vertical movements of the ship (‘stamping the waves’) by increasing safety and comfort, and meanwhile contributed to 20% savings on fuel consumption, it afterwards found its way to wide application in the offshore sector as well.

1.2 Repair and maintenance

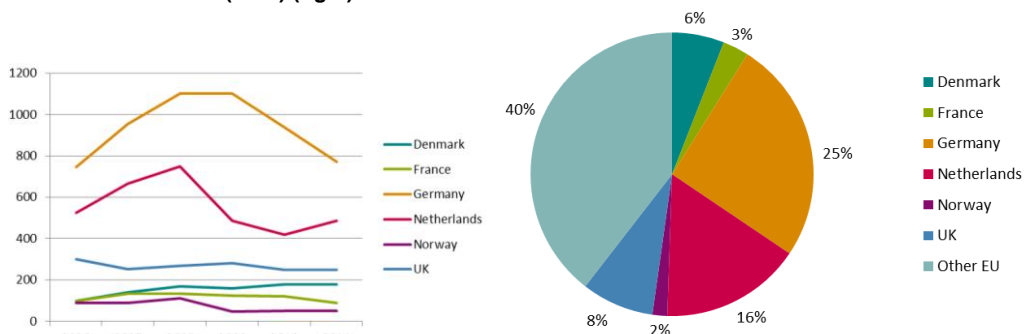
Repair and maintenance is a different type of business, typically involving short term work of between 10 and 12 days for a ship, as opposed to sometimes more than a year in newbuilding. Although sometimes part of the same company, usually yards undertaking repair activities are different ones from those involved in newbuilding, and also at different locations, often closely to main shipping lanes as to minimise the out-of-service time of a ship. This means large ports including those in the North Sea (the Hamburg – Le Havre range) have an advantageous position vis-à-vis repair demands.

Before the crisis of 2008 the repair and maintenance yards in Europe were quite competitive; however since the crisis competition has increased. Especially yards around the North Sea are losing their position to yards located around the Black Sea, due to lower labour costs.

Conversion yards are an intermediate category, in statistics often lumped with repair but in practice having more similarities with new build yards. Since the crisis the orders declined as conversion is an expensive activity. Since the second half of 2010 yards receive some order again and the market is gradually growing again. The competition with yards elsewhere in the world is limited.

Figure 1.1 shows the turnover of the repair, maintenance and conversion yards in the countries located in the North Sea basin. It should be noted that the figures presented for Germany, UK and France also include the orders of yards, not located in the North Sea Basin. Yards in the Netherlands seem to recover after the crisis of 2008, while Germany yards are losing their positions.

Figure 1.1 Turnover of repair, maintenance and conversion yards (2006-2011, in mln Euros) (left) and breakdown of shares within the EU (2011) (right)



Source: CESA annual report 2011-2012, modified by authors.

Although the turnover of repair and conversions yards has declined, the share of the North Sea countries in Europe remains a substantial 55%. (Please note that the figures presented for Germany, UK and France also include the orders of yards located in other sea basins).

⁶ Roks-Maurits, W., 2011, The future of Naval shipbuilding in Europe. Will Joint Product Development solve the problems? MA thesis, Erasmus University.

1.3 Marine equipment

A third and very important segment present in the North Sea basin is the marine equipment manufacturers. This is a very heterogeneous group containing both very small as well as very large companies, and the structure differs per sub segment. The engine manufacturers are large companies that operate worldwide and do not produce marine specific products only. They have offices all over the world, but their headquarters are located in the North Sea region. Examples are Wärtsilä, Rolls Royce and MAN. The engine manufacturers sell their products both to European and Asian yards. The number of marine engine producers is limited and the mentioned European players are considered leaders in class.

Also the providers of marine electronics are large companies that do not only produce equipment for the marine sector. Examples are SAM electronics, Siemens and Imtech. These companies work worldwide, usually have liaison offices in Asian shipbuilding countries, and often have assigned licenses to Asian manufacturers.

Producers of emission reduction devices are often SMEs with only a few products. These companies deliver for clients based regionally mainly, with limited ability to access non-EU markets. Apart from fuel efficiency improvement, the demand for emission control relates to regulatory restriction without offering direct operating advantages to the users. Thus depending on the state of legislation they will have a business or not. Examples are Couple Systems, Germany and Multronic in Belgium, who make after treatment systems, but also Skysails with their fuel-saving kite. For instance the German SME Couple Systems has developed a dry exhaust cleaning device that will reduce the NOx emissions⁷. Also large engine manufacturers are producing exhaust gas cleaners. Wärtsilä will supply the systems for four new container/ ro-ro vessel which will be built in Korea. The system will clean both SOx and PM emissions.

Finally, ballast water treatment systems are receiving increased attention following the increased ratification of the Ballast Water Management Convention, and in the past few years several manufacturers have applied for type-approval of their systems. Examples of recent approvals are BIO-SEA (France) and DESMI Ocean Guard (Denmark).⁸

As for newbuild yards, marine equipment suppliers are also affected by the economic crisis, because less new vessels are built. However as European manufacturers serve a multitude of segments worldwide, they appear more robust to market fluctuations within ship segments.

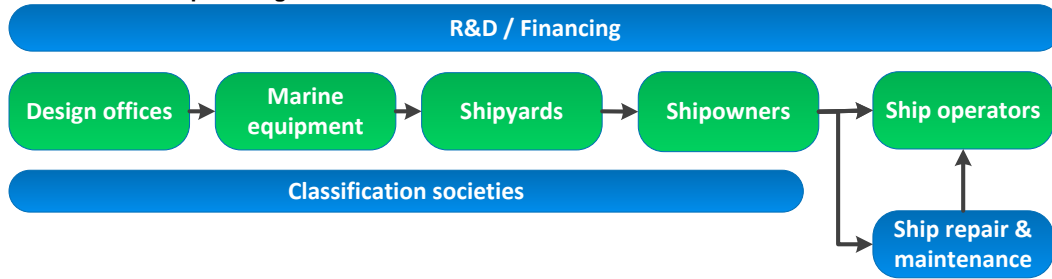
1.4 Value chain

As seen in the following figure, the shipbuilding sector, responsible for the provision of vessels is linked to practically all sectors of the marine economy that make use of vessels.

⁷ <http://couple-systems.de/index.php/start.117.html>

⁸ World Maritime News, 2013.

Figure 1.2 Value chain of Shipbuilding



While marine equipment and design offices are placed ‘upstream’ from shipyards in the value chain, direct interaction with shipowners, the decision-makers in terms of purchase takes place which implies designers and equipment manufacturers try to deal with owners directly instead of being dependent on a yard selecting their services instead of those from others. As North Sea based ship ownership is still quite high (especially in the earlier part of this century with various fiscally attractive financing schemes in place in various countries (NL, GE), close contact is fairly easy being an advantage for the region.

1.5 Economic impact in the region

The following table shows the economic impact of the sector on the region. The figures are exclusive and therefore can be aggregated. The figures presented in the table are derived from statistics based on NACE codes.

Table 1.2 Overview of the economic contribution of the Deep Sea Shipping industry

Economic relevance of deep Sea Shipping								
	Norway	Denmark (Whole)	Germany (N. Sea)	The Netherlands	Belgium	France (N. Sea)	U.K. (N. Sea)	Total
GVA (mln €)	2,909	50	540	609	70	n.a.	1,162	5,340
Employment	26,106	820	10,840	7,700	1,270	n.a.	17,647	64,383

Source: Country Fiches

1.6 Strengths and weaknesses

Main strengths of the shipbuilding and marine equipment sector in the North Sea region are:

- Specialisation in niche markets (cruise, offshore vessels, dredgers) in which regional shipyards are bearing globally recognised brands (STX/Aker, Meyer Werft, IHC, Damen);
- Innovative SMEs and strong position of marine equipment industry also from a global perspective, especially with regard to green technologies (Hamburg manufacturing cluster in particular);
- Strong linkages between yards and marine equipment manufacturers – in the specialised segments longstanding relationships have been built based on trust allowing for joint R&D and innovation and joint market actions;
- Spillovers between defence and commercial segments especially as a playground for innovative technologies – however vulnerable to budget cuts currently implemented in various countries.

Identified weaknesses include:

- High labour cost levels vis-à-vis competitor regions in and outside Europe. Within Europe and even within the North Sea basin competition for skilled labour is felt with Norway being able to offer the highest salaries;
- Vulnerability to raw material prices volatility;
- Access to skilled labour – besides the cost also an overall pressure on availability is felt with reduced interest in blue collar engineering work and competition from other technology sectors such as offshore wind;
- Access to finance: due to the currently weak shipping market, clients have difficulty providing own funds while banks are reluctant. As regular payment schedules are not always aligned with production costs – especially not for equipment manufacturers – competition with Asian yards has intensified (also caused by state guarantee schemes offered);
- Potential difficulties in knowledge protection (especially among SMEs).

2 Potential to achieve measurable Blue Growth outcomes

2.1 Key trends

2.1.1 Market potential dependent on other marine sectors

First of all, shipbuilding development is dependent on the trends in the shipping markets – which as other sector reports within this study show – can be highly diversified. A short summary would include:

- Freight shipping segments facing overcapacity today but still expansion of capacity as an aftermath of the ordering boom from the pre-crisis period. As a result new orders for these segments have reduced to very low levels, implying very little building and equipment demand in the years to come. Another implication is the reduced economic lifetime of ships. Earlier scrapping implies also less maintenance cycles within the lifetime of a ship;
- However as the growth of global shipping activity is expected to continue, demand for port expansion, reclaiming of land, access channels etc. will positively affect demand for dredging and offshore construction vessels;
- The cruise market is still booming and continued growth is expected, in the North Sea as well as elsewhere, resulting in a demand for more ships. However there is also a pressure on the prices cruise operators can charge, and more and more lower-priced markets are tapped into. This may eventually reflect upon the newbuild requirements. Furthermore non-EU yards are trying to enter this market;
- The oil & gas sector is in a declining phase in this part of Europe, so it is not likely that many new ships will be ordered from there. However the skills base of the industry in the North Sea region is so high that demand from other world regions, where the oil & gas sector is prospering (Brazil, Western Africa, potentially the Arctic), will benefit North Sea offshore shipyards in years to come;
- The offshore wind market has taken off rapidly in this part of Europe, and several shipyards have managed to gain foothold in this field, where specialised ships for construction are required as well as increasing numbers of service vessels. Forecasts for this segment are promising⁹;
- Yachts, and in particular mega-yachts, have seen rapid demand increase in the 2000s, and the global crisis has only had a limited impact on the latter, possibly because the wealthy on earth are less vulnerable to economic variations. With upcoming economies seeing increasing numbers of millionaires more demand is likely to emerge;
- The exploratory area of deep sea mining is still in an uncertain stage, but eagerness to investigate has already resulted in industry R&D involvement which may eventually translate into orders, for which North Sea offshore and dredging yards are considered well placed;
- For other marine sectors, the impact of trends on shipbuilding demand is less clear.

⁹ KPMG Advisory (2010), Energy & Natural Resources, Offshore Wind in Europe, 2010 Market Report

2.1.2 Other trends relevant across marine sectors

Apart from these trends within main marine sectors, some other key trends can be identified that affect shipbuilding and marine equipment industries in the North Sea region.

Access to finance

Access to finance is a general problem in shipping and shipbuilding. Especially due to the economic crisis banks are reluctant to finance the construction of new vessels or new shipping companies. The low profitability of existing companies, in combination with the reluctance of banks to provide them with liquidity is responsible for the shrinking of their reserves leading to the need to search for alternative sources of finance¹⁰. With the existing oversupply of vessel capacity, shipping companies are terminating whenever possible the chartering of vessels. The “German-dentist” ship financing model¹¹ which formed the basis for the construction of the world leading German fleet based on private capital is put under threat¹². Also considering port financing, despite the fact that accessing bank financing is still an available option, the sector is expected to face problems in the future regarding its access to finance in view of the most recent developments in the banking sector of Europe. It is therefore expected that the sector will have to consider also alternative sources of financing for the near future¹³. On the other hand the problem is less intense in non-freight sector served by North Sea yards as generally clients have still profitable businesses and deeper pockets.

Under certain conditions the shipbuilding sector may receive governmental support in the form of state guarantees. The European Commission has created three exemptions for the shipbuilding industry that do not disturb the internal market and competition between companies and countries. The newest Framework ends per 31 December 2013. In 2014 the rules will be transferred to more general regulations¹⁴. The three areas for state aid identified are: regional aid¹⁵, innovation aid¹⁶ and export credits¹⁷.

In an attempt to respond to the low availability of bank financing, shipping companies have turned to explore alternative sources schemes to finance their operations. Using company bonds, either in simple structures or more elaborate tailor-made to the needs of each company is becoming a popular method to raise liquidity from private sources. Despite the fact that this financing scheme proves to be more expensive than bank loans, at the current global financial setting it has proven to be a valuable alternative to acquire the funds necessary for operations¹⁸.

Installation of new scrubbers: tension between environmental obligations and financing

The North Sea will be a SECA zone from 2015 onwards. Vessels are only allowed to have 1.5% SOx in their fuel. To realize this, vessels should switch to LSFO (Low Sulphur Fuel Oil), but to realize this the MGO should be forbidden. This would cost Dutch refineries, only, already € 2 bn and would have a major impact on the economic activity. Vessels are still allowed to sail on MGO, and in case they will not switch to LSFO, they have to install wet or dry scrubbers. For large vessels this will be a million investments. Due to

¹⁰ <http://www.nortonrosefulbright.com/knowledge/publications/33057/innovation-in-ship-finance-tapping-the-capital-markets>

¹¹ <http://www.economist.com/node/190277>

¹² <http://www.ft.com/intl/cms/s/0/19dc9da4-7f81-11de-85dc-00144feabdc0.html#axzz2jIA5z2hf>

¹³ http://live.easyfairs.com/fileadmin/groups/8/Shop_2012/Day_1_12.10_Berend_Paasman_pdf.pdf

¹⁴ The provisions on innovation aid will be included in the future Framework for State aid for research and development. The provisions on regional aid will be included in the revised Regional Aid Guidelines.

¹⁵ State aid is allowed if the investment is used for upgrading or modernizing existing yards and is not used to restructure the yard financially.

¹⁶ Aid for innovation in existing shipbuilding, ship repair or ship conversion yards is justified, provided that it relates to the industrial application of innovative products and processes.

¹⁷ Ship owners may be granted state-supported credit facilities for new buildings or vessel conversions.

¹⁸ <http://www.nortonrosefulbright.com/knowledge/publications/33057/innovation-in-ship-finance-tapping-the-capital-markets>

low freight prizes shipping companies have no reserves left to invest in these scrubbers, while the banks are reluctant to invest in them, due to high technical risks.¹⁹

Environmental regulations

During the last years the focus on the environmental performance of shipping has increased. **Regulations** related to ship emissions, both into air and water, have become stricter. Main source of environmental regulation is the IMO, more specifically the IMO convention MARPOL (International Convention on the Prevention of Pollution from Ships) and the Ballast Water Convention. Based on the MARPOL Convention it is possible to introduce special areas where stricter rules may apply relating to specific kinds of pollution. The North Sea as well as the English Channel and the Baltic Sea, are designated as Emission Control Zones for sulphur (SECAs). This means that vessels sailing in these waters are meant to burn fuel with low sulphur content (less than 1%). As from January 1st 2015, the sulphur content allowed for sailing in these waters will drop to 0,1%. Compliance with the new emission regulations can be met in 3 ways:

- i) installing scrubbers;
- ii) using Low Sulphur Marine Gas Oil (LSMGO); or
- iii) using LNG as fuel. The latter seems to be an economical viable solution only for new-build vessels.

Each solution seems to have individual positive and negative points and it is not yet clear which one of the 3 the final industry response will be.²⁰ In any case these regulations are seen as opportunities for manufacturers to sell their more advanced maritime equipment, and North Sea based suppliers have a strong position in the various green technologies identified. It is noted that suppliers from the region also serve regulatory driven demand from other areas.

Box: Wartsila Receives Repeat Order for Emissions Control Products

Wärtsilä, the marine industry's leading solutions and services provider, has re-ceived a repeat order to provide a hybrid exhaust gas cleaning and SCR system. The contract was signed in December 2012.

The systems provide universal compliance with sulphur limits including the North American ECA, the 2015 0.1 per cent ECA in Europe, the worldwide 0.5 per cent sulphur limit from 2020 and Tier III IMO NOx limits from 2016. The hybrid exhaust gas cleaning system also enables the choice between open-loop and closed-loop scrubbing to be made at any time, maximising control. This means that exhaust gas cleaning using only seawater can be enabled at sea but while manoeuvring or in port the system can be closed, re-circulating the water already within the scrubber. In addition, the SCR system, which is integrated into the engine down-stream of the exhaust gas turbine, will remove up to 95 per cent of NOx from the vessel's emissions.

Source: World maritime news - January 15, 2013. In: SEA Europe Shipbuilding Market Monitoring, March 2013.

Retrofitting vessels to achieve fuel efficiency and meet regulations can create additional work for repair & maintenance yards, most likely for ships operated regionally.

R&D cooperation models and innovation

The shipbuilding industry has a history of sector-wide coordinated action in research as well as marketing. Relevant examples are the creation of the working group of European maintenance, repair and conversion yards and the Dutch program "integraal samenwerken" aiming in strengthening Dutch shipbuilding.

¹⁹ 'Duitse werven nog steeds in zwaar weer', SWZ/Maritime, May 2013

²⁰ Chatzitoliou K., Environmental compliance & Liabilities, Bureau Veritas, 2nd European Ports & Shipping Conference (2013)

Dedicated working group established to promote the European maintenance, repair and conversion yards.

To strengthen the position of European maintenance, repair and conversion yards the umbrella organisation for ship related companies, SEA group, has established the dedicated working group SMRC (Ship Maintenance Repair Conversion). Companies involved in the working group have formulated ambitions aimed at improving the image and position of European repair yards. Main aims are: profile of the industry, improve awareness of activities performed by repair yards and improve lobby in Brussels. New European regulation can improve the new orders and improve the competitive position of these yards.²¹

Dutch program 'Integraal samenwerken' aims to improve competitive position of the Dutch shipbuilding industry.

In the Netherlands the program 'Integraal samenwerken' is launched. Not only ship yards, but also marine equipment suppliers and knowledge institutes are cooperating together intensively to improve the competitive position of the Dutch maritime industry. Main way to improve the competitive position is to be innovative. The combination of partners involved in the program ensures innovative ideas and concepts. Partners are, e.g. MARIN, TU Delft, Damen, Alewijnse and Cofely.²²

The main players in marine equipment construction are located in the North Sea Basin and are working on innovative ideas to reduce the environmental impacts done of vessels.

Intensified cooperation between European and Asian Marine equipment manufacturers

Hyundia Heavy Industry (HHI), has received type test approval for two ultra-long stroke marine engines. The engines are under licence with MAN diesel & Turbo. Both engines are a G-type marine engine and are able to save 7% of fuel and therefore reduce emissions with about 7% compared to engines with the same output. It is calculated that the engines will save the owner between \$ 1.3 and 2.9 million dollar.

Moreover initiatives like the Clean Shipping Index²³, which is an index created to measure the environmental performance of vessels, attempt to raise awareness over the environmental performance of vessels used for the logistic operations of multinational companies with the aim of convincing larger enterprises to use only the most environmental friendly vessels as part of their Corporate Social Responsibility policy.

Exploring new markets beyond 'traditional' ships

An example of the exploration and exploitation of synergies to be found with other maritime sectors can be found in the behaviour of shipyards. German shipyards have already started specialising in the production of platforms and foundations. E.g. TKMS and SIAG to cover the ground lost to Asian vessel constructors.

Ferries invest in hybrid power by installing batteries

Scandlines invested in a new hybrid power system for one of its ferries, Prinsesse Benedikte. Batteries are installed and hereby replace one of the original diesel driven gensets. The vessel can operate on full electric propulsion when manoeuvring and to berth in port. Depending on the conditions the vessel uses either one genset plus batteries or the batteries only. It is estimated that the remaining life of the diesel drivelines is extended up to three times.²⁴

²¹ 'Reparatie en ombouw: andere take van sport'. Maganize Scheepsbouw Nederland, September 2013

²² Integraal samenwerken, September 2013

²³ <http://www.cleanshippingindex.com/>.

²⁴ 'Electric choice sparks community benefit', Marine propulsion & auxiliary machinery, August/September 2013

2.2 Drivers and barriers for growth

Table 2.1 Strengths and weaknesses analysis of the most promising economic activity

	Drivers for Growth		Barriers for Growth	
	From SWOT analysis	from Benchmark analysis	from SWOT analysis	from Benchmark analysis
Aftermath of the financial crisis	Cooperation of shipping companies	Pursuing energy efficiency Vessel-pooling Exploitation of alternative financing options	Overcapacity – lower rates – threatened viability of sector	Difficulty accessing bank finance Loss-making rates in the Europe-Asia route
Development and innovation	N. Sea tops innovation on maritime equipment	Dutch program 'Integraal samenwerken'		
Access to finance (shipbuilding)			Banks are reluctant to finance + State aid framework for shipbuilding will end.	
New markets (Offshore wind)	European yards can be used to construct platforms etc.	TKVM and SIAG in Germany		Asian yards also start to build offshore vessels (against lower cost)
Maritime clusters	Strong concentration of ports of global importance in the Hamburg-Le Havre range	SMRC working group to focus on profiling repair yards		
Stricter environmental regulation	Marine equipment active in developing equipment compliant with upcoming rules	Exhaust gas cleaners: Wärtsilä Couple Systems: dry exhaust cleaning device	Inability of shipping companies to comply adequately with a good portion of their fleet	
Cruise shipping growth	Increased focus on environmental performance, equipment manufacturers can benefit	Princesse Benedikte	Asian yards start to build cruise vessels	Mitsubishi Heavy Industry started to build vessel in 2013
Environmental regulations and energy efficiency	Alternative fuels and maritime equipment (scrubbers)	Slow-steaming		Introduction of ECAs

Table 2.2 Key impacts on the sector

Type	Key impacts	Extent of impact
<i>Economic</i>		
Competitiveness, trade and investment flows	DSS sector competitiveness has a high impact on EU competitiveness as it affects all export and import value chains. The impact of the shipbuilding industry is limited, only in niche markets, e.g. offshore and cruise, the industry has an impact. The marine equipment supply industry is very competitive and European is leading, however Asian companies are catching up.	High
Operating costs and conduct of business/Small	The limited access to finance is hampering	High

Type	Key impacts	Extent of impact
and Medium Enterprises	both the development of shipbuilding and marine equipment.	
Innovation and research	<p>Organisational innovation is high with horizontal and vertical cooperation between actors of the shipbuilding value chain being a strong case.</p> <p>The marine equipment sector is highly innovative. This is also stimulated by the upcoming environmental restrictions. The shipbuilding industry tries to improve the level of innovation through close cooperation with the marine equipment industry and knowledge centres.</p>	Medium
<i>Social</i>		
Employment and labour markets	<p>Especially the marine equipment sector is looking for high skilled workers. Often heard compliant is that not enough skilled workers are available.</p> <p>On the other hand competition in the shipbuilding sector is fierce and European yards are struggling. It is unlikely that employment will grow. The marine equipment industry has a growth potential and this will probably influence the growth in employment positively.</p> <p>Overall the demand for labour will decrease.</p>	Limited
Access to educational systems	Industry is well-connected to main education centres especially on the technical side.	Limited
<i>Environmental</i>		
Impact on climate	The focus of shipbuilding and the marine equipment industry is on improving the environmental performance of their products.	Medium

3 Growth scenarios for the future

3.1 Description of the nature of the economic activity and value chain

The shipbuilding sector consists of two major economic activities: the construction and maintenance of ships at yards and the supply of marine equipment. In the North Sea as well as elsewhere in Europe, yards are facing fierce competition from Asian competitor yards, and are trying to stay competitive these yards focus on high value niche markets, e.g. cruise vessels (Meyer Werft), dredgers (IHC) and offshore vessels (STX Norway, Damen, SBM Offshore). The North Sea based marine equipment industry is considered world leading with a strong focus on green technologies (fuel efficient engines, after treatment systems and alternative powering systems). They export worldwide and most of the larger ones (M.A.N., Wärtsilä, Rolls Royce) have subsidiaries in Asian shipbuilding countries. However implementation of innovative green marine equipment is facing slow processes, with ship owners the final decision-makers and classification societies not easily approving new technologies.

3.2 Potential development: Description of economic and infrastructural scenario

While overcapacity in main shipping segments slows down the potential for ship yards, large growth potential is still seen for the marine equipment sector. The increased focus on fuel efficiency reduced operating costs and 'green' performance of ships, the demand for energy efficient engines or alternative powering systems is very positive. In addition, suppliers in the North Sea region are well equipped to provide the equipment needed to stricter upcoming environmental rules. However the uncertainty regarding this introduction is problematic for, especially, the smaller suppliers, as their current market size is limited and ship owners are not willing to invest in their expensive equipment before new rules are clearly in place. These companies might be bankrupt before the introductions of the new regulations.

Apart from these, North Sea based shipyards building for growing specialised niche sectors (offshore wind in particular) will be able to grow along with these sectors.

3.3 Factors decisive for growth (drivers/barriers)

For the three core segments that North Sea based shipyards are serving, key drivers are:

- Offshore: the oil & gas sector moving towards exploration and production in deeper waters and more harsh marine conditions (e.g. Arctic). The offshore wind sector booming (see section 3.2) and requiring offshore technology and services especially in the construction phase;
- Dredging: continued need for coastal protection (see section 3.8), combined with the expansion to other world regions where North Sea expertise is called upon, along with the requirement for this sector to serve other markets (again offshore wind but also ports development, tourism and eventually deep sea mining);
- Cruise: seeing a double-digit growth in past years and an ambition to raise the importance of the North Sea region (see section 3.7), continued demand for cruise ship capacity is expected, although facing non-EU competitors challenging Europe's lead position.

In addition, key drivers potentially benefiting North Sea based equipment manufacturers relate to main greening trends observed, in particular:

- Global demand for more fuel efficient ships, driven both by market factors (high fuel prices) and regulatory trends (EEDI);
- Specific emission regulations in place for European waters (North Sea and Baltic in particular), resulting in a demand for LNG propulsion as well as after treatment technologies, area in which North Sea based manufacturers have a leading position.

3.4 Uncertainties: external drivers and requirements

The main uncertainties are related to:

- Market development: the shipping market is highly volatile and historically shipbuilding has seen a 'pig cycle' with a lag time causing overcapacity to have risen even after the global crisis started;
- Regulatory uncertainty: ship owners tend to wait responding to regulations until very high levels of certainty are in place, resulting in very low demand for green technologies even now less than 14 months to implementation of the North Sea SECA is in place. Furthermore the perceived risks by ship-owners of new technologies that are not yet proven prevents the quick uptake of newly developed technologies.

3.5 Synergies and tensions: potential environmental consequences and spill-over impacts to other sectors

Possible synergies can be found with the offshore (oil and gas but also wind) industry. Especially the rapid growth of the wind sector has provided positive spin-off for regional suppliers and yards, who could offer their oil & gas expertise to this sector. Also the growing demand for cruise tourism provides synergies. The greening trend is a cross-cutting synergy that shipyards and suppliers provide to all marine sectors.

3.6 Framework conditions: regulatory environment of the economic activity

Most influencing regulations are the IMO Conventions: MARPOL (on emissions) and the Ballast Water Convention. Based on the MARPOL Convention the North Sea and English Channel are appointed as a SECA zone by 2015. To comply with these rules vessels need new marine equipment and the suppliers in the North Sea Basin have developed the equipment needed.

From a financing perspective rules regarding State Aid for shipbuilding are important. The rules related to regional aid, innovation aid and export credits will no longer be part of a dedicated state aid framework for shipping, but of general regulations. Under the current State Aid Framework several countries, e.g. The Netherlands, Germany and France, have introduced national guarantee schemes, which ensure loans to shipyards in order to construct new vessels in the pre-delivery phase.

4 Joint actions leading to growth and jobs

Three areas of action are identified:

- Research & production cooperation;
- Access to finance;
- Regulatory certainty.

Research and production cooperation

In the North Sea based shipbuilding and marine equipment industry, collaboration models are already well developed, mostly at a national scale though or at an EU level. Cross-border cooperation at regional level could contribute to serving larger shares of sea basin markets like the offshore wind sector, and existing cluster support tools may suit this aim. An example in place is the RoBoship project involving 24 partners from Germany and the Netherlands.

RoboShip

The shipping industry is extremely competitive. European shipyards can only stay ahead of the international competition by specialization in building ships with a high added value. An example is the cruise ships built by the Meyer wharf in Papenburg. However, staying competitive, the shipyards will have to lower their production costs even further. This can be achieved by standardizing components, processes and design, and by an increasing automation of the production process.

Despite all the recent innovation in the shipbuilding industry there are still many manual processes. An example is processes in ballast water tanks, such as welding, welding inspection, cleaning, coating and inspection. BWTs are used to stabilize a ship. They are constructed in a way (i.e. narrow, complex) that makes access for both people and robots very difficult.

The purpose of RoboShip is to develop an intelligent multi-sensor robot system for the inspection and maintenance of ballast water tanks in ships such as the cruise ships built at the Meyer wharf in Papenburg.

Partners include INCAS3, Meyer Werft, Universität Twente, Universität Groningen, Xsens, Imotec, Hochschule Osnabrück, Amazone Werke, DLV Plant, Grimme, Universität Wageningen, Tyker Technology, B. Strautmann und Söhne, Productschap Akkerbouw

Source: <http://robotik.dfki-bremen.de/en/research/projects/smartbot-1.html>

Access to finance

A second field of joint actions relates to finance access, which is limited and hampers owners to invest or yards to acquire working capital. The revised aid regime will already address this. Further action may be to pursue the sector-initiated company bonds method, which although more costly may take away some of the funding bottlenecks.

Regulatory certainty

As argued North Sea based manufacturers are well placed to serve the environmental regulations driven demand for clean technologies. However regulatory uncertainty – including slow ratification processes of IMO conventions but also North Sea governments signals following pressure from other marine sectors – lead to postponement of investments. The EU's voice in international forums like IMO as well as its exchange with Member States could be an action to support this need.

5 Conclusions

The shipbuilding and marine equipment industry located in the North Sea region is considered of high standing with globally recognised brands and delivering products especially to markets where highest quality standards are required (oil & gas, offshore, dredging) or high complexities (cruise). Furthermore equipment manufacturers operate worldwide and make use of synergies with non-marine sectors as well (e.g. automotive). The export potential of yards is good as well and in the said fields the region is considered best-of-class supplier world wide.

These strengths have caused the North Sea based industry to be less affected by the global shipbuilding crisis than other parts of the world, although still a number of yards went bankrupt and especially SME manufacturing firms are struggling to survive.

The promising outlook for a number of marine sectors (offshore wind, cruise, marine construction) along with regulatory and cost drivers calling for green and efficient technologies provide a good basis for growth of the sector. As however other shipbuilding regions are also trying to enter these segments now that their other markets are low, continuous innovation and progress is needed to stay ahead of the herd.

Uncertainties relate to access to finance as well as regulatory implementation, which would negatively affect the potential for the region.



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