



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

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Annex III D - Sector Analysis - Deep Sea Shipping

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# 1 Maritime actions of the sector in the region

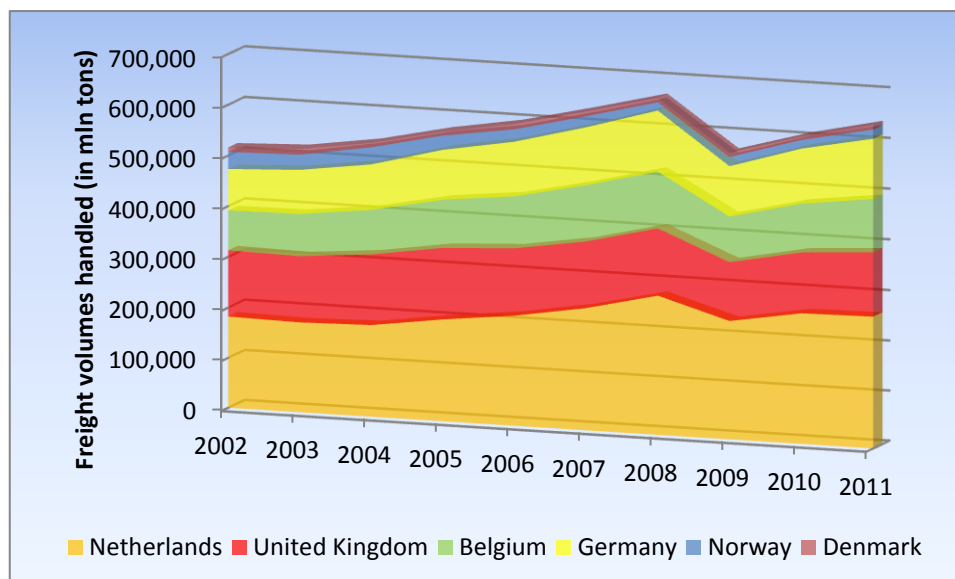
Deep Sea Shipping (DSS) can be defined as: “the *international (freight) transport by sea with large vessels that often sail fixed routes containers, major bulk) or tramp shipping*”<sup>1</sup>

For the countries bordering the North Sea and English Channel basin deep-sea shipping forms a significant maritime activity. An important contributor to this is the Le Havre – Hamburg port range (located mainly in the North Sea and English Channel basin), which includes some of the biggest ports in Europe and the world. The ports of the North Range, located in a range of about 500km along the south coast of the North Sea and the English Channel, serve the hinterland of Germany, The Netherlands, Belgium, France and that of other European countries, eventually comprising a market of more than 350 mln people. More than 50% of the cargo volumes handled there have an extra-EU origin while the ports of the area serve as transshipment hubs between Deep-Sea and Short-Sea services.<sup>2</sup>

## 1.1 Performance of the deep sea shipping sector

In 2011, the ports of the countries (United Kingdom, Belgium, Netherlands, Germany, Denmark and Norway) bordering the North Sea basin handled a total of more than 648 million deep-sea tons. It should be noted that despite the sudden slump of international trade volumes following the 2008 crisis outbreak. Deep sea shipping has managed to bounce back to pre-crisis levels achieving even a 25% increase in freight volumes handled since 2002.

Figure 1-1 Deep sea cargo handled by North Sea countries' ports (in mln tons)



Source: Eurostat; database mar\_sg\_am\_cw

At a European level, the North Sea basin holds a 38% share of all EU maritime cargo<sup>3</sup> but when it comes to deep-sea-going cargo in specific, North Sea ports handle as much as 57% (Figure 1-2) of

<sup>1</sup> Ecorys, Blue Growth, final report (2012)

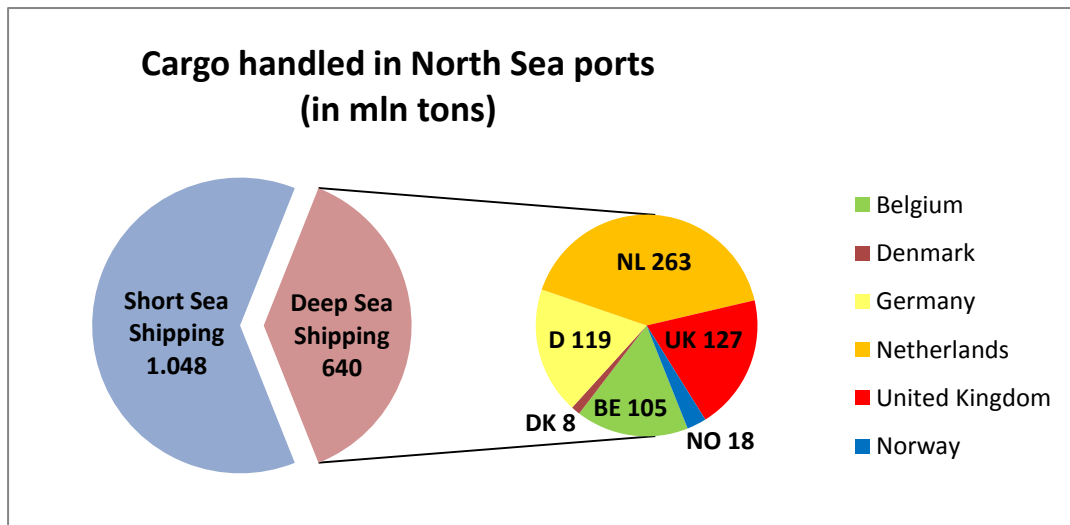
<sup>2</sup> Maatsch and Tasto, Hamburg-Le Havre Range topped 40 million TEU in 2011, ISL (2012)

<sup>3</sup> Eurostat database (mar\_go\_aa)

all deep-sea cargo arriving or departing from European ports making the North Sea effectively the main gateway for EU international trade. The increasing globalisation of trade and the specialisation of North Sea ports in receiving deep sea going vessels have also strengthened the position of deep sea shipping within the North Sea ports as the share of deep sea cargo in North Sea ports raised within the last decade from 34 to 38% of all cargo handled.

Most of the deep-sea trade in the region goes through The Netherlands which accounts for as much as 41% of the total deep sea cargo volumes of the sea basin. Belgium, Germany and the United Kingdom follow with about 15 to 20% each.

Figure 1-2 Cargo handled in North Sea ports by service type and country (2011)<sup>4</sup>



Source: Eurostat; database mar\_sg\_am\_cw

## 1.2 Value chain

Deep Sea Shipping itself is part of the value chain of many other sectors. Essentially all goods that are transported overseas, or make use of raw materials transported overseas, use this sector as part of their value chain. DSS has a role in the value chain of commodities either as a means of transport for raw material, or for delivery of intermediate and or final products.

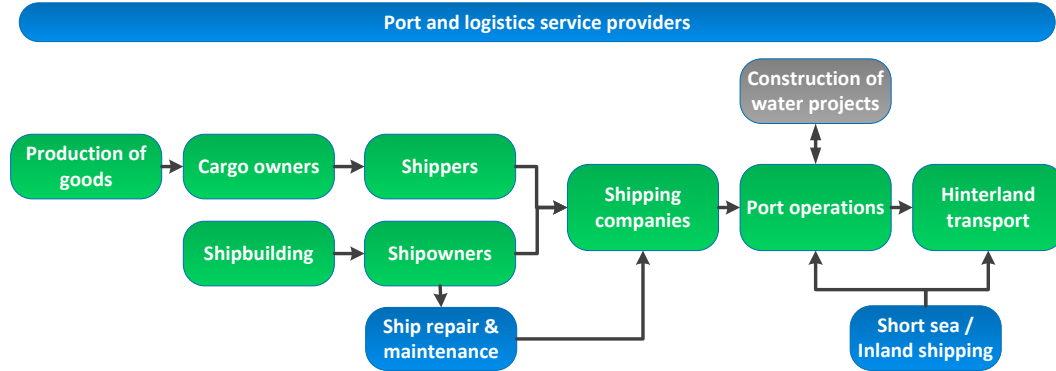
Due to the geographical nature of transport, it is not only individual actors of the DSS value chain that compete among each other, but the North Sea route supply chain as a whole is facing competition from alternative routes for cargo. Should the North Sea supply chain for instance come across straggling ports, increasing congestion in hinterland transport bottleneck or inability to provide adequate ship repairing services, then the competitive position of the whole supply chain is weakened to competition. On the other hand, strong actors connected to the North Sea supply chain may reinforce the competitiveness of the whole supply chain and encourage further development.

Moreover, the use of the same pool of resources makes it hard, if not impossible to completely separate the value chain of DSS from that of other marine economic sectors. For instance, the DSS sector as well as the Short Sea Shipping (SSS), the inland shipping and the passenger transport sector, make partial use of the same, or closely linked infrastructure, for the provision of which they

<sup>4</sup> Germany Denmark and United Kingdom data include also non-North Sea ports

relay on the output of the water projects construction sector. The main principle is that the value chain of the DSS consists of two interacting branches. One related to the provision of vessels (means of transport) and one related to the provision of products (targets of transport). As seen in the following figure, the shipbuilding sector, responsible for the provision of vessels is linked not only to the DSS sector but to, practically, all sectors of the marine economy that make use of vessels.

Figure 1-3 Value chain of Deep Sea Shipping



Cargo owners are the party owning the products that are transported. They indicate the start and end point of the cargo transport route thus putting into place the supply and demand for DSS at a higher level. Nevertheless they have no direct influence on the way shipping routes are drawn and the ports of call for vessels.

Freight forwarders form the connector link between cargo owners and ship operators. Usually they own neither the cargo nor the vessel, however, they hold the capability of drawing the link between he two. Depending on their scope they act either as agents for the cargo owners, or the shipping companies, or even for both matching transport demand with supply.

Moving downwards the value chain, we encounter a highly competitive, oligopolistic structure of shipping companies. Especially when container transport is concerned, this segment of the value chain is dominated by a handful of European and East-Asian companies that operate on global shipping routes. These actors are the ones to decide how the shipping network will look like canalising global cargo flows through their shipping network. They operate cargo vessels that may be their own or may be used on a long-term lease. They are probably the most powerful player in the DSS value chain as they are centrally located in the chain of actors and with their decisions they apply pressure to all other segments of the market (i.e. if shipping companies decide to operate larger vessels, port operators are probably forced to deepen their terminals to accommodate them). Moreover, it is sometimes the same companies that operate feeder lines to supplement their DSS activities and doing so they totally formulate the shipping network.

**Table 1-1 List of top 10 terminal operators in the world**

**Top 10 global/international terminal operators' equity based throughput, 2012**

Ranking	Operator	Million TEU	% share of world throughput
1	PSA International	50.9	8.2%
2	Hutchison Port Holdings	44.8	7.2%
3	APM Terminals	33.7	5.4%
4	DP World	33.4	5.4%
5	COSCO Group	17.0	2.7%
6	Terminal Investment Limited (TIL)	13.5	2.2%
7	China Shipping Terminal Development	8.6	1.4%
8	Hanjin	7.8	1.3%
9	Evergreen	7.5	1.2%
10	Eurogate	6.5	1.0%

Source: Drewry Maritime Research

Notes:

1. Unless stated otherwise figures include total annual throughput for all terminals in which shareholdings held as at 31st Dec 2012, adjusted according to the extent of equity held in each terminal
2. Figures do not include stevedoring operations at common user terminals and also exclude barge/river terminals
3. COSCO Group includes COSCO Pacific and COSCO Container Line
4. PSA and HPH figures have been adjusted to account for PSA's 20% shareholding in HPH
5. Hutchison figures include HPH Trust volumes
6. Some figures are estimated

Next part of the DSS value chain consists of port operations, this part being in close interaction with the relevant part in the SSS and the hinterland transport value chain. Port and terminal operations can be conducted either by public authorities or private companies. At this part of the value chain, there are 4 major global terminal operators (PSA International, Hutchison Port Holdings, APM Terminals and DP World) accounting for more than 5% of the global cargo throughput each<sup>5</sup>.

In the North Sea region, this concentration is seen similarly. Hutchison Port Holdings operates terminals at the ports of Rotterdam, Amsterdam, Felixstowe and, Thamesport. The PSA Group operates terminals in Yarmouth, UK, Antwerp and Zeebrugge while planning to expand to the port of Flushing. DP world is present in the ports of Antwerp, Tilbury and the London Gateway, while it will be participating in the operation of the Rotterdam World Gateway. Finally, APM Terminals has established operations in the ports of Rotterdam, Bremerhaven, Zeebrugge, Wilhelmshaven and Dunkirk<sup>6</sup>. Also, international container carriers that operate in the region have acquired interests in container terminals in the region. The list here includes MSC, CAM CGM, NYK, CKYH, Zim, HMM, APL, Evergreen and others. These carrier companies have expanded their operations into terminal operations attempting to find synergies through vertical integration of the value chain and by operating their own separate terminals.

Finally, port operations set the demand side for construction of port related projects and provide cargo for the operations of hinterland transport. The latter has been facing the challenge to cope with the raising cargo volumes provided by the increase in global trade.

<sup>5</sup> <http://www.drewry.co.uk/news.php?id=232>

<sup>6</sup> OSC, North European containerport markets to 2020, (2009)



### 1.3 Main sector actors

The North Sea ports, especially those located in the Hamburg- Le Havre range can be seen as the gateway to Europe for international trade. Four of the region's ports (Rotterdam, Hamburg, Antwerp and Bremerhaven) made it to the top 30 of container ports for 2012<sup>7</sup> handling upwards of 4mln TEU each. This strong concentration of port activity in the region is supplemented by the secondary ports of Zeebrugge, Felixstowe, Amsterdam and Immingham (with the two latter specialised in bulk cargo) that supplement the strong port cluster of the region. Moreover, additional ports handling considerable cargo volumes are located just adjacent to the area in the scope of this study, like the ports of Southampton and Le Havre and strengthen further the port cluster of the North Sea.

The ports of the North Sea are selected as ports-of-call by shipping companies due to their competitive port infrastructure and good connections to their hinterland region.

Regarding the shipping companies in the sector, a clear distinction has to be made between bulk and container freight. In the bulk segment (liquid and dry bulk cargoes account for about 70% of the volume), the market is quite fragmented. The container segment is mostly consolidated by larger mainline carriers like Maersk, MSC and CMA CGM while some smaller players like Unifeeder and Seago are also active<sup>8</sup>.

An interesting aspect of the sector is the variety of alternative port management structures and ownership models. While initially, most ports used to be operated as a service ports (state-owned), currently a number of the region's most important ports are, or have been, through a transition phase to new port models (mainly including private operators). An example of this is transition is the port of Amsterdam currently on debate regarding the privatisation process<sup>9</sup>. Currently the model applied to the most important of the region's ports (Rotterdam, Hamburg, Antwerp etc.) is that of the Landlord port, where port authorities own only the basic infrastructure and lease it out to operators. These concessions are mostly on long-term contracts and private companies perform port operations. An intermediate stage was that of the Tool port model, which was adopted by the French 'ports autonomes' prior to the French port reform, in which the port authority owned and leased to operators both infrastructure and superstructure. Finally there is a small number of fully privatised ports, mainly in the United Kingdom where port land, infrastructure and superstructure are privately owned and managed<sup>10</sup>. The private sector operates 15 of the 20 largest ports in the UK by tonnage and around two-thirds of the UK's port traffic.

Regarding container terminals, as mentioned earlier, the attempt to vertically integrate the supply chain and establish hub-ports in strategic locations has prompted shipping companies to take shares in new terminal developments in the region. This was initially an attempt to secure deep-sea container handling capacity when some ports run into capacity problems. According research by the Ocean Shipping consultants (OSC), container carrier companies and global terminal operators were operating, in the North Sea region, as of 2009 container terminals with an overall capacity of nearly 68mln TEU<sup>11</sup>. Those terminals were either operated either exclusively by the terminal operators or in cooperation with the container carrier companies.

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<sup>7</sup> Container Market 2011/12, Drewry (2012)

<sup>8</sup> Ecorys, Blue Growth, final report, Deep Sea Shipping profile (2012)

<sup>9</sup> Egbertsen, J., Ports are changing, Port of Amsterdam, 2<sup>nd</sup> European Ports and Shipping Conference (2013)

<sup>10</sup> Katsarova I., Liberalisation of EU port services: issues and consequences for dock workers, Library Briefing, Library of the European Parliament (2013)

<sup>11</sup> OSC, North European containerport markets to 2020, (2009)

Transshipment from the main global shipping lines to feeder services is handled mainly by the larger hub-ports of the region. In the 90's these ports were mainly Hamburg, Bremerhaven, Rotterdam and Felixstowe. However capacity constraints in the early 2000's in the latter led to the rise of the importance of Antwerp as a transshipment port. In the meanwhile, the increasing trade volumes destined for the Baltic Sea region has boosted the importance of Hamburg and Bremerhaven as major transshipment ports.

## 1.4 Economic impact in the region

The following table shows the economic impact of both sectors on the region. The figures are exclusive and therefore can be aggregated. It should be noted that the figures for shipbuilding do not only include the construction of deep-sea vessels, but also the construction of the more sophisticated vessel, e.g. offshore vessels and cruise vessels. The figures presented in the table are derived from statistics based on NACE codes. As The Netherlands and Belgium have only a limited number of DSS vessels registered under their flags, in these countries, the DSS sector appears to be underperforming in matters of GVA and employment creation compared to countries with larger commercial fleets, such as Germany, the UK and Norway.

**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
<b>GVA (mln €)</b>	5,065	100	3,150	914	547	263	1,039	<b>11,078</b>
<b>Employment</b>	16,454	1,040	19,690	6,900	3,306	2,635	9,543	<b>59,568</b>

Source: Country Fiches

However, the impacts of the DSS sector for the North Sea region are not limited to the simple reporting of GVA and employment creation. It is important to also take into account the type of jobs created by the DSS activities. Due to the geographical nature of transport, the jobs created, as well as the relevant GVA born, have a strong local connection. This makes the jobs less volatile and probable to move to other parts of the world as they are certainly not offshorable, while the sector is resilient to crises of other specific sectors. Naturally the sector gets influenced by global crises that deliver a hit to the whole of the economy, as that of 2009; however, this is however also the case for nearly all industries. Finally, it should also be mentioned that the jobs created by the DSS sector are not related to a specific segment of the labour force. Port operations create both low- and high-end jobs, spreading welfare more equally between social strata and eventually leading to a higher added value for society as a whole.

Additionally, the existence of a strong logistics sector, a vital part of which is the ports segment, functions as a booster for the whole of the supply chain of all relevant industries. It should be therefore noted that the further strengthening of the competitiveness of the DSS sector for the North Sea region, causes, beyond the direct job and GVA creation, also an indirect one, through the strengthening of the value chain and competitiveness of other industry sectors.

Finally, the existence of the Hamburg – Le Havre range ports as a deep sea transport cluster causes a high environmental burden for the region with the large numbers of vessels sailing in the North Sea and the creation of large hinterland flows of cargo. To Europe as a whole however, the existence of this transport hub in the Northern Sea region might even be considered to act



positively for the environment. This is because of the creation of economies of scale in freight transport by consolidating transport flows creating a hub-and-spoke-like transport network which eventually leads to decrease in the overall emissions per shipment. This is a trade-off between local and regional/global environmental burden. Nevertheless, this results in the region of the North Sea facing a disproportional environmental burdened, the alleviation of which is aimed with the introduction of the emission control zones for the North Sea, an issue further elaborated In the next chapter<sup>12</sup>.

### Strengths and weaknesses

Main strengths of the North Sea deep sea shipping sector, including the ports and landside services associated, are the following:

- Large volume of operations providing economies of scale that have brought the region a competitive advantage vis-à-vis other parts of Europe. The well-established position of the ports of the region in the European context, as well as their early investment into building adequate infrastructures has made the North Sea port cluster an important node for global trade;
- Highly integrated services network both on the marine side (shortsea and feeder services to regional ports within the sea basin as well as other parts of Europe – Baltic in particular). The good infrastructural connection of the ports of the region to the European transport network has made possible to extend their hinterland also to regions that are closer to other port ranges (i.e. Alpine region);
- The geographical position of the North Sea, with the existence of a strong economically region in the immediate hinterland, (Northern Germany, The Netherlands, Belgium, Northern France, The UK etc.) which is since long integrated in the global production system that has emerged in the second half of the last century; has placed the ports of the Hamburg-Le Havre range as definite ports of call for the largest vessels and attracted the trade that has extended their hinterland reach. Moreover the position of the North Sea in the global map has made the ports of the region capable of serving as hubs to attract trade orienting to the Baltic and Scandinavian countries;
- Fierce competition between ports for attracting deep sea (container) cargoes resulting in high operating efficiencies. The geographic and cultural proximity of the ports of the region has allowed for spill-over effects that has boosted the competitive position of the whole range;
- The integrated internal market of the EU has provided a competitive advantage to European ports by lowering the administrative and physical burden of cross-border trade.

Identified weaknesses are:

- The limited ability to expand land side infrastructure is an issue for the ports of the regions. As most of them have been very important ports in a highly urbanised region, most of the ports of the Hamburg-Le Havre range have arrived to a point that further expansion is difficult due to the existence of large cities in their close vicinity. Alternative expansion towards the sea front (like the case of the Maasvlakte 2), besides being too expensive, cannot be a solution in all cases;
- Being located in a very densely populated area, the N. Sea ports are experiencing congested hinterland connections. This situation is expected to deteriorate as trade volumes increase;
- Competition between ports (countries) in the region and limited coordination beyond national borders causing overcapacity and risk of development failures (example JadeWeserPort);
- Slow decision-making processes with regards to port expansion and infrastructure development can lead the ports of the region to be too late to maintain their competitiveness.

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<sup>12</sup> Sheffi Y., Logistics Clusters: A growth Engine, World Economic Forum (2012)



## 2 Potential to achieve measurable Blue Growth outcomes

### 2.1 Trends, Opportunities and Threats

#### 2.1.1 Globalisation / Increasing volumes of global trade

Deep Sea shipping has a role of raising importance in modern product value chains, the increasing globalisation of which has resulted in an on-going raise of global trade volumes. Nowadays, the steady liberalisation of trade has resulted in goods being processed in various locations and value being added in several countries that are specialised in specific process activities. With half of global trade consisting of intermediate products<sup>13</sup>; DSS is called to handle increasing cargo volumes year by year. This trend of on-going increase in trade volumes has been shortly interrupted by the global financial crisis, but the last decade has seen an overall strong increase in international trade volumes. Between 2002 and 2008, global trade increased by roughly about US\$ 1 trillion per year, while by 2012 international trade has nearly reached again pre-crisis levels.<sup>14</sup> Forecasts on global trade for 2030 show that global trade corridors are likely to change from what they currently look like with the emergence of new transport corridors to include also parts of the world currently outside major shipping routes (like S. America and Africa). Nevertheless; existing major trade routes between North European countries and their counterparts in the rest of the world will see increasing trade volumes despite the decrease in their relative importance<sup>15</sup>.

#### Opportunities:

- The trend for increasing trade volumes can be seen as an opportunity for the DSS sector to continue growing and creating added value and employment for the coastal economies of the North Sea basin. Furthermore, increasing volumes may bring additional economies of scale and scope; strengthening existing clusters;
- Increasing cargo volumes to the major ports of the region will put pressure to the development of better hinterland connections especially over more environmental friendly modes (such as inland shipping and rail) which might smoothen the external impacts of transport;
- Ports of the North Sea will need to seek cooperation to deal with the projected increase in trade volumes.

#### Threats:

- Trade globalisation is foreseen to reduce the relative importance of Europe as part of the global shipping network as new markets dynamically enter the global scheme. This might pose a threat for the North Sea DSS sector as it will need to remain more competitive than competing maritime clusters that may arise in other parts of the World or Europe;
- Continued growth of DSS transport volumes may lead to increasing pressure on the environment, especially if concentration of the DSS activity remains solely on the Hamburg – Le Havre range;
- Increasing trade volumes will place additional stress on bottlenecks of hinterland transport;
- Moreover most North European ports face location and area constraints which will have to be dealt with if expansion of the ports is considered in order to deal with increasing needs for terminals.

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<sup>13</sup> Hoekman, B., Global Supply Chains, Logistics Services and International Cooperation, Outlook of the logistics and supply chain industry 2012, World Economic Forum (2012)

<sup>14</sup> Rattliff, H.D., The container shipping industry: global trade's weakest link, Outlook of the logistics and supply chain industry 2012, World Economic Forum (2012)

<sup>15</sup> PWC, Future of world trade; Top 25 sea and air freight routes in 2030 (2011)

### 2.1.2 *The aftermath of the global financial crisis - Overcapacity*

Following the rapid expansion of global trade during the early 2000's, shipping companies worldwide had placed orders for new vessels accounting for 50% of the capacity of the existing global container fleet. The same was seen in other segments notably dry and liquid bulk. After the burst of the global financial crisis at 2008, the new orders continued coming into the market although there was no demand for additional transport capacity. This led to an overcapacity for container transport, which resulted in lower tariffs. Shipping companies were forced to lower their charges in the years following the outburst of the crisis, even accepting loss-making rates in the route between Asia and northern Europe. Only 2 out of the 12 largest container shipping companies reported profits. This might increase the probability that one of the biggest sector firms might go bankrupt within the following years. A commonly applied practice to tackle overcapacity is slow-steaming, the operation of ships in lower than designed speeds which result in increasing trip duration but also in lower fuel consumption and increased utilisation of vessels. Some shipping companies like Maersk have gone one step further and withdraw ships from overcrowded lines to reduce offered capacity. Industry forecasts indicate that for at least the following 5 years, the merchant fleet will be facing no capacity constraints<sup>16</sup>.

Additionally, the global financial crisis has made the banking sector tighter in providing finance to companies in the sector.<sup>17</sup>

#### Opportunities:

- The financially troublesome position in which the shipping lines currently are has placed an additional motive for pursuing technological and organisational innovation in order to cut on operating costs;
- One of the most favourable means of achieving cost reduction (especially given also the projected increase in fuel prices) is by putting emphasis on energy efficiency which will lead to decreasing negative environmental impacts but also give a boost to the European marine equipment market;
- The larger shipping companies as well as other actors of the value chain have sought for greater cooperation (both horizontal and vertical) to work through the new market conditions.

#### Threats:

- With the financial conditions of large shipping companies at pressure, the bankruptcy of a major sector actor is a possibility that cannot be ignored;
- Financial insecurity may lead shipping companies to sell their holdings in terminal operations and other non-core businesses to focus on their core activities, disintegrating thus the DSS value chain;
- In view of the sector's reduced profitability and also due to the overall economic climate, access to finance from the bank sector has become (and might become even more) difficult;
- Slow-steaming has caused an increase in transport times in the main inter-continental routes which puts under pressure the value chain of multiple commodities and the related actors as they are forced to increase their inventory costs and lead time for product distribution.

### 2.1.3 *Rearrangement of global shipping routes (Panama Canal expansion)*

The emergence and growth of developing markets all around the world is paving the way for the redesign of global trade routes as increasing share of the global trade will not go via Europe or N.

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<sup>16</sup> <http://www.reuters.com/article/2013/10/02/us-nordic-summit-maersk-idUSBRE9910LB20131002>

<sup>17</sup> <http://www.nortonrosefulbright.com/knowledge/publications/33057/innovation-in-ship-finance-tapping-the-capital-markets>

America in the future<sup>18</sup>. A factor expected to further contribute to the redesign of global shipping routes, is the on-going expansion of the Panama Canal with a third set of locks to facilitate vessels of up to about 12.000 TEUs<sup>19</sup>. This development will not only make it possible to use larger vessels in the Asia to East coast of N. America route, but will also allow the operation of round-the-world equatorial services connecting Europe, Asia and N. America and setting the backbone for a potential total reform of global shipping lines. Evolvement of a new global network structure would be in close line with the process of further globalisation of trade and production. In the long term, the potential implementation of the under-study Gran Canal Interoceanico de Nicaragua<sup>20</sup> as well as the use of trans-Arctic sea routes which might become available due to climate change and which might provide distance savings in the order of thousands of miles, can result in the redefinition of the major shipping routes facilitating a large part of the intercontinental cargo traffic. However climate forecasts indicate the Arctic route will remain accessible only seasonally until the second half of this century, limiting its short term potential. In a shorter time horizon, the exploitation of the resources to be revealed under the existing ice cover might bring additional trade flows to the North Sea ports, as they will probably be the marine gateway for these products to Europe.

Opportunities:

- The possibility to operate larger vessels through the expanded Panama Canal will boost the use of the newest, largest vessel classes eventually making use of economies of scale;
- Shorter global routes will lead to cost reductions via less fuel requirements and eventually strengthen the competitive position of the sector at a global level. The Arctic route “brings” Asia closer to Europe and especially to the North Sea ports, potentially strengthening their competitive position in global shipping routes. The existence of a strong port cluster in the region can be exploited to secure that the Hamburg-Le Havre range retains an important position in global shipping routes.

Threats:

- The rearrangement of global shipping routes due the expansion of the Panama Canal may lead to a marginalisation of the North Sea ports as the equatorial round-the-world line might become the backbone of the global shipping network of major port hubs.

#### 2.1.4 Increasing vessel sizes

The current economic downturn, as well as the tough competition in the DSS sector has steered many shipping companies towards exploring the possibility for cost cutting by achieving economies of scale. Technological developments have made it possible to achieve economies of scale in maritime transport by operating larger vessels (up to 18.000 TEUs) as initially done by Maersk<sup>21</sup> and followed by other sector companies<sup>22</sup> in order to cut on fuel consumption and average container shipment costs. The use of larger vessels will probably lead also to a reorganisation of the shipping network patterns as these vessels will not be able to call in as many ports as done in nowadays main shipping lines.

Opportunities:

- Larger vessels will mark a decrease in overall emissions per cargo shipment and produce cost savings for maritime transport leading to a stronger and more competitive DSS sector;

<sup>18</sup> PWC, Future of world trade, Top 25 sea and air freight routes in 2030 (2011)

<sup>19</sup> <http://www.pancanal.com/eng/expansion/>

<sup>20</sup> [http://www.enriqueboianos.org/docs\\_varios\\_pdf/Gran\\_Canal.pdf](http://www.enriqueboianos.org/docs_varios_pdf/Gran_Canal.pdf)

<sup>21</sup> [http://translate.googleusercontent.com/translate\\_c?depth=1&hl=el&ie=UTF8&prev=t&rurl=translate.google.com&sl=nl&tl=en&u=http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/37997/ArticleName/MaerskstuurteersteTripleEnaarAntwerpen/Default.aspx&usq=ALkJrhqlypYmHSyk6Fpb8IT16REhW715kg](http://translate.googleusercontent.com/translate_c?depth=1&hl=el&ie=UTF8&prev=t&rurl=translate.google.com&sl=nl&tl=en&u=http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/37997/ArticleName/MaerskstuurteersteTripleEnaarAntwerpen/Default.aspx&usq=ALkJrhqlypYmHSyk6Fpb8IT16REhW715kg)

<sup>22</sup> <http://www.ibtimes.com/chinas-number-2-shipping-company-orders-five-worlds-largest-box-container-vessels-korean-shipbuilder>

- Most of the North Sea ports have already adjusted their port and hinterland infrastructure to be able to facilitate the larger upcoming vessels (and the increase they will cause cargo flows) gaining so a competitive edge in the race to being selected as preferable ports-of-call for the larger vessels;
- The already strong DSS cluster of the Hamburg-Le Havre range will most probably hold its position as the gateway for Europe even in the event of less port calls by larger vessels, due to the strong port cluster to be found here with ports that are also complementary regarding their trade counterpart locations, and the ability to receive these large ships (as opposed to most ports in other sea basins).

Threats:

- On-going ordering of larger vessels by all major shipping companies might lead to even more spare capacity of the container fleet. This not only affects the North Sea but the sector world wide;
- Operation of larger vessels in combination with increasing trade volumes can lead to increasing demand for hinterland transport capacity, as well as put pressure on peak capacity needed in ports due to the larger call sizes, while on the supply side there is already a struggle to meet current demand;
- Larger vessels with higher overall load and unload times might be calling in fewer ports in the North Sea, leading some ports to a role of decreased importance.

### 2.1.5 Vertical and horizontal integration and cooperation along value chains

Amongst others, globalisation of production and trade, have given raise to attempts for vertical and horizontal integration of value chains. In the direction of horizontal integration, we can classify a series of mergers and acquisitions leading to the emergence of 10 major shipping companies and 4-6 global terminal operators that dominate the DSS sector. Moreover, some of the major global shipping companies, having exploited as much as possible, the possibilities for cost savings in the maritime transport segment, attempt to find space for further cost cuttings by attempting a vertical integration of the value chain. They do so by acquiring shares or concessions to operate terminals and trying to get hold of hinterland connections<sup>23</sup>. Currently major container terminal operators, usually in cooperation with shipping companies operate in the North Sea terminals of 68mln TEUs of handling capacity.

Opportunities:

- Horizontal integration can also take the form of port cooperation exploiting identified synergies in ports of complementary nature;
- Integration of the value chain may lead to stronger actors through the exploration of synergies in the sector and reinforce the competitive position of the North Sea DSS value chain;
- Growing shipping activity along with increased environmental pressures and subsequent policy actions as well as public opinion, will be a feeding ground for innovative green technologies development, in which North Sea based manufacturers have a forefront position that can be exported to other regions;
- IT advancements can considerably increase not only port efficiency, but also interoperability and transfer of information along the different actors of the value chain.

Threats:

- Further horizontal integration of the value chain may eventually lead to a violation to EU competition regulations as some actors might then become too powerful and the sector might be transformed into an oligopoly;

<sup>23</sup> Rodrigue, J.P., Maritime Transportation: Drivers for shipping and port industries, OECD International Transport Forum, (2010)



- The creation of too-large-to-fail sector actors.

### 2.1.6 *Environmental regulations and emission restriction zones (SECAs etc.)*

During the last years the focus on the environmental performance of shipping has increased. Regulation 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 1<sup>st</sup> 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.<sup>24</sup>

The LNG industry is one of the economic activities presenting the strongest growth in the last decade. The industry is currently at the phase of expanding its infrastructural network and the planning of LNG storage facilities is an issue a lot of countries in Europe are currently facing. There is a synergy however to be exploited between the DSS and the LNG industry as LNG shipping is foreseen to gain market share in the near future.

Opportunities:

- Improved environmental performance of the port and shipping sector will facilitate achieving consensus from local societies for port related projects;
- Synergies with the LNG industry can be exploited.

Threats:

- A too sharp uptake of stricter environmental regulations vis-à-vis other port regions might make the North Sea ports an unattractive destination for shipping companies weakening so its competitive position;
- Implementing retrofit options as well as equipping vessels with marine equipment is a capital requiring investment which depends on the availability of funding which for the time being is not as easy to obtain for ship owners;
- The current timing of putting into force the ECAs, at a period that the shipping industry is already under financial pressure might endanger the viability of some shipping firms as besides the upfront investment also operating costs will increase while it is uncertain if these can be passed on to clients;
- The focus on fuel efficiency influences both the new build market and the market of existing vessels. Main driver to invest in new vessels is their improved fuel efficiency compared to older vessels. Although a number of major container carriers have ordered new – larger – ships with the aim to reduce per unit operating costs (fuel consumption), the current world fleet is relatively young and therefore it is expected that not many new vessels (besides the category with ultra-large vessel category) will be built in the coming years (also due to existing overcapacity);
- LNG fuelling facilities for ships are not widespread and this can restrict the uptake of LNG as a fuel.

<sup>24</sup> Chatzitoliou K., Environmental compliance & Liabilities, Bureau Veritas, 2<sup>nd</sup> European Ports & Shipping Conference (2013)

### 2.1.7 Problematic 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 finance<sup>25</sup>. With the existing oversupply of vessel capacity, shipping companies are terminating whenever possible the chartering of vessels. The “German-dentist” ship financing model<sup>26</sup> which formed the basis for the construction of the world leading German fleet based on private capital is put under threat<sup>27</sup>. 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 future<sup>28</sup>.

Opportunities:

- Shipping companies are exploring alternative financing modes and seem to be successful (currently) in meeting their financing needs despite the negative financial environment and their weak financial performance;
- There is a shift in the policy of international funding institutions (such as the EIB) to fund environmentally friendly projects such as port projects<sup>29</sup>;
- The European Union has made ports of the core TEN-T network (such as those of the Hamburg-Le Havre range) and ports linked to them via the Motorways of the Sea, eligible for EU funding in the 2014-2020 period through the Connecting Europe Facility (CEF). EU funding and lending facilities will prioritise projects concerning port access and hinterland connections.

Threats:

- For ship owners access to finance is a problem. Banks are reluctant to invest large sums of many in new vessels or new technologies. The reluctance to provide funding influence the shipyards because less new vessels are ordered and also large conversions are delayed. Also the marine equipment industry is influenced by the lack of finance. Only proven technology can obtain sufficient funding, although the ship owner still has to convince the bank of the positive business case. This implicates that obtaining finance for a new engine is still possible, but obtaining financing for after treatment devices is virtually impossible.

## 2.2 Sector response

In this section examples are provided of the sectors response to the trends previously identified.

### 2.2.1 Globalisation / Increasing volumes of global trade

In sight of the increasing trade volumes that North Sea ports have been called to handle, the DSS sector has attempted to achieve better integration of the hinterland connections to the ports<sup>30</sup>. Aiming at smoothening the burden of the increasing scale of freight transport activities, the EU has promoted the funding of a core and a comprehensive Transport network (TEN-T) aiming at

<sup>25</sup> <http://www.nortonrosefulbright.com/knowledge/publications/33057/innovation-in-ship-finance-tapping-the-capital-markets>

<sup>26</sup> <http://www.economist.com/node/190277>

<sup>27</sup> <http://www.ft.com/intl/cms/s/0/19dc9da4-7f81-11de-85dc-00144feabdc0.html#axzz2jIA5z2hf>

<sup>28</sup> [http://live.easysfairs.com/fileadmin/groups/8/Shop\\_2012/Day\\_1\\_12.10\\_Berend\\_Paasman\\_pdf.pdf](http://live.easysfairs.com/fileadmin/groups/8/Shop_2012/Day_1_12.10_Berend_Paasman_pdf.pdf)

<sup>29</sup> McDonough, A., Maritime Transport: Scotland's Sustainable Growth Opportunity, EIB (2009)

<sup>30</sup> Rodrigue, J.P., Maritime Transportation: Drivers for shipping and port industries, OECD International Transport Forum, (2010)

integrating the patchwork of national transport systems. The TEN-T is focused on providing connector links by road, rail and inland waterways to major gateway ports of the EU<sup>31</sup>. An example of this attempt to achieve better and more environmental friendly connection to the hinterland is the joint effort of the Ports of Rotterdam and Amsterdam to develop a high-speed, dedicated, freight railway connection to the Ruhr area in Germany which would remove considerable amounts of freight vehicles from the already congested road network of the Netherlands while increasing access of the ports to their hinterland markets<sup>32</sup>.

Regarding provision of a better overview of the potential access to the hinterland, the port of Antwerp has launched the Port of Antwerp Connectivity Platform<sup>33</sup>. This is a platform aiming at providing information for access to over 155 inland terminals. The Port of Rotterdam has launched a similar platform providing an overview of possible access to inland terminals, the *Inland Links*, about a year earlier.

### 2.2.2 *The aftermath of the financial crisis – Overcapacity*

The DSS sector response to the existing overcapacity of vessels has been in multiple levels. Many shipping companies have reacted to the reduced cargo traffic by not only reducing rates but also by removing vessel capacity deployed in the Asia-Europe route in an attempt to close the gap between supply and demand and maintain sustainable rates for container transport<sup>34</sup>. The sector as a whole has tried to raise occupancy rates of the existing vessels by resorting to slow-steaming. This consists of operating vessels at speeds well below their capacity, at the area of 16knots. In this way there are considerable fuel savings to be achieved while the newest Triple-E class containerships of Maersk are designed to be able of gaining maximum advantage out of slow-steaming<sup>35</sup>. Along these two developments, the three biggest shipping companies (Maersk, MSC and CMA CGM) have agreed on forming a vessel pool and sharing container transport capacity on the Asia-Europe, Trans-Atlantic and Trans-Pacific routes<sup>36</sup>. This has come after the introduction of the G6 cooperation of other global shipping lines in sharing vessel capacity in the Far East – Europe services<sup>37</sup>. Latest developments of the sector see even the cancelling of scheduled sailings to deal with the expected low demand during the 2013-14 winter period<sup>38</sup>.

### 2.2.3 *Increasing vessel sizes and rearrangement of routes*

Less than a month ago, the *Mary Maersk* has become the first Triple-E class containership of Maersk to call at the Port of Antwerp. Just a few days earlier, the *Majestic Maersk*, was the first vessel of that class to call on the English port of Felixstowe<sup>39</sup>. The 18.270 TEU vessels are currently the largest in the world. Those mega-vessels are currently deployed in the Europe-Asia route and are capable of producing economies of scale that lead up to a 50% cost reduction in container shipment costs. With more shipping companies following the example set by Maersk and making the transition to 18.000 TEU vessels it has become necessary for ports in the North Sea to

<sup>31</sup> [http://ec.europa.eu/transport/themes/infrastructure/revision-t\\_en.htm](http://ec.europa.eu/transport/themes/infrastructure/revision-t_en.htm)

<sup>32</sup> Merk, O. and T. Notteboom, The Competitiveness of Global Port-Cities: The cases of Rotterdam/Amsterdam – the Netherlands, OECD Regional development Working Papers, 2013/06

<sup>33</sup> [http://translate.googleusercontent.com/translate\\_c?depth=1&hl=el&ie=UTF8&prev=t&rurl=translate.google.com&sl=nl&tl=en&u=http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/38022/ArticleName/OokachterlandplatformAntwerpen/Default.aspx&usq=ALkJrhqRci7ZcBd3yUS3N1QaMUSItL65GMq](http://translate.googleusercontent.com/translate_c?depth=1&hl=el&ie=UTF8&prev=t&rurl=translate.google.com&sl=nl&tl=en&u=http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/38022/ArticleName/OokachterlandplatformAntwerpen/Default.aspx&usq=ALkJrhqRci7ZcBd3yUS3N1QaMUSItL65GMq)

<sup>34</sup> <http://www.lloydsll.com/freight-directory/viewarticle.htm?articleID=20017811129&src=rss>

<sup>35</sup> Jorgensen R., Slow steaming; The full story, Maersk (2012)

<sup>36</sup> <http://www.ft.com/intl/cms/s/0/d0edcd42-d7d9-11e2-b4a4-00144feab7de.html#axzz2j0haNL6T>

<sup>37</sup> <http://www.worldcargonews.com/htm/w20111220.286200.htm>

<sup>38</sup> [http://www.joc.com/maritime-news/container-lines/g6-alliance/g6-alliance-cancels-eight-asia-europe-sailings-winter\\_20131009.html](http://www.joc.com/maritime-news/container-lines/g6-alliance/g6-alliance-cancels-eight-asia-europe-sailings-winter_20131009.html)

<sup>39</sup> [http://www.eadt.co.uk/business/felixstowe\\_world\\_s\\_largest\\_container\\_ship\\_the\\_majestic\\_maersk\\_makes\\_maiden\\_visit\\_to\\_port\\_1\\_2860247](http://www.eadt.co.uk/business/felixstowe_world_s_largest_container_ship_the_majestic_maersk_makes_maiden_visit_to_port_1_2860247)

adjust their infrastructure in order to be able to facilitate these vessels. As the increase in vessel size is expected to be accompanied by a reduction in port calls, ports compete on attracting as many as possible of the new services provided by these larger vessels in view of the transition to a more hub and spoke structure of global shipping routes<sup>40</sup>. The largest ports of the Hamburg - Le Havre range have already adjusted their infrastructure to be able to accommodate the latest megavessels. The benefits of maintaining a strong port cluster in the North Sea has shown in the occasion of the *Mary Maersk* not being able to call at the port of Rotterdam due to an on-going strike, then the vessel called at the nearby port of Antwerp with a minimal deviation from her route<sup>41</sup>. This kind of port cooperation might prove to be an important element in the race for retaining the competitive position of North Sea ports in the event of restructuring of global shipping routes after the completion of the Panama Canal expansion.

#### 2.2.4 Vertical and horizontal integration and cooperation along value chains

As stressed also in the previous section, port cooperation as part of the horizontal cooperation of the DSS value chain can yield considerable advantages. Additional examples of port cooperation can be found in the close interconnection of the ports of Rotterdam and Antwerp<sup>42</sup>, which in some cases are seen as an integrated gateway to their hinterland which boosts the aggregate competitive position of them both.

However further consolidation of the sector is sometimes bouncing against competition regulations of the EU. The latest example being that the EU did not allow HPH to buy 49% of the shares of ECT in Rotterdam (HPH would have been dominant in Northwestern Europe since it already operates Felixstowe, Thamesport, and Harwich).

On the other hand, the trend of vertical integration of the value chain, with shipping companies integrating into their business terminal operations seems to be retreating as shipping companies are more probable to transfer their shares in terminal operations in this time of financial scrutiny they are facing. The Communication from the Commission on port policy<sup>43</sup> describes in priority action 4, the need to develop the “e-maritime” and “e-freight” initiatives that will not only increase port efficiency but also facilitate vertical cooperation by facilitating information flow between actors and provide information over multimodal logistic chains.

#### 2.2.5 Environmental regulations and emission restriction zones (SECAs etc.)

Albeit slow-steaming is mainly an effect of the existing overcapacity, it contributes, together with the introduction of the new largest cargo vessels to lowering the emissions caused by cargo transport overseas. Additionally, 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 of vessels. For instance the German SME Couple Systems, has developed a dry exhaust cleaning device that will reduce the NOx emissions<sup>44</sup>. Also large engine manufactures are producing exhaust gas cleaners. Wärtsilä will supply the systems for four new container/ ro-ro vessel which will be build in Korea. The system will clean both SOx and PM emissions.

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<sup>40</sup> <http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/38027/ArticleName/Top3carriersbrengenRotterdamzwareklaptoe/Default.aspx>

<sup>41</sup> <http://www.nieuwsbladtransport.nl/Nieuws/Article/tabid/85/ArticleID/37997/ArticleName/MaerskstuurteersteTripleEnaarAntwerpen/Default.aspx>

<sup>42</sup> Merk, O. and T. Notteboom, The Competitiveness of Global Port-Cities: The cases of Rotterdam/Amsterdam – the Netherlands, OECD Regional development Working Papers, 2013/06

<sup>43</sup> COM (2013) 295 final

<sup>44</sup> <http://couple-systems.de/index.php/start.117.html>

Moreover initiatives like the Clean Shipping Index<sup>45</sup>, 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.

### 2.2.6 Problematic access to finance

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 operations<sup>46</sup>.

#### 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 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.<sup>47</sup>

## 2.3 Summary of sector strengths and weaknesses

Table 2-1 Strengths and weaknesses analysis of the most promising economic activity

	Drivers for Growth		Barriers for Growth	
	From analysis	SWOT from Benchmark analysis	from analysis	SWOT from Benchmark analysis
Increasing trade volumes	Increasing port cooperation		Marginalisation in a global context	Difficult to secure space for port expansion
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
New shipping routes	Strong competitive position of the N. Sea ports due to good infrastructure.		Possible restructuring of global routes	

<sup>45</sup> <http://www.cleanshippingindex.com/>.

<sup>46</sup> <http://www.nortonrosefulbright.com/knowledge/publications/33057/innovation-in-ship-finance-tapping-the-capital-markets>

<sup>47</sup> 'Duitse werven nog steeds in zwaar weer', SWZ/Maritime, May 2013

<b>Evolution of vessel sizes</b>	Emission reduction per shipment	Readiness of N. Sea ports to facilitate largest vessels	Calling in fewer ports. Increased need for investment to meet requirements	
<b>Hinterland connections</b>	N. Sea ports have better accessibility than their competitors	TEN-T policy for reinforcing port access EU promoting financing of hinterland links	Bottlenecks from increasing volumes	
<b>Development and innovation</b>		e-maritime and e-freight initiatives		
<b>Environmental regulations and energy efficiency</b>	Alternative fuels and maritime equipment (scrubbers)	Slow-steaming Marine equipment compliant with upcoming rules are produced	Inability of shipping companies to comply adequately with a good portion of their fleet	Introduction of ECAs
<b>Maritime clusters</b>	Strong concentration of ports of global importance in the Hamburg-Le Havre range	SMRC working group to focus on profiling repair yards		
<b>Maritime spatial planning</b>	Allocation of dedicated spatial resources reduces naval accidents risks	Rearrangement of the Dutch maritime zones	Conflicts over spatial resources between maritime activities	

**Table 2-2 Key impacts on the sector**

Type	Key impacts	Extent of impact
<b><i>Economic</i></b>		
Competitiveness, trade and investment flows	DSS sector competitiveness has a high impact on EU competitiveness as it affects all export and import value chains.	High
Administrative burdens	There are high administrative requirements related to import and export of cargo	Medium
Innovation and research	Organisational innovation is high with horizontal and vertical cooperation between actors of the DSS chain being a strong case.	Medium
<b><i>Social</i></b>		
Employment and labour markets	Demand for skilled labour in the sector persists, however it is not limited to white or blue collars. Overall the demand for labour will decrease.	Limited
Social inclusion	The sector produces a positive output for social inclusion as it produces a fair distribution of jobs across social strata with higher than regional average value added.	Limited
Access to educational systems	Sector is well-connected to main education centres serving it, mainly at national level though	Limited
<b><i>Environmental</i></b>		
Impact on climate	The DSS sector is a large contributor to aerial pollution. The focus of the whole DSS sector, is on improving the environmental performance of their activities.	Medium
Transport and usage of energy	The sector currently uses low efficiency fuels, this however is undergoing a switch to more	Medium



Type	Key impacts	Extent of impact
	energy efficient operations.	
Impacts on biodiversity	Ballast water should be treated with care as they might transfer species from other habitats that endanger biodiversity.	Medium
Impacts on water quality and resources	Idem	Medium
Likelihood and scale of environmental risks	There are environmental risks associated to the sector, related to the possibility of fuel or liquid bulk leakage after naval accidents.	Medium



## 3 Growth scenarios for the future

### 3.1 Deep sea shipping

#### 3.1.1 *Description of the nature of the economic activity and value chain*

The North Sea and especially the Hamburg – Le Havre range presents a strong concentration of port activities related to deep sea shipping. Main ports of the area are the ports of Rotterdam, Antwerp, Hamburg, Amsterdam, Zeebrugge, Bremerhaven and Felixstowe supplemented by the ports of Le Havre and Southampton that fall marginally off the geographical scope of this study. The ports of the region form the main gateway to Europe for overseas trade, while their feeder and shortsea activities are also very strong. Some of the ports are among the most competitive and efficient in the world, with a fraction of those major ports specialised in specific cargo segments (Antwerp for containers and Amsterdam for bulk cargo), or having a universal character (Rotterdam), while others have a strong geographical orientation (English deep sea ports are hubs for Great Britain trade and Hamburg and Bremerhaven facilitate especially trade to the Baltic).

Opposite to the highly fragmented structure of port authorities, (container) terminal operations and especially shipping activities are concentrated in a few actors with dominant global presence. In this setting, the challenge for the DSS sector of the North Sea is of a dual nature. First it has to remain competitive regarding global standards as it is part of the global production chains of products and in order to help maintain the competitive position of European trade (which feeds the sector with products to ship). On the other hand, the North Sea ports are called to compete with port regions around the continent (and especially those in the Western Mediterranean basin) in order to retain their competitive position as the gateway of Europe. In that struggle, they rely considerably on the competitive advantage potentially delivered by their good hinterland connections.

#### 3.1.2 *Potential development: Description of economic and infrastructural scenario*

According to the identified trends, the DSS in the North Sea will be faced in the future with slowly but steadily increasing cargo flows as a result of increasing trade volumes and vessel sizes calling at less ports thus putting extra strain on specific port-to-hinterland bottlenecks due to increased requirements in peak capacity. The latter will require ports to develop more efficient operations, assisted by the increasing use of ICT systems and specialised infrastructure. A probable scenario is that the DSS trade will be concentrated to fewer ports in Europe also as a consequence of the potential impact the Panama Canal expansion will have on global shipping routes. Moreover, as the space for efficiency gains within each section of the value chain grows narrow, there is a driver for cooperation across the various sections which we will be probably experiencing more and more often, with co-operation of port terminals between terminal operators and shipping liners being a first example. Further integration of the value chain is expected as the opportunities for collaboration are further explored, with emphasis being in the integration of hinterland connections. Finally, in the face of the increased infrastructural requirements for ports operations, the existing clash with cities over land for their respective functions is probably going to be intensified, with ports continuing their out-of-the-city relocation of activities. The clash with other non-maritime activities is already pushing for the sector “greening” which will continue in the future with the further application of stricter environmental regulations.

### 3.1.3 *Uncertainties: external drivers and requirements*

As mentioned before, the external drivers that will define the DSS sector in the coming years can be summarised as follows:

- the rapidness of further globalisation of production and trade and of the increase in trade volumes in existing important shipping routes but also for smaller expanding trade routes; the way this trend will evolve will be the single most important factor to define future development of the DSS sector, the port sector will need to step up to be able to handle increasing cargo volumes. This will be highly dependent on the continuation of the trade;
- The ability to provide adequate capacity of hinterland transport for the North Sea ports to cope with increasing cargo volumes and clear bottlenecks will be, to a large extent, a defining factor to the development of the sector. Smooth cooperation between ports and hinterland transport but also the continuation of public support to cross-border transport infrastructure projects is a prerequisite;
- Shipping companies are currently challenged to overcome the bad financial circumstances that currently affect them, their capacity to adopt more cost effective solutions (i.e. larger vessels) and to find innovative funding schemes to overcome the negative financial environment will define the future of the sector;
- It is yet to be seen, to what extent the completion of the Panama Canal extension in 2014 and together with the emergence and strengthening of new trade routes, might lead to a reshaping of global shipping routes which will effect also the competitive position of the North Sea DSS sector. The ports of the region will have to provide upgraded services to keep its important position in the global shipping network;
- The continuation of the reaction of the sector to stricter environmental regulations, in the North Sea, but also globally, is another critical point that will determine the evolution of the sector in the near future. The capacity to produce more elaborate marine equipment and also to pursue for alternative, more environmental friendly fuel besides finding the capital necessary to invest in these solutions is not certain, as already there are voices asking for the postponement of the stricter regulations implementation;
- Finally, the possibility to continue finding and exploiting synergies, with other marine sectors (like the LNG sector) , especially as some coastal regions become more and more congested with activities, as well as the capacity to alleviate tensions generated by the competition for resources and space in particular (especially for areas crowded with maritime activities such as the North Sea) will define the growth potential of the DSS sector in the future.

### 3.1.4 *Synergies and tensions: potential environmental consequences and spill-over impacts to other sectors*

The DSS sector is currently working towards reducing the external costs it produces for society mainly by implementing stricter environmental regulations on emissions and ballast water discharges. Currently there are tensions generated with other (maritime or not) activities which regard especially spatial resources. On the water-side, there is competition for anchorage areas and vessel corridors in busy coastal areas against areas allocated to fisheries, off-shore wind and oil platforms and other activities. On the land-side the DSS sector is competing with the city activities for spatial resources, as cities attempt to expand towards and around port areas. A consequence of this is the increasing friction between the two activities caused by the disturbance of city by port activities.

On the other hand there are considerable synergies to explore with other maritime (and non-maritime sectors), the existence of a strong port cluster in the North Sea provides a good basis for further development of the maritime cluster. Especially synergies with the rapidly growing LNG

sector should be explored as LNG can be used as an alternative fuel for DSS that can assist in achieving compliance with the increasingly strict environmental regulations.

### 3.1.5 *Framework conditions: regulatory environment of the economic activity*

European and International regulations are of increasing importance in setting the framework conditions for the development of the DSS sector. The recent Communication of the Commission on the port policy labelled *Ports: an engine for growth* identifies the main challenges that the port sector (and to a large extent also the DSS sector) is facing and draws a proposed strategy to overcome them, including emphasis on increasing efficiency, environmental performance, hinterland connections, innovation, modernisation of infrastructure and labour conditions.

The issue of increasing the sectors environmental performance is further influenced by the IMO Conventions on emissions (MARPOL) and the Ballast Water Convention, as described later in the shipbuilding section. The TEN-T planning instrument has identified, via the TEN-T guidelines, the multimodal core and comprehensive network for the EU. Specific targets are set for the infrastructure connecting all ports belonging to the TEN-T core network by 2030.





## 4 Joint actions leading to growth and jobs

A number of joint actions that would significantly profit the DSS sector of the North Sea can be identified. The region of the North Sea contains the most developed European port range with a well established position as the gateway of Europe, but also contains some of the most competitive ports actors globally. Nevertheless inter-, intra- and trans-sectoral cooperation can be a significant factor in maintaining its leading global position and in reinforcing the DSS value chain. Some examples of joint actions that can lead to sector growth and jobs are the following:

- Ports that serve an overlapping hinterland area can achieve increased benefits by engaging into closer cooperation. Integration under common administrative structures or cooperation platforms that facilitate the coordination of their actions can lead to avoiding duplication of facilities. Lowering of administration and other barriers can foster spill-over effects as well. The examples of the ports of Rotterdam and Amsterdam that promote even joint investments in hinterland connections and investigate into aligning their complementary functions can set an example (although there is a lot of room for further cooperation) of cooperation in multi-port gateway regions;
- The increasing use of ICT is a promising factor for retaining the competitiveness of the sector. The promoted initiatives on e-freight and e-maritime can facilitate exchange of information and boost competitiveness. However cooperation inside the sector is required (probably at an EU level) to facilitate the smoother alignment of systems;
- Further, the development of applications providing increasing levels of information on hinterland connections (such as the platforms developed by the ports of Antwerp and Rotterdam) can facilitate integration of the hinterland and strengthen the competitive position of ports, however developing separate platforms could be regarded as a waste of resources in contrast to aiming for a joint system maximising its capacities. Actions at EU level such as SafeSeaNet could serve as a mechanism for further streamlining of port level developments;
- Facing the increasing lack of space to expand and facilitate new activities, inter-port cooperation becomes important as a factor. Making optimal use of spare capacity through cooperation between not only different port terminals within the same but also between different ports can help ports avoid unnecessary investments. Having an integrated hinterland network between neighbouring ports can maximise the capacity sharing potential;
- Investigation of cooperation with other maritime sectors can yield benefits in all directions. Increased action can be taken in co-ordinately achieving an efficient allocation of coastal and maritime resources to avoid tensions and risks. Moreover cooperation with the LNG sector can align the potential of efficient investments in LNG storage facilities and creating the necessary facilities for LNG-fuelled vessels;
- Finally, the competitive position of the sector in a global scale has been due to its ability to keep ahead of technological developments, and respond rapidly to challenges posed by a challenging global environment by implementing innovative solutions. This emphasis on innovation (organisational and technological) could be promoted throughout the sector with joint research projects where actors in different parts of the DSS value chain would cooperate to produce system optimised innovative solutions.



## 5 Conclusions

The DSS sector is a mature economic activity in the North Sea and English Channel Sea basin. In the southern part of the North Sea, a considerable concentration of important deep sea ports can be found in the so called Hamburg-Le Havre range. The ports of the region serve as the main trade gateway to Europe, with some of them (i.e. the port of Rotterdam) qualifying as amongst the most efficient ports in the world. However; the strong global and regional position of the DSS sector in the North Sea, does not mean that the sector is not facing challenges that threaten its potential to continue being a major contributor for growth and jobs in the region. Issues like the increasing concern drawn on environmental issues and the challenges raising in the aftermath of the economic crisis of 2008 threaten the DSS sector performance. The response of the sector in tackling the arising problems has been rather mostly in the right direction. The sector exhibits, in response to the challenges encountered by the global environment, increasing adaptability. This involves, among other responses, adaptability in enhancing its environmental performance by implementing cost-effective solutions (i.e. slow steaming, larger vessels, alternative fuels etc.) as well as increasing horizontal and vertical integration aiming at more efficient structures. However the sector's response to arising challenges, especially in the case of value chain integration, involves increasing levels of joint ventures and planning among; actors located in different positions in the DSS value chain; competing firms and between different sectors' actors. This trend should and can be facilitated by promoting joint ventures that can lead to sustainable sector growth and creation of jobs.