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OFFSHORE SUPPLY INDUSTRY DYNAMICS

BUSINESS STRATEGIES IN THE OFFSHORE SUPPLY INDUSTRY

CBS MARITIME

CROSS-DISCIPLINARY AND PROBLEM-FOCUSED RESEARCH
AND EDUCATION IN THE MARITIME INDUSTRY CONTEXT

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4 INTRODUCTION

This report is part of the research project “The competitive challenges and strategic development possibilities for The Blue Denmark”, which was launched in 2014. The project is funded by the Danish Maritime Fund and carried out by researchers at CBS Maritime which is a Business in Society Platform at Copenhagen Business School with a focus on value creation in the maritime industries.

The project embraces various maritime segments from shipping and offshore to ports and suppliers. The research questions for the individual projects have been formulated by researchers at CBS Maritime in cooperation with companies in the maritime sector.

This report “Offshore Supply Industry Dynamics – Business strategies in the offshore supply industry” is the second report in mapping project D. It examines the markets and business strategies of various suppliers and furthermore presents an analysis of the challenges and opportunities for the companies engaged in the different parts of the sector. The report is developed from interviews with top management of key players in the Danish supply industry combined with studies on management literature.

The macro- and meso levels of the offshore sector are examined in the CBS Maritime report “Offshore Supply Chain Dynamics – The main drivers in the energy sector and the value chain characteristics for offshore oil and gas and offshore wind”, which constitutes the first part of mapping project D. It offers insights into the main drivers in the energy sector (macro level) and the value chain characteristics for offshore oil and gas and offshore wind (meso level).



Photo: Scanpix/Iris

The offshore supply industry is a complex entity to examine for several reasons. First, the industry has no NACE code, which makes it difficult to define the sector. Second, the industry consists of a multitude of different markets with different value chains. The turbine installation company operates in a market that is very different from the market of the pump manufacturer or the supplier of safety equipment – even if they are all part of the offshore sector. Third, the importance of the offshore sector varies between the different actors. The drilling contractor is totally dependent on the offshore sector. For the pump manufacturer, however, the offshore sector may only account for a smaller part of the total turnover.

The offshore supply industry thus consists of a multitude of different markets with different characteristics, and it would be impossible to cover them all in detail. The aim of this report is thus not to give a thorough analysis of all the markets and business strategies in the offshore supply industry, but to highlight the diversity of the two value chains. This is done by analyzing a limited number of markets and examining how various suppliers position themselves within these markets.

The aim of this report is thus to:

1. Exemplify the diversity of the two value chains by analyzing five different offshore markets
2. Exemplify how different offshore suppliers pursue different business strategies in order to position themselves where the competitive forces are weakest
3. Examine what challenges and opportunities these offshore suppliers are facing depending on their position in the value chain(s)

In order to secure the inclusion of different parts and levels of the offshore value chain(s), the report operates with three different ideal types of suppliers within the sector: (1) The specialized offshore supplier, (2) the general maritime/logistics supplier, and (3) the general (3rd tier) supplier. The categorization is developed in the before-mentioned CBS Maritime report “Offshore Supply Chain Dynamics – The main drivers in the energy sector and the value chain characteristics for offshore oil and gas and offshore wind”. As the sector is extremely complex, it is important to state that the categories are ideal types. They do, however, give an indication of the most common types of offshore suppliers.

The first ideal type – the specialized offshore supplier – is usually a direct supplier or sub suppliers (1st or 2nd tier) to the energy company. The group of specialized suppliers includes companies with value chain specific competences (and equipment), which can only be used in one value chain and, in many cases, only in few links. They are usually large companies that provide a vital service to the energy company. Their direct link to the energy companies and their dependence on one value chain means that these companies are very vulnerable to changes at the macro level (e.g., price on oil, geo politics, energy security, environmental policy), which affects (public) investments in the energy sector. It is important to state that it is the service that is value chain specific and not the company. As a turbine producer, Siemens Windpower performs a value chain specific activity, but the Siemens Group also performs a number of other services and activities in this and other value chains. From this category, the report examines the market characteristics for drilling contractors and the business strategy of Mærsk Drilling.

The second ideal type – the general maritime/logistics supplier – is usually a direct suppliers, or sub supplier (1st tier or 2nd tier) to the energy company. This group of suppliers has non-value chain specific competences, which can be used in a number of ocean-based industries, provided that they have the necessary equipment. These competences include maritime competences (navigation, seamanship etc.), logistics competences (transportation of heavy structures, warehouse management, supply chain management etc.), construction and repair of ships and steel sections, etc. Many of these companies have a background in the shipping sector and have entered the offshore industry because of the demand

for maritime competences. The group includes supply vessel operators, stand by vessel operators, shipyards, construction yards, commercial divers, ROV operators, operators of installation vessels, etc. but also freight forwarders, port operators, terminal operators, and inland haulage providers etc.. They are usually only engaged in few links, but their ability to move from one value chain to the other means that these companies are less dependent on changes at the macro level, which affects (public) investments in one value chain or the other (Olesen, 2015). From this category, the report examines the market characteristics for wind turbine installation companies, stand by vessel operators, and windfarm logistic providers. It examines the business strategy of A2SEA, which is the market leading wind turbine installer; World Marine Offshore, which operates in windfarm logistics; and finally Esvagt, which is a stand-by vessel operator in the oil and gas sector, but is currently entering offshore windfarm logistics.

The third ideal type is the general (3rd tier) supplier. This is by far the largest and most diverse group, which includes a broad range of component manufacturers providing pumps, safety equipment, steel sections, telecommunication, paint, engines, etc. These companies have traditionally been suppliers to shipyards and rig construction yards. Many of these companies have, however, begun to provide after-sales services to the energy companies and the 1st or 2nd tier suppliers (drilling contractors, supply vessel operators etc.) and have thus positioned themselves closer to the end customers. The general suppliers have various levels of specialization, but their distance to the energy company means that they are often situated in several links of the value chain and that they can switch from one value chain to the other. From this category, the report examines the market characteristics for pump manufacturers. Within this market, it compares the business strategies of two Danish pump manufacturers, DESMI Pumping Technology and Iron Pump, which have positioned themselves differently in the market for pumps and pumping solutions.



Photo: Scanpix/Iris

Three ideal Types of Offshore Suppliers

The Specialized Offshore Supplier:

- Direct supplier or sub supplier (1st tier or 2nd tier)
- Value chain specific competences (only applicable in one value chain)
- Positioned in few links of the value chain
- Include drilling contractors, well management companies, manufacturers of drilling equipment, turbines etc.

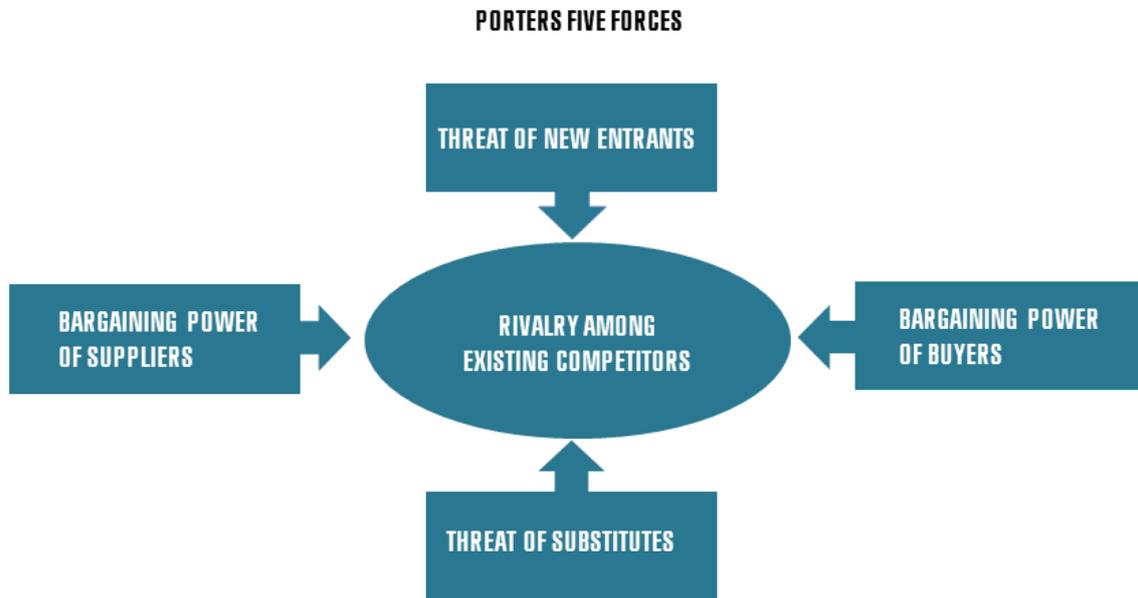
The General Maritime/Logistics Supplier:

- Often a direct supplier or 2nd tier supplier but in some cases also 3rd tier supplier
- Non-value chain specific competences (usually from the shipping sector) which are applicable in multiple (maritime) value chains
- Includes supply vessel operators, stand-by vessel operators, freight forwarders, haulage providers, shipyards and construction yards, ports, commercial divers, ro-v operators, maintenance providers (e.g. In steel or electronics) engineers, project managers, ship management companies etc.

The General Supplier:

- Traditionally 3rd tier supplier of equipment (often for shipyards) but increasingly also direct (1st tier) supplier of after sales services etc.
- Applicable in multiple value chains
- Positioned in several links
- Various levels of specialization
- Includes Manufacturers Of Pumps, Safety Equipment, Steel Sections, Telecommunication, Paint Etc.

The theoretical framework for the analysis of market characteristics and business strategies is Michael Porter's five forces, which he presented in *The Five Competitive Forces that Shape Strategy* (Porter, 2008). Porter argues that the profitability of all industries are influenced by (1) the threat of new entrants, (2) the bargaining power of suppliers, (3) the bargaining power of the buyers, (4) the threat of substitutes, and (5) rivalry among existing competitors. In order to differentiate itself, a company should position itself where the forces are weakest (Porter, 2008).



PORTER (2008): *The Five Forces That Shape Strategy*, Harvard Business Review

The threat of new entrants in an industry depends on the entry barriers. Entry barriers may be described as the advantages that incumbents have relative to new entrants. High entry barriers mean that the threat of entrants is low and vice versa. Entry barriers may include: (1) Supply side economies of scale (incumbents produce a larger volume and benefit from lower cost per unit, which forces the entrant to enter the industry on large scale), (2) demand side benefits of scale (incumbents benefit from a larger network), (3) customer switching costs (it is expensive for customers to switch from one product to another), (4) high capital requirements (if major investments are needed in order to enter the industry), (5) other incumbency advantages (e.g. branding or better access to raw materials or technology), (6) unequal access to distribution channels (incumbents have better channels of distribution), or (7) restrictive government policy (restrictions on foreign investments or strict licensing requirements may scare off potential entrants).

The bargaining power of the suppliers is another important factor. A strong group of suppliers will try to capture a larger share of the value by charging higher prices, limiting quality and services, and raising switching costs for the industry. The group of suppliers is strong if: (1) It is more concentrated than the industry, (2) the suppliers are not dependent on the industry, (3) industry participants face switching costs when changing supplier, (4) suppliers offer differentiated products, (5) there are no substitutes for the products the suppliers provide, or (6) the suppliers can threaten to integrate forward.

The third competitive force is the bargaining power of the buyers. A strong group of buyers will try to capture value by forcing down prices, demanding better quality and services, and play industry participants out against each other. Customers have negotiation leverage if: (1) There are few buyers and the industry has high fixed costs, (2) industry products are standardized or undifferentiated, (3) buyers face few switching costs, or (4) buyers can threaten to integrate backwards. The buyers are price sensitive if: (1) The product it purchases represents a large share of its cost structure, (2) the buyers earn a low profit, (3) if the quality of the buyers product is little affected by the quality of the industry product,

or (4) if the industry product has little effect on the buyers other costs (thorough seismic investigations may for example make the E&P a lot of money so they will be willing to pay more for this service).

The fourth competitive force is the threat of substitutes that perform the same (or a similar) function as the industry products by different means. When the threat of substitutes is high, it limits the profit potential of an industry. The threat of substitutes is high if (1) The substitute offers a better price performance and (2) switching costs are low.

The final competitive force is rivalry among existing competitors. This may include price wars, new products, advertising, and service improvements. High rivalry limits the profitability of an industry. Intense rivalry is great if: (1) Competitors are numerous and/or equal in size and power, (2) industry growth is slow and the competition for market shares is fierce, (3) exit barriers are high (which may keep actors from quitting the market even when facing losses), (4) rivals are highly committed to the industry, or (5) firms have difficulties reading each other's signals.

Price competition is especially destructive to an industry as it transfers profit directly from the industry to the customers. Price competition is most liable to occur if: (1) Products or services are undifferentiated and switching costs are low, (2) fixed costs are high and marginal costs (the cost of making one extra unit) are low, (3) capacity expansions must be large in order to be efficient (which disrupt the supply-demand balance), or (4) the product is perishable (e.g. tomatoes rot if they are not sold. This creates a strong incitement to cut prices).

As Porter points out in the title of his paper, the competitive forces within a market shape company strategy. A company will try to position itself where the forces are weakest, exploit changes in the forces and even try to reshape the forces in its own favor (Porter, 2008). The following sections will analyze the markets and strategies of six offshore suppliers in relation to this theory.

The market structure and business strategy of a specialized offshore supplier is examined on pages 11 to 13, by investigating the market for drilling contractors and the business strategy of Mærsk Drilling.

The markets and business strategies of general maritime/logistics suppliers are examined on pages 14 to 22. Pages 14 to 16 examine the market for wind turbine installations and the business strategy of the market leading Danish company A2SEA. Pages 16 to 18 examine the market for stand-by services in the oil and gas sector and the business strategy of Esvagt. Finally, pages 19 to 22 examine the market for providers of logistics services in the offshore wind sector and the business strategy of World Marine Offshore.

Pages 23 to 30 examine the market structure and business strategies of two general (or 3rd tier) suppliers. Pages 23 to 25 examine the recent development of the marine equipment industry, from manufacturing companies to more service oriented companies. Pages 25 and 26 examine the market for pumps and pumping solutions, followed by an analysis of two Danish pump manufacturers, who have positioned themselves very differently within this market. Pages 26 and 27 examine the business strategy of Iron Pump, and pages 28 to 30 examine the business strategy of DESMI Pumping Technology.

Based on the previous sections, the report identifies four key challenges and three key opportunities that most offshore suppliers have in common, despite the fact that they operate in very different markets. These challenges and opportunities are identified on pages 31 to 36.

The report is concluded with a brief summary on page 37.



THE SPECIALIZED OFFSHORE SUPPLIER

The group of specialized suppliers includes companies with value chain specific competences (and equipment), which can only be used in one value chain and in many cases only in few links. This section examines the competitive forces in the market for drilling contractors and exemplifies how Mærsk Drilling has positioned itself within the market.

MARKET STRUCTURE: THE MARKET FOR DRILLING CONTRACTORS

The drilling contractors are important actors in the upstream value chain for offshore oil and gas. The exploration and production companies (E&Ps) will usually contract with drilling contractors during the exploratory drilling phase when, drilling production wells and during the well-plugging phase.

In 2012, there were app. 100 offshore drilling contractors worldwide. The market has, however, witnessed an increasing consolidation where larger players such as Transocean have bought up smaller competitors. A large share of the market is thus divided among a limited number of operators. In 2012, the four main actors – Transocean, Ensco, Diamond Offshore and Seadrill – owned 36% of the 868 drilling rigs in the world (Snyder, 2013).

The limited number of drilling rigs makes the market for drilling contracting very transparent with a high degree of price competition. Dayrates are frequently announced by contractors and collected by commercial data providers (e.g. RigLogix, ODS-Petrodata, and RigData). This provides transparent and reliable data. If one single drilling rig becomes open in the market, the price will fall immediately. High fixed costs furthermore amplify the pressure on the drilling contractors to keep capacity filled through discounting (Porter, 2008). It is, however, possible for the players to enter into more specialized segments including harsh environment and deep water drilling.

The market for offshore drilling contractors is characterized by high entry barriers. These include: (1) Investments in rigs and equipment and (2) finding the right people with the right competences. Despite the high entry barriers, the market is fairly dynamic with several entrants and exits. This is especially the case among the smaller companies, where asset speculation is widespread and companies enter and leave the market on a regular basis. Among the dominant players, however, the market is characterized by stability and the largest companies have generally been in the market for many years.

The buyers are the E&Ps that are strong international players with considerable bargaining power. The market between the E&Ps and the drilling contractors is fairly separated, and only few E&Ps have integrated backwards in the value chain. These companies perform drilling operations in a limited number of specific oilfields, but don't compete openly in the market. Some drilling contractors integrate forward and do rig management on production rigs owned by the E&Ps, but this is not common either. The close connection to the E&Ps means that the drilling contractors are very sensitive to political currents. If investments in the oil and gas sector fall, the drilling contractors are some of the first to be affected. This could be a result of falling prices on oil and gas or of geopolitical developments. The current situation in Russia has closed the market for several E&Ps, who have been forced to cancel their contracts with a number of drilling contractors. This has left several rigs open in the market and has forced prices down.

There are no direct threats of substitutes, as the services provided by the offshore drilling contractors cannot easily be replaced. The E&Ps – on which the Drilling Contractors are totally dependent – are, however, very exposed to substitute products in the form of alternative energy sources. The political currents and technological development thus affect investments in various energy sources. Geo political changes, technological development, and energy security issues can change supply of and demand for various energy sources, so can concern about global warming and air quality. The recent shale gas development in the US is a good example of how the introduction of a new technology has influenced the global supply pattern and contributed to the falling oil prices.

The market for drilling contractors has two key suppliers: (1) The shipyards engaged in rig construction and maintenance and (2) the equipment suppliers. Today, Korean and Singaporean shipyards dominate the rig-building market for deep-water and jack-up rigs. The two Singaporean companies – Keppel Corporation and SembCorp Marine – account for about 70 percent of the market for production of jack-up rigs and dominate the market for semi-submersibles. However, the Chinese Shanghai Waigaoqiao and China Rongsheng Heavy Industries have also begun securing orders. The intense price competition between the construction yards means that these suppliers have a weak bargaining power.

The suppliers of specialized drilling equipment are mainly American and European companies, the largest of which include National Oilwell Varco (US), MHWirth (Germany), GE oil and gas (US), and Cameron (US). The following section examines how one of the leading drilling contractors – Mærsk Drilling – has positioned itself within this market.



Photo: www.maersk.com/press-room

MÆRSK DRILLING – A GLOBAL PLAYER IN THE HIGH QUALITY NICHE

KEY FIGURES 2014: Employees: app. 4.000, Turnover: \$ 2.1 billion, Profits: \$ 478 million.

- Born global
- Focus on the harsh environment and ultra-deep water segments
- High quality niche with focus on product development

Mærsk Drilling was established as an international drilling contractor in 1972 and is the only Danish drilling contractor. Today, the company is one of the four main activities in the A.P. Møller Mærsk Group and among the six largest drilling contractors in the world.

As the market for offshore drilling is transparent and characterized by intense price competition, it has become increasingly important to increase competitiveness and find niches in the markets. In order to differentiate from the competitors, Mærsk Drilling has focused on the niche for innovative high-class rigs and drill ships. The company has invested in one of the newest and most innovative fleets in order to stay in the high-class segment. The rigs are designed in-house, whereas many competitors use more standardized rigs. This strategy allows Mærsk Drilling to operate in some of the most challenging areas in the world and live up to the strictest standards.

Mærsk Drilling mainly operates in two segments: (1) Harsh environment and (2) ultra-deep-water. The company is the largest jack-up operator in the Norwegian part of the North Sea and the majority of the activities are situated in this area. In 2009, the company entered the ultra-deep-water segment and today, Mærsk Drilling has semi submersibles and drill ships operating all over the world including Egypt, the Caspian Sea, Gulf of Mexico, Angola, and Cameroun.

The customers are international E&Ps including BP, Shell, Petronas, Statoil, ConocoPhillips, Exxon Mobile, Chevron, Talisman, and Total. These are powerful companies and Mærsk Drilling is dependent on their investments in new wells. In order to counter customer power, Mærsk Drilling is engaging in a number of development projects with customers. These joint projects make it harder for customers to switch to competitors. The Wire Drill Pipe project, which allows the drilling equipment to analyze subsurface data, is carried out in cooperation with Total and the 20K project is made in cooperation with BP. Mærsk Drilling is also preparing for a possible future market in the Arctic region, which has some of the most harsh and difficult conditions. The company has thus engaged in a development project with Exxon Mobile and Rosneft which aims at developing an all-year drilling concept with an ice management system that allows for drilling in ice that is 4 meters thick. Joint R&D-projects are thus an important way to develop services that allow the company to differentiate itself from the competitors.

The main suppliers of vessels and rigs are shipyards in Singapore and Korea such as Keppel and Daewoo. The drilling equipment is mainly provided by American and European companies. National Oilwell Varco in Texas, MH Wirth, and GEW are important suppliers. The relation with the equipment suppliers is close and extends to after sales service agreements, training of personnel, spare parts, joint product development programs, etc. Some key suppliers even have employees permanently stationed at Mærsk Drilling, in order to solve everyday problems quickly. Even if there are only a few major suppliers of drilling equipment and the companies work closely together, Mærsk Drilling is not exclusively dependent on one supplier.

Mærsk Drilling has less influence on the remaining equipment for the rigs and drill ships, e.g. lifesaving equipment, pumps, engines, etc. Rigs and ships are generally being delivered as turn-key from the shipyard and all negotiations with sub-suppliers are carried out by the shipyard, which can choose from two or three suppliers on the makers list.

THE GENERAL MARITIME/LOGISTICS SUPPLIER

The general maritime/logistics suppliers are characterized by non-value chain specific competences, which can be used in a number of ocean-based industries, provided that they have the necessary equipment. Many of these companies have entered the offshore industry from other maritime industries including shipping, fishing, etc. Most Danish maritime suppliers have developed their business around the domestic market, but have increasingly expanded to new geographic locations. A company like Esvagt is a good example of this development.

The non-value chain specific competences have allowed several logistics providers to enter new areas of business in the past years. Blue Water Shipping has expanded from the transportation of general goods (which is still their main area of business) into wind turbine logistics and offshore logistics. Esvagt has recently expanded from stand-by services in the oil and gas sector (which is still their main area of business) into offshore wind. And World Marine Offshore (which was established by former Esvagt-employees) has established a business for near shore transit in the offshore wind sector.

The fact that the maritime and logistics suppliers are characterized by non-value chain specific competences doesn't mean, however, that they are equally competitive in all ocean-based value chains. The Danish company A2SEA focuses exclusively on wind turbine installation and is highly competitive in this market. The company could potentially fill a gap in the order book by performing other tasks, e.g. oil rig decommissioning, harbor construction, etc., but is less competitive in these markets. It could thus be argued that the company should be categorized as a specialized supplier. As most of its competitors, however, are also engaged in other sectors, it has been decided to categorize it as a general maritime/logistics supplier.

The following sections examine the markets for wind turbine installation, stand by services, and offshore logistics and how A2SEA, Esvagt, and World Marine Offshore have positioned themselves in these markets.

MARKET STRUCTURE: THE MARKET FOR WIND TURBINE INSTALLATIONS

The installation of offshore turbines is usually contracted to a specialized turbine installation company. The market is currently concentrated in the countries along the shores of the North Sea. As a result, the main actors are based in Denmark, UK, and the Netherlands. Even if the knowhow base and operations are still situated in countries around the North Sea, the ownership of the companies is becoming increasingly global. One of the major operators, Seajacks, is owned by a Japanese equity fund and another major operator, Swire Blue Ocea, is headquartered in Singapore.

The market for installation of offshore turbines is rather undifferentiated and price competition is fierce. From 2008 to 2010 the market was booming and several new companies entered the market. This happened despite the high entry barriers which include: (1) Investments in equipment and (2) investments in building an adequate knowhow base and organization. Most entrants were large companies with activities in offshore oil and gas. In 2010, however, the market turned. This led to increased consolidation and specialization as several companies tried to exit the market. These included Technip, Hochtief, and Ballast Nedam.

The customers are the public and private energy companies, who operate the wind farms. The boundary between operator and installer is not always clear, as several operators are also engaged in installation. DONG Energy is thus a majority shareholder in the market leading offshore wind turbine installation company A2SEA. The dependency on energy companies and the level of (public) investments in offshore windfarms mean that the installation companies are very reliant on the policy making of the states. Even if the customers are large companies with considerable bargaining power, the ability to move into other sectors reduce the customer dependency of the installation companies.

On the supply side, the main suppliers are: (1) The shipyards that build the installation vessels and (2) the equipment suppliers that provide the necessary equipment. Today, the shipyards are mainly positioned in Asia. With regard to the

equipment suppliers, the picture is murkier. Most suppliers have thus disaggregated their value chains over several locations in order to benefit from location specific competitive advantages. The fierce price competition among shipyards and marine equipment manufacturers means that the installation companies have considerable bargaining power towards their suppliers.

A2SEA - FROM PIONEER TO MARKET LEADER

KEY FIGURES 2014: Turnover: DKK 1.05 billion, Profits: DKK 234 million, Employees: 403.

- From pioneer to market leader
- Expansion in the North Sea Area
- Competitiveness through specialization

A2SEA was established in the Danish city of Fredericia in 2000, as one of the pioneers in the market for offshore wind turbine installation. Today, the company has a market share of app. 50%. In 2009, DONG Energy became majority shareholder in the company with 51% of the shares, while the remaining 49% of the shares are owned by Siemens. Since 2012, A2SEA has also been engaged in cable installation when the company became majority shareholder in CT Offshore.

A2SEA can best be characterized as a combination of a project shipping company and a contracting company. The market for wind turbine installation is rather undifferentiated and price competition is fierce. In order to compete in this market, it is imperative to have high productivity. Installing a windfarm includes many repetitions and it is important to know exactly how you do it in the most efficient way. A2SEA has focused exclusively on offshore wind, while many competitors are also engaged in other areas. Installation of windmill foundations, cables, and windmills accounts for app. 95-98% of the company turnover. The remaining 3-5% include replacement of key components, cargo transfer, maintenance, and accommodation. This focus has allowed the company to build a knowhow base and organization that is tailor-made for turbine installation.



Photo: www.a2sea.com/w-content

A2SEA's main customers are the windfarm operators. DONG, owning 51% of the company, is a major customer, but the customer portfolio also includes other European energy companies like Statoil, Statkraft, and RWE. The company was originally built up around the Danish market but today, it has gradually expanded its activities to other areas around the North Sea, and has recently got its first contract in Asia. Currently, UK is the largest market followed by Germany, the Netherlands, Belgium, and Denmark.

On the supply side, the large installation ships are built in China while the smaller ships for crew transfer have been built in Denmark. When it comes to equipment, A2SEA has mainly installed components from northern European producers. This is mainly because these suppliers have the highest level after sales services in the North Sea area.

The company has in-house ship management, which takes care of crew management, technical management, and HSEQ. Currently the ships are mainly crewed with Danish sailors. The company has, however, experienced problems with finding the right people, as it is difficult to go from conventional shipping into this very specialized segment.

A2SEA has a close cooperation with several large players in the value chain. The most important ones are the owners DONG Energy and Siemens, but the list also includes several other wind turbine, - and equipment producers. On the supply side, there has been less product development, mainly with the Danish shipyards during the construction of the vessels for crew and cargo transfer.

MARKET STRUCTURE: STAND-BY SERVICES IN THE OIL AND GAS SECTOR

The market for stand-by service providers is fairly standardized and undifferentiated. In the North Sea area the market consist of a number of companies with exclusive focus on this market and a number of larger companies that are mainly engaged in other activities, including supply services and anchor handling, but provide stand by services as a side activity.

Stand-by operators mainly compete on price and quality. The latter includes the number of operation days which determine to what extent the customers can perform various activities (repairs, helicopter landings etc.) but also the safety profile of the stand-by service provider. Price competition is fierce, even if several companies try to differentiate through improved service.

During the 1970s and 1980s the entry barriers were low and in the Danish part of the North Sea many fishing vessels entered the market for stand-by services. Today the sector has been consolidated and is characterized by high entry barriers and there are not many entrants and exits in the market. Investments in vessels pose one barrier. Training and recruiting crew with the right competences is another.

The main customers are the Exploration and Production companies, who extract the oil and gas from the underground but also the drilling contractors. These are large and powerful actors with considerable bargaining power, but there are several to choose from. The fact that the general maritime/logistics suppliers have competencies that can be used outside the offshore oil and gas sector, furthermore means that they are not exclusively dependent on the E&Ps.

The main suppliers are the shipyards, who build and maintain the ships and the suppliers, who deliver the equipment. As most logistics providers are small companies, it is not uncommon that ship management has been outsourced to third parties, in order to achieve economies of scale and improved training and recruitment of personnel.

The market for offshore stand by services is not threatened by substitute products. Stand by services can only be carried out by specialized shipping companies, and once the production platforms have been installed they need to be serviced. New sources of energy may, however, influence investments in oil and gas extraction and thus affect the market for stand-by services in the long run.

ESVAGT - EXPANSION FROM THE HOME MARKET IN THE HIGH QUALITY SEGMENT

Key figures 2014: Turnover: DKK 943 million, Profits: DKK 252 million, Employees: 850.

- Expansion from Danish home market to Northern Europe
- Migration from oil and gas to offshore wind
- Competitive edge through quality

Esvagt was founded in 1981 in the Danish town of Esbjerg by two fishermen and a navigator from A.P. Møller. By that time, stand-by services in the Danish sector was mainly carried out by refitted British trawlers. The entrepreneurs, however, decided to enter the market and won a contract with DUC. In 1991, the Danish shipping company Svitzer bought 50% of the shares in Esvagt. Until the late 1990s, Esvagt operated in the Danish part of the North Sea sector with DUC as the major customer. In order to reduce its dependency of one customer and one market, Esvagt began expanding to areas outside the Danish sector, in the early 2000s. Today, the company is a dominant player in the Danish and Norwegian parts of the North Sea and the company has recently expanded into offshore wind (Hahn-Pedersen & Guldberg, 2006).

Esvagt provides a wide range of services to the E&Ps. The main business area is the provision of standby and ERRV (Emergency Response and Rescue Vessel) duties. In order to avoid human injuries or death, oil spills, and other accidents that may affect the marine environment, there is a requirement for provision of safety contingency for offshore installations and drilling rigs in the oil and gas industry. The ERRV vessels thus have capacity to combat oil spills and a more extensive support can be provided by multirole vessels. The company also provides tanker assistance during hook-up to the oil fields, anchor handling assistance, and rig moves. The multirole vessels furthermore have capacity to perform supply duties. For a couple of years, Esvagt has provided inter-oilfield transfers of cargo and personnel.



Photo: www.esvagt.com/news/press-information

The general maritime and logistics competencies of the company have furthermore allowed Esvagt to expand into the growing offshore wind sector, where it provides accommodation and transfer of personnel to remote offshore windfarms. This is especially relevant when the oil price is falling and investments in new oilfields are postponed. It furthermore makes the company less dependent on few customers.

Within the market for stand-by services, Esvagt has positioned itself in a high quality segment. Several competitors, especially in the UK sector, try to compete on price. In order to avoid the most fierce price competition, Esvagt has pursued a strategy of delivering a higher quality of service. The number of operation days is a key factor in this regard and is especially important in the harsh-condition segment in the North Sea. The company furthermore aims at delivering a higher level of security. This allows Esvagt to operate in some of the most difficult areas in the world and may provide a good offset to enter other challenging areas like the Arctic.

The company has established itself on the Danish market, but has gradually expanded to other locations. Today, Esvagt has almost 100% market share in the Danish sector and about 40-45% in the Norwegian sector. The company has recently entered the UK sector, which is the largest sector in the North Sea. As already mentioned, these are different markets. In the Danish and Norwegian sectors, high quality is a key factor for achieving a competitive advantage. In the UK the market is more characterized by price competition. Denmark, Norway, and UK are strategic markets. Most of the installations for production of oil and gas in the North Sea are around 20 years old and will need extensive maintenance and refitting. This may pose some opportunities for the company. By entering markets in other geographical areas, the company also spread the risk as it becomes less dependent on one market.

Apart from the strategic markets in the North Sea area, Esvagt is also engaged in a number of opportunity driven operations where the company follows the customers to new locations. At the moment, the company thus also has vessels stationed in Senegal, Egypt, Gran Canaria, and the Barents Sea.

Finally, Esvagt has recently entered the market for logistics services in offshore wind, which has been growing rapidly in the past years. The competences needed to provide stand by services in the oil and gas sector can thus easily be used to provide offshore windfarm logistics, provided that the company has the right equipment. Esvagt is currently providing services in Germany and from 2016; the company will also be entering the UK market.

In the oil and gas sector, Esvagts customers are the E&Ps that produce the hydrocarbons. Esvagt service all the operators in the Danish sector and another app. 15 E&Ps in the Norwegian sector. The company is thus not dependent on a few large operators. The contracts may vary from a few weeks to 1-3 years. In some cases, long term contracts of 8-10 years are concluded but this is uncommon.

Suppliers include the shipyards providing the vessels and equipment suppliers. When building a ship, the company usually contract with a Norwegian design company. When selecting the shipyard, several factors are taken into account including price, quality, delivery security, etc. In the past years, the company has used shipyards in Spain, Singapore, Norway, and Turkey depending on the type and complexity of the individual ship. The design company will often suggest which equipment suppliers should be used, as company specific products are thought into the design of the vessel. This means that several suppliers are Norwegian.

In contrast to many other stand-by service operators, especially in the UK, Esvagt has in-house ship management. Even if it may be more expensive than outsourcing ship management, the Esvagt management assesses that it provides a competitive advantage with regard to quality.

Esvagt has close connections with customers and suppliers. Product development with the customers is often initiated when a customer asks for certain services in a tender and Esvagt develops a solution. In some cases, Esvagt may also approach a customer with a certain solution that the company expects the customer to demand. Large customer specific ships are always contracted before they are ordered, while smaller and more general ships may be built on speculation.

Esvagt also has product development with equipment suppliers. According to the top-management, this type of cooperation is, however, becoming less and less common as the Danish equipment industry is becoming increasingly internationalized and production is moving to low wage countries.

MARKET STRUCTURE: PROVIDERS OF LOGISTICS SERVICES IN OFFSHORE WIND

The market for offshore logistics providers in the wind turbine sector can generally be divided in two segments: Near shore and offshore. Windfarms situated near shore are usually serviced by small personnel transfer vessels that operate on day-to-day shore transit from a nearby port. Windfarms situated far from the coast are serviced by larger offshore support vessels that are semi permanently stationed at the windfarm. These vessels are typically equipped with advanced personnel access systems, cranes, workshops, a helideck, and accommodation for about 50 people (BVG Associates, 2014). Esvagt has recently entered the market for offshore supply services, while World Marine Offshore operates in the near shore market.

The market for nearshore logistics providers has been growing rapidly, in the past years. The services are fairly standardized and undifferentiated and the market is characterized by low entry barriers. You basically need a boat and a crew in order to enter the market. The rapid growth and the low entry barriers mean that many new actors have entered the sector, in the past years. The market is thus very fragmented and characterized by many small players. This has led to fierce price competition, especially on the short contracts. On the long contracts, other factors such as the number of operation days and the degree of local content are more important. The future will probably see a consolidation and increased specialization similar to the one that has taken place in the oil and gas segment. The market for windfarms situated far from land has not experienced the same growth. The entry barriers for this market are higher than for near shore shipping, as the ships are larger and need more expensive equipment.

The market for offshore wind logistics is not threatened by substitute products, as it is the most economical way to service the offshore turbines.

The main customers are the companies who oversee the maintenance. This may be the energy companies, but more often it is the turbine manufacturers. These companies are large and have strong bargaining power, especially on the short term contracts. Even if the offshore logistics suppliers are dependent on the energy companies and turbine manufacturers, they are not as dependent on changes in energy investments and geopolitical changes as their customers. Once the wind turbines have been installed, they require regular maintenance despite changes in the national energy policy. A main threat is, however, that the buyers may decide to integrate backwards. It is thus not uncommon that energy companies buy a part of an offshore shipping company as has been seen with Esvagt (A.P. Møller Mærsk Group) and A2SEA (DONG).

The main suppliers are the shipyards, who build and maintain the ships and the suppliers who deliver the equipment, but many logistics providers also use ship management companies for crewing and technical management. The bargaining power of the shipyards depends on the type and complexity of the vessel. The market for standardized ships is thus characterized by several companies and intense price competition. With regard to the construction of more complex vessels, however, only few yards have the necessary competencies and their bargaining position is thus better. As most logistics providers are small companies, it is not uncommon that ship management has been outsourced to third parties, in order to achieve economies of scale and improved training, recruitment and technical management.

20 WORLD MARINE OFFSHORE: A NEW ENTRANT WITH A NEW TECHNOLOGY

KEY FIGURES 2013: Turnover: DKK 10.4 million, Net Profits: DKK 2.9 million; Employees: app. 70.

- Market entry in offshore wind logistics with a new technology
- Establish a track record and diversify into the oil and gas sector
- Globalize operations by following the customers abroad

World Marine Offshore (WMO) was founded in Esbjerg in 2011 by entrepreneurs with a background in Esvagt. The company has a fleet of six support vessels and is owned by the management and a group of external investors. By 2013, the company has 12 onshore office employees and app. 60 sailors, who are hired through the ship management company NT-Offshore.

WMO has entered an undifferentiated market with low entry barriers and high price competition, especially on the short contracts. In order to differentiate from the competitors, the company pursues a strategy of providing a better performance than the existing players, but at the same price. In order to achieve this, WMO has entered the market with a new ship design, the Windserver, which the management expects will provide more operation days than the average competitor.

The company currently provides two main services: (1) Transfer of cargo and crew to offshore windfarms installations which is by far the largest activity and (2) guard and rescue operations which is a small side activity. In the future, the company wants to provide a complete service package that also includes diving and inspection services. These activities are, however, to be performed by sister companies, which will allow WMO to focus exclusively on the shipping activities. In October 2014, the first step in this strategy was taken when the owners of WMO bought a diving company.

WMO is currently very dependent on the North Sea market. As the company currently operates in German and Dutch waters, the main competitors are European shipping companies from the countries around the North Sea. At the moment, app. 30% of the WMO fleet is engaged in long term contracts with Vattenfall and Siemens, but the company expects the proportion of long term contracts to increase to app. 70%, over the next couple of years.

In the longer perspective, WMO aims at expanding its operations outside the North Sea. The WMO management also sees a potential in the oil and gas sector – depending on the future development in the sector. If it is proven that the Windserver design allows for an increased efficiency, the ships and competencies could possibly be applied to the oil and gas sector.

WMO's main customers are large multinational energy companies. Given the size of the customers, it is possible that these might at some point integrate backward in the value chain. It is not uncommon in the offshore wind sector that an energy company owns a certain proportion of a shipping company. This may create a stronger economic foundation for the company, but may also reduce flexibility.

WMO's suppliers mainly include the shipyards constructing the vessels, equipment suppliers, and the ship management company that provides sailors for the fleet. The ships have been built at the Fjellstrand Shipyard near Bergen in Norway. The Norwegian shipyard was one of few with the competences to build the Windserver-vessels. Another reason for selecting the shipyard was the attractive Norwegian export credit scheme, which was found more attractive than the Danish export subsidy schemes and the conditions of Danish Growth Fund. Today, several providers of stand-by services and offshore logistics are building their ships in Norway. These include Mærsk Supply Service, Esvagt, and WMO. With regard to the equipment suppliers, WMO has mainly contracted with the companies that offer the best after sales service agreements in the North Sea area.

The sailors are being recruited through the ship management company NT-Offshore, which is completely integrated with WMO. The company prefers to use Danish machine operators, navigators, specialists, etc., as the high quality of their skills gives the company a competitive advantage. Most of the seamen, however, are from the Philippines. Mainly because the management believes that they are more committed to the tasks than most Danish sailors and not so much because of the lower wage level.

Product development has been imperative for WMO. The ships are based on the Windserver design, which is developed and patented by one of the entrepreneurs. In 2011, the Windserver was one of the winning concepts of the Carbon Trust Offshore Wind Accelerator Access Competition. Powered by a set of four engines turning controllable pitch propellers, the vessels are equipped with ballasting systems, to shift between rough-weather mode and lightweight transit, and an integrated stabilizing-foil to beef up the hull while cutting maintenance costs. The Carbon Trust afterwards stated that the WS design would “dramatically improve” offshore and personnel safety during transfer, and estimates that the vessels will extend the window for offshore & maintenance activities from 200 days a year to app. 300 days. Recent industry analysis suggests that this improvement could deliver almost 4% cost reduction at wind farms by 2020.

At the moment, however, WMO face the same challenges as several other small and medium sized companies: The daily operations take up all the time and leave little time for further product development, even if the company has several ideas for future products. As an example, WMO wants to develop a battery propulsion system for the WS-ships, in order to achieve a greener profile. The existing batteries are too large and not sufficiently powerful and WMO would like to engage in a joint R&D project. The company has been in contact with a number of Danish equipment suppliers, but currently the project needs time and money. On the customer side, WMO knows that the customers demand a number of specific solutions, e.g. on how to attach the ship to the windmills, and WMO has the necessary technology. The company, however, lack the time and money for further development and testing.



Photo: Scanpix/Iris



THE GENERAL (OR 3RD TIER) SUPPLIER

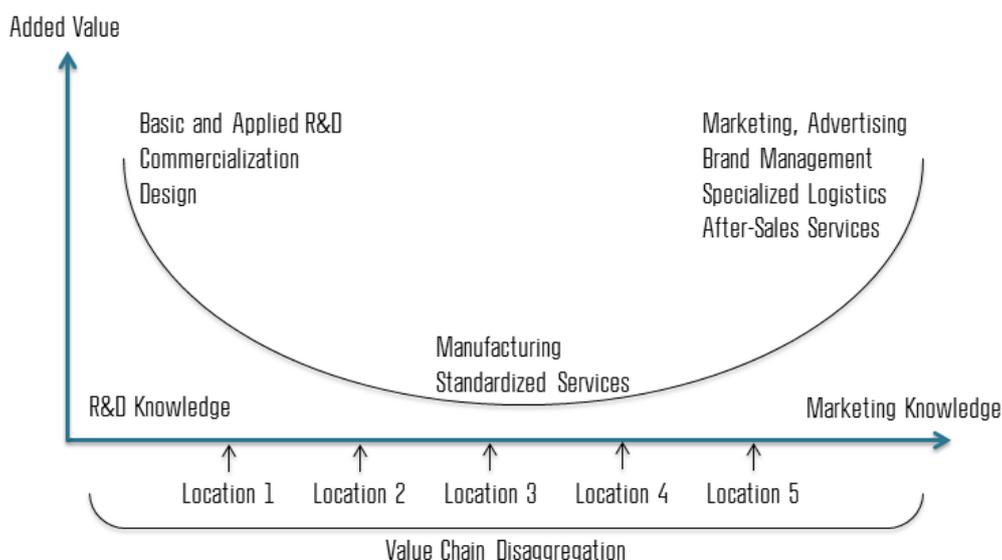
During the past decades, the maritime equipment supply industry has experienced several and extensive changes. Markets and supply chains have become increasingly globalized, the value chain is being sliced in order to take advantage of geographic competitive advantages, capturing the value is becoming increasingly important, and marine equipment has gradually evolved from low tech to high tech. The term equipment supplier is used deliberately instead of equipment manufacturer. A major point in this section is thus that equipment suppliers increasingly outsource or offshore manufacturing processes, and increasingly target high value added design and after sales activities.

FROM REGIONAL TO GLOBAL SUPPLY CHAINS

The past decades have seen an increasing move of manufacturing activities from developed countries to low wage countries. This development has also affected the offshore supply industry. In the offshore oil and gas sector, the construction of drilling rigs, drill ships, product platforms and installation vessels mainly takes place in Asia (Kaiser & Snyder, 2013). The offshore wind sector has not (yet) been exposed to industrial dislocation to the same extent, as the transportation of huge turbine elements over very long distances is not economic. Manufacturers of wind turbines and foundations for the offshore sector have thus located their manufacturing activities near the major markets, mainly around the North Sea. The manufacturing of (standardized) offshore vessels has, however, increasingly been moved to Asia.

The gradual move of manufacturing activities to low wage countries has also affected the 3rd tier equipment suppliers, who have increasingly outsourced or offshored their more standardized manufacturing activities. Apart from benefitting from lower wages, the suppliers also benefit from reduced time-to-market and closer customer relations (to shipyards, construction yards, etc.).

THE SMILING CURVE OF VALUE CREATION



Mudambi (2008): Location, control and innovation in knowledge intensive industries. In: *Journal of Economic Geography* 8

For most suppliers, this development has changed the value chain from regional supply networks to increasingly complex global supply networks. The value chain has been split up between numerous geographic locations, in order to benefit from the competitive advantages of each area. The high value added activities are mainly located in developed countries. This includes R&D, design, commercialization, marketing, brand management, specialized logistics, and after sales activities. Manufacturing activities and more standardized services have, however, increasingly been outsourced or offshored to developing economies. (Gereffi, 1999; Pyndt & Pedersen, 2006; Mudambi 2008).

The Danish pump manufacturer DESMI is a good example of this development. In 2004, the company established production facilities in Suzhou near Shanghai in China, in order to have the production close to the customers and to reduce production cost. The focus on Asia continued with the establishment of a subsidiary in Korea, in 2009, and in 2013, the decision was taken to move all manufacturing activities to China. Today, the company has 21 subsidiaries in 15 countries and the pumps and pumping solutions are sold to more than 100 countries. In 2012, DESMI furthermore established its own bronze foundry near the production site in China. By integrating backward in the value chain, it has become easier for the company to develop new products and the increased in-house knowhow on casting has strengthened DESMI's position when negotiating with other forgeries. The high value added activities are, however, still situated in Denmark.

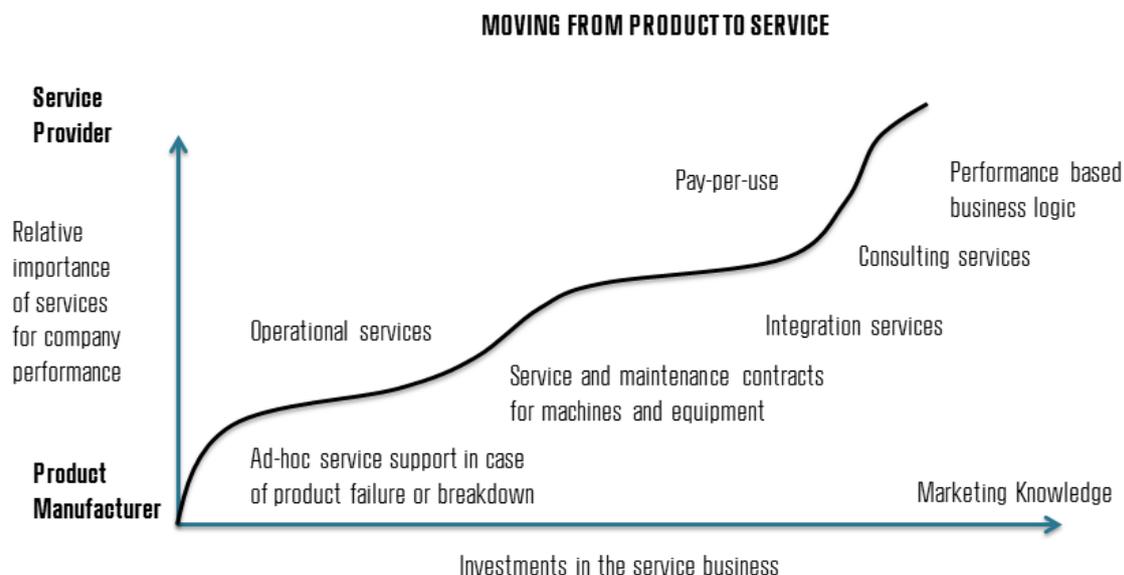
THE TRANSFORMATION FROM TRADITIONAL MANUFACTURER TO SERVICE PROVIDER

A second trend is the gradual transformation of most equipment suppliers from manufacturers to service providers. At a general level, suppliers of equipment for the marine and offshore industries target two markets. The first is a market for shipbuilding and rig construction. This market is mainly concentrated in Asia, near the major shipyards, but to some degree also in other parts of the world. The second market is a market for retrofit and after sales services. In the offshore sector, the markets for retrofits and after sales services are mainly located near the production areas. In the offshore oil and gas sector these areas mainly include the North Sea, the Gulf of Mexico, the Caspian Sea, the areas west of Nigeria, Angola in West Africa, and in the Persian Gulf. For the offshore wind sector, the main market for after sales services is situated around the North Sea (Offshoreenergytoday.com, 2010).

The disaggregation of the value chain between several geographic locations (and actors) has made it increasingly important for equipment suppliers to secure a large share of the value added. Where the low value added manufacturing activities are outsourced or offshored, the market for high value added retrofits and after sales services has become increasingly important for the equipment suppliers. By performing these activities, the supplier attempt to secure a larger share of the value added, which may otherwise be taken by other actors. The demand for after sales services has also increased. In the past decades, the crews on the ships and local craftsmen would take care of repairs, but the increased complexity of the spare parts and equipment means that these activities are increasingly being handled by specialized teams.

The types of after sales services provided by equipment suppliers have also changed gradually over time. Most suppliers have traditionally offered ad-hoc service in case of breakdowns or product failures. In order to capture a larger share of the value, however, some suppliers have begun to offer (life time) after sales service contracts for equipment and machines. Suppliers are also increasingly examining the prospect of providing financing schemes, operation monitoring, leasing of equipment, integrated consulting service, and pay-per-use agreements (Fischer et al., 2014). Many suppliers are trying to change the business model from providing a piece of equipment to providing a lifetime service. In doing this, the equipment supplier also creates a new (high value added) market for which he/she is the only supplier.

In order to be able to provide these new services, equipment suppliers are increasingly engaged in developing (new) systems for monitoring and operating the equipment. This means that the (high value added) activities in the input stage, such as R&D and design, have become increasingly important. For developing new types of monitoring systems new competences are needed. These systems are made by engineers and not by smiths. This means that equipment that is traditionally perceived as low tech (e.g. pumps) is increasingly becoming high-tech. The process poses several challenges for the suppliers: How to convince asset playing ship owners with a short investment horizon to engage in these contracts? Who owns the equipment? But it also offers new possibilities for the companies that can develop the right business model with regard to financing, service-network, legal framework, etc.



Avlonitis et al. (2014): Driving Competitiveness through Servitization

The (high value added) development activities in the input stage are furthermore characterized by increasing vertical and horizontal cooperation, where suppliers, customers, and sub-suppliers are engaged in joint projects. Product development is gradually moving from individual units to complete systems that are tailor made for the individual customer. Apart from a higher service level, this may also cause a lock-in effect as customer switching costs are raised. It furthermore gives the equipment supplier an opportunity to become the exclusive supplier on after sales services, which has also become an increasingly important way to capture a larger share of the value (Mudambi, 2008; Linden et al., 2009).

The following sections will examine the market for pumps and pumping solutions and exemplify how two Danish pump suppliers, DESMI and Iron Pump, have positioned themselves differently within this market.

MARKET STRUCTURE: THE MARKET FOR PUMPS AND PUMPING SOLUTIONS

The market for pumps and pumping solutions is one of the many markets in which offshore equipment suppliers operate. The market is fairly standardized and undifferentiated and customers can generally switch between suppliers. There are, however, different degrees of standardization and quality. At one end of the scale are (very large) companies with standardized product portfolios like the Danish pump manufacturer Grundfos. In the middle are companies with standardized products that can be modified to a certain extent, in order to meet the demand of the individual customer. The Danish pump manufacturer DESMI Pumping Technology is an example of a company in this category. At the other end of the scale are very specialized companies that have positioned themselves in a niche for unique high quality pumps mainly for European shipping companies. Among others, this category includes the Danish pump manufacturer Iron Pump.

The market for pump solutions is a fairly transparent and only few companies enter and leave the market. This is primarily a consequence of high entry barriers. Incumbents generally have a track record advantage that entrants lack. Another advantage for established players is that they have a much broader product portfolio than entrants. The customers often demand a variety of pumps, and it takes a long time to develop a broad product portfolio. In order to overcome these barriers, new entrants need to (1) enter the market with a new technology, (2) take over an established player (like Colfax did when they bought Alweiler, or like Wärtsilä did when they bought Hamworthy), or (3) depend on subsidies (like several Chinese companies that have entered the market in the past years).

Shipbuilding has historically been the most important market for many pump manufacturers and today, the main customers are shipyards in Asia. In the past years, however, the offshore sector has become increasingly important. Apart

from shipbuilding and rig construction building, maintaining power plants constitutes an important market for most pump suppliers. Suppliers have strong bargaining power, as the products are fairly standardized and there are several suppliers to choose between.

In order to increase time-to-market, and to some extent also to reduce production costs, many pump manufacturers have moved their manufacturing activities to Asia, in the past years. This, however, mainly includes the companies with a fairly standardized product portfolio. The more specialized companies are usually characterized by high linkage economies, which means that value is generated in the links between the different activities (e.g. between R&D, manufacturing and the sales force). For these companies, it is important to control several links in the value chain, as the costs of outsourcing or offshoring activities are too high. These companies have usually kept production in the land of origin. Most pump manufacturers have also expanded their sales and aftersales activities abroad, in order to enhance these activities.

The single most important supplier for the pump producers are the foundries casting the bronze. The suppliers generally have weak bargaining power, as there are several foundries and their products are fairly standardized. The pump manufacturers may pursue different strategies towards the suppliers depending on the business model. Some companies use local suppliers, while other companies use suppliers in low wage countries. Finally, some companies integrate backwards and establish in-house bronze casting facilities in order to control the value chain and maybe strengthen product development on the supply side.

Within this market, pump manufacturers may position themselves differently. The following section compares the strategies of two Danish companies, DESMI Pumping Technology and Iron Pump, who have been highly successful in the market for pumps and pumping solutions, but through very different setups. In 2011, DESMI A/S, the mother company of DESMI Pumping Technology A/S, was awarded the “Entrepreneur of the Year in Denmark” prize for its ability to embrace the global market, while Iron Pump was characterized as one of the “Hidden Champions” by the Danish Agency of Science, Technology and Innovation in 2014.

IRON PUMP: UNIQUE HIGH QUALITY EQUIPMENT PRODUCED IN DENMARK

KEY FIGURES 2013: Employees: 100, Turnover: DKK 134 million, Net profits: DKK 2,2 million.

- Niche strategy with 1:1 high quality products
- Bottom line focus
- Production facilities in Denmark

Iron Pump was founded in 1906 by C.G. Arnesen. The company is situated in Herlev near Copenhagen and produce pumps for the marine, offshore and energy sectors.

Business model, product differentiation and internationalization

As the market for pumps and pumping solutions is fairly standardized and undifferentiated, it has become increasingly important for companies to increase competitiveness and find niches in the market. In order to differentiate from the competitors, Iron Pump has positioned itself in a niche for unique high quality pumps mainly for European shipping companies. As a consequence, Iron Pump’s main competitors are not companies in Asia but other European companies, who are positioned in the same niche. The production of unique high quality products creates high linkage economies between different departments, which makes it is difficult to offshore and, unlike most pump manufacturers, Iron Pump has kept its production facilities in Denmark.

Shipbuilding has historically been the most important market for Iron Pump and today, the largest customers are shipyards in Asia. In 2010, the company entered the offshore sector which today, accounts for app. 20-25% of the turnover. Entering the offshore sector was a strategic decision based on the fact that: (1) Price competition is less fierce in this sector than in shipping and (2) the pumps are not very different from shipping. The offshore orders are generated

from a few large customers, mainly shipyards in Asia, and app. 90% of the pumps are exported. Apart from shipbuilding and rig construction, the energy sector is an important market.

Iron Pump sells most of its pumps through a network of local agents that also represents several larger pump manufacturers. This allows the company to be included in other companies' sales packages. Iron Pump's 1:1 niche strategy, however, also means that the company has a smaller product portfolio than many of the competitors. Iron Pump thus only delivers water pumps while pumps for oil has to be bought from others. The strategy of joint packages is especially relevant in the offshore sector where the orders are often larger than the average shipping package.

Iron Pump has recently established its first in-house sales office in Shanghai, in order to be closer to the main customers. This has proven to be very valuable as the personal contact is extremely important. The dialogue with the customer allows the company to tailor the exact pumping solution for a specific project.

After sales services

After sales service is currently a very limited activity for Iron Pump amounting to less than 2% of the turnover. The company is currently too small to have a global service. Instead, the company prioritizes having service technicians at the sales office to help the customers (shipyards) in the installation phase. This service makes the pumps more attractive. The company furthermore prioritizes examining incidents where a pump has broken down. Being in the high quality market, Iron Pump is very protective of its brand and it is imperative to examine and fix mistakes immediately.

Product development

Developing new products is becoming increasingly important for Iron Pump. Product development is, however, also one of the major challenges, because the company is too small to employ specialized full-time R&D engineers. As a consequence, R&D only makes up a small percentage of the investments and is often driven by legislation, e.g. the EU CE-markings which require the pumps to be more efficient.

While most Danish manufacturing companies have offshored production to Asia, Iron Pump has kept its production facilities in Denmark. There are two main reasons for this strategy: (1) Iron Pump is owned by a foundation and the foundation charter specifies that the main activities shall be located in Herlev and (2) the production of 1:1 products is very difficult to offshore or outsource to Asia. The company generally outsources mainstream products and focus on niche production instead. The location of the production facilities, however, also poses a number of disadvantages in the competition with other pump manufacturers. Apart from the higher wage level in Denmark, it takes 5 to 6 weeks to ship the products to China.

Bronze casting is by far the largest supply activity for Iron Pump and the past 15 years has seen major changes on the supply side. In the 1990s, the main suppliers were regional bronze foundries on Sjælland. Today, the suppliers include a Chinese agent, a foundry in Poland, and a couple of Danish foundries. For Iron Pump, it has become increasingly important not to be dependent on one supplier. Having several suppliers offers several advantages: (1) It increases the company's bargaining power, (2) it leads to reduced costs as some suppliers are more efficient than others depending on the specific task, and (3) having several suppliers help to secure delivery on time. The company always has at least two supply options for any specific order, so that a delay in e.g. China can be supplemented from a supplier in Europe.

Iron Pump aims at being among the 10 largest customers when dealing with subcontractors, in order to obtain good conditions. Iron Pump, to some extent, decides what sub-suppliers (foundries) the agent uses. It is thus important to avoid the same suppliers as large competitors that will be prioritized at the cost of smaller customers. Iron Pump has a continuous product development with all of its suppliers, as it is the link in the value chain where the largest profits can be made.

28 DESMI PUMPING TECHNOLOGY: GLOBAL EXPANSION AND FOCUS ON AFTER SALES

KEY FIGURES 2014: Turnover: DKK 400 million, Net Profits: DKK 57,5 million; Employees: 154 worldwide.

- Offshoring sales and production with focus on the medium-quality Chinese market
- Topline focus with increased focus on sales and expansion
- Product development and after sales services

Founded in 1834 as De Smithske Jernstøberier, DESMI A/S is one of the oldest existing companies in Denmark. In the past decade, DESMI has been transformed from a regional company engaged in casting, machining, and pump manufacturing to a global player engaged in a number of activities, ranging from ballast water treatment and oil spill response to international contracting and pumping solutions. Today, the pumping activities are concentrated in DESMI Pumping Technology, which is the main focus of this section.

Business model, product differentiation and internationalization

In the marine and offshore sector, DESMI Pumping Technology mainly operates in two markets: (1) A market for shipbuilding and rig construction which is mainly concentrated in Asia but to some degree also in Germany and Southern Europe and (2) a retrofit market which is mainly concentrated in Europe. The main customers in the first segment are shipyards in China, Korea, and Japan, while the main customers in the latter are shipping companies and offshore operators.

Historically, shipbuilding has been the most important market for DESMI Pumping Technology but in the past year, the offshore industry has become increasingly important. Today, app. 20% of the turnover is generated from the offshore sector. DESMI's large product portfolio means that the company can usually deliver app. 80% of the pumps for an offshore package.

In the past decade, DESMI Pumping Technology has evolved from a regional player to an international company with a global value chain. In 2004-2005, DESMI Pumping Technology established new production facilities in Suzhou near Shanghai in China. This was followed by the establishment of a subsidiary in Korea, in 2009, and in 2013, the decision was taken to move all manufacturing activities to Asia. The offshoring strategy has been driven by the dislocation of the shipbuilding industry from Europe to Asia. By establishing manufacturing activities in Asia, the company pursuing this strategy wants to reduce time-to-market, improve relations to customers, and benefit from lower wages.

The establishment of a global value chain is closely linked to the demands of the customers. The company has increasingly moved away from the high quality European niche market towards the larger Chinese market, which demands a more standardized product. In order to be able to compete on the Chinese market, it was imperative to reduce cost in manufacturing. This also means that DESMI's main competitors are not European companies but mainly Japanese and Korean pump manufacturers. The company has thus developed a product portfolio, which is so standardized that you can make a global supply chain and, at the same time, so flexible that you can adapt it to the customers demand. The increased focus on time to market, in the past years, is another reason for establishing production facilities in Asia. This is also the case regarding sales where DESMI Pumping Technology has pursued a strategy of establishing in-house representations close to the customers.

The topline focus of the mother company, DESMI A/S, over the past 10 years has led to an increase in turnover from DKK 300 million in 2004 to DKK 800 million in 2013. Today, the company has 21 subsidiaries in 15 countries and the pumps and pumping solutions are sold to more than 100 countries.

Offshoring the production activities to China has however also posed a number of challenges. Initially, DESMI Pumping Technology experienced problems with the quality from some suppliers. In order to gain further control of the supply side, DESMI Pumping Technology decided to integrate back in the value chain. In 2012, the company established its own bronze foundry near the production site in China. Integrating backward has made it easier to develop new products and the increased in-house knowhow on casting has strengthened DESMI's position when negotiating with other forgeries. Today, app. 80% of the bronze parts are produced in-house.

The increased demand for communication has been another challenge for DESMI Pumping Technology, and much effort has been put into integrating the company as “one global company”. Today, the administration has been centralized in three main locations in Chesapeake (USA), Shanghai (China), and Aalborg (Denmark).

The manufacturing activities that are being offshored to China mainly involve low-value added activities. The high value added activities, such as R&D and product development, are located in Denmark. Today, however, R&D, however, only makes up a small part of the costs.

The exclusive focus on high value added activities in Denmark also means that the company demands employees with new competences and skills. Earlier, the company mainly hired smiths and machining workers. Today, the increased focus on control systems and the general move from low-tech to high-tech, means that it is mainly electricians and IT-engineers that are sought for.

After sales services

DESMI Pumping Technology is mainly engaged in two types of aftersales services: (1) Demand for spare parts and (2) demand for maintenance and service. Both activities have been growing, in the past decade. The demand for spare parts because of the increased number of DESMI pumps running worldwide, and the demand for maintenance and services because these activities are increasingly being handled by teams and not by the crew on the ships.

Today, app. 20% of DESMI's turnover is generated from aftersales activities. These activities have historically been concentrated in Northern Europe, but as part of the globalization strategy, the company has recently established service centers in Singapore, Pusan (Korea), and Shanghai (China), and service activities are currently being set up in Dubai.

Product development

Product development has become an important way of differentiating from the competitor. Much focus has been given to the development of electronic control systems, which optimize the pumps and pumping systems during operation.

DESMI OPTISAVE is an example of this strategy. Most cooling water systems on-board are designed for operation in 32°C seawater. 95% of the time, however, ships operate in colder water, which means that the cooling system absorbs too much energy. So even if pumps are traditionally perceived as low-tech equipment, the attempt to differentiate means that it is becoming increasingly high-tech. This can be perceived as the first step on the path to turning the production of pumps into a total service activity.

In the past, DESMI Pumping Technology has mainly conducted product development programs with its major customers, i.e. shipping companies, large district heating plants, or major industrial players. The main purpose has been to tailor the product portfolio to the customers' needs but, to some extent, also to integrate with the customers.

It has become increasingly attractive for smaller clients to engage in joint projects with DESMI Pumping Technology. One reason is that DESMI Pumping Technology has already completed several projects and thus has become more experienced and professional in this regard. Another reason is the expansion of the company, in the recent years, which means that DESMI Pumping Technology is better able to carry the project through. At the same time, however, product development with the larger clients has become more difficult, because many of the customers have become increasingly complex.'



CHALLENGES AND OPPORTUNITIES FOR THE OFFSHORE SUPPLIERS

As shown in the previous sections, the offshore supply industry consists of a multitude of actors operating in very different markets. Even so, there are a number of challenges and opportunities that most offshore suppliers have in common. The following challenges and opportunities have been identified through interviews with top management of various Danish offshore suppliers.

CHALLENGE 1: UNCERTAINTY ABOUT ENERGY INVESTMENTS

The offshore supply industry is very dependent on investments in the energy sector. In this regard, the energy companies (and the states) are the main drivers in both value chains (offshore oil and gas and offshore wind). The level of investments depends on a number of interrelated factors including supply and demand of different sources of energy, geopolitical changes, energy policy, energy security, etc. In the long term, the technological development may influence investments as new sources of energy become competitive. In the oil and gas sector, the extraction of shale gas is one example, in the sustainable energy sector the development of solar plants is another.

For most suppliers, the uncertainty about energy investments is considered a major challenge. Changes in the level of investments in the two value chains mainly affect suppliers who are: (1) Direct suppliers to the energy companies, (2) engaged in the installation-phase, and (3) have value chain specific competences.

This means that the specialized offshore suppliers, drilling contractors, offshore turbine installation companies, etc., are usually the ones that are most affected by the geopolitical development, energy policy, and changes in the price of various energy sources.

In the oil and gas value chain, there are several examples of geo political controversies affecting specialized offshore suppliers. In March 2015, the state owned Russian E&P, Rosneft, cancelled a \$150 million contract with the offshore driller Northern Offshore, due to the Western sanctions against Russia (Offshore Energy Today, 2015). There are also several examples of a falling oil price (resulting from a change in supply and/or demand) leading to the cancellation or postponement of investments. In May 2015, Shell, Total, and A.P. Møller-Mærsk postponed investments in the Bonga- and Chissonga-fields in Western Africa (EnergiWatch, 2015). A falling oil price will initially affect investments in the most expensive and difficult oilfields. This also means that it is the most specialized, high-niche suppliers with newest and most expensive equipment who are affected first.

The wind energy sector is in many ways even more sensitive to energy political changes, as the sector is extremely dependent on (public) investments. In order for the sector to grow and attract private investments, a clear political long-term investment strategy is imperative, as day-to-day decisions creates uncertainty and scare off (private) investors.

The group of general maritime and logistics suppliers, supply service operators, stand by service operators, freight forwarders, haulage providers, etc., are also affected by falling investments, though not to the same extent as is the case with the specialized offshore suppliers. The maritime suppliers are often engaged in maintenance and operations activities, which are less affected by changes in investments, compared to the actors who are engaged in the installation phase. The high level of fixed costs means that established production platforms and windfarms continue to operate (almost) regardless of the energy prices, whereas investments in development of new oil fields or windfarms are immediately affected. The general maritime and logistics suppliers can furthermore use their competences in other value chains. e.g. move from offshore oil and gas to offshore wind or vice versa, and thus become less dependent of investments in one value chain.

The group of general (3rd tier) suppliers is the least affected by energy policy, geopolitics, and changes in the price of various energy sources compared to companies in the two categories mentioned above. For most suppliers in this group,

the offshore sector only accounts for a part of their turnover. Most suppliers are furthermore situated in several links of the value chains, not only in the installation phase but also in the operations phase, which is less affected by falling investments. Finally, most general (3rd tier) suppliers are increasingly engaged in after-sales-services, which is also tied to the operations phase.

CHALLENGE 2: HOW TO CONTINUOUSLY DIFFERENTIATE FROM THE COMPETITORS

Staying competitive is a fundamental challenge for all companies. It is often achieved through price competition and product differentiation. Price competition is a general parameter all companies have to face. In this regard, companies situated in low-wage countries have an advantage to competitors in countries with high wages. For companies situated in high-wage countries, it has thus become increasingly important to differentiate from competitors (Baines et al., 2007).

Mærsk Drilling is an example of a specialized offshore supplier that has positioned itself in a high quality niche, in order to avoid competing directly with the more standardized drilling operators. This strategy allows the company to operate in some of the most challenging areas of the world, but also demands continuous product development.

A2SEA is categorized as a general maritime and logistics supplier, even though the company could rightly be categorized as a specialized offshore supplier. The main reason for this categorization is that the company operates in a market where most of its competitors are engaged in several other (maritime) value chains. A2SEA, however, differs from its competitors by acting as a specialized offshore supplier. The company has decided to focus exclusively on turbine installation and has structured its entire organization specifically for this purpose. This focus allows the company to compete on price.

For the more traditional general marine suppliers, however, competitiveness is often achieved by providing a better service than the competitors and not exclusively on price. For companies like World Marine Offshore and Esvagt, the number of operation days is a decisive parameter. World Marine Offshore has pursued this strategy through in-house product development. Esvagt differs through a combination of skilled crews, in-house product development, and continuous training. Whether to compete on price or quality, however, also depends on the customers and type of activity. In the Danish and German parts of the North Sea, most operators value better service over lower price. In the UK market, however, price is much more important.

For the general (3rd tier) suppliers, there are several different strategies for becoming competitive. Iron Pump differs from the large medium quality pump producers by positioning itself in high quality niches. DESMI Pumping Technology attempts to stay competitive through a combination of price competition and differentiation. By developing new high-tech products, the company is pursuing a servitization trend that allows it to differentiate itself from its competitors. DESMI Pumping Technology furthermore attempts to reduce costs, by dislocating the manufacturing activities to low wage countries near the main customers. This strategy, however, leads to a number of organizational challenges, which will be examined in the next section.

CHALLENGE 3: ESTABLISHING A GLOBAL ORGANIZATION

Having an optimal organizational setup is important to all companies. In the past decades, however, the dislocation of manufacturing activities to low wage countries has had extensive organizational consequences for most maritime suppliers. Today, most ships are being built in Asia and several maritime suppliers have offshored a number of activities to countries near the major shipyards. This is especially the case for manufacturing companies, whereas service providers have not been exposed to this development to the same extent.

In the past decades, a number of companies in the traditional maritime nations have evolved from regional companies to global players. The expansion strategy has several drivers. By establishing a global value chain the companies hope to achieve: (1) Reduced time to market, (2) closer relations to customers, and (3) lower production costs. The establishment of a global value chain is, however, not without problems. Apart from the ramp up effects that often follow the establishment of a global value chain, many companies may experience a number of difficulties.

The first challenge when transforming a regional player into a global player is to gain support from the employees. When establishing a global value chain, the manufacturing activities are usually dislocated to low wage countries and this may cause resistance within the existing organization. Second, when having an organization in different places, with different cultures and different people, it may be a challenge to create a sense of unity. Third, the company may experience problems coordinating the global activities. A particularly important aspect of value chain organization concerns not its constituent activities per se, but the linkage between them. Design activities may become more efficient if they are closely linked with the manufacturing activities, since information may flow more readily between units within a single firm. These linkage economies arise from the linkages between the different activities in the chain (Mudambi, 2008).

The key to avoiding these challenges is constant communication. Internal marketing should explain the benefits of pursuing the globalization strategy for the entire company, in order to create an employee-pull effect. The use of online communication platforms and exchanges of employees across geographic locations should be used to create a sense of unity within the company. And finally, facilitating constant communication across departments is vital in order to avoid linkage problems.

CHALLENGE 4: PRODUCT DEVELOPMENT

One of the most common ways for companies to differentiate themselves from competitors is through continuous product development. This has, however, become increasingly difficult for several reasons.

First, the increased globalization and consolidation within the maritime industry means that it has become more difficult to establish joint development projects. This is the case with regard to both vertical and horizontal cooperation. Suppliers and customers have increasingly complex organizations that may be difficult to navigate. The industrial dislocation across continents has only served to increase this complexity.

The second reason mainly relates to small and medium sized enterprises (SMEs). Several of these companies perceive the size of their organization as an obstacle to product development. First, most SMEs will have to allocate most resources to the daily operations, which leaves no time for further product development. Second, most SMEs don't have enough tasks to justify hiring full time engineers. Third, due to their size, new research projects involve a certain risk. SMEs will have to choose their business areas carefully and are thus reluctant to launch development projects that may not lead anywhere.

There are several suggestions on how to overcome these challenges. Industrial consultants may act as intermediaries, who can connect the relevant companies and knowledge institutions, as well as facilitate open innovation. These intermediaries could furthermore assist the companies with knowledge on how to achieve funding for R&D projects etc. The latter is especially important with regard to the SMEs that may not have these resources in-house. Establishing a pool of researchers to be shared among companies and/or research institutions may be another way to overcome this problem. This may, however, lead to new difficulties. University researchers and private companies may e.g. have different goals, and problems with confidentiality may also occur.



OPPORTUNITY 1: PRODUCT DEVELOPMENT

The opportunities for the (Danish) offshore suppliers are in many ways closely linked to the challenges that were mentioned in the previous pages. Product development is considered a challenge for most offshore suppliers. It is, however, also perceived as a major opportunity.

For Mærsk Drilling (a specialized offshore supplier) continuous product development is an important tool to differentiate itself from the competitors and position itself in a high quality niche. For World Marine Offshore (a general maritime/logistics supplier) product development has proved to be equally important. The development of the Windserver design is thus a key element in their strategy to provide a better service.

For manufacturing companies, the development of new products furthermore allows the companies to follow the servitization path. A servitization strategy may allow the company to: (1) Differentiate itself from competitors by providing specific services, (2) generate a steadier stream of revenue and thus become less affected by the economic cycles, and (3) perform high value added activities while outsourcing low value activities.

DESMI Pumping Technology is an example of a company that has begun a gradual transition from a traditional manufacturer to a more service oriented company. By increasing its focus on electronic supervision of the pumps, DESMI Pumping Technology also shapes the market forces in its favor, by creating a new after sales market for the company. Because pumps are traditionally a piece of low-tech equipment with few wearing parts, there is a natural upper limit for the demand for after sales services on them. By developing monitoring systems for the pumps, however, DESMI Pumping Technology turns pumping solutions into high-tech equipment, and thereby creates a new market for monitoring services. The company is thus increasingly turning the sale pumping solutions into a total service (which also includes the equipment produced by the company).

The servitization strategy is complex and poses several challenges, especially within the marine and offshore segments. A key challenge is the legal model. Who owns the ship/rig and what happens with the service contract if it changes owner etc. Servitization may, however, offer an opportunity for suppliers that can develop the right business model with regard to financing, monitoring, repairs, legal issues, etc. Companies in neighboring industries have successfully implemented this concept, e.g. Burmeister & Wain Scandinavian Contractor in the market for diesel power plants.

OPPORTUNITY 2: ENTERING NEW MARKETS

Expanding to new geographic locations is perceived as a major opportunity for most offshore suppliers. The specialized offshore suppliers (e.g. drilling contractors) and the general maritime and logistics supplier (e.g. offshore installations companies, stand-by service operators, and supply service operators) are very dependent on the energy companies and will usually follow them to new markets. In September 2015, A2SEA became the first European offshore wind contractor to install turbines in Asia, when it signed a contract to install two turbines on the Taiwanese Formosa 1 project. In the oil and gas segment, the arctic region may prove a future opportunity for actors in the high-quality niche, who have an advantage when it comes to operation under strict standards and in harsh conditions such as the North Sea.

Entering new markets is also perceived as a huge opportunity for the general (3rd tier) suppliers. For DESMI Pumping Technology, entering the Chinese market is perceived as a huge opportunity. Iron Pump has also had great benefits from establishing a sales office in China. The establishment of additional sales offices near the main customers may have similar positive effects on sales. It may even be possible to include service technicians to help the customers (shipyard) in the installation phase and provide after sales services. Time to market is also becoming increasingly important. If a company can establish assembly facilities near the main customers (and near the suppliers) it could reduce delivery time and increase competitiveness.

36 OPPORTUNITY 3: ESTABLISHING A GLOBAL ORGANIZATION

As has already been mentioned above, several maritime manufacturing companies perceive the transformation from regional to global player as a major challenge. For maritime suppliers with manufacturing activities, the establishment of a global organization with a global supply chain is also considered an opportunity. Depending on the business model of the individual company, a global organization may provide reduced time to market, closer relations to customers, and lower production costs. This may be a key factor for entering new markets. For DESMI Pumping Technology, the lower production costs have allowed the company to compete with Japanese and Korean pump manufacturers in the Chinese medium-quality market. For manufacturing companies, who wish to pursue this strategy, it is important to be able to establish a product portfolio that is so standardized that you can make a global supply chain and, at the same time, so flexible that you can adapt it to the customers demand.



Photo: Scanpix/Iris

The offshore sector consists of several markets with different value chains. The market of the turbine installation company is completely different from the market of the supplier of safety equipment or the freight forwarder, even though they are all part of the same sector. And even within the same market, companies will position themselves in different segments in order to stay competitive.

The importance of the offshore market furthermore varies between the various actors. For the general (3rd tier) suppliers (e.g. a pump manufacturer), the offshore sector may only account for a smaller part of the total turnover. For the specialized offshore supplier (e.g. a drilling contractor), it may be the only market. The dependency on the offshore sector thus varies from company to company.

The different offshore suppliers have had to adapt their business strategies to the competitive forces within their specific market, as has been shown in the previous sections. Some general trends in the supply industry may, however, be observed.

As manufacturing activities have increasingly moved from developed economies to developing economies, the value chain of many suppliers have changed from regional to (complex) global supply networks. The value chain has been split up between numerous geographic locations to take advantage of the comparative advantages of each area. The high value added activities are mainly located in developed countries while more standardized (manufacturing) activities have been offshored to low-wage countries. A second trend is the gradual transformation of most equipment suppliers from manufacturers to service providers. As manufacturing activities have increasingly been outsourced or offshored, the high value added activities in product development, marketing, branding, and after sales services have become increasingly important. These markets are not concentrated in Asia but are situated around the main sites of offshore operation. Many suppliers are trying to change their business model from providing a piece of equipment to providing a lifetime service. In doing this, the equipment supplier also creates a new (high value added) market for which he is the only supplier. In order to be able to provide these new services, equipment suppliers are increasingly engaged in developing (new) systems for monitoring and operating the equipment. This means that the (high value added) activities in the input stage, such as R&D and design, have become increasingly important.

The suppliers of maritime and logistics services are characterized by non-value chain specific competences, which can be applied in several sectors. Several companies have entered the oil and gas sector from other maritime sectors (shipping, fishery, general cargo logistics, etc.) and many companies have moved further into the offshore wind sector, which is characterized by rapid growth and low entry barriers. The companies are furthermore very mobile and can potentially serve geographical markets far from the home market. Most companies have thus developed their business in the home market and have expanded to other geographic locations.

The specialized offshore suppliers are characterized by value chain specific competences. Some companies have been able to apply their offshore competences onshore or vice versa. This includes companies like Ross Offshore, which has applied its offshore competences in land-based drilling and shale gas extraction, or turbine manufacturers like Vestas or Siemens, who have moved turbines from land to sea. That said, the specialized offshore suppliers are extremely dependent on the energy companies. The main strategy of the specialized suppliers is thus to increase competitiveness and be able to follow the energy companies into new areas. In the offshore oil and gas sector, this may include the arctic area, the ultra-deep segment, the harsh conditions segment etc. In the offshore wind sector, it may include targeting growing markets (in developing countries). In order to do this, the specialized suppliers are increasingly performing development projects with the energy companies and other specialized offshore suppliers.

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