



Maritime Branch Analysis: A workbook in the PROTEUS series

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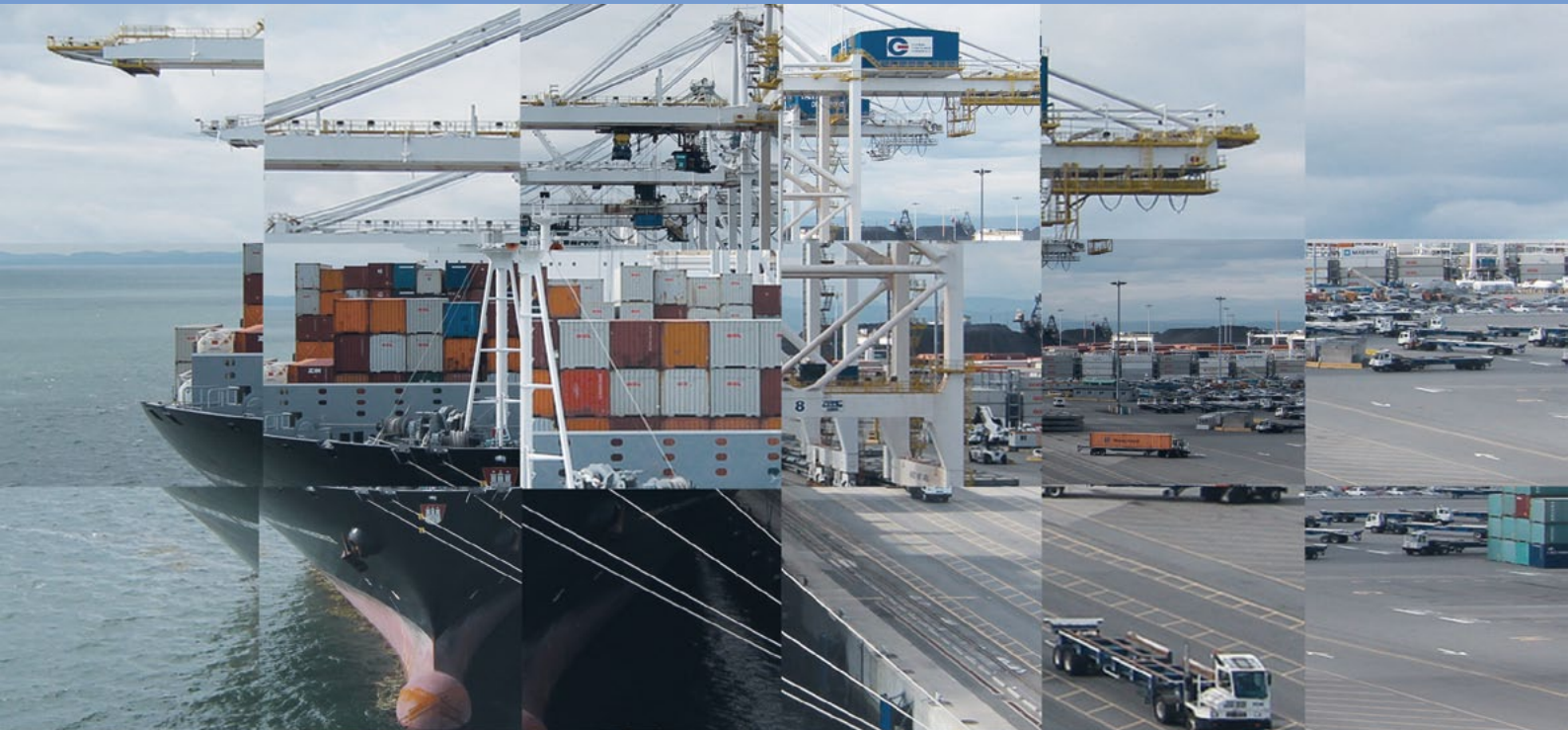
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#1

MARITIME BRANCH ANALYSIS

A workbook in the PROTEUS series



Danish  Maritime

1 Maritime Branch Analysis

2

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WHAT IS IN THIS BOOK?

The intention with this first workbook is to present the purpose of the PROTEUS Innovation Consortium and to create a holistic understanding of the maritime industry, seen from a Danish standpoint. The workbook sets the scene for the whole series of PROTEUS workbooks and has the goal of inspiring maritime suppliers to start identifying new business opportunities, through servitisation of their businesses. After a short introduction to the motivations and objectives of both the participating companies and the PROTEUS consortium as research project, a description of the maritime industry, the market and the key stakeholders is presented. A closer look at the PROTEUS companies, their organisations and their offerings, serves to describe the companies' current state in their transition towards the integration of product/service business practices. A central element in this workbook is our charted needs cycle of the maritime branch's main customer – the shipowner. This needs cycle acts as a framework for emerging business opportunities identified in the PROTEUS project. Concluding the workbook a summary and an outlook act to kick-start the seven-fold workbook series on product/service-systems.

Maritime Branch Analysis

A workbook in the PROTEUS Series

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Party Officer 2nd Class Andrew Meyers, U.S. Navy



THE PROTEUS INNOVATION CONSORTIUM

INTRODUCING PROTEUS

PREFACE

The vast majority of countries in the developed world are now dependent on their service sectors for between 70-80% of their gross domestic product. Even companies with decades of expertise in producing manufactured products are experiencing an increased need to understand before-, during- and after-sales service and have therefore embarked on business development activities that tightly combine product and service offerings in their portfolios. Closer customer contact, commoditisation of goods, total cost of ownership, and product liability are just some of the reasons for this transition. As yet there are only few systematic guidelines and instruments available to aid the development of servitised products. Therefore this series of workbooks. In this first workbook we present an industry sector of great importance and source of wealth to the Danish society, which is also experiencing and influencing a move towards intensified service integration into business- and product development activities. The workbook has been created by condensing the transcripts and the insights we have gained from a wealth of studies across the maritime branch, and it serves to provide a unique insight into a whole industry sector's readiness and first steps towards servitisation. Although this book is written primarily for our partners on the PROTEUS project, we are sure it can be a source of inspiration to a broad range of practitioners, policy makers, academics and students.

Tim McAloone, PROTEUS Project Manager

WHAT IS PROTEUS?

The Danish Agency for Science, Technology and Innovation (DASTI) promotes and funds so-called innovation consortia, a novel constellation of research and innovation activities, involving industry, technical service companies and research institutions. The idea with innovation consortia is to promote the relationship between research and actual innovation activities in industry, resulting in both enriched research recognitions and applied industrial results. PROTEUS is one of DASTI's current innovation consortia, which focuses on the Danish maritime industry, particularly from the viewpoint of suppliers to the industry.

THE INNOVATION CONSORTIUM'S FOCUS

The PROTEUS Innovation Consortium is working to jointly develop new knowledge about how after-sales service can be effectively integrated into business and product development in industrial organisations, so as to become a source of revenue and value, rather than a cost to the company. The company participants in PROTEUS are all from the maritime industry and are interested in understanding, through examples, how to effectively and systematically integrate service development into their product development and business creation processes.

UNIQUE WITH RESPECT TO PSS

Current literature, tools and methods on Product/Service-Systems (PSS) include examples of procedures for the integration of product and service features in product development. However these approaches do not consider a number of key areas for business, such as the commercial considerations, the strategic organisational issues, or the possibilities of collaboration across the value chain. With its industry-wide consortium of companies, PROTEUS is in a unique position to begin to address some of these issues from a whole branch perspective.

PROTEUS PROJECT IN DETAIL

The PROTEUS* project is a 3 ½ year Innovation Consortium financed by the Danish Agency for Science, Technology and Innovation (DASTI). The consortium is formed by ten companies (see page 10), a branch organisation, two research institutions and an engineering consultancy. The participating companies are mainly suppliers of equipment used in ship building, operation and maintenance. Danish Maritime is the branch organisation, where most of the participating companies are represented. The research institutions are DTU Department of Mechanical Engineering and CBS Department of Operations Management. Finally, IPU Product Development supports the project with its services in engineering consulting and methodology implementation.

* The name of the consortium, **PROTEUS**, is an acronym for the research project title: “**PRO**duct/ service-system **T**ools for **E**nsuring **U**ser-oriented **S**ervice”. It is also an apt title, as it is the name of a mythological Greek sea-god, symbol of adaptability in the face of the changing nature of the sea.

***But
what is
PSS?***

PRODUCT/SERVICE-SYSTEMS (PSS) is an innovation strategy, where a greater integration of products and services has the potential to decouple business success and economic growth from mere product sales.

Instead of viewing a product as an isolated entity, the PSS design activity focuses on creating the right combination of products and services, needed to aid the customer in reaching their goal. Incorporating service thinking into the product development process gives rise to new business opportunities; the product has the opportunity of being made more robust throughout its life cycle (i.e. it is 'Designed for Service') and the customers' entire needs and activities are considered and catered for, from the very beginning of the development process. A PSS solution does not necessarily imply that the service provider is the producer of the physical product(s) included in the PSS, but the service provider must take responsibility for the delivery of the service to the customer, including its timing, physical elements, agreements and related risks. Examples of PSS are emerging in a broad range of markets, from Business-to-Consumer (B2C), through Business-to-Government (B2G) to Business-to-Business (B2B).

A QUICK LOOK AT THE PROTEUS COMPANIES

MAN PrimeServ Frederikshavn



EST. 1883 site in Frederikshavn. Acquired by MAN in 1980.

+ Offers spare parts and service for four-stroke engines and propellers through a variety of offerings.

\$ MAN PrimeServ EUR 1.55 Billion

👤 300 approx. in Frederikshavn. 15,000 in MAN Diesel & Turbo whereof 2,800 in MAN PrimeServ

Alfa Laval



EST. 1883. Aalborg Industries acquired by Alfa Laval in 2011.

+ Optimisation of processes, saving energy and reducing emissions by providing equipment, systems and competence to the marine and diesel power industries.

👤 15,000 approx. whereof 4,000 in Marine

\$ EUR 3.2 Billion

YIT Marine



EST. 1982, as a marine department of Nordic Brown Boveri. Since 2003 part of YIT Group.

+ Offers el-technical and monitoring-solutions, integrated electrical systems.

👤 YIT Group 24,000

\$ YIT Group EUR 4.5 Billion

NoreqActa



EST. 1955. Part of Noreq Group since 2010

+ Offers cranes, deck equipment and life-saving equipment for ships, offshore and industry applications.

👤 125 approx.

\$ EUR 40M

EST. Year of establishment

+ Offerings summary

👤 Number of employees

\$ Latest annual revenue reported

Göteborg

Borås

Jönköping

Pres-Vac Engineering



EST. 1952

+ Offers high velocity pressure vacuum valves, deep well cargo pumps and Marine Inert Gas Systems.

50-99

EUR 15M

Klinger DK



EST. 1948

+ Offers valves and seals for the maritime industry.

20-48

Hempel



EST. 1915

+ Offers marine, decorative and container paint and coating expertise.

5000+

EUR 1.1 Billion

Lloyd's Register ODS



EST. 1980

+ Offers consultancy within areas such as noise & vibration, machinery dynamics, measurement, testing and signal analysis.

65 approx.

Novenco Fire Fighting



EST. 60+ years. Acquired by Wilhelmsen Technical Solutions in 2012.

+ Offers fire fighting systems for marine and land-based applications.

35

DKK 54.6M

Emerson Marine Tank Management



EST. 40+ years

+ Offers solutions in integrated tank management systems, valve remote control, cargo monitoring systems, ballast, fuel oil and service tank level gauging and draft measurement.

640 approx.

USD 148M

Danish Maritime



EST. 1919

+ Contributes to the continuous success and global competitiveness of the Danish maritime industry by promoting and developing favourable conditions.

Helsingør

Gladsax

København

Roskilde

Malmö

Kalmar

MOTIVATION OF THE PROTEUS COMPANIES TO PARTICIPATE

The breadth and diversity of companies involved in PROTEUS has allowed for a mapping of several different motivations for embracing service thinking. This diversity has to do with the companies' different characteristics (size, market share, history, current product offerings, etc.) and also their readiness to approach different strategies. The most relevant motivations for joining PROTEUS are summarised below.

KEY MOTIVATION OF PROTEUS COMPANIES

- Strengthened competitive edge
- Enhanced value creation for the customer
- Knowledge sharing across companies
- Network opportunities globally
- Identification of structured and

defined service development activity

- More effectively utilised competences internally, plus development of new required competences
- Business strategies

Among the companies there are different expectations towards the outcomes of PROTEUS, as each organisation has differing levels of experience with respect to developing after-sales activities. Regardless, the main shared reason for companies committing to PROTEUS is the desire to strengthen their competitive edge. Being more systematic about service design, development and deployment, becoming insightful with regards to the customer's activities and needs and more actively seeking service partnerships, are seen as the three main motivations and ways of

achieving a competitive edge. There is also an eagerness to share knowledge about the maritime industry's current condition and likelihood of future developments, as well as market trends and needs from both shipyards and shipowners. The motivation for sharing resources is also directed towards an understanding of how existing competences can be reconfigured, developed and expanded, based on experiences within or outside of the consortium. Companies are furthermore seeking support in developing their service portfolios, as well as learning how service business integrates within existing business models, both theoretically and practically.

STRENGTHEN COMPETITIVE EDGE

"We have 20,000 of our products on the market but we only provide service to approximately 25 % of these. This is where PROTEUS should help us."

ENHANCED VALUE CREATION FOR THE CUSTOMER

"We need deep insight into what the shipowner's needs are. Maybe we think we know the right solution, but what does that help if the customer doesn't want it? A common market analysis and understanding is extremely important for this project."

**KNOWLEDGE SHARING
ACROSS COMPANIES**

"It is a new thing in the maritime industry that one devotes oneself to knowledge. This can be our competitive edge in Denmark."

**NETWORK OPPORTUNITIES
GLOBALLY**

"If it is possible to create some collaboration around the concept of having partnerships to create shared service centres, it is definitely something we would like to participate in."

BUSINESS STRATEGIES

"The big difference is not to focus on service as another product, but to implement a new selling approach, which includes technical service as a part of the solutions. In other words, to sell the value we create for our customers' businesses and not only talk about products, or hours spent!"

**STRUCTURED AND
DEFINED SERVICE
DEVELOPMENT ACTIVITY**

"We haven't historically been that good at integrating after-sales in the development, but we are getting better at it."

**MORE EFFECTIVELY UTILISED
COMPETENCES PLUS
DEVELOPMENT OF THOSE
REQUIRED**

"The whole after-sales department could be an independent business unit."



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THE MARITIME INDUSTRY



AN INDUSTRY IN TRANSITION

Denmark currently depends on its service sector to generate 77 % of the gross domestic product. Even industries with decades of expertise in producing manufactured products are experiencing an increased need to grow their business towards service, in order to compete with production in lower cost economies.

In the Danish maritime industry in particular, shipyards have historically produced large proportions of the fleet nationally, due to a close collaboration between shipowners and shipyards, e.g. Mærsk and the OSS shipyard at Lindø. The picture has historically been the similar throughout Europe, with the development of ships and shipbuilding being closely associated with European shipyards. This picture has changed, however, due to the fierce price competition resulting from the outsourcing of shipbuilding to the East

– firstly South Korea and then to China. The Eastern competitiveness arises from low-wage labour at the shipyards and to some degree on national government subsidies. Thus, European shipyards today have limited capacity and are mainly centred on building specialised ships, such as supply ships and cruise ships. As a consequence, European shipyards currently represent 6-10% of the global market share. However 40% percent of global shipowners are located in Europe. Therefore, there is an opportunity to offset the thinning of the new-build shipbuilding market in Europe, by establishing new after-sales business activities, based on targeting shipowners directly.

Shipyards traditionally have the upper hand in the market, being able to pressure shipowners on both specification and price of newly-built

ships. However, the global displacement of the shipbuilding industry is eroding such influence and giving shipowners more bargaining power in the contracting phase of the ship-build. For suppliers to the maritime industry this means new opportunities, but it also means that they must adapt their planning and development strategies to new offerings for the different interests of both shipowners and shipyards. These two customers provide a challenge for the maritime supplier company, as they typically have different responsibilities and therefore motivations: shipowners generally prioritise products on a long-term basis, meaning that the best solution focuses on price, quality, and latterly also on total cost of ownership; shipyards generally prioritise products on a short-term basis for cost reasons, as the operating life of the ship is beyond their responsibility and motivation. Figure 1 illustrates this changing dependency.



Figure 1: Changing dependencies between the three main maritime stakeholder groups.

THE MARKET

MARITIME INDUSTRY MARKET TRENDS

The maritime industry first felt the repercussions of the 2008 financial crisis in autumn 2009, where a global shipbuilding surplus gave rise to a large number of cancellations. This led to a 2011 global fleet capacity that exceeded the cargo volume by 20%. In early 2012 the size of the global order book had dropped to 46% below the 2008-peak and was expected to be almost halved within the year. Accordingly, in 2012, the global average new-building prices dropped by 40%, after peaking in 2008 and are approaching those of construction, while the price of steel has more than doubled since 2002. Estimates are that around 20% of global yard capacity might be shut down, reaching the global capacity levels of 2008 by 2014.

Looking closer at Denmark, the Danish Shipowners' Association reported that new-build orders will drop from 80 in 2012 to less than 10 in 2015.

This scenario of shipbuilding activities shrinking globally is happening simultaneously with the decreasing presence of European shipyards. Nevertheless, the global cargo volume is expected to keep increasing as it has been doing, even during financial crisis, supported mainly by growth in the BRIC economies. To this steady growth European shipowners have contributed by generating almost half of the global new-build orders in 2012, owning 40% of the global merchant fleet. Danish shipowners, in turn, control 7% of world tonnage, 3% of which are directly owned.

The current displacement in bargaining power, from shipyard to shipowners, means that maritime suppliers' primary customer contact and therefore influence is also gradually changing. This shift is thus contributing to an increased activity in the area of after-sales service and support; in many cases this rate of change is incongruent with turnover or increased profit. To adapt to the new situation is a challenging task, even if the competences to deal with such a new business area are in place. It is furthermore still difficult to access the financial resources required to execute such a transformational process internally, or in collaboration with other companies.

Another current market trend is the growth of business targeting the off-shore market, where customers

ask for solutions that need competences similar to those used in the maritime market. An example of this is the off-shore windmill industry, where numerous maritime supply companies provide products and services.

CULTURE IN MARITIME INDUSTRY

The changing environment in the Danish maritime industry is strongly affecting its culture, which has historically been rooted in traditions and de facto ways of doing business. Understanding and adapting the culture to the new business reality will help in navigating the changes the industry is facing.

How culture affects service provision and quality

An important element to pay attention to is the difference between how the provision of a service is understood in eastern and western cultures, respectively. Western markets are used to paying a premium to have service included in the offerings by the suppliers. In Asian markets the culture is rather different, as service is often expected to be a free offering that comes with the purchased component.

Networking culture

When interviewing the PROTEUS companies and their representatives all pointed out that the Danish branch is characterised by cross-company networks, where people communicate and exchange knowledge and →

→ ideas. This has been expressed by *“if you know a hundred people within the Danish maritime industry, then you know them all”*. The workforce in the Danish maritime branch is fluid, with relatively frequent movement of staff between companies. This contributes to a higher level of competence in the branch.

Reputation

The market for maritime suppliers is characterised by trust and confidentiality as part of the suppliers' image, meaning that the relationship is based on reputation from previous successful transactions. It is the suppliers' understanding that experience from previous projects is one of the most important factors when shipowners are to choose between potential suppliers. Likewise, suppliers that are new to the market can benefit

substantially from partnering with more renowned suppliers, with an image of quality and service in the high-end.

Innovation culture

One major innovation driver in the maritime industry is new and emerging regulations, imposed on the shipowners and component suppliers by legislation institutions. In some situations companies actually lobby for the development or the increasing conditions of e.g. environmental laws, if they are in a position to live up to these themselves. In other cases customers demand product customisations or new after-sales activities from their suppliers. In both cases a strong tradition of product development and an experience in agility towards customer demands has enabled Danish suppliers to respond to new and emerging laws.

However, this high capacity to adapt in the face of legislation or customer demands has shaped an innovation culture that in general is not proactively driven by e.g. research on market needs.

Conservatism

The afore-mentioned pattern of innovation is influenced by the fact that Danish shipowners are only interested in installing new components on a ship if the ship can remain operational in the meantime. The two main drivers for shipowners to install new types of component are (i) to live up to new legal standards, or (ii) to reduce costs (downtime due to breakdown or in more seldom cases, running costs). There is a general reluctance towards trying new technologies and in most cases a low level of motivation to make longer term investments, either due to lack of knowledge of Total Cost of Ownership (TCO) or due to unfavourable shipownership and/or liability relations.

TOTAL COST OF OWNERSHIP (TCO)

In a traditional product-focused market, the supplier who is able to deliver the specified good at the lowest price is likely to win the contract. Several industry case studies have shown that the main costs related to a product are in fact found in the product's later life cycle stages. In many cases, upfront cost savings are achieved by choosing lower quality materials and, cutting corners, thus delivering a product of lower quality. This can have a negative impact on life cycle costs, as lower quality often leads to more frequent breakdowns and shorter lifespans. Consequently, in choosing a supplier, the customer should adopt a more holistic approach and consider the costs pertaining to the entirety of the product ownership timespan. In other words, the customer should focus on the "Total Cost of Ownership" (TCO).

THE INDUSTRY NETWORK

THE INDUSTRY AS A NETWORK AND VALUE SYSTEM

As the transition to a PSS approach brings with it new business strategies, customer relationships often change and expand with time, encompassing many new stakeholders in the development and operation of the system. The object being designed is not just the physical product; it is the performance of the product throughout the whole life cycle. This means that the value creation process is not held by one company alone and as such is created at a system-solution level. This sets a challenge towards creating strategies that include the right stakeholders in the development or operation of the system (in this case the ship). Mapping the network within which the company is positioned will reveal the different stakeholders and

their roles in the network, plus the kind of relations and deliverables that exist. The network can also be used to reveal the value flow and thereby hint towards potential business models for the company.

The mapping of the stakeholder network can be done in many ways. Here it is illustrated by mapping the main stakeholders and their relations. The map is aimed at explaining the PROTEUS suppliers' roles and relations in the industry. Figure 2 will be used in the following pages to explain the dynamics within the Danish maritime industry.

THE RELATIONS AND ROLES DESCRIBED

The PROTEUS companies are all present in the same value system, namely that

of the maritime industry. They are suppliers of maritime equipment or services for a large range of commercial vessels (merchant ships). This includes both tramps and liners, for whom different parameters are of importance, affected by the point of contact to the customer (purchase dept., technical dept. or ship management). If the bargaining power resides at the shipyard, the first purchase price is of highest importance, meaning that the suppliers with high quality and long-life products will not necessarily appear on the shipyard's makers list.

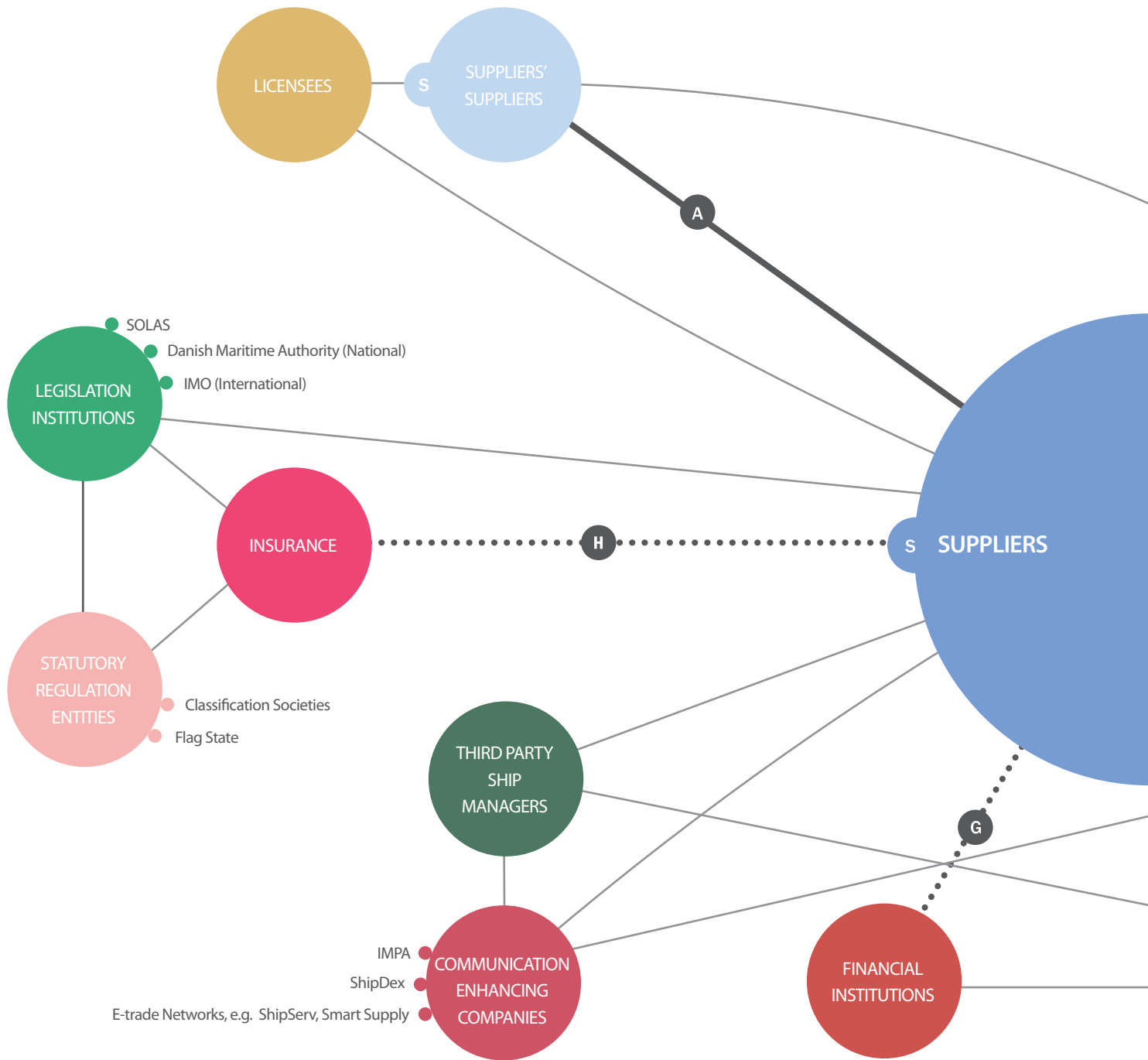
The following paragraphs will explain specific chosen roles and deliveries in the network.

Moving up the value chain

The relationship between supplier and sub-supplier, marked as (A) in Figure 2, is important to be able to deliver quality products without delay and at a minimum cost. The supplier's ability to perform well in the after-sales period is highly dependent on their ability to deliver spare parts and to run any warranty issues. The suppliers that offer services, such as repairs or reconditioning of a system, depend on having spare parts on stock or being able to reorder without delay. This is intensified if the supplier is in a PSS relationship with the customer, having e.g. ownership of the system or the maintenance activity, which is increasingly observed at different suppliers in the industry. Increasing amounts of companies in the maritime industry are now more than mere goods suppliers, offering a mixture of products and services, and in some cases even selling the performance of the system rather than the system itself. This development lifts the suppliers up the value chain, towards a business partnership with the shipowner (D).

Knowledge sharing and collaboration

The role of the maritime branch organisation is affecting the industry in many ways. As a knowledge institution, it delivers market information, important for the suppliers (C) in building new product development approaches or in readjusting their service activities. The branch organisation also conveys movements in the IMO to the suppliers and continuously works to influence →



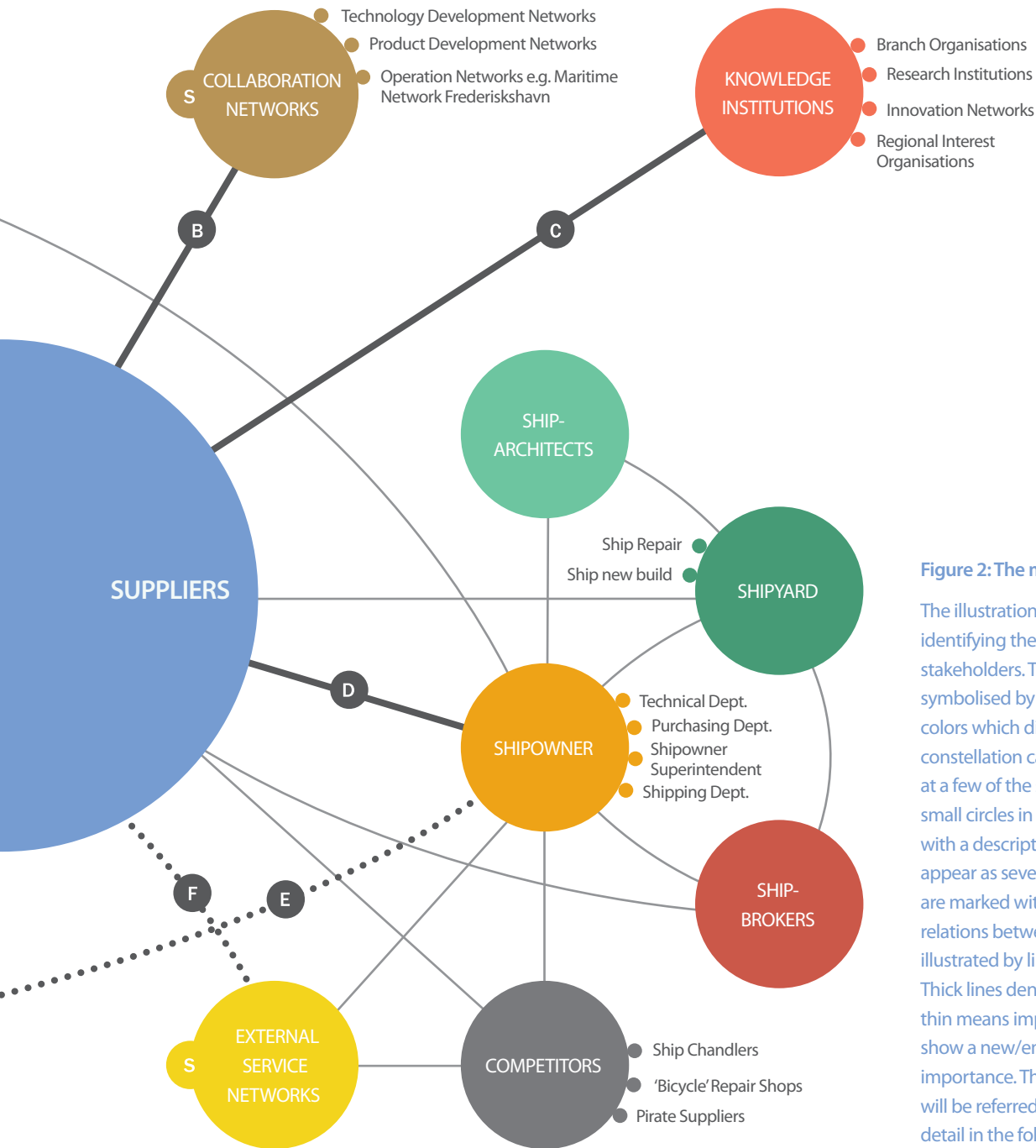


Figure 2: The maritime network

The illustration is constructed by identifying the industry's significant stakeholders. The stakeholders are symbolised by circles of different colors which differ in complexity. The constellation can vary, which is shown at a few of the stakeholders by a set of small circles in the same color together with a description. The suppliers can appear as several stakeholders; these are marked with the letter (S). The relations between the stakeholders are illustrated by lines of different types. Thick lines denote high importance, thin means important and dotted lines show a new/emerging relation of high importance. The letters on the relations will be referred to and explained on detail in the following pages.

→ emerging regulations, in order to strengthen the conditions for Danish suppliers (and at the same time lifting the quality of the world fleet).

Relations between the suppliers can be observed as being through a collaboration network, or between single suppliers and networks (B). The most common relationship between the suppliers is a regular customer/supplier relationship (A), but collaborations on retrofit products are also becoming increasingly common, here multiple suppliers collaborate on developing state-of-the-art products that e.g. meet the latest or future regulations. Operations-oriented networks such as the Maritime Network in Frederikshavn are examples of how multiple suppliers are joining forces, in order to be able to offer holistic after-sales solutions for their customers in a one-stop-shop format, as they act as a strategic marketing network.

Long life products & long term cost

With an operational period following the whole life cycle of the ship – in some cases lasting up to 25 years – maintenance costs are an ever present burden. Preventive maintenance as both condition-based and time/count-based maintenance are offered by many of the suppliers in PROTEUS (D), causing a shift in focus for the company from unit cost (cost of the goods produced) to the life cycle cost connected to offering long-term maintenance and managing the company assets needed for this shift. In providing these offerings, the suppliers' relationship with their banks is of utmost importance as it ensures liquidity and freedom to operate (G). Some of the larger companies are even offering financial packages in partnerships with financial institutions. These offerings seek to support the shipowner, using a Total Cost of Ownership approach (E). This supports the customer in long-term planning and often

ensures a pay-back time for a maintenance programme of five years or less. Besides maintenance activities, regulations in the industry from legislative institutions such as SOLAS and IMO often result in new requirements and therefore expensive retrofitting solutions. This can put a huge strain on the financials of the shipowner.

Sharing risk - contractual challenges

The maritime landscape is characterised by its large focus on approval of components. This is required to insure the ship. To ensure compliance, ships undergo a "vetting" process where the statutory regulation entity (i.e. the classification society) inspects the ship, system or single components. The shipowner needs to insure the ship so as to meet future issues with responsibility (claims) in connection to e.g. securing the cargo and delivering on time. Service agreements and maintenance contracts usually mean added risk to the supplying company.

Such agreements introduce a complex myriad of new contractual responsibilities, divided among multiple companies, covering many relations (customer, suppliers, and suppliers' suppliers (A), (B), (D)). In a PSS approach, where the ownership of and risk involved in operating the system are shared by supplier and customer, the supplier's relation to insurance companies (H) becomes all the more important.

Establishing global presence

Many of the suppliers are expanding their presence towards the shipowner, approaching different strategies to reach the ship on a global scale. The larger companies in the consortium have own service stations globally, whereas the smaller companies send out a service squad or collaborate with external service networks (F). Here it is observed that the suppliers are training each others' technicians to expand their global presence. Many suppliers offer education and training of the crew, technical department etc. of the shipowner, hereby furnishing the on-board technicians with the tools to better support their product, hereby the relationship (D) with the shipowner is changed.

The suppliers' multiple roles

As provider of both equipment and services for the ship the suppliers must fulfill many roles. Suppliers can deliver to new-builds via the shipyard or the shipowner as main customer. They can also be sub-suppliers to a supplier or even supplier in the operation of the ship. Furthermore, they can become financial partners in long-term contracts with the shipowner and they can be development partners to another supplier. Other observed roles include acting as an academy, educating the customer or being service-network partners to other equipment suppliers. Finally, they can act as technical departments, advising the customer in maintenance. The key point in all of these roles is the fact that suppliers today are parts of a complex value system – as opposed to being part of a classical linear supply chain.

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THE PROTEUS COMPANIES





ALFA LAVAL

HISTORY AND BACKGROUND

Alfa Laval is a large leading global company, engineering and manufacturing equipment for the marine industry. The company offers a portfolio of different products, all within the context of steam, heat, oil treatment and safety solutions. Apart from the marine business, Alfa Laval supplies products to the industrial/land area, together with offshore (floating production systems). Alfa Laval acquired Aalborg Industries in 2011. Both Alfa Laval and Aalborg Industries have a long history offering a variety of services on their products.

PRODUCT AND SERVICE PORTFOLIO

Alfa Laval products can be found on most ships and in most power plants worldwide, operating together with a wide variety of applications and

processes. As a truly global supplier with a full network of service and support, Alfa Laval provides strong technical competence in the following areas: separation, filtration, fuel conditioning, heating and cooling, desalination, ballast water treatment, tank cleaning, inert gas generation, steam generation, waste heat recovery, oily waste reduction and exhaust gas cleaning. Within these areas, Alfa Laval focuses on product development not only on new solutions, but also on making proven solutions simpler, more reliable and more economical. In this way, Alfa Laval demonstrates ongoing application leadership. Likewise, Alfa Laval makes progress for the future, pioneering technologies that reflect the environmental focus and serve the industry's changing business needs. With its global service business Alfa Laval Aalborg offers a

plethora of services such as operator training, commissioning of equipment, inspections, condition reports, upgrade and overhauls, repair on-site and on its external brands. The company offers OEM spare parts for both own and external brands.

BUSINESS PRESENCE AND SERVICE STATIONS

Alfa Laval employs a total number of approx. 15,000 people (with approx. 4,000 in the Marine and Diesel Division), represented in 99 service centres worldwide. The company's main engineering activities are in Sweden, Denmark and the Netherlands. The major manufacturing sites are in China and Denmark. The company divides its parts and service business into three areas: service, repair and spare parts.



BUSINESS COMPETITIVENESS

Alfa Laval operates against strong competition, but spare parts and service afford the company a strong position on the market. Alfa Laval has a large installed base of more than 35,000 marine boilers and heat recovery units and more than 50% of the world's new-builds are provided Alfa Laval's marine boilers. A large installed base, together with new environmental legislation, has had a large impact on the entire parts and service business, which in 2012 had a remarkable increase, despite the financial crisis. After the acquisition of Aalborg Industries, Alfa Laval's products will reach a larger application area and larger customer base, which will generate an increase in both the new and after-sales markets.

MOTIVATION TO PARTICIPATE IN PROTEUS

Alfa Laval's motivation in PROTEUS is to gain inspiration regarding PSS experiences (from other companies) and methods (from the researchers), but also to share own knowledge between the PROTEUS companies. It also has a particular interest in carrying out an in-depth study of the internal competences within the company, in order to create a portfolio of new offerings for the company's after-sales business.

Example of PSS thinking

Alfa Laval is focusing its organisation on offering solutions and systems rather than single products. Therefore the company is planning to establish a development unit called, "Product and Solution Centre", which will match the company's approach of project-based integrated product and services. Besides this Alfa Laval has created a training centre, with the objective of creating a strengthened business, based on selling courses for the users of the company's own products, but also courses for operators of its external brands.



EMERSON MARINE TANK MANAGEMENT

HISTORY AND BACKGROUND

Emerson Process Management is one of five business platforms of the large American owned Emerson group. One division of Emerson Process Management is Marine Tank Management (MTM) with marine applications for tank management. The company's core business is to provide solutions that help improve efficiency and safety of ship operations. Emerson Process Management established MTM to better focus on marine solutions, after the merger of several well-reputed companies in the industry, such as Rosemount Marine, Damcos and LevelDatic. MTM's competences hereby cover several areas, such as systems integration, radar tank gauging, hydraulic and electro-hydraulic valve remote control and measurement by means of both electro-pneumatic and pressure technology.

PRODUCT AND SERVICE PORTFOLIO

MTM's offerings often comprise of adaptable combinations of products and services, whilst also providing products and services separately, if needed. An example of such a product/service combination is the integrated tank management systems, marketed by MTM. It is a complete solution for the monitoring and control of all tank-related functions on any type of ship. The system covers products and subsystems, such as valve remote control systems with compact actuator design, cargo monitoring systems with approved radar solutions and Ballast & Service tank level systems, providing accurate tank level indication, with either pressure sensors or electro-pneumatic technology.

BUSINESS PRESENCE AND SERVICE STATIONS

The Emerson concern is a globally diversified company, with approximately 127,700 employees and 250 manufacturing locations worldwide. The MTM division comprises around 640 employees, with manufacturing facilities in 10 countries. Approximately 70 % of MTM's production is in China and only 5 % in Denmark. Product development is carried out in Denmark, Sweden, China and Singapore. MTM also offers one-stop-shop efficiency, with worldwide support and has an after-sales unit, which is made up of 120 employees, 16 of which are based in Denmark. Besides these after-sales staff, the company also has a broad network of service partners.



BUSINESS COMPETITIVENESS

Besides operating in a fairly competitive market with players such as Hoppe Bordmesstechnik, Pleiger, and Kongsberg, MTM's competitive edge resides in the so-called bottom-up approach. As an active manufacturer the company has the knowledge not just to produce but also to install and operate its products and systems, and furthermore to continuously develop retrofit solutions and new after-sales products.

MOTIVATION TO PARTICIPATE IN PROTEUS

MTM already generates revenue from after-sales activities and can see the potential in pursuing PSS as a strategy to gain more income from after-sales. The company is particularly interested in gaining insights into the shipowners' needs and in ways to translate these needs into service offerings. The company is also motivated by the drive to become preferred supplier to shipyards,

"The PROTEUS project is after-sales focused, which should inspire us to explore our opportunities within service, so we suppliers can gain more out of it..."

After-sales manager, Marine Tank Management

and sees an expansion of after-sales offerings as an important way to achieve this. It is currently in the process of establishing a service network in collaboration with global service partners; for this reason MTM is interested in further improvements of the company's product- and service development process, in order to embrace a global service network and a strong service business.

Example of PSS thinking

MTM's systems comprise of a package of products and services, named Marine Tank Management. This offering is a classic example of a PSS strategy, as it is not a single product but a bundle of multiple products and services, focusing on the performance, on a long-term basis. Another characteristic element here is that the ownership of certain maintenance activities is taken over by the supplier, e.g. the monitoring of the system.

Image courtesy of Hempel. All rights reserved



HEMPEL

HISTORY AND BACKGROUND

Hempel is a world leading supplier of paints and coating expertise within the maritime sector, both for new-builds and after-sales service. As of 2012, business units comprise of Protective (fixed installations, e.g. bridges and windmills), Marine (ship hulls), Decorative (buildings), Container and Yacht. Hempel was founded in 1915 in Denmark by J. C. Hempel, who pioneered the production of ready-mixed paints for the maritime industry, a novel product in times when shipowners most often mixed their own paints. Consistent quality in paints and coating services was the main selling point for J.C. Hempel's business, which from the very beginning went under the motto "Quality and Service".

PRODUCT AND SERVICE PORTFOLIO

In addition to quality painting products the company provides in all its business units, Hempel also offers Technical Service (TS) in the Protective, Marine and Container units, which is delivered by coating advisers during new-build or as after-sales, in the operation phase of the ship or structure. Different levels of service agreements are available, depending on the extent to which Hempel is part of the coating project management. Hempel describes its activities as: "... to produce and sell protective coatings that increase the long term value of customers' investment".

BUSINESS PRESENCE AND SERVICE STATIONS

Hempel is a global player with some 5,000 employees working in 80+ countries, based in 48 sales offices, 150+ stock points, 24 factories and 10 R&D centres. The three main R&D centres are located in Copenhagen/Denmark, Barcelona/Spain and Guangzhou/China. Additional regional R&D centres are located in USA, Bahrain, Singapore, South Korea, UK and Germany. Hempel has Technical Service stations all over the world. These service stations can consist of coating advisers alone or be a mix of sales-staff and coating advisers. With 670 coating advisers among the total of 5,000 staff, Technical Service is a considerable part of Hempel's activities.



BUSINESS COMPETITIVENESS

The market of maritime paints is dominated by a small number of companies, including Hempel. Hempel's market position is attributed mainly to product quality, but increasingly on the selling of coating expertise, which the company is targeting to become a strengthened business area.

MOTIVATION TO PARTICIPATE IN PROTEUS

Hempel's interest in PSS is based on the challenges that the company has experienced, in ensuring profitably from selling TS. As the challenge is to convince its customers that there is extra value to be gained from paying for service/coating expertise; traditionally this expertise has been expected as an integral part of the coating product itself.

The ambition is to considerably raise the share that TS has in revenue and profit.

Hempel's market position is attributed mainly to product quality, but increasingly on the selling of coating expertise, which the company is targeting to become a strengthened business area

Example of PSS thinking

Complementing Hempel's TS offerings, the company has established an education department, Hempel Academy, where training courses for certified coating expertise are sold, both to customers and partners, but also to competitors. "The big difference is not to focus on service as another product, but to implement a new selling approach, which includes technical service as a part of the solution. In other words, to sell the value we create for our customers' businesses and not only talk about products, or hours spent!"



Image courtesy of Danish Maritime. All rights reserved.

KLINGER DANMARK

HISTORY AND BACKGROUND

Klinger Danmark (Klinger DK) is part of the Klinger Group with more than 30 operating companies worldwide. Klinger is known for manufacturing valves and sealing products and with more than 160 years of experience in supply to the maritime industry. One can find Klinger products on-board many ships. To support the marine industry Klinger established in 2009 a Marine Application Centre in Brøndby outside Copenhagen.

PRODUCT AND SERVICE PORTFOLIO

Klinger DK's main product portfolio comprises fluid control products, gaskets and seals. The product portfolio includes level gauges, valves, gaskets and seals for steam boilers, general steam applications, fuel oil incl. MGO, exhaust gas and LPG applications.

The vast experience with maritime applications and certifications has led to a recent developed service tool called Klinger Marine Valve and Seal Selection Tool. The tool is a CD-ROM catalogue, which helps the user to find information about a specific valve or seal, utilising users' knowledge of the application where the valve or seal is applied. The tool also allows the user to search via an IMPA number.



BUSINESS PRESENCE AND SERVICE STATIONS

Klinger consists of more than 30 operating companies, with a presence in more than 70 countries worldwide. To serve customers with Klinger products on-board Klinger DK uses a combination of the Klinger network and shiphandlers in key ports.

One of the company's greatest strengths is its technical knowledge about configuration and adjustment of a valve or seal to a given application.

Example of PSS thinking

To support the marine industry Klinger has established a Marine Application Centre in Brøndby, close to Copenhagen.

One of the main outputs in terms of service delivery is the Klinger Marine Valve and Seal Selection Tool. The tool is a CD-ROM catalogue, which is built on the back of Klinger's vast experience with maritime applications and certifications.



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LLOYD'S REGISTER ODS

HISTORY AND BACKGROUND

Lloyd's Register ODS specialises in engineering dynamics. The company provides expert advice to the marine, energy, and rail industries – reducing technical and commercial risk and enhancing asset performance. The company's expertise covers noise & vibration control, the dynamics of rotating machinery and the dynamics of structures. The company was founded in 1980, under the name Ødegaard & Danneskiold-Samsøe. In 2005, the company was acquired by the maritime classification society, Lloyd's Register, to link up with and strengthen the consultancy services offered. Today, Lloyd's Register ODS is an integral part of the Lloyd's Register Group, working to help improve quality, safety and business performance.

PRODUCT AND SERVICE PORTFOLIO

As a consultancy, Lloyd's Register ODS is a purely service-based corporation. Its maritime service portfolio includes noise & vibration assessment, sea trial assistance, measurement surveys, troubleshooting, as well as laboratory measurement of sound insulation properties of materials and components. Additionally, it offers technical client training within many of its expertise areas.

BUSINESS PRESENCE AND SERVICE STATIONS

Lloyd's Register ODS employs some 60 engineers, situated in the main office in Denmark and in satellite offices in Norway, Sweden and France. Representatives are sited in Lloyd's Register Group offices in Houston, Dubai and Singapore. The Lloyd's

Register Group as a whole includes some 7,500 people in 240 offices worldwide. Historically, Lloyd's Register was a specifically maritime organisation, but later diversified into other industries, including oil & gas, process industries, nuclear and rail. Today, the Lloyd's Register Group embraces more than 100 specialist companies that provide expertise and independent services to a wide range of market sectors and industries.

BUSINESS COMPETITIVENESS

Lloyd's Register ODS has earned an international reputation for highly focused R&D and is the partner of choice for a large and diverse client base, which for the maritime segment includes shipowners, shipyards, naval architects and component suppliers, worldwide. With access to the technical



expertise of the Lloyd's Register Group, Lloyd's ODS can take on a wide range of technical problems.

MOTIVATION TO PARTICIPATE IN PROTEUS

For Lloyd's Register ODS, the drive to participate in the PROTEUS project is to explore new business opportunities through inspired industry collaboration. Application of the PSS methods may potentially help to identify hitherto uncharted client bases and further tailor solutions to market needs.

Lloyd's Register ODS has earned an international reputation for highly focused R&D and is the partner of choice for a large and diverse client base.

Example of PSS thinking

Lloyd's Register ODS offers technical consulting services. The company supports the client by also offering training courses within many of its expertise areas. This helps the client to form a better understanding of the problems that may occur and hopefully to a more informed choice of service .

MAN PRIMESERV FREDERIKSHAVN

HISTORY AND BACKGROUND

MAN PrimeServ Frederikshavn is one of six headquarters of the after-sales division at MAN Diesel & Turbo, globally providing after-sales service for all product groups of MAN Diesel & Turbo. MAN Diesel & Turbo is amongst the world's top three in the area of diesel and gas engines, used in medium and low speed applications on-board ships and for stationary power plants.

The company is also provider of complete aft ship solutions, with propellers and automation systems for ships. MAN Diesel & Turbo has a unique business model, where the production is mostly licensed out to sub-suppliers and the after-sales is a strategic business area with its own brand name MAN PrimeServ.

PRODUCT AND SERVICE PORTFOLIO

MAN PrimeServ Frederikshavn is a service provider for four-stroke propulsion engines, propellers and control systems. The offerings range from original spare parts, over technical service to retrofit and upgrade solutions and complete service packages. The different service packages can e.g. consist of a tailor-made operation and maintenance contract. MAN PrimeServ's Service Center Denmark in Frederikshavn offers repair, reconditioning, overhauls and inspections. MAN PrimeServ Frederikshavn also offers remote monitoring of the engine on different levels, of which the most advanced package will be an integral part of an advanced product/service offering. MAN PrimeServ Frederikshavn offers training through its academy, for

both own technicians and customer's superintendents and crew.

BUSINESS PRESENCE AND SERVICE STATIONS

MAN PrimeServ Frederikshavn employs approximately 300 people, but is part of a global network with 120 service hubs worldwide and a total number of 2,800 people in the after-sales business worldwide. The global network consists of both sales offices and workshops. In Denmark MAN PrimeServ has offices in Frederikshavn, Holeby and Copenhagen, each providing service solutions, technical service and spare parts for different engine types and applications within propulsion, GenSets and power plants. MAN PrimeServ Frederikshavn has a storage facility in Frederikshavn and Singapore, thus being able to cover the entire world with most spare parts within 24 hrs.





BUSINESS COMPETITIVENESS

MAN PrimeServ has a strong market position, as it possesses the best knowledge to make the most of its engines. MAN PrimeServ has one of the worlds largest, most well established and continuously growing maritime service networks, which enable the company to react quickly to e.g. troubleshooting and breakdowns. The biggest source of competition on spare parts, which is still seen as MAN PrimeServ's cash cow, comes from "pirate" companies and its own licensees, due to the strategy where home production of new engines is being phased out. Independent workshops and service facilities are also a competitor, as PrimeServ continues to become better at servicing MAN engines. For the retrofit and upgrade solutions within the propeller business, other propulsion system suppliers are also considered as competitors.

MOTIVATION TO PARTICIPATE IN PROTEUS

Due to ever increasing fuel prices and stricter environmental legislations, combined with the customer's focus on operating costs and crew optimisation, there is potential for growth in both service contracts and retrofit/upgrade solutions for MAN PrimeServ Frederikshavn. The company would like to share knowledge with the PROTEUS participants, specifically with the aim of exploring new service solutions and becoming even better at developing these. Particularly discussions and experience exchange regarding customer service provision and customer satisfaction are of high interest for MAN PrimeServ Frederikshavn.

Example of PSS thinking

MAN PrimeServ offers a service called Engine Management Concept "EMC", which implies a total management of the maintenance of the engine, with a fixed monthly payment. The concept was piloted with the Alaska Tanker Company (ATC) on all of its four shuttle tankers. The details of the EMC encompass a series of different activities normally taken care of by the shipowner. In this case MAN PrimeServ provided a delivery of spare parts connected to scheduled maintenance, arranged overhauls through an interval of 6,000 hours, and furthermore provided assistance of operational matter through online support from PrimeServ Augsburg.

Image courtesy of NoreqActa. All rights reserved.



NOREQACTA

HISTORY AND BACKGROUND

Since 1955, NoreqActa has developed and manufactured marine cranes in Denmark. The company name was until 2010, when it was acquired by the Norwegian Noreq Group. The company has expertise in building and supplying windlass (i.e. apparatus for lifting heavy weights), life rafts, MOB davits and other deck-related products. Since 2005 NoreqActa has expanded its business to include dedicated service activities on its products as a direct result of legislative requirements, stating that inspections on cranes for life-saving equipment should be carried out by certified producers.

PRODUCT AND SERVICE PORTFOLIO

NoreqActa's produced on-deck cranes have a capacity ranging up to 50 tonnes. In addition to own

and partner-based technical service activities on equipment, offerings also include performance- and service-logs through a so-called software-based "Management System". This offering is an online database which allows shipowners, other customers, partners and NoreqActa's own service staff to view and document service activities, enabling on-site tracing of past activities on each crane equipment installation.

BUSINESS PRESENCE AND SERVICE STATIONS

NoreqActa is based in Odense, Denmark and has its primary production activities in Poland and China. NoreqActa is represented by 35 local agents across the world, with around-the-clock service. This is achieved through strategic partnerships with similar

companies, where technicians are educated to maintain each others' products. Such partnerships allow for global commissioning on NoreqActa's products.

BUSINESS COMPETITIVENESS

The competitiveness of the company is based on quality via materials, a competent workforce and continuous monitoring of the development process – from the drawing board through packaging and testing. NoreqActa regards itself as one of the leading engineering and production companies for high quality cranes, deck equipment and life-saving equipment for use on large ships, offshore platforms and industrial applications.



MOTIVATION TO PARTICIPATE IN PROTEUS

There are many ideas for PSS within the company and employees with an exceptional drive to develop the after-sales service activities of the company wishing that resources can be allocated to such activities. Through PROTEUS, it is the aspiration of the company representatives to acquire inspiration for PSS solutions, ideas for how to implement PSS solutions (e.g. the establishment and running of global service stations) and to share knowledge on the subject with the other participating companies.

The competitiveness of the company is based on quality via materials, a competent workforce and continuous monitoring of the development process – from drawing board through packaging and testing.

Example of PSS thinking

The new business activity of establishing globally distributed service stations is coined in the motto "Being local globally is the key to NoreqActa's success". NoreqActa has entered into collaboration with a company which produces similar products, but in a different range and without overlapping to NoreqActa's products. Both companies educate their service technicians in each others' products, to enable both companies' technicians to service one another's equipment and thereby expand the companies' service network to the customers.

NOVENCO FIRE FIGHTING

HISTORY AND BACKGROUND

Novenco Fire Fighting (NFF) has delivered high quality fire fighting systems for more than 60 years. Its main market is the maritime and offshore industry. NFF develops, produces, installs and commissions fire fighting systems. The company is a world leader within water mist technology. Product development is focused on the NFF trademarked nozzle, whereas the remaining parts of the system are purchased from sub-suppliers. NFF was previously a department of Novenco, with business applications within HVAC/R. In 2008 NFF became a separate company and in 2012 the company was acquired by Wilhelmsen Technical Solutions (WTS).

PRODUCT AND SERVICE PORTFOLIO

NFF defines itself as system developer and supplier, not as product supplier. The trademarked nozzle is only one element of NFF's business, the company's main expertise is in the configuration and dimensioning of the fire fighting system. NFF's primary product is the XFlow System, a low pressure water mist system used for local protection, full protection and accommodation areas. In addition to the nozzle, the system consists of pumps, sensors, starter cabinets, power packs, valves, manometers and piping. NFF's service offers are contracted with the customer and the company focuses on offering on-demand support for ordering spare parts or receiving product guidance. NFF also offers annual service on its fire fighting systems as well as inspection,

repairs and crew training, offered when requested by a customer.

BUSINESS PRESENCE AND SERVICE STATIONS

NFF's headquarters, storage and production are located in Denmark with approximately 35 employees. In addition the company also has production facilities in China. Furthermore the company has employees in Korea, Italy and China, who handle project management, sales and commissioning of the fire fighting systems, but currently not service. NFF is part of a service network with agents in Poland, Norway and USA that can service its systems. Currently it is not economically feasible for the customer to have a service technician sent out to manage a service inspection. A local fire fighting system costs approximately



EUR 13,500 -70,000, whereas it would cost EUR 7,000 to send a service technician from Denmark to China. NFF has designated service technicians and a number of its project managers are available to travel overseas for occasional service assignments.

BUSINESS COMPETITIVENESS

In the full protection market NFF offers low pressure water mist system solutions, which are more energy efficient and result in significant cost savings in comparison to CO₂-based systems. In the local protection market, which is relatively new and arose due to an IMO regulative, NFF presents itself as the largest non-Asian producer. Due to the relatively low level of complexity in the product the competition is mainly on price. Furthermore, the market is relatively closed, due to the fact that to test and achieve approval from the classification companies for a new system can be a very costly activity, which creates a relative high market entry price. One of the selling points of the NFF system is that it is made of standard parts (i.e. easy maintenance by the owner), which often results in a limited after-sales market for them.

MOTIVATION TO PARTICIPATE IN PROTEUS

NFF sees PROTEUS as a good opportunity to network within the industry. The company is interested in learning about how more systematically to develop new service concepts and to strengthen the service business activity. Another area of interest is to explore the generation of new PSS business models, trying out specific PSS concepts.

Example of PSS thinking

As a fire fighting systems supplier NFF falls within the category of safety equipment supplier. NFF has explored opportunities for collaborating with supplementary safety equipment suppliers to offer a safety package solution for its customers. Additionally, NFF has recently expanded its portfolio to include alternative fire fighting solutions, in order to be able to offer package solutions for customers.

As a safety equipment supplier, a part of securing future PSS opportunities has been to actively participate in the discussion on regulations for servicing the fire fighting equipment at IMO. In this way NFF is able to assess and plan for future needs and opportunities for product and service solutions.



Image courtesy of Pres-Vac Engineering. All rights reserved.

PRES-VAC ENGINEERING

HISTORY AND BACKGROUND

Pres-Vac Engineering was established around 60 years ago and is currently one of the market leaders in high-velocity pressure/vacuum valves and venting systems. The company's main area of expertise is within venting systems, such as critical safety systems. Its primary customers are shipowners and Pres-Vac's main application area is on tankers transporting Volatile organic compounds (VOCs). On these ships, valves and venting systems are required by IMO regulations. Pres-Vac works closely with IMO to create new regulations, as the company holds great expertise in the product development of such systems. In 2010 Pres-Vac acquired the Maritime Inert Gas Systems (MIGS), which was a leading supplier of systems for on-board production of nitrogen on chemical tankers.

PRODUCT AND SERVICE PORTFOLIO

Pres-Vac has a focused product portfolio, selling valves, pumps and Maritime Inert Gas Systems (MIGS) -systems. Valves and venting systems are used within tankers to balance any pressure within the tank and the surroundings. Pres-Vac produces three types of pumps: emergency pumps, ballast pumps and 'Deep-Well Cargo Pumps', the latter of which is a company patent. These pumps can be used on both chemical and product tankers. Pres-Vac Marine Nitrogen Systems provide the on-board capability for generating a safe storage environment for hazardous cargo, preserving perishable goods, and ensuring the safety of crew. At the same time these systems also provide significant operational cost-savings through total self-sufficiency and up to

30% energy saving over conventional systems. Pres-Vac has a varied service offering that includes troubleshooting, worldwide certified service technicians, service guidance to operation, OEM spare parts, and a wide range of training courses. For the operators of the systems and partnering service engineers.

BUSINESS PRESENCE AND SERVICE STATIONS

Pres-Vac has four to five service technicians, who operate globally to conduct service-related activities on ships. These technicians are not dedicated fully on service, but are also product developers, managed by the company's service manager. In addition to this, one to three people from the production division of Pres-Vac are skilled to also handle service jobs. Pres-Vac is expanding its partner service



technicians worldwide, from eight to eleven, with centres in Lisbon, Qatar and Istanbul.

BUSINESS COMPETITIVENESS

Pres-Vac has a leading position on the world market of high-velocity pressure/ vacuum valves and venting systems, and with a 50% market share. Pres-Vac presents itself as “...the largest tank venting solution supplier in the world”. The company’s strong position is reinforced through its close collaboration with IMO, as many regulations exist in connection to safety on tankers, and Pres-Vac’s expertise contributes to set the standards.

MOTIVATION TO PARTICIPATE IN PROTEUS

Pres-Vac is interested in collaborating on shared service technicians, being thus more globally present and providing service on that scale. A larger strategy for

service-oriented concepts is a priority activity for the company, which is working to create of different levels of service in different service packages. Furthermore Pres-Vac is interested in knowledge sharing on how to start up new sales centres on a global scale, plus how to create awareness of new service locations.

The company’s strong position is reinforced through its close collaboration with IMO, as many regulations exist in connection to safety on tankers, and Pres-Vac’s expertise contributes to set the standards.

Example of PSS thinking

Pres-Vac Engineering offers training courses for the operators of its systems and partnering service engineers. The company operates on a global scale, offering certified overhauls of its systems. It presents its service mission as: “...to have your vessel back in service as fast as possible, with minimal off hire and loss of income. Good enough is not an acceptable quality standard – it is either World Class or Not World Class...”



Image courtesy of YIT Marine. All rights reserved

YIT MARINE

HISTORY AND BACKGROUND

YIT Marine is provider of large integrated electrical systems through electro-technical and monitoring solutions for the maritime industry. YIT Marine is a department established in 1982 within YIT A/S - the Danish part of the YIT Group, which is a large Finnish company with more than 100 years of history and currently 25,000 employees in 14 countries. The YIT Group has two different divisions: Construction services and Building services. YIT Marine has traditionally made most business on new-builds with the shipyards as main customers. After the closure of Danish OSS shipyard in Lindø, YIT Marine flipped its business towards after-sales with the shipowners as its main customer. The company is taking advantages of its previous close relationship with shipyards, offering

highly skilled consultancy and a wide range of retrofit solutions.

PRODUCT AND SERVICE PORTFOLIO

As provider of integrated electrical systems, YIT Marine is the link between a large number of products on the ship, as almost all products are part of an electrical installation that needs power and cabling. The company has therefore extensive knowledge and expertise in installing, testing and starting up many of these products, as the company is usually involved during the new-build process. An average container ship has 2,000 km of cabling, which reveals the complexity and importance of its systems. A sample of the major electrical components that are often installed in ships includes: switchboards, control consoles, converters, alarm systems and networks, which is where

the main expertise lays. YIT Marine does not manufacture any of its own products, but is mainly a design and sales house of these. The department also provides spare parts to other installed products outside its own systems. YIT Marine offers service technicians for a broad range of system failures, through different services, such as regular maintenance, repair and troubleshooting.

BUSINESS PRESENCE AND SERVICE STATIONS

YIT Marine is located in Fredericia, Denmark, with a service technician network spread throughout Europe, in a number of different regions: Nordic countries, Baltic countries, Russia and Germany. YIT Marine has approximately 30 marine technicians that travel overseas.



BUSINESS COMPETITIVENESS

In the context of the transmission of main business contact from shipyards to shipowners YIT Marine is in a privileged position, as the company can facilitate this change for other companies, due to the central role of its electrical systems. Regarding service potential, the company has worked with 180 new-builds, having therefore a fair amount of installed base to target. YIT Marine central position as power structure provider on the ship can also be used to lead collaboration between suppliers, such as the utilisation of its expertise when contacted in connection to a system break-down, whereby the company can act as a consultancy, screening and advising what kind of system to purchase.

MOTIVATION TO PARTICIPATE IN PROTEUS

YIT Marine's motivation lies within the possibility to create a close collaboration with the suppliers in connection to commissioning of new-builds, and in any repair jobs, being a troubleshooter across PROTEUS companies. YIT Marine has also expressed an interest to create shared service centres, where the company could bring its system integration competences.

"We need a deep insight into what the shipowner needs are, maybe we think we know the right solution, but what does that help if they do not want it? A market analysis, is extremely important for this project."

[YIT, 2010]

Example of PSS thinking

YIT Marine worked closely with Odense Steel Shipyard (OSS), where the company was supplier since the launch of its Marine Department in 1982 and up until the recent closing of OSS. The knowledge gained during these years allows the company to provide consultancy support to shipowners with respect to the building of technical specifications, acting as the connector and facilitator between shipowners' and shipyards' technical discussions, and hereby expanding its service offerings holistically.



Image courtesy of Danish Maritime. All rights reserved.

DANISH MARITIME

HISTORY AND BACKGROUND

Danish Maritime is an industrial association with close to 50 members. The association was established in 1919 as the Shipyard Association “Skibsværftsforeningen” and changed name in 2003 to Danish Maritime (Danske Maritime) as they expanded the association members from only shipyards to also include Danish Maritime equipment manufacturers and maritime service suppliers. The association functions as a channel to market insight and intelligence within the maritime industry on a global scale, so as to enable the Danish maritime companies to increase global competitiveness.

BUSINESS PROPOSITION

Danish Maritime initiates cooperation between its member businesses in a variety of areas. It is a centre of knowledge, furnishing its members, public authorities and the media with the latest relevant information on the maritime sector. The association brings together members businesses in meaningful networks and enables and ensures cooperation with other parts of the Danish international maritime clusters. One of the most important tasks of the association is to contribute to the continuous success and global competitiveness of the Danish maritime industry, by promoting favourable conditions for the Danish maritime industry, also on a political scale.

BUSINESS PRESENCE

Danish Maritime has offices in Copenhagen and Bruxelles and is a recognised political player and consulting partner within maritime affairs. The association has good collaboration with Danish and European politicians, along with participating in international, regional and local networks. Danish Maritime is member of several international maritime knowledge institutions, such as European Network Maritime Cluster (ENMC) and Maritime Development Center of Europe (MDCE). The association has participated in several IMO committees, where Danish Maritime is aiming for high international standards for the Danish maritime industry.



MOTIVATION TO PARTICIPATE IN PROTEUS

Danish Maritime was an instrumental part of the initiation of the PROTEUS consortium, with the aim of intensively and continuously creating a focus on the after-sales business of its members. It is the association's belief that to stay as a nation of maritime strength and competitive edge, the maritime companies must refocus their businesses, taking advantage of their high knowledge and levels of expertise. Danish Maritime's interest is focused on supporting its members in moving towards integrated product/service-oriented businesses.

One of the most important tasks of the association is to contribute to the continuous success and global competitiveness of the Danish maritime industry, by promoting favourable conditions for the Danish maritime industry, also on a political scale.

Example of PSS thinking

Danish Maritime has many initiatives to bring the Danish maritime industry a step closer to a strengthened after-sales position globally, where a main focus is set on collaboration across companies. The association is orchestrator of several projects, one of which is focused on a combined retrofit and strategic marketing alliance. This retrofit cluster is developing package solutions, together with an implementation and maintenance strategy, enabling their customers to meet future environmental regulations. Through this offering, the suppliers support their customers in the pre-phase of acquiring products, aiding the operation time of the ships, as this implementation can be an integrated part of other yearly checks or five-year inspections.

THE CONSORTIUM

GLOBAL PRESENCE

Recognising the potential for developing further after-sales activities, a vital element of the consortium is the global presence of companies, to enable them to service their customers, regardless of location. All PROTEUS companies are located in Denmark and the majority are members of The Danish Maritime association. The maritime industry is a strong globally reaching industry, not least due to the ever-mobile nature of shipping. Global presence can be created and ensured in many ways:

- Service partnerships
- Self-owned service networks
- Service squads
- Call-centers
- Sales offices

- Sales agents
- Online services
- E-commerce

The map on the following page displays the global presence of the PROTEUS companies, representing sales offices and service stations located around the world. The map clearly shows the global nature of the consortium and the maritime business as it was in 2011, when the data were collected. Around half of both sales offices and service stations of the consortium are based in Europe, approximately a quarter based in Asia and the remaining appear as distributed across the rest of the globe. In addition, it should be noted that the amount of offices and stations is increasing, especially in the Asian regions. This is due to the fact that global shipping activities are prominent in Asian ports, where 9 out of 10 of the

world's busiest ports are located (based on Total Cargo Volume in thousands of tonnes.). It could be argued that the business of ports might not directly relate to after-sales activities, however there are data to show how the majority of activities (e.g. the dismantling of around 1,000 ships for recycling each year) happen in facilities in South Asia, where 90% of European ships end up.

A large proportion of the companies have self-owned international production facilities, sales offices, product development and service stations, scattered across many different countries. Common for all of the producing companies is that they have production activities abroad, by e.g. own production facilities in China or by outsourcing all production to foreign production facilities. Quite a few companies retain parts of their

production in Denmark, with a specific focus on the production of crucial parts. This is due mainly to quality reasons, but also to hinder plagiarism.

DIVERSE COMPANY SIZE IN RELATION TO SERVICE THINKING

The companies in PROTEUS vary widely in terms of their size. This makes the results of the project relevant for a broad audience.

For both large and small organisations there are challenges and opportunities in embracing service thinking. Small companies are more sensitive to market changes, tending to be willing to create partnerships with larger networks of companies, rather than setting up their own global service networks, due to the costs involved. On the other hand their light organisational structures enable them to be agile players in the industry, adapting faster internally to couple with such changes. Large organisations find it harder to embody such organisational transformation, often because it takes time to make changes in group strategy without modifying corporate visions. However, their size allows these companies to have greater reach for service provision and better organisational structures in place to support customers. It can be observed that those companies with well developed after-sales departments are having greater success in navigating the low conjuncture situations – even though this has happened without the help of strategic or systematic approaches towards the development of after-sales service per se. →

GLOBAL PRESENCE MAP

EUROPE

- ☰ 46 %
- 🚢 51 %

Rotterdam

- 50%
- #3

Gothenburg

- 40%

Saint Petersburg

- 50%

Istanbul

- 60%

Alexandria

- 40%

Geneva

- 40%

Buenos Aires

- 40%

SOUTH AMERICA

- ☰ 8 %
- 🚢 6 %

Mumbai

- 40%

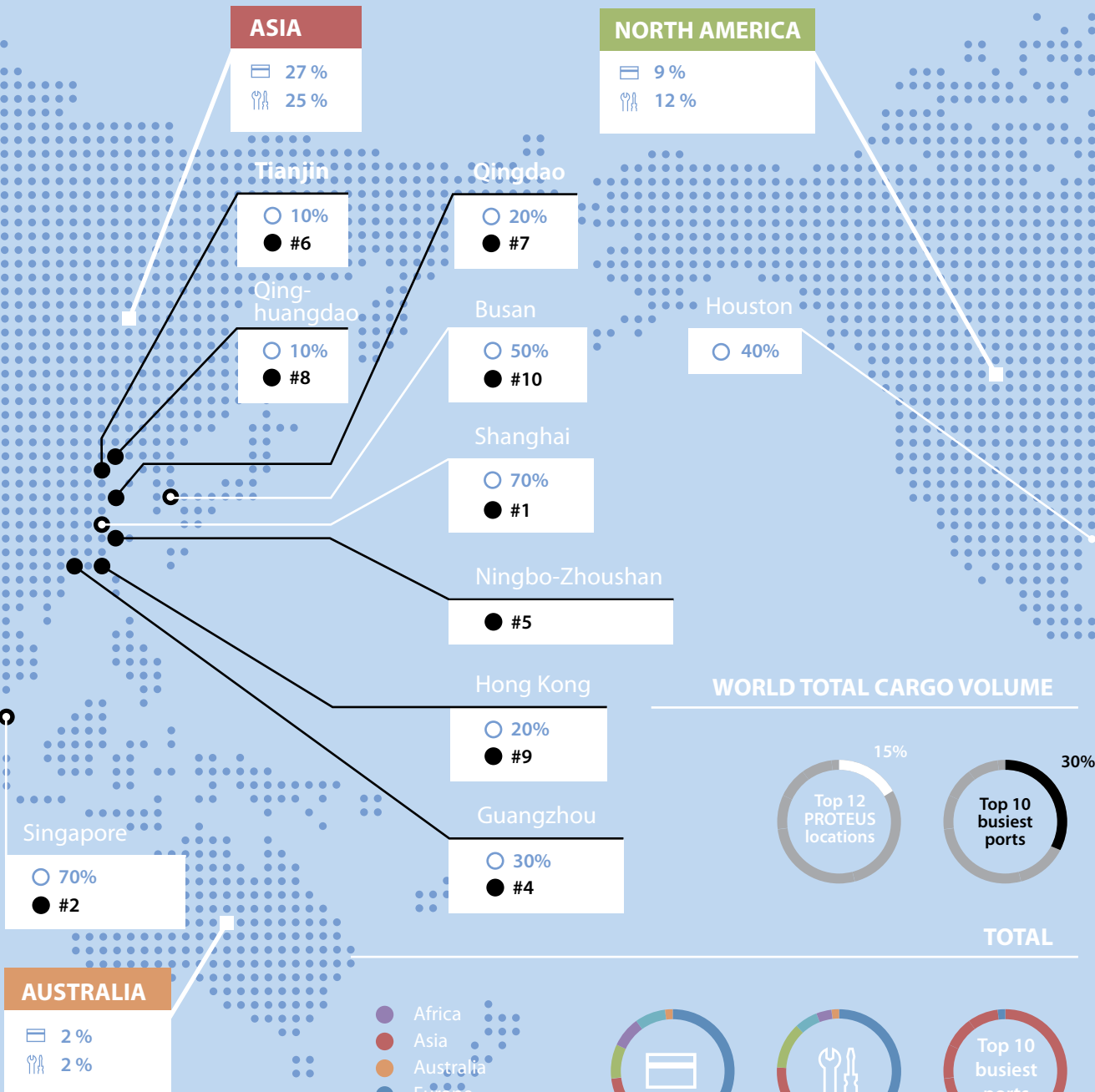
AFRICA

- ☰ 8 %
- 🚢 4 %

- ☰ Percentage of Sales Offices represented by at least one PROTEUS company
- 🚢 Percentage of Service Stations represented by at least one PROTEUS company
- Percentage of PROTEUS companies present* in this location
- Top 12 locations by presence* of PROTEUS
- Top 10 of world busiest ports by Total Cargo Volume (thousands of tonnes)**

*Including Sales Offices and Service Stations

** Source: AAPA World port Rankings 2010





ORGANISATIONAL CHALLENGES

Utilising customer information

Offering PSS solutions is typically more complex and demanding on the company. PSS solutions should be based on the customers' activities, challenges and needs, which means that information on customers is essential in the development of such. However, many companies are challenged in integrating information about the customers into the development of new solutions. A very beneficial approach that has been seen at some companies is the segmentation of customers, based on a thorough understanding and analysis process. The segmentation can be used for marketing, sales and development purposes, enabling each effort to

focus on the specific customer types' needs. A company has several contact points with the customer, from sales, through installation and warranty, to after-sales and service. Each contact point might be a source of valuable customer information. The challenge lies in utilising this information as a foundation for business opportunities.

Internal collaboration

In many traditional manufacturing (incl. some PROTEUS) companies the collaboration between departments is often sparse. In the smaller companies, most departments are located within the same building, if not in the same office, but this does not always lead to cooperative habits. Each employee or department has its own focus and collaboration is kept to a minimum, as all are pressed on time and

resources. Collaboration in the smaller companies has often been seen to have a personal nature, based on who knows whom, instead of being based on which department could benefit from collaboration. Larger companies tend to have silo-based organisational structures, where each department has their own agenda, budget and KPIs to adhere to. Cross-departmental collaboration is seldom in focus or given resources. Collaboration and alignment between geographically dispersed departments is often seen and successful, but it is between the same functional units e.g. R&D departments located in different parts of the world interacting on a regular basis. Little collaboration across functional units is seen. For instance, communication or collaboration between the development department and the service or after-sales department is

mostly non-existent, as well as communication between either of these and the marketing department. Thereby the after-sales department might have relevant input from customers which never reaches product development.

“Supporting the aftermarket business hasn’t been a focus in our department [marketing], as our company has been very silo based. We are working towards changing this by strengthening our internal collaboration.”

The low priority of inter-departmental communication is usually caused by the belief that little can be gained from it, but this also comes down to resources. Some see the potential of working together across departments but lack the means, time and resources to transform the potential into actions. If management recognise the potential that can be gained by collaboration between departments, resources need to be allocated for it to work. Many companies have acquired smaller companies that exist as brands within the larger organisation. As former companies become departments inside a large organisation, collaboration can become even more complex. If a company is interested in developing total package solutions, acquisitions can be a part of a strategy to be able to offer performance based offers. →

Andy Liang, Flickr.com/agroove, (CC BY-SA 2.5)



External Collaboration

Being at the right place at the right time is crucial for the success of any service business. In the maritime industry, when a breakdown occurs on a ship, time is of the essence and product/service prices become less important than the time it takes to fix the problem. Large companies are often seen to have self-owned service stations at key geographical locations. This requires a substantial investment to set up but also retains the profit within the company. Smaller companies do not often have the resources to create their own service networks. This can be problematic if the company is interested in expanding its service activities but also if the company is required by regulation to service the

product as the certified producer.

Different solutions have been seen to this challenge, two examples follow:

1. The supplier enters a financial partnership with an external service network (as individual local service stations or as larger service networks) by training and/or certifying the technicians connected to the service station, in a profit-sharing agreement. The supplier will in this case have expenses in assets connected to training and in return gets an opportunity for increased service business, with both sale of spare parts as well as maintenance activities. The aim of a partnership like this can also be a way for the supplier to create a better reputation (brand-value) by choosing a renowned service partner.

2. A supplier with an existing service network can also enter into a partnership with a company of similar but not competing products, where they “share” service stations globally. By sharing facilities by and/or having own service technicians present, companies are certified to service each others’ products.

Product Development

Product development in the maritime business is not surprisingly influenced by the market. Shipowners are hesitant to experiment with new and untried solutions, as failures can be extremely costly. Incremental improvements are often preferred to groundbreaking, but untested solutions. Reliability is essential in the maritime business. This is evident in the product development processes observed at the suppliers.



Product development in the maritime industry is typically driven by new regulations, customers' needs for customisation or other market demands. Development based on regulations is often requirements-based, where the existing solution is optimised on specific accounts to, for instance, become more environmentally friendly. Depending on the regulations, the solution can be groundbreaking, but comprises mostly of adjustments to existing solutions.

Another strategy to generate new products is new combinations of existing parts. Usually this happens when a customer has special requirements to the application of the product. In such cases, different parts are changed to fit the application, thereby creating a new product. These changes can be small adjustments, as well as major changes that can result in a whole new way of functioning; the latter being far less frequent than the former. Whether this can be classified as new product development is dependent on the degree of the modifications. Product alterations or customisations are also seen in the production process. Some minor requirements and product changes are directly made by the production workers, without going past developers or engineers.

If a company is interested in a new business area or market, a common way of expanding the product range is by purchasing a company with the existing technology and production. In many cases the acquired company functions as a new department, remaining mainly the same as before, but with a new company name. →

→ A long-term development strategy tends to be proactive to customer needs. The danger of being reactive is that it opens up the opportunity for competing companies to also offer the solution and gain market share. The potential of creating revenue on service is recognised across the companies. However, the development of service solutions is not often allocated many resources. As stated by one company:

“We deliver so many systems that we haven't had time to develop our service concepts yet. We have had a nice chat about how we would like to do it, but that's it, so far.”

Many of the companies have several potentially great service ideas but have no-one in charge of service development. Without a “service

champion” or coordinator, many good ideas never reach beyond the drawing board. Even in companies that have someone in charge of service, the person rarely has time or resources dedicated to service development and is mostly kept busy handling the company's existing service offers. In some cases one person is in charge of service and service concepts. However, there is often no systematic process for the development of this. The companies that have the largest income from service are the ones with designated after-sales and service departments, with integrated product/service business development processes. This approach has resulted in more complex solutions that, besides being profitable, also ensure customer lock-on. The integrated business development has so far been project based. It has been a reaction to an identified market

opportunity. Only one company in the consortium has been seen to attempt to make service a part of a continual structured development process.

There is a major opportunity and recognised need for companies to benefit from a systematic approach to integrated product/service development into a continual business development process, using knowledge about customer and market needs.

The current state of the maritime branch, with respect to organising for systematic service development, is similar to many other industry branches observed. The difference is that a number of conditions have created a movement in the maritime branch, providing favourable conditions for the Danish companies to servitise.



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THE CONSORTIUM'S OFFERINGS

By looking at the companies and mapping all the current offerings, one can gauge the consortium's existing PSS maturity level – hereby essentially seeing how well the companies are doing in delivering effective, integrated products and services. It goes without saying that for a company to plan its future course, the current position must be known. In using the term “offering” we intend to encompass any type of value delivered by the companies themselves, or in collaboration with customers or partners. When moving toward an integrated product/service strategy, it is important to bear in mind that this value is delivered in using the product and not in selling it. As product life expectancy is increasing, this changed perspective opens up possibilities for creating an after-sales business with more sustainable revenue streams, than is the case for

new-sales. In moving toward a PSS strategy the company changes its interaction with the customer, from transactional (sales) to relational. Figure 4 shows the PROTEUS companies' key offerings on a continuum, from product-oriented to customer-oriented. Most of the companies are challenged by moving from a product-oriented business towards an integrated product/service-oriented business, but the data also contain examples of non-manufacturing companies. These are typically consultancies or service providers, looking to move in the opposite direction by adopting a ‘productification’ approach, wherein product components are integrated into their service-based offerings.

PRODUCT

Most of the offerings seen in the consortium are based on physical goods (products). These products can vary in type from commodities, through standard products, to highly customised products or systems. Some of the offerings are systems that integrate components from other suppliers – even from within the consortium. Almost all products are highly integrated with other systems on the ship. Even for non-critical components, this integration demands a high degree of coordination between suppliers.

PRODUCT USE SERVICES

Many of the offerings are designed to support the operation of the product – these offerings are called “product use services” as they are based on →

PRODUCT ORIENTED

CUSTOMER ORIENTED

Development Strategies

PRODUCT

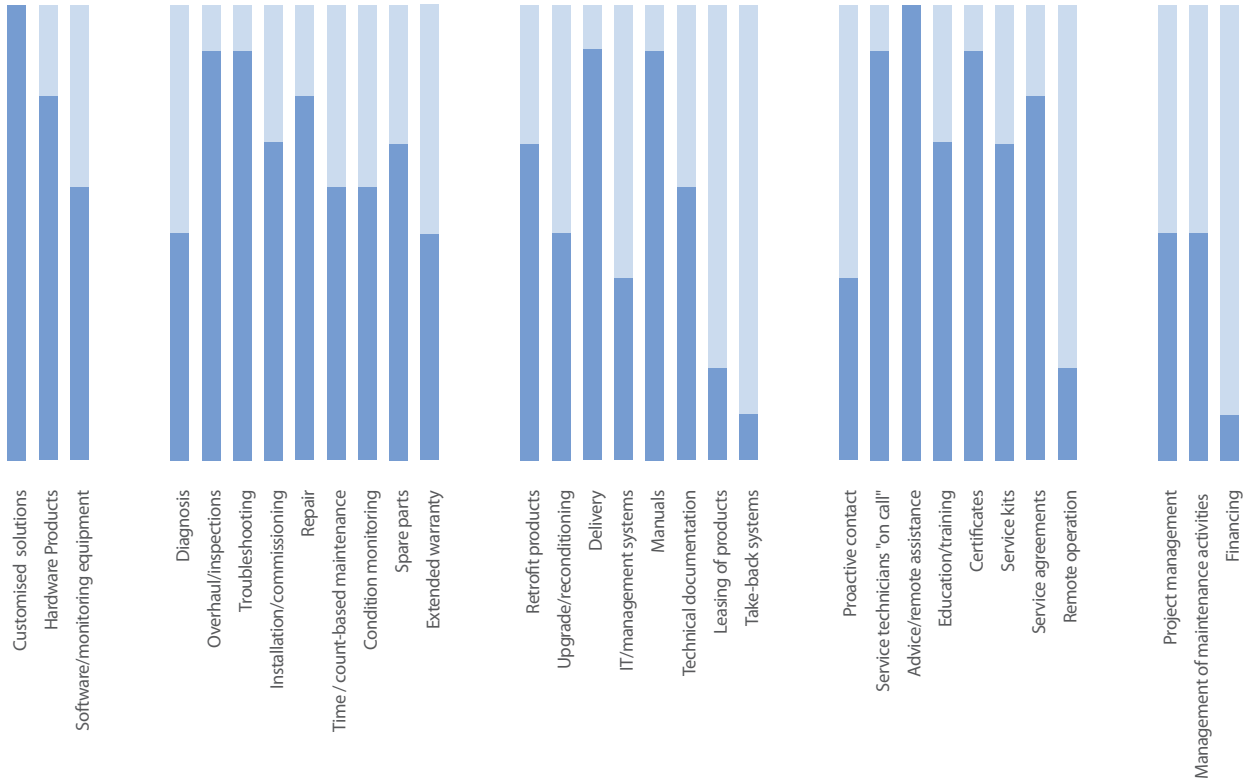
PRODUCT USE SERVICES

PRODUCT LIFE SERVICES

CUSTOMER ACTIVITY SERVICES

BUSINESS SUPPORTING SERVICES

Offerings



■ Offered by PROTEUS companies

■ Not offered by PROTEUS companies

Figure 4: Offerings Map (measured in 2011).

→ providing services and/or products in the use phases of the ship's life cycle. The products supported can be the supplier's own products or the products of other suppliers. Examples of such product use services include corrective and preventive maintenance through on-site inspections, conducting troubleshooting, diagnosis, repair and larger overhauls.

PRODUCT LIFE SERVICES

In some cases the suppliers support not just the operation, but multiple phases of the product life – such offerings are termed “product life services”. As an example, some offerings include systems of pooled reconditioned spare parts that are offered to the shipowner in exchange for current, worn parts (in need of reconditioning). In some cases, the ownership of the reconditioned

part is kept with the supplier, so as to reduce the amount of effort needed for future exchanges. Product life service also includes take-back systems, where the supplying company is responsible for disposal, recycling and compliance to any legislation in the product's end-of-life phases.

CUSTOMER ACTIVITY SERVICES

Many of the companies focus on their customers' activities and on how to support these. The resulting offerings can be categorised as “customer activity services”. For example, many of the companies offer training and education programmes for the crew and the ship's technical staff. Only a few suppliers are gaining a profit on training-based offerings – in most cases the training is part of an integrated service package, perhaps due to legislative requirements.

Many of the suppliers also offer support for the daily operations of the ship, through advice and remote assistance – for instance through call centres or on-site visits. Some suppliers provide service agreements that mimic a “car-wash model”, where service elements can be incrementally added on top of each other to reach the right level of activity support. In another approach, the supplier proactively contacts the customer when service is needed – this need is established by measuring how often the product has been used (count-based) or even measuring on the product itself (condition-based).

BUSINESS SUPPORTING SERVICES

The final category of offerings are called “business supporting services”. Looking at the product-supplying

companies in PRTOEUS, only a few of them directly support their customers' business processes. This makes sense, as these processes are traditionally seen as core parts of the customer's business. An observed example of such business supporting services is a maintenance management offering, in which the supplier takes the responsibility of all maintenance required for a given system. Another core customer business process is the ongoing effort to free and acquire liquidity for executing the business. In some instances the suppliers support customers as a financial partner by offering, among other things, financing packages.

SUMMARY

From the mapping of the key offerings within the consortium, one can see that this is an industry that has taken its first steps towards integrated product/service strategies. Most companies offer a range of different service offerings - some in the form of "add-ons" to product offerings and some in the form of advanced, long-term service agreements, with pre-defined fees and interactions. In most cases, the ownership of and responsibility for the product remains with the customer, with the exception of a few cases, where the responsibility of maintenance management has been moved to the supplier.

AN AGGREGATED OVERVIEW OF PROTEUS COMPANIES OFFERINGS

Figure 4 presented 31 key offerings of the companies in the PROTEUS consortium. In the following we present a broader, aggregated palette of products/service mix (+ variants), the range of channels to the customer (8 identified), and the wide range of offerings provided (54 identified), that we have seen offered by one or more PROTEUS company.

This overview can serve as a self-check list for the individual company to consider product/service strategies, and will be used later in this workbook series to describe existing and emerging PSS offerings.

PRODUCT / SERVICE MIX



Product
Offered



Service
Offered



Product/Service
Offered



Performance /
Solution Offered

CHANNELS TO THE CUSTOMER



Call Centre



Sales Office



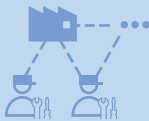
Sales Agent



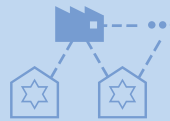
E-Commerce



Online Services



Service Squad



Own Service Stations



Service Partnerships

OFFERINGS



Monitoring Equipment



Reconditioning



Upgrade



Retrofit Products



State of the Art Deals



Product Leasing for Repair Task



Spare Parts



Spare Parts On Demand



Spare Parts Owned by Company



Spare Parts Owned by Customer



Spare Part Pitstop

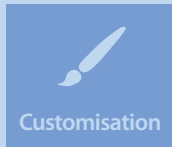


Spare Part Kit

OFFERINGS



Upgradeable
Service
Selection



Customisation



Customised
Products



Customised
Services



Customised
Product/
Service



Customised
Solutions



Packages



Product
Packages



Product/Service
Packages



Service
Packages



Service Kits



Technical
Documentation



Product
Manuals



Digital Product
Manuals



Digital Catalogue
Identification
Support



Management
Systems



Shared
Management
System with
Customer



Service
Agreements



Certificates



Warranty



Extended
Warranty



Financing



Proactive
Contact



Project
Management





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SHIOWNERS' NEEDS CYCLE

CUSTOMER ACTIVITY CYCLE (CAC) – KNOW YOUR CUSTOMER

The customer activity cycle (CAC) is a tool used to identify customer needs and new business opportunities. A CAC puts the customer in the centre and focuses on the activities connected to the use of a product or service. The CAC is divided into PRE, DURING, and POST phases. PRE describes the customer's activity prior to the product use. DURING describes the customer's activities when using the product, and POST describes the customer's activities when s/he no longer uses the product. By describing and illustrating the customer's activities in detail, it is possible to identify previously unidentified business opportunities.

The CAC is a scenario tool and only depicts one scenario of customer activities at a time. Different scenarios

have different CACs. It can be useful to make multiple CACs depicting different scenarios, to achieve an in-depth understanding of the customer needs. Several scenarios of the shipowner's activities are interesting to look closer at depending on the type of product, service or system that is provided. For instance, ship maintenance, buying/selling ships, keeping in compliance, docking, etc. By mapping out the customers' activities, it is possible to identify where to support the customer, but also to identify activities that one can undertake for the customer.

CUSTOMER CHALLENGES AND NEEDS

The complexity of the maritime business is also reflected in the challenges the customers face. The customers are a complex group with different types of challenges and

needs, which provide different types of opportunities for suppliers and other stakeholders alike. The following challenges/needs are not divided into different customer types, since some transcend these lines and others are independent of them.

System overview

When a breakdown or malfunction occurs on a ship it can on some occasions be difficult to identify the problem. An undetected malfunction in one part of the system can lead to a breakdown in other parts of the system, resulting in difficulties in localising the main cause of the system to fail. There are already several monitoring and alarm systems to identify product or system malfunction, but this area is indeed an area that lacks the focus. Digitalising the systems is one way to create better condition for good

operation and therefore also maintenance. In other cases the problem is easily identifiable, however the component and its specifications and requirements can be hard for the crew to identify and replace. Especially smaller and less central components can be hard to identify, since they can have specific requirements for the given applications, due to for instance particular thermal conditions. It can be a challenge for the crew to discern specific products. This can lead to much misspent time on ordering and installing wrong components and in worst-case scenarios, can lead to a greater system breakdown. In addition to identifying the components and their requirements, the crew or purchase department also uses time to obtain an overview of the different suppliers and prices for the component. Especially for smaller components, the costs due to time used to identify the component and collect information and prices greatly surpass the purchase price of the component.

Planning / Managing time and money / Foreseeable expenses

There are many products and systems on-board a ship that need to be serviced and maintained. Much of the shipowner's time and resources are used to get an overview of when and where this is needed, as well as planning it in accordance to time schedules. In case a component needs to be replaced, time issues can be more important than component price. The time between needing a component and having it on-board the ship should be as swift as possible. There is a demand to foresee the need for a product replacement before the need arises. →

NEEDS

- Pre-project should meet all the shipowner's design specifications
- Good communication between shipowner, shipyard and suppliers

- Good communication between shipowner, shipyard and suppliers
- Compliance between shipowner's and shipyard's makerslists
- Different ship design options
- Easily comparable offers
- Offers of components that meet shipyard/shipowner demands
- Ship offers that meet shipowner's demands

- Good communication between shipowner, shipyard and suppliers
- Reasonable price from shipyard
- Easy access to well defined and transparent offers

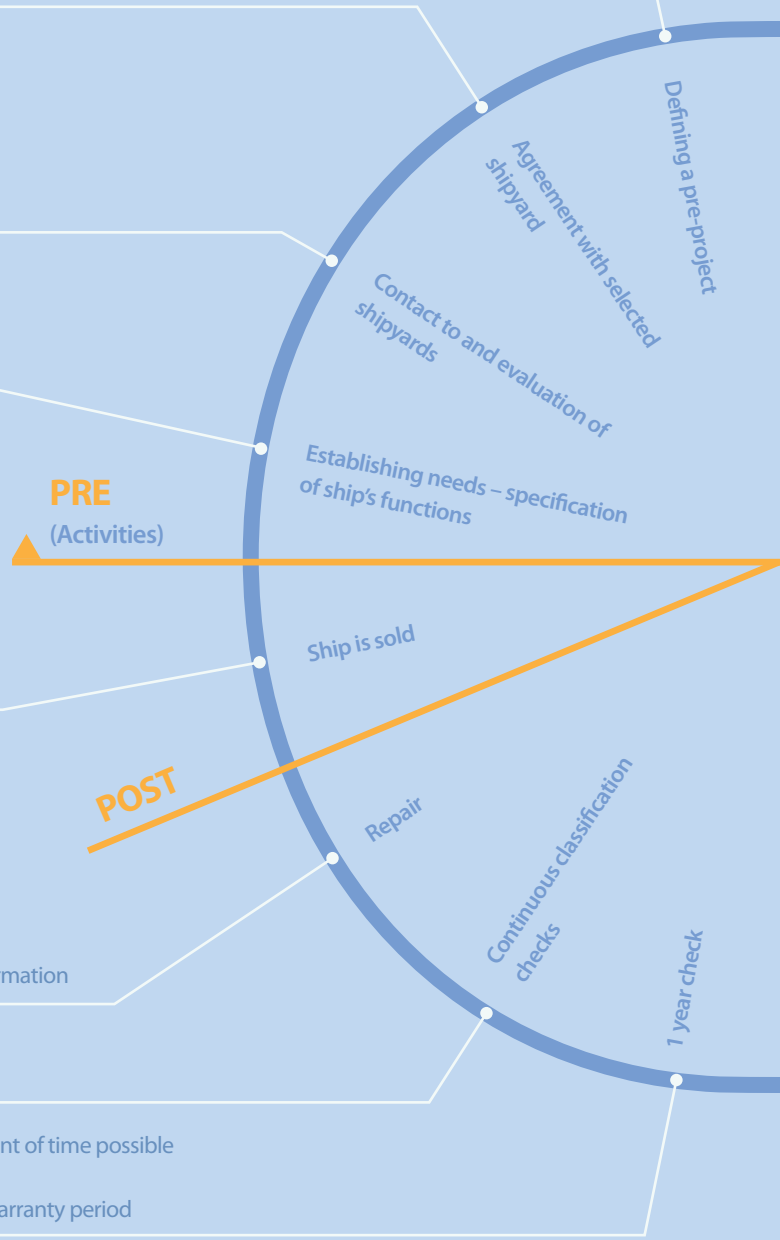
- Access to information regarding available products on the market
- Counselling on the development of design specifications
- Help to detail design specification
- Help to meet customer demand
- Provision of knowledge about existing shiptypes/fleets

- Retain high sales or scrap price
- Attainable, credible and neutral condition report of ship
- Live up to end-of-life related regulations

- Crew is able to execute repair
- Low cost repair
- Speedy repair
- No doubt or discussion about liability
- Repair should not interfere with the ship's operation to avoid breakdown or other needs for repair
- Good communication between shipowner, shipyard and supplier
- Overview of the components on-board, their producers and contact information

- Ship should remain classified
- Components have the intended functionalities

- Quick and efficient check that delivers the ship back in the shortest amount of time possible
- Fewest possible problems or failures
- All problems and failures should be identified and corrected within the warranty period



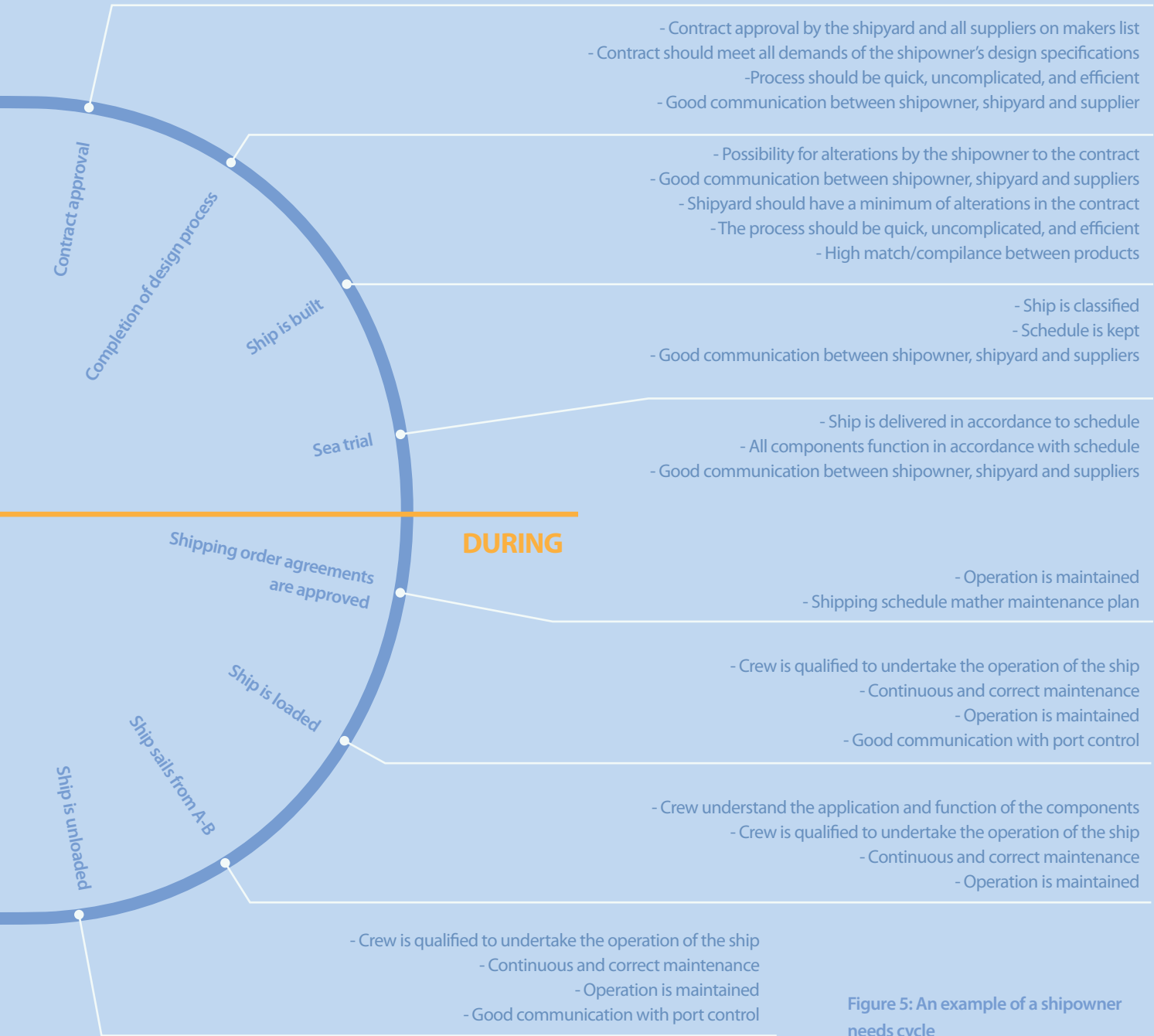


Figure 5: An example of a shipowner needs cycle

→ Some products incur annual expenses for the shipowner. For example, some safety equipment is required to have a service check each year. The price of the service check can vary from year to year, which makes it difficult to plan the budget. Therefore some shipowners demand solutions that offer fixed rates or annual fees for products that they know require some kind of regular service check or maintenance.

Today many shipowners have chosen to reduce the fuel consumption by reducing the cruising speed – this is called “slow steaming”, which is an ongoing trade-off between time and money. As shipping prices have been reduced because of overcapacity in the world fleet, the need for shipowners to plan ahead to cut costs has increased. It becomes increasingly important to

comply with the time schedule to keep the fuel cost down. If the ship is forced to speed up to compensate for delays it reduces the shipowner’s profit.

Retrofit solutions are becoming increasingly common today, due to regulations as well as system optimisation and cost reduction opportunities. However, many retrofit solutions require that the ship is in dock. As a ship is very seldom docked to merely install a retrofit solution, this needs to be planned in accordance with, for example, 1- or 5-year checks. As a docking is extremely busy a retrofit needs to be coordinated with many other operations on-board the ship, on a very limited time schedule. In such a docking, the main cost driver is usually the ship’s downtime – not the cost of components, labour etc.

Keeping/Increasing uptime

Major breakdowns that stop or delay the ship are extremely costly. Shipowners want the highest possible uptime of the products and systems that are crucial for the operation of the ship. They are interested in guarantees that ensure a certain percentage of uptime. These demands can require alterations of the product, system or service in terms of sensors, monitoring systems.

A reduction of ship crews has been seen for many years, but this has now reached a current minimum. There are many shipowners that further reduce the cost of crew by hiring cheaper, but often less qualified crew. This increases the requirements for the systems and components - and also opens opportunities for the supply of service.

Keeping in compliance

The IMO is constantly making new regulations that shipowners have to keep in compliance with, to be able to operate at sea. Keeping in compliance can be very costly. For instance, many ships are required to comply with the upcoming NOx emissions standards. Often this will mean huge investments for the shipowners. As the value on ships has decreased severely since the financial crisis, banks are hesitant to invest in ships or loan money to shipowners. If the shipowners are not in compliance, they are not allowed to operate at sea and are thereby unable to create revenue. Without revenue they are unable to invest in the required systems. The shipowners need a solution to this impasse.

Keeping track of the different regulations and the effects on the ship can be a comprehensive task. Shipowners use time and money to keep track of all the different regulations that affect their fleet.



Official U.S. Navy, Flickr.com/usnavy, (CC BY2.5)



NEW BUSINESS OPPORTUNI- TIES WITHIN PROTEUS

As determined in the previous sections, the maritime industry is faced with considerable change, whilst at the same time being challenged with the conflict between established and emerging ways of doing business. Nevertheless, as with any transformation, opportunities are appearing. For inspirational purposes we present some opportunities that are already being seized within the consortium, as well as examples from other industries with higher degrees of product/service integration.

Knowledge sharing within the network

Throughout the exploratory phases of the project the companies have exhibited an eagerness to share knowledge and expertise with the research group. There are already

several organisations in the consortium sharing their expertise in e.g. increasing effective communication between R&D and after-sales, or in sharing e.g. education programmes. As observed in other industries a more open predisposition towards sharing information has the potential to increase collective strength, for instance through so-called “open innovation” practices.

Organisational transformation

Many opportunities are driven from within the organisation. The willingness to invest in service and business development can result in great profits. This has been observed in the maritime industry as well as in industries previously confronted by this transformation. The focus should be on developing integrated business

solutions and not separated product and service solutions. Most companies already possess the knowledge that is needed for this, but need a change in communication and mindset. By collaborating across departments some companies are already able to create solutions that can create income throughout the whole of the product life cycle.

Cross-company collaboration

There are opportunities for business collaborations between companies from the PROTEUS consortium, especially amongst ones with natural similarities in their products or products' functions (e.g. safety or propulsion). Such a kinship can form a strong outset for collaborations. A step further could be to adapt the development and service processes from both partaking companies, achieving more holistic product packages.

Changed ownership and new responsibilities

In the light of the unfavourable market conditions, an increased openness to new ownership constellations has been observed in the industry. Several suppliers are now mirroring business models seen in other industries, by maintaining ownership of the goods provided and gaining revenues from selling performance outputs. These setups typically result in more predictable costs for the shipowner.

In maintaining the ownership, a whole new set of responsibilities are moved to the supplier. In cases where compliance is key, such agreements can be a way for the shipowner to mitigate risk and gain peace-of-mind, despite ever-increasing legislative pressure.

Finally, the suppliers are also moving to cease the opportunity found in alleviating the costs faced by the shipowners, in micromanaging an immense undergrowth of non-critical components.

Strategic partnerships with financial institutions

The shipowners' liquidity is currently limited and the risk aversion of the financial markets limits opportunities for external financing. As a consequence, shipowners are not necessarily able to act on attractive business cases provided by suppliers, unless these are of a "must have" nature. →

→ To combat this financial stalemate, several suppliers have established direct collaborations with financial institutions, to provide the funding needed for realising the business cases. Similar strategies are seen in the road transport industry. In the logistics industry, examples are seen of partnerships with other financial partners, such as institutional investors.

Formulation of life cycle oriented contracts

As shipowners move toward a more proactive stance on the risks and costs of the operational phase, the suppliers respond by providing contracts that address the full life cycle of the component. These contracts enable the supplier to capture value for a long period of time – in some cases sacrificing some of the upfront lump sum

payment of components or services. In the maritime industry there are many examples of mutually beneficial contracts that include benchmarking dimensions, (financed) upgrade schedules and risk sharing.

PSS packages

As shipowner organisations outsource more of their technical departments and as technological complexity increases, measurements to reduce complexity become a top priority. To meet this demand, some suppliers are bundling products and services in standardised packages, requiring fewer touch-points between the customer and the supplier and a reduced level of management. Also, as these packages can be coordinated and optimised for quick installation, the all-important issue of downtime costs is simultaneously addressed.

Global service presence

With several companies we see strategies for providing global service coverage, whilst at the same time maintaining a financially viable business. Some companies have partnered with other suppliers outside the consortium to utilise the existing global local networks of the latter. Others have opted to send technicians by plane or helicopter around the globe.



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SUMMARY AND OUTLOOK

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SUMMARY

The Danish maritime industry is navigating challenging market conditions. Driven by macroscopic forces and new industry trends, suppliers are witnessing a market power shift. This is opening up opportunities for expanding their business activities over the different life cycle phases of the ship, targeting new customer activities. To thrive under these circumstances companies that are able to find harmonious combinations of product and service offerings are needed.

In the light of these market conditions, the companies in the PROTEUS consortium have been analysed. This analysis has shown a diverse group of companies, both when looking at product type and company size. Furthermore, a group of organisations

with diverse opportunities to improve internal development processes for both product and service. Finally, a map of the existing offerings within the consortium has shown space for growth towards the servitisation of offerings.

To create a rich and shared understanding that will facilitate the growth of business around the new customer activities, an analysis of their needs and activities throughout the life cycle has been presented. This description has laid the foundation upon which to create a shared language to articulate further explorations within the consortium and the industry in general.

Finally, a number of business opportunities have been uncovered. Some of these are already implemented in the companies of the consortium

and others are observed in related industries. But there are also some business opportunities observed here which have not yet been pursued.

THE WAY FORWARD: COMING WORKBOOKS

Integrated product/service development is possible and profitable, examples of how to engage in such transformation exist and these are important to learn from, in order to reduce inertia. Workbook 2 will showcase three success stories from similar industries, but from other branches than the maritime.

To ensure strong adoption of PSS in their organisations, the PROTEUS companies are asking for guidance on how to assess a company's PSS readiness, as well as descriptions of



important PSS Organisational capabilities required and actions to be executed to ease the transition. Workbooks 3 and 5 will expand on these topics, respectively.

A need for more systematic approaches to product/service development has been identified. PSS Tool Book, number 4 in this series, will offer a catalogue of tried-and-tested tools and methods for doing exactly this.

There is also a need to explore ways to serve customers in the most integrated and effective manner, necessitating an identification of similarities and relations between companies as a basis for fostering new business collaboration. Workbook 6 will elaborate on PSS Partnerships.

Companies in the consortium already have after-sales service activities, plans for such and/or intentions to strengthen their after-sales service revenues. Workbook 7 will provide a guide to identify and execute attractive PSS Business Models.

References
























Page 24: Allee, Verna. 2011. Value network and the true nature of collaboration. ValueNet Works and Verna Allee Associates.

Page 67: Tan A.R., Matzen D., McAlloone T.C., Evans S. 2010. Strategies for designing and developing services for manufacturing firms. CIRP Journal of Manufacturing Science and Technology, 3/2: pp. 90-97.

Page 74: Vandermerwe, S., Rada, J. 1988. Servitization of Business: Adding Value by Adding Services. European Management Journal, 6/4: 315-324.

Use the check boxes to chart and plan your offerings! 

What do you offer to your customers?

	 Product Offered	 Service Offered	 Product/Service Offered	 Performance / Solution Offered		
 Call Centre	 Sales Office	 Sales Agent	 E-Commerce	 Online Services	 Service Squad	 Own Service Stations
 Service Partnerships	 Monitoring Equipment	 Reconditioning	 Upgrade	 Retrofit Products	 State of the Art Deals	 Product Leasing for Repair Task
 Spare Parts On Demand	 Spare Parts Owned by Company	 Spare Parts Owned by Customer	 Spare Part Pitstop	 Spare Part Kit	 Upgradeable Service Selection	 Customised Products
 Customised Services	 Customised Product/Service	 Customised Solutions	 Product Packages	 Product/Service Packages	 Service Packages	 Service Kits



Technical Documentation



Product Manuals



Digital Product Manuals



Digital Catalogue Identification Support



Management Systems



Shared Management System with Customer



Service Agreements



Certificates



Warranty



Extended Warranty



Financing



Proactive Contact



Project Management



Service Technicians On-Call



System Consultancy



Academy



Training Other Companies' Technicians



Reciprocal Training



Installation of Products



Installation Consultancy



Installation of Other Companies' Products



Delivery



Take-Back Systems



Commissioning / Sea Trial



Design Support



Management of Maintenance



Diagnosis plus Recommendations



On-Site Inspections



Planned Overhaul



Troubleshooting



Repair



Time/Count-Based Maintenance



Condition-Based Maintenance



Remote Monitoring and Operation

Draw your offerings!

This first workbook in the PROTEUS Innovation Consortium' seven-book series describes the transition of a whole industry branch towards integrated Product/Service-System design and business development. The aim of the workbook is to inspire maritime suppliers to start identifying new business opportunities through the servitisation of their businesses.



This book is printed on 100% recycled / recyclable paper, which has received the above environmental approvals

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