

# #6

# PSS PARTNERSHIPS

A workbook in the PROTEUS series



1

**Maritime Branch Analysis** A deep dive into the maritime industry in Denmark through the lens of our twelve partner companies. This report is the outcome of the descriptive exploratory phase of PROTEUS. ISBN: 978-87-90416-87-4

2

**PSS Case Book** The transformation process towards a PSS-oriented company is described, through the presentation of three best practice cases. Each case describes motivations, challenges, business models and PSS offerings. ISBN: 978-87-90416-88-1

3

**PSS Readiness Manual** A self-assessment and guidance workbook, for a producer/supplier to begin to prepare the transition from product- to product/service-system development. ISBN: 978-87-90416-89-8

4

**PSS Tool Book** A catalogue of tried-and-tested tools and methods towards PSS development, with examples of implementation and a recommended methodology for application. ISBN: 978-87-90416-90-4

5

**PSS Organisation** A look at how to assess a company's PSS potential and description of important organisational capabilities, issues and actions for the PSS providing company. ISBN: 978-87-90416-91-1

6

## PSS Partnerships

7

**PSS Business Models** A step-by-step guide to the strategic planning and development of PSS solutions, providing a process-oriented view on PSS business model types. ISBN: 978-87-90416-93-5

# WHAT IS IN THIS BOOK?

---

In this sixth workbook in the PROTEUS book series a deep dive is taken into the role of partnerships and networks in supporting PSS in the maritime branch. Initially, it is shown how PSS solutions can often benefit from or even depend on the presence of collaborations between stakeholders. This acknowledgement leads to the introduction of the novel idea of a value network – as opposed to the well-known notion of a value chain. Moving on, the differences between various types of value networks are explored. In finishing off this initial theoretical discussion, the typical motivations for building partnerships and networks are treated, along with the barriers typically met in trying to build a network. Having established a theoretical basis for understanding partnerships and networks, the workbook goes on to describe three different cases of partnerships and networks in the maritime branch. After these accounts of real world cases, the workbook rounds off by providing a number of suggestions and guidelines, at the same time identifying the need to establish new relations and to pursue the opportunities identified.

## **PSS Partnerships**

A workbook in the PROTEUS Series

© 2013 Technical University of Denmark (DTU). Unless otherwise stated in specific graphical material.

Authors: Jakob Bejbro Andersen, Krestine Mougard, Tim C. McAloone, Adrià Garcia i Mateu, Line Neugebauer, Juliana Hsuan and Thorkild Ahm.

Funding: Danish Agency for Science, Technology and Innovation (DASTI), Danish Maritime Foundation

Design: Adrià Garcia i Mateu and Krestine Mougard

Cover Picture: Brocken Inaglory (CC BY-SA 2.0)

Published: Technical University of Denmark (DTU)

Printed: MercoPrint a/s

Print Volume: 300

December 2013, 1st Edition.

ISBN: 978-87-90416-92-8

Citation data: J.B. Andersen, K. Mougard, T.C. McAloone, A. Garcia i Mateu, L. Neugebauer, J. Hsuan and T. Ahm (2013) *PSS Partnerships: A workbook in the PROTEUS series, PRO-06*, ISBN: 978-87-90416-92-8, Technical University of Denmark, 46 p.

E-book version and more information at [www.dtu.dk/proteus](http://www.dtu.dk/proteus)

# CONTENTS

---

<b>THE PROTEUS INNOVATION CONSORTIUM</b>	<b>4</b>
Introducing PROTEUS	6
What is a PSS	8
<b>MARITIME PSS PARTNERSHIPS</b>	<b>10</b>
PSS Extends Insights and Reach	12
Why Partnerships Matter in PSS	13
Internal and External Activities	14
From Value Chains to Value Networks	14
Linking Strategy and Network	16
Drivers for Value Networks	20
Barriers and Trade-offs in Collaborating	21
Tools for Describing Partnerships	22
<b>EXAMPLES OF PSS PARTNERSHIPS</b>	<b>24</b>
Green Ship of the Future	26
Danish Maritime Companies: Providing Retrofitting Packages	30
PrimeServ Frederikshavn and Alfa Laval: Building Academies	34
<b>BUILDING A PARTNERSHIP</b>	<b>38</b>
Clarifying the need for partnerships	40
Exploration	41
Initiating	42
Rolling out and operating the network	43
Technical implications	44
<b>SUMMARY</b>	<b>46</b>

Ryan Espanto, Flickr.com/ynd413/3952382779 (CC BY 2.0)



# 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, the sixth workbook in the series, we focus on the partnership and network aspects of PSS. Inherently, moving towards PSS-based business entails moving closer to either the customer or other suppliers, or both. In fact the whole notion of value chain is readdressed, as the boundaries between value creation and value consumption blur and the focus on the delivery of value-in-use replaces traditional notions of production-to-sales transactional relationships. The value chain is therefore replaced by the value network as a key concept in this workbook. Through a description of our observations and activities on the PROTEUS project, plus the description of some of the cases we have experienced, we describe the partnership dimension of PSS as one of the key areas to focus on for the PSS-transitional company. 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.

**Professor 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: “**P**ROduct/ 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).



Official U.S. Navy Page. Flickr.com/usnavy/9718805644 (CC BY 2.0)



# MARITIME PSS PARTNERSHIPS

---

A supplier company pursuing a PSS strategy will most likely be faced with extensive changes in relation to customers, competitors, sub-suppliers and other stakeholders. In fact, by looking at the very basic notions of PSS, one will realise that these changes are bound to occur and that they are in many cases desirable. Former competitors or companies, placed in different parts of the traditional value chains, will see themselves forming partnerships and creating value in unison. Such partnerships form a strong competitive platform, which is better described as a *value network* than a *value chain*. To enable a better understanding of these networks and the partnerships that forge them, this workbook addresses three central questions:

---

*“Why are partnerships and networks important in PSS?”*

*“How does a company gain an understanding of its current network and partnerships?”*

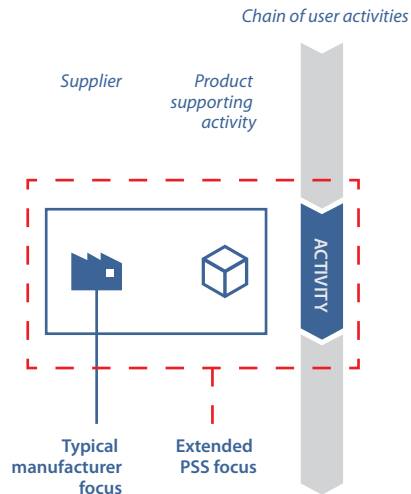
*“How does a company go about identifying, establishing and managing new partnerships and networks?”*

To answer these questions, the workbook will present a theoretical basis for understanding partnerships and exemplify this with a number of maritime examples, taken from our empirical observations in the PROTEUS Innovation Consortium. From this theoretical and practical foundation, recommendations will be made regarding the establishment of PSS partnerships and networks to create closer relationships and new business opportunities.

---

## PSS EXTENDS INSIGHTS AND REACH

As explained in the earlier section of this workbook: *“But what is PSS?”*, a supplier focusing on customer activities has an improved ability to cater to the different needs of the customer. Normally, manufacturers focus mainly on the product-, sales- and distribution dimensions, when dealing with the customer, as shown in Figure 1. In PSS, this domain of the manufacturer is extended to also include insight into (and increasingly responsibility for) the activities of the customer. Hereby the relationship between the customer and the supplier is changed from transactional to relational through a continuous interaction. The activities of the customer are a direct expression of the priorities and needs of the customer organisation. This means that the supplying company has a much stronger basis for aligning its



offerings to the customer's needs. An example of such an extended domain could be a supplier of water filters for ballast water treatment, either discarding or considerably down-scaling its product-centric business and instead creating business based on helping the customer to clean the ballast water.

### WHY PARTNERSHIPS MATTER IN PSS

In changing the domain of its business to include the activities of the customer, the supplier (inadvertently or consciously) moves into the domain of other stakeholders; the obvious overlap is with the customer, as the activities supported are part of the customer's operations. However, when looking at these activities, one will realise that a number of services and products are used as a support to reach the desired outcome (e.g. for the shipowner: getting from A-B with maximum up-time at the lowest cost and highest safety). For each of these products and services, another supplier exists, who is also in the business of supporting that particular activity. In fact, the successful execution of the activity is likely to be dependent on the interplay between the products and services, coming from different stakeholders (including the customer). When analysing this system of products and services supporting the activity, one is likely to identify inefficiencies and redundant elements. When the water filter supplier, mentioned as an example above, moves its focus to the customer activities, it will realise that other suppliers are crucial in supporting the activity of cleaning ballast water; pump and tank manufacturers are examples of other suppliers supporting the same activity. →

**Figure 1.** Expanding focus for PSS manufacturer.

---

→ When observing the flow of ballast water through the filter, pump and into the tank, inefficiencies will most likely become apparent – maybe the filter size or type is poorly matched to the pump, or perhaps the geometry of the tank makes the filter difficult to reach, when it needs to be changed. In addition, it might be that filters and pumps are delivered separately, using two independent distribution networks, where really only one is needed.

### INTERNAL AND EXTERNAL ACTIVITIES

The perspective on the customer described above could just as well be adopted further back in the value chain; any sub-supplier sees the supplier placed downstream as their customer. As such, any sub-supplier can benefit from adopting an activity-centred perspective. In fact,

---

activity-centric value chains frequently prove themselves to outperform more traditional, transactional value chains with regard to cost, flexibility and robustness.

A direct consequence of the above considerations is that any organisation in the value chain is potentially both a PSS-supplier and -customer. This necessitates an activity-centric perspective on not only the operations of the customer, but also the supplier company's own operations. An understanding of internal as well as external activities is crucial for the PSS value mechanisms to work. In Workbook 7, the notion of PSS procurement strategies is discussed – strategies in which an understanding of internal activities is used for procuring more cost-efficient and tailored services from the suppliers.

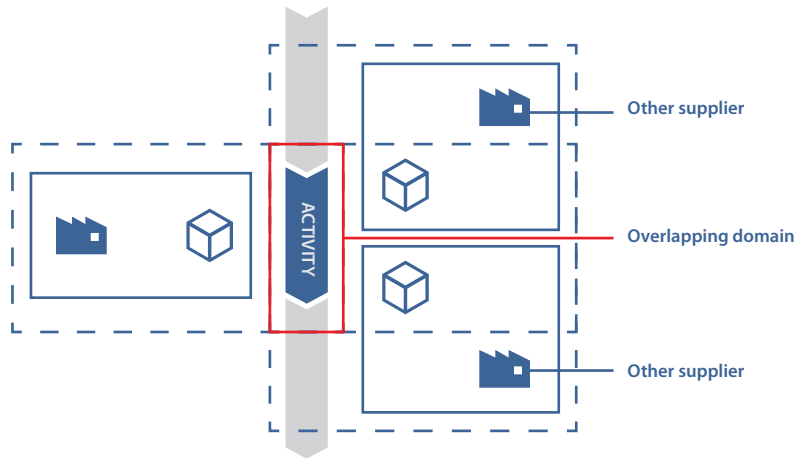
---

### FROM VALUE CHAINS TO VALUE NETWORKS

If the orientation towards internal and external activities has become central to the supplier's business, the supplier will most likely also have realised that these activities can be supported by internal as well as external means. As stated above, it is likely that suppliers of products or services for a given customer activity will realise that other suppliers will be supporting the same activities. These suppliers might not sit in the same value chain, or perhaps they are part of a completely different industry, but they can still be crucial in reaching the desired outcome for the activity.

The traditional way of supporting the move towards an activity focus is for the supplier to extend its capabilities and portfolio, to include other offerings





needed to support the activity. Often, a more resource efficient solution would be to establish strategic partnerships with other companies that support the activity. Such a move would focus on creating partnerships, able to cover a larger part of the PSS by integrating across value chains. This is merely one way of collaborating in a value creating system. A different type of collaboration could emerge if a supplier realised that the success of certain internal activities, such as development of new solutions, was highly dependent on the quality of components or sub-systems from sub-suppliers. In such a case, the supplier could choose to integrate upstream in the value chain and include the sub-supplier in a co-development of new solutions, with the common goal of creating the best possible product (serviceable).

The term “value chain” has been used extensively up until this point. However, the examples provided and points made all hint towards the same general realisation; namely that the notion of a chain, with its inherent linear and sequential one-directional logic, is a poor way of representing the value creating systems seen in PSS. When supporting a customer activity by coordinating offerings with other suppliers, or when including sub-suppliers in the (internal) activity of developing new solutions, the notions of upstream/downstream and a linear progression break down. For this reason this workbook proposes an alternate way of describing the value creating system – the “value network”. →

**Figure 2.** Suppliers entering shared domains due to an expanded PSS focus.

→ In a value network, organisations support each other, based on operational needs. Instead of purely transactional interactions, where value is added in one direction and capital flows in the other, the network is characterised by mutually beneficial relationships or partnerships.

### LINKING STRATEGY AND NETWORK

The value network can take a variety of different forms, depending on what purpose it serves. To strengthen the understanding of how different types of networks relate to the strategy of the company, this section takes a deeper dive into important characteristics of a value network.

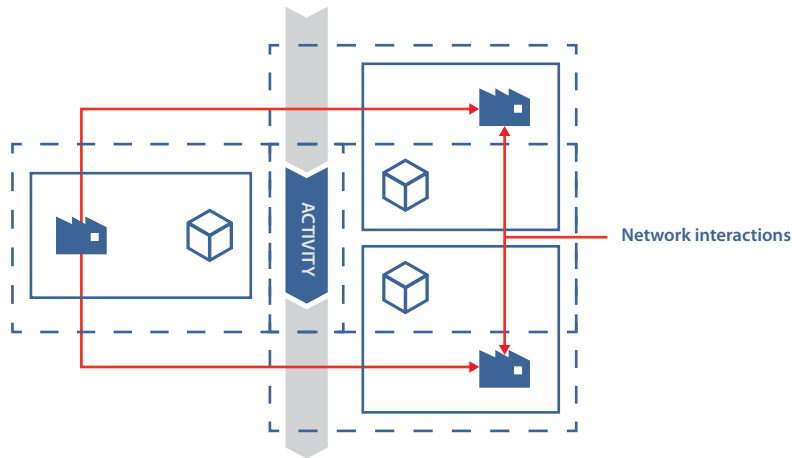
### PSS Development Strategies

In the PROTEUS consortium the preferred approach for categorising

PSS strategies has been to place them on a continuum ranging from “product oriented” to “customer oriented”. On this continuum, certain groups of strategies can be placed, as shown in the Figure 3. For more on the PSS categorisation, see Workbook 1 in the PROTEUS series. For many manufacturers, moving towards the lower part side of the continuum means rethinking the way they do business.



**Figure 3.** Continuum for PSS strategies.

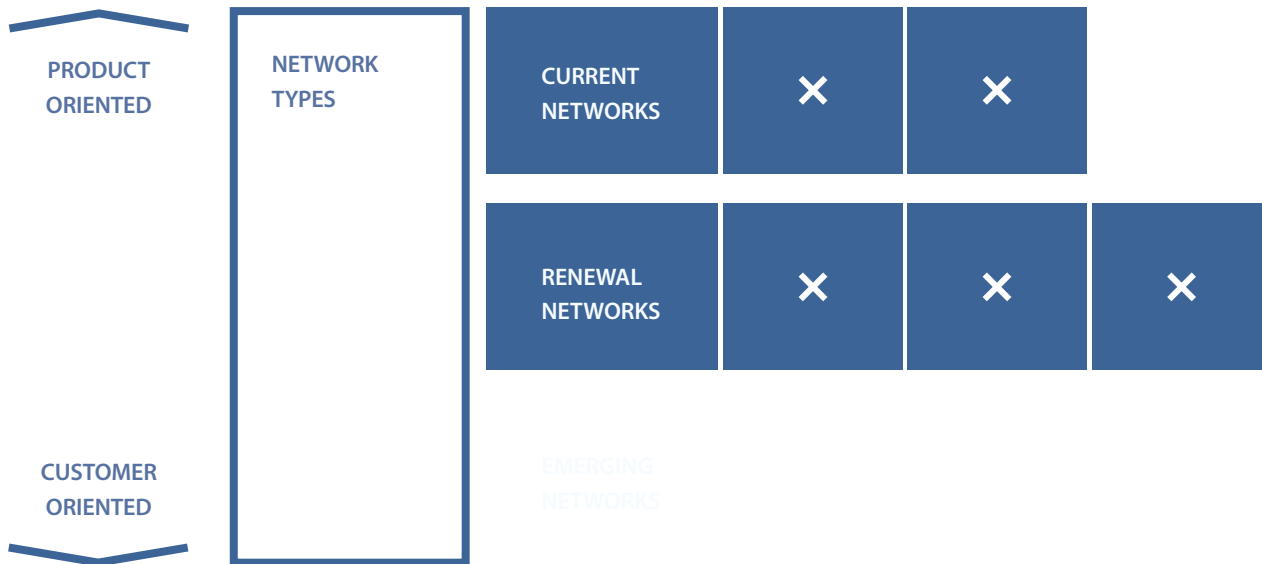


### Network and interaction types

In tune with the PSS continuum from the previous section, the network type needed to support different types of business strategies can be determined by looking at the novelty of the business. In other words, if the strategy requires the company to create value for the customer in new ways, it is likely that a different type of value network is needed. Based on this logic, Figure 5 shows three general types of networks and how they relate to the PSS continuum from the previous section.

This begs the question: How can different network types be characterised? One answer to this question is to look at the interactions between the network stakeholders, as different value networks have different interaction types. In Figure 5 the relations between the three general types of networks and types of interaction are shown. It is apparent (and not surprising) that current business networks require simpler and more traditional interactions. As the role of the network moves toward renewing the current business of the company, more advanced interactions are needed, such as data sharing and legal agreements. Finally, if the network has the purpose of supporting an emerging and novel business, it is likely to be characterised by coordinated efforts in offerings development and risk-sharing, among other things. →

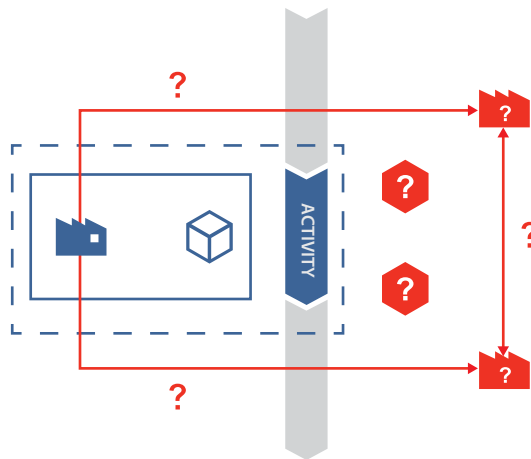
**Figure 4.** New interactions created in the PSS context.



INTERACTION TYPE	Communication	Coordinated procurement	Data Sharing
EXPLANATION	Communication needed to support the coordination and transactions between stakeholders.	Purchasing goods and services from the sub-suppliers in a coordinated fashion, in order to save cost.	Sharing data to improve understanding of customer and offering performance.

×	×	×				
×	×	×	×	×	×	×
Network development	Legal agreement	Mutual support	Co-development of offerings	Platform sharing / pooling	Risk sharing	Co-financing
Collaborating on designing and executing new networks solutions.	Legal contracts between stakeholders, in order to define mutual commitments and responsibilities.	Use one partnering company's service personnel to support the other partner's products.	Partners collaborate on creating offerings based on products, services and technologies from all partners.	To increase reach and capabilities, partners can utilise each other's facilities, infrastructure and human resources.	Dividing the risks involved in providing offerings among several partners. "e.g. performance offerings".	Handling large investments by splitting the costs among more than one partner.

**Figure 5 .** Network and interaction types in PSS. After Kristian Möller and Arto Rajala, 2007.



**Figure 6.** Market pull

## → DRIVERS FOR VALUE NETWORKS

Many different examples of network creation have been observed in the PROTEUS consortium, along with different drivers for creating a network. Some of these drivers will be described in depth in the next chapter, which describes PSS partnership cases in the maritime branch. Before describing the cases, this chapter will delve deeper into two general types of drivers for value network creation – *market pull* drivers and *capability push* drivers.

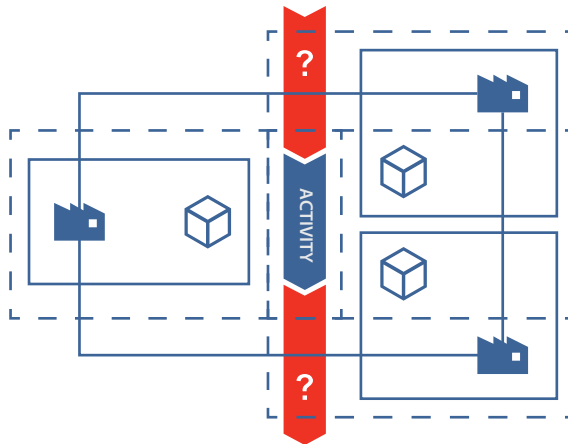
### Market pull

Many of the considerations made in the previous sections are essentially concerned with clarifying how a focus on the customer activities will in many cases lead to the creation of new value networks. In such cases, it is clear that the supplying company is “pulled”

into new ways of doing business and also into new partnerships, by needs observed in the market. In this supply and demand-aligning mechanism, the suppliers are (in principle) pulled toward the most profitable and sustainable business setup. A demand in the market and the potential to capture value, based on the demand, is a strong basis for forming new partnerships and networks, focused on a common goal. Usually, the process of network formation will begin with one company that has been able to identify a demand in the market. In many cases, this company will be unable to meet the demand alone and for this reason the organisation is driven towards creating partnerships with other companies.

### Capability push

Another, less prevalent driver for creation of value networks is “capability push”. In this case the creation of networks is based on a mutual exploration of the partnering organisations’ capabilities. Such an exploration can lead to the identification of areas in which the organisations can cooperate and create value, in a way that would be impossible to create for the separate organisations. In exploring the possibilities for collaboration, the organisations are likely to identify both internal and external activities that can be beneficial. This type of exploratory approach is not, from its initiation, driven by specific demands in the market, or even in the participating organisations. Rather, the driver might be a simple curiosity towards the opportunities that lie in interacting with other companies.



A dialogue driven by a market demand (market pull) can be restricted to certain operational and market specific areas, reducing the complexity of the dialogue. The capability push driven dialogue lacks this delimitation and therefore requires a much higher degree of transparency and willingness to share.

In reality, the value network creation will be driven by a mix of market pull and capability push. In some cases a demand in the market is the original reason for organisations to collaborate. On discussing how to meet such a demand, the organisations are likely to gain an increased understanding of each other's capabilities, which will create an opportunity to identify other areas in which the companies can collaborate and create value (capability push) together.

#### BARRIERS AND TRADE-OFFS IN COLLABORATING

Regardless of whether a particular collaboration is spurred by a market pull or a capability push, there are a number of potential barriers and trade-offs facing a new value network. Barriers could include intellectual property issues, trade secrets, long-term customer loyalty agreements, and insurance limitations, to name a few. Trade-offs could include revenue-splitting, risk of late entry to the market, sharing of valuable customer contacts, loss of flexibility due to commitment to long-term collaboration agreements, and so on. The successful creation of a value network is determined by an early recognition and handling of these barriers and an open collaboration to find the right balance in the trade-offs. →

**Figure 7.** Capability push

---

### → Complexity

Although PSS is arguably a superior strategy for ensuring a strong value creation for customers and suppliers alike, the strategy is generally characterised by a higher degree of complexity than traditional product-centric businesses. This increase is due to the need for other types of data, dealing with relations to new stakeholders, contracts etc. Such complexity is likely to discourage certain suppliers, if it is not compensated for by the increased turnover, profit or other benefits.

### Conflicts of interest

It is unlikely that direct product competitors will see the value in entering into the same value network, as there will most likely be conflicting interests. More obvious partnership

candidates can, however, also be reluctant to commit to value networks for more subtle reasons. One observed example of this is suppliers worried about sending the wrong signal to their customer, the shipowner. The reason being that suppliers participating in a value network can be seen as trying to consolidate the market and reduce the shipowners' ability to choose freely.

### Trust

Engaging in a deep dialogue about forming a partnership will inevitably require a certain level of trust. To some extent, this trust can be ensured through contracts and agreements. As the value network is inherently dynamic, there is a need for interacting outside the formal relations. For this to work there needs to be a certain level of (non-formalised) trust between the parties.

---

### Equity

In any partnership there is always the risk that one partner manages to get a better deal than the others do. Such an asymmetry can be quite natural, as some partners are bound to contribute more or take a higher risk. If the rewards are not split in a fair and transparent way, some network members are likely to lose the motivation to participate.

### Culture

As the stakeholders in the network are likely to have run separate, profitable businesses before the creation of the network, there is a likelihood that some stakeholders have established a corporate culture that does not necessarily agree with that of the other stakeholders. The stakeholders should be aware of such cultural differences, as these can lead to misunderstandings and diverging goals.



---

## TOOLS FOR DESCRIBING PARTNERSHIPS

Transparency, mutual understanding and management of complexity are necessary for establishing partnerships and building networks. To ensure a good exchange of information and a strong understanding of the customer needs, market context etc, a number of tools can be used. Such tools can act as mediators in the dialogue between potential partners or as a method for each partner to gain a proper understanding of their customer's activities. Tools can also be used to understand the position and role of each organisation in the market. Workbook 4 in the PROTEUS series lists a large number of tools for use in creating new PSS solutions. A few of these tools are particularly useful for gaining an understanding of the basis for partnerships. Below, three of these are briefly described:

- **The Ecosystem Map:** The tool provides an overview of how information, capital, services and products flow between different stakeholders in the ecosystem. It can be used to describe the current ecosystem, but can also be used to describe a proposed future situation.
- **The User Activity Cycle (UAC):** The UAC helps to create an understanding of the activities – how they interact and how they relate to the life cycle of products and services.
- **Network visualisation tools:** Software tools such as **Gephi** ([www.gephi.org](http://www.gephi.org)) and **TouchGraph** ([www.touchgraph.com](http://www.touchgraph.com)) can be used to visualise complex networks, featuring dozens of stakeholders and perform a number of analyses.



Official U.S. Navy Page: Flickr.com/photos/857943121 (CC BY 2.0)

# EXAMPLES OF PSS PARTNER- SHIPS



## GREEN SHIP OF THE FUTURE

### DESCRIPTION

Green Ship of the Future (GSF) is a development network aimed at investigating and creating solutions and knowledge for reducing the environmental impact of the shipping industry. The project is a so-called *public-private partnership*, in which stakeholders from industry engage with public knowledge institutions to realise a number of separate projects, which contribute to the overall goals of the network.

### MOTIVATION

In 2009, Denmark hosted the 15th UN Convention on Climate Change, COP15. Several stakeholders in the maritime industry saw the summit as an opportunity to demonstrate the ability to address the global

environmental issues driving climate change. Before this, the industry had not been particularly focused on environmental issues and the network's four founding partners, Aalborg Industries, A.P. Møller-Mærsk, MAN Diesel and Odense Shipyard, agreed that this was an unviable situation. The initial group of four partners represents both the customer and supplier side of the market. This combination made the network and its objectives very attractive to other stakeholders and since its establishment, the network has grown to include some 40 project partners. These partners include other suppliers, customers and networks in the maritime sector as well as knowledge institutions, classification societies and universities. The network has also received funding from the Danish Maritime Fund.

Since its conception, the GSF network has focused on solutions that are easily applicable in the short term - the reason being that these solutions will have a greater impact faster. Furthermore, the idea of focusing on environmental improvements was rather new in the maritime sector when the GSF network was established, meaning that many, relatively simple solutions were ripe for implementation. In other industries, where the "low hanging fruits" have already been harvested, focus is likely to be on more advanced and long term solutions.

### GETTING STARTED

As the GSF project is aimed at continuously initiating new projects to create knowledge and new products, the "getting started" part is the actual operational phase of the network.

---

Therefore, the approaches used in the initial stages for building the network are still being used today.

The general approach is to provide a platform upon which to present and create relevant projects. This forms a basis for collaborations among interested and relevant stakeholders. This is achieved by organising quarterly network gatherings, where the partners of the network present interesting projects and learn about technical developments in the industry. Often these projects already have one or more pre-defined project partners, but during the network gatherings (and afterwards) other stakeholders have the opportunity to join the projects. In other words, the projects are created and initiated in the network as a whole, but executed by smaller networks of partners. Each project is executed on a voluntary basis and no financing of project activities comes from the GSF network itself. However, a number of major studies carried out by both the GSF and the spin-off networks have received funding from the Danish Maritime Fund.

## SOLUTIONS

As already mentioned, the network develops both knowledge and new products. For all projects, the results are publically available. This open innovative setup is acceptable to the partners because of the fact that most of the knowledge and solutions created are embedded in the competencies and knowledge of the partners. As such, there is little risk that other, competing organisations can copy the results. →

---

→ EXECUTION

In the initial stages of the GSF network, the focus of the projects was to look at product-, technology- and knowledge-driven projects – an approach that allowed the suppliers to stay within their respective areas of expertise. This approach led to a number of strong showcases at COP15. Since COP15 the network has worked to redefine its role and establish a focus that is more in tune with the stated intent of being as close to the market and customer needs as possible. For this reason, the network has moved more towards so-called “studies”, where projects are not delimited by product or technology area, but rather by the customer’s preferred categorisation: vessel types. This means that recent projects have been more focused on looking across the network and

---

trying to identify how the general performance of a certain ship type can be improved. An example of this is a recently initiated project focusing on how a tanker vessel should be configured, if this were entirely determined by the customer’s needs.



Kevin Burkett, Flickr.com/kevinburkett/4108448424 (CC BY-SA 2.0)

## DANISH MARITIME COMPANIES: RETROFITTING PACKAGES

---

### DESCRIPTION

A Danish retrofitting network, led by the branch organisation Danish Maritime, has developed a list of retrofit packages to ensure high safety and reduced emissions: particularly NOx and SOx and Energy Efficiency Design Index (EEDI) improvements, relating to CO2 emissions. Each package is based on the components and services of the Danish Maritime suppliers. The benefits and practical requirements for each package are well known, enabling the shipowner to quickly and easily understand why and how the packages should be implemented.

### MOTIVATION

The retrofitting project was initiated based on two main realisations: the first was that International Maritime Organisation (IMO) regulations, particularly within environmental areas, were coming into force. The other realisation was that the current world fleet is very young, meaning that any solutions to the environmental problems would have to be retrofitted to existing vessels, rather than being installed on new-builds. Suppliers have been affected by the drop in shipbuilding projects (new-builds), following the economic crisis and credit crunch of 2008. For this reason, the move to a retrofitting-centred business constitutes a much needed opportunity for the maritime suppliers.

### GETTING STARTED

To address the issues faced by the shipowners, a number of packages were formulated, all focusing on specific IMO regulations. To concretise the packages, they were described in detail for specific, relevant vessel types. By mapping the current product and service offerings of the supplier companies, relevant suppliers were linked to each offering. These suppliers then carried out the necessary calculations and adaptations to integrate their respective products into the overall package. Data from each supplier were used to establish an understanding of how the overall system would perform, with respect to increased efficiency, reduced emissions and so forth. Furthermore the practical issue of how the proposed package would be installed (during a docking or while the ship is in operation) was



---

investigated and addressed, by coordinating and timing the installation of the sub-systems. This coordination ensures that the packages can be installed in a quick and straightforward manner.

### SOLUTIONS

To introduce the packages to the shipowners, the retrofitting project has developed a web portal, listing the different packages and vessel types for which they were designed. When choosing a retrofitting task, the shipowner is presented with information on the content of a suitable package, performance improvements and where possible, an estimate of the required investment and return on investment. If the package is attractive to the shipowner, the website also provides direct links and contact information for the relevant component and service providers. As the website develops, added functionality will be added, proposing additional retrofit tasks that could be sensible to carry out in conjunction with each other.

### EXECUTION

The retrofitting network's packages are not locked to a specific list of suppliers in the network. Rather, the retrofitting website indicates that the performance improvements and practical advantages described for the packages are for the proposed suppliers. The shipowner is free to choose other suppliers, but in doing so there is a possibility that the package as a whole will not perform as well. →

---

→ This “soft” approach to positioning the network’s suppliers is very much in line with experiences from the PROTEUS consortium; partnerships and networks among suppliers can in some cases be seen as a way of undermining the shipowners’ bargaining position and freedom to operate. For this reason, it is crucial that the ability to choose other suppliers is always present.

The retrofitting network’s offerings are currently based on the product and service portfolios of the supplier network. As new solutions are developed, the retrofitting packages will be updated and new packages will most likely emerge. This process of updating the network’s portfolio is handled by suppliers informing the retrofitting secretariat of new developments and by the secretariat actively monitoring the supplier

---

companies and their respective portfolios. Furthermore, if the market need changes – for instance through new or revised legislation – the network has a varied portfolio of offerings, which enables it to adapt the packages and comply with the new market conditions.



Andy Liang, Flickr.com/agroove/8657231618 (CC BY 2.0)

## PRIMESERV FREDERIKSHAVN AND ALFA LAVAL: BUILDING ACADEMIES

### DESCRIPTION

PrimeServ Frederikshavn and Alfa Laval collaborated around improving their academies for training ship crews and the shipowners' technical departments. Also, the academies have the role of providing internal training for the companies' service personnel. The academies train users of the companies' systems in operation, emergency processes, maintenance procedures and much more. Through this collaboration, the two companies have also unearthed a plethora of other attractive areas for partnerships and new business areas.

### MOTIVATION

Both companies are facing the challenge of transitioning from a product-centric to a service-centric business. For this reason, both

companies saw a value in sharing knowledge about the transition. One attractive area for collaboration had already presented itself – sharing knowledge on implementing and running an academy as a business. Additionally, both companies saw a potential in further exploring the opportunities that could emerge from a collaboration. On the basis of these shared interests, it was agreed that the two companies would meet and investigate. This is a clear case of a collaboration starting with a specific market need (market pull), which then goes on to explore the capabilities of the collaborators and the added opportunities (capability push). The initiation of the collaboration was facilitated by the PROTEUS consortium.

### GETTING STARTED

The collaboration was initiated at a workshop involving several representatives from both companies. The workshop was facilitated by staff from the PROTEUS research group. To get started, each company gave an in depth presentation of their operations and current challenges. This initial presentation included a description of each company's previous experiences within creation and operation of academies, and their general experiences with the transition from product- to service-oriented business. From this point, the companies engaged in a collaborative session where the UAC (see Workbook 4) was used to map specific customer activities and how the companies supported these. Furthermore, the Ecosystem Map (see Workbook 4) was used to gain an understanding of each company's

---

interactions with the customer and other stakeholders in the value network. Finally, the companies also used the so-called Offerings Map (see Workbook 4) to gain an understanding of the company's portfolio of offerings. The insights generated were then used as a basis for identifying collaboration opportunities and the creation of new product/service offerings.

## SOLUTIONS

The workshop progressed the initial concept of expanding academy offerings within each company; among other things, the potential customers for the academies were identified and on this basis, marketing strategies were discussed. Also, roll out and requirements for training facilities were discussed.

Furthermore, at the workshop the companies identified a large amount of other attractive opportunities. These solutions touched upon a number of themes, including back-office integration and co-delivery of performance-based offerings, centred on user needs. In fact, the workshop led to a catalogue of 44 new offerings and 24 opportunities for integrating back-office functions. →

---

→ EXECUTION

The initial collaboration has now developed into a sustained relation between the two companies and both companies have implemented academies. PrimeServ Frederikshavn's after-sales division previously held both production and R&D of four-stroke engines, the academy therefore builds on a strong knowledge foundation. Alfa Laval has subsequently created a full internal map of competencies, enabling the company to formulate competency strategies and train personnel accordingly at the academy. Both companies are working to strategically use the insights that the academy provides as a platform for getting feedback from their customers. Among other things, the feedback is used for improving future products of the companies. The companies have

---

agreed on a knowledge sharing plan for academy experiences and continuous co-development.



Andy Liang, Flickr.com/agrovia/8657231618 (CC BY 2.0)



Official U.S. Navy Page, Flickr.com / usnavy / 8454319230 (CC BY 2.0)





# BUILDING A PARTNERSHIP

The previous chapters have shown how networks and partnerships can be understood from a theoretical standpoint and how network relations have previously been formed in the maritime branch. In this last chapter, reflections are made on these understandings and descriptions, leading to some recommendations for companies that are looking to build new value networks.

Describe required capabilities



Determine network capabilities



Identify shortcomings



Search for relevant partners

## CLARIFYING THE NEED FOR PARTNERSHIPS

In the section “Why partnerships matter in PSS”, the link between a PSS strategy and the need for new partnerships and network relations was established. In short, if a company finds itself moving towards a PSS, it will most likely also be moving towards creating new links to other stakeholders.

*Note: If the company is driven by a “capability push”, the intended network partners will already be in place, rendering the points of this section obsolete.*

When realising that a certain customer activity or -outcome constitutes an attractive business proposition, the supplier company should attempt to establish a proper understanding of

the capabilities required for delivering the intended PSS. This can be achieved by using tools such as the User Activity Cycle (UAC). Preferably, this should be done in collaboration with the customer or a current/intended partner. This collaborative approach is central in avoiding the caveats described in the earlier section “Barriers and trade-offs in collaborating”. By analysing the customer’s activities with the UAC, insights will be gained with regard to the required reach, product support and customer interactions. These insights can serve as a basis for exploring the current network’s ability to support the business model.

The basis for the Green Ship of the Future network was that a number of stakeholders from the maritime branch convened and discussed how the

---

branch could change its current direction and put the environmental issues on the agenda.

### EXPLORATION

Having established the insights about the required network capabilities, the initiating company needs to gauge its current network's capabilities and identify shortcomings. In some cases, the company and its internal units can form a good basis for new business strategies. Furthermore, the company is likely to have existing partnerships that could be useful in pursuing the new PSS strategy. However, as the PSS strategy will in many cases constitute a significant change in the way value is created in the network (see the section "Network and interaction types"), there will most likely be capabilities missing. Also, certain partners are likely to become redundant in the new value creation mechanism. In this case, the company can either invest time and money to build the necessary capabilities internally (perhaps by way of acquisition) or look for external partners, interested in and capable of providing the necessary support.

To gain an understanding of the internal and external network capabilities, the Ecosystem Map (see PROTEUS Workbook 4) should be used. Again, the quality of the output is improved if the relevant stakeholders (customers, partners, sub-suppliers) are involved in the process. The tool should provide a visual understanding of the current network, its stakeholders and the type of relations that are currently present. →

---

If the network of stakeholders becomes very large, more quantitative analytical methods can be deployed. In the retrofitting case, mentioned earlier, each supplier in the network was categorised by technology area and –capability. This categorisation was then used to identify groups of suppliers with related offerings and to form a basis for the different retrofitting packages. In a subsequent analysis, the data from the retrofitting project was imported into a network visualisation and -analysis tool. This tool enabled the project manager to see new, unanticipated opportunities in the network.

### INITIATING

To form a strong network and ensure that value is created for both the customer and the supplying partners,

---

it is often useful to set common goals – perhaps by identifying mutual problems. The cases in the last chapter have shown that there are many shared challenges and opportunities for the maritime suppliers – environmental legislation being an obvious example. In breaking down the resulting sub-goals, the network partners are likely to realise that interests diverge. This is not strange, seeing that the partnership is most likely formed among dissimilar companies. Despite working towards the same overall goal, the incentives for each network partner should be considered and tailored to fit the goals of that organisation. As an example, the partners could be joining forces to address the overall goal of “reducing the customer’s administration burden” and some network partners could find their benefit in just that – a

---

performance-based profit, related to reduced administration. For other partners, however, the benefits could lie elsewhere: perhaps in increased reach; improved bargaining position with regard to suppliers; increased robustness; shared risk; etc.

Again, the Ecosystem Map can serve as a strong tool to map relations and incentives for existing and new stakeholders. In this process, it is crucial that the main beneficiaries of the new value creation mechanism (the network) participate in the formulation of the ecosystem and its incentives. This is partly to ensure that the actual and not the proposed benefit is in focus, and partly to ensure that the incentives are sized in accordance with contribution and risk. As such, the Ecosystem Map can be used as a basis for negotiating

---

an equitable scheme for network incentives. Based on the result, formal documents for the cooperation can be drawn up and the partners can move toward operationalising the planned network and its relations.

### **ROLLING OUT AND OPERATING THE NETWORK**

The network perspective is all about teaming up and sharing/exchanging existing capabilities, rather than investing and building new expensive capabilities. As such, the main hurdle for implementing a new network is the establishment of the necessary interactions.

The formal agreements formed when initiating the partnership are crucial for ensuring a smooth operation of the network. Of course, most PSS solutions will also require a certain measure of separate and shared investments. However, these investments are likely to be significantly lower than the investments (in time and money) needed, if a single stakeholder were to provide the same PSS.

The inclusion of relevant stakeholders in the development of new partnerships and networks is a good approach to minimising the number of surprises emerging, when trying to implement the network. However, even the best-made plans are likely to change. Perhaps the customer reacts slightly differently; maybe a key stakeholder in the value network changes its strategy and so forth. Luckily, one of the common benefits of network-based value creation is the network's ability to adapt to changing conditions. →

---

→ Rather than resist the changes, the stakeholders should embrace this characteristic of the network and continually review and revise the basis for collaboration.

This constant mode of change is well exemplified in the Green Ship of the Future network, where the network has reinvented itself several times over.

### TECHNICAL IMPLICATIONS

Before rounding off the final chapter in this workbook, a few notes are provided on the technical implications for the considerations above. As stated several places in the other PROTEUS workbooks, PSS solutions often entail changes to the products and technologies used for supporting the customer's activities. Many of

---

these changes relate to the shift from traditional value chain to the value network.

As several different network partners will be involved in supporting products and systems, it is key that the abilities required for the support task are present with all partners. This can be achieved in two ways: One way is to train personnel to be able to service the new products and systems. The other approach is to review the product's design and simplify the operation in a way that enables 3rd parties to service it.

Seeing that the systems provided by a network of suppliers are likely to be more interconnected than systems provided by single suppliers, there will often be a need for information

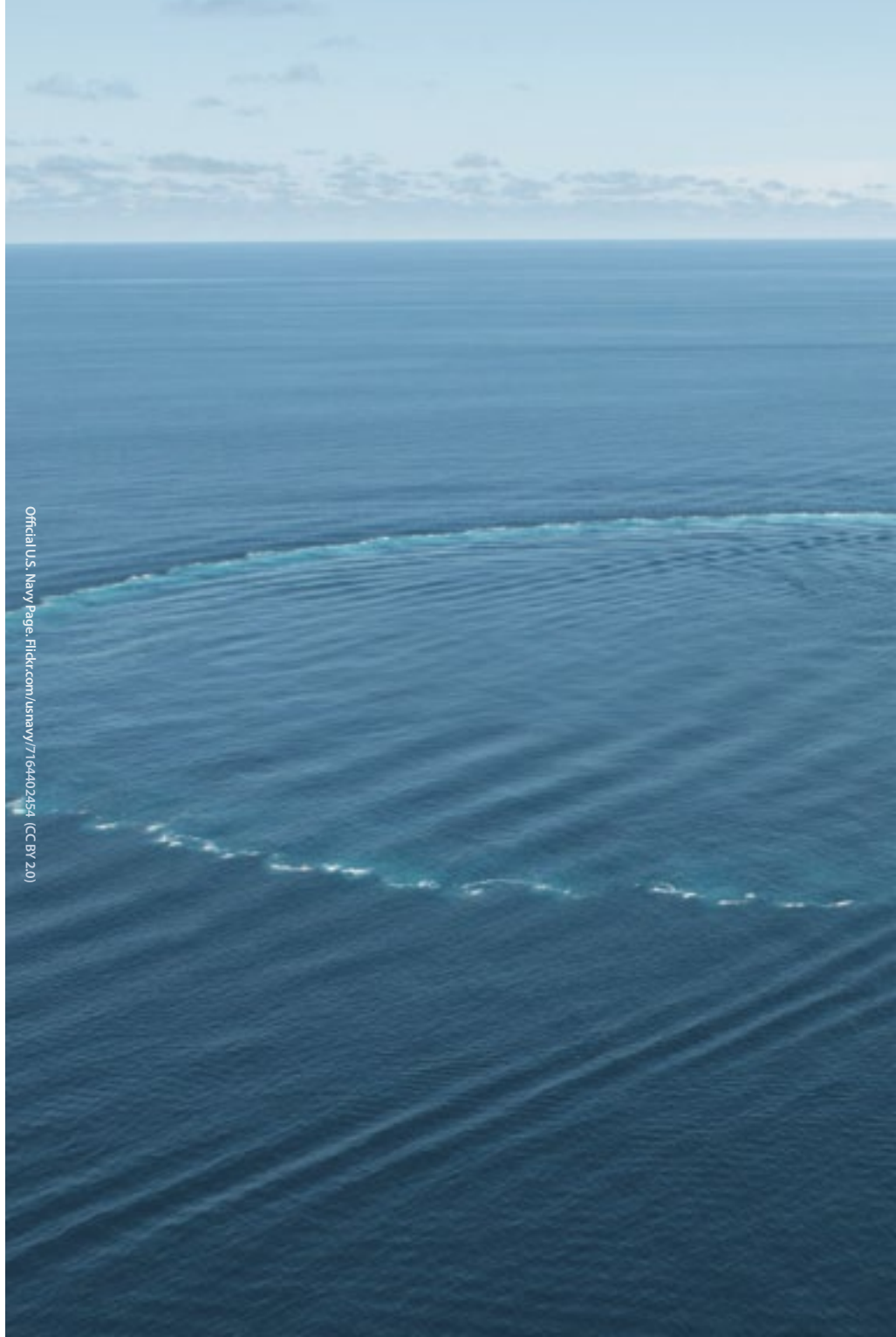
---

to pass between systems provided by each supplier. For this to happen, the suppliers need to gain an overview of the interfaces between subsystems and the data needed across these interfaces. This overview might lead to the realisation that certain subsystems need to be tweaked, in order to better interface with the rest of the overall system. Such tweaks could involve new input/output facilities, added sensors or even new intermediate systems. To ensure proper interaction with other systems and 3rd party serviceability, it is prudent for the value network stakeholders to draw in relevant network partners, when designing and revising products.



Uscgpress. Flickr.com/uscgpress (CC BY 2.0)

Official U.S. Navy Page, Flickr.com/usnavy/7164402454 (CC BY 2.0)





# SUMMARY



---

This workbook has addressed the three questions posed in the introductory chapter. In rounding off the book, the answers for each of these questions are summarised, in turn.

- *Why are partnerships and networks important in PSS?*

This workbook has shown that partnerships are an inherent part of most PSS solutions. When moving from product focus to customer activity focus, a new support system and value logic is necessary. Customer-relationship management is seen to expand to “network” relationship management, as the continuous interactional relationship demands involvement of multiple stakeholders on a long-term basis. Also, the network can be seen as a way of mitigating the need for large and risky internal investments and acquisitions.

- 
- *How does a company gain an understanding of its current network and partnerships?*

A number of tools have been proposed to help clarify the company’s current position and a theoretical basis for understanding how the network relates to the strategy of the business has been offered.

- *How does a company go about identifying, establishing and managing new partnerships and networks?*

To create a new PSS business based on a novel value network, the company needs to set goals that are relevant to all parties involved in the network. More importantly, the company needs to realise that the benefit for each stakeholder in the network is likely to be different. To navigate this complex space and establish a strong basis for

---

future network collaboration, a number of tools have been recommended.

The key to creating strong networks is to ensure transparency and mutual trust in all interactions. Hopefully this workbook has hinted how a maritime supplier should go about creating new, competitive value networks that can compete on the global market for years to come.



Official U.S. Navy Page, Flickr.com/usnavy/7164402454 (CC BY 2.0)

### Source for the cases

1st case:

Magnus Gary, General Coordinator,  
Project Green Ship of the Future

2nd case:

Michael Prehn, Underdirektør, Deputy  
Director, Danish Maritime

3rd case:

Ejnar Siig Christensen, Manager, Repair  
Sales & Order Execution, Alfa Laval  
Aalborg

Rikke B. Knutzen, Business Developer,  
MAN Diesel & Turbo

### General reference

Page 17-18: Mougard, K., Neugebauer,  
L.M., McAloone, T.C., Bey, N., Andersen,  
J.A.B. 2012. Collaborative Product/  
Service-Systems – On conceptualisation  
of PSS offerings and business  
nets. Proceedings of the 4th CIRP  
International Conference on Industrial  
Product-Service Systems.

Page 18-19: Möller, Kristian and Arto  
Rajala. 2007. Rise of Strategic Networks  
— New Modes of Value Creation.  
Industrial Marketing Management,  
36(7), 895-908.





This sixth book in the PROTEUS Innovation Consortium's seven-book series describes why partnerships and networks are crucial factors in delivering successful PSS solutions. The book uses theoretical considerations and case examples to establish an understanding of maritime PSS networks and partnerships. Based on this understanding, the book goes on to provide a number of recommendations for how suppliers can start building networks based on PSS.



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

**The Technical University of Denmark**  
Department of Mechanical Engineering  
Anker Engelundsvej 1, 101A  
DK-2800 Kongens Lyngby

