



Norwegian University of  
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# Servitization in Norwegian Manufacturing

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## **Problem Description**

The main purpose of this thesis is to investigate servitization in Norwegian manufacturing companies. The thesis will do a literature study on the field of servitization and examine a selection of Norwegian manufacturing companies that have servitized.

Main content:

1. Review and discussion of literature relating to servitization
2. Case studies exploring servitization
3. Evaluating the case studies against the presented theory

Assignment given: 17. January 2011

Supervisor: Øystein Moen



## Preface

This paper has been written as a master thesis at the Norwegian University of Science and Technology, spring semester 2011. It is written as a part of our specialisation in Strategy and International Business Development at the Department of Industrial Economics and Technology Management.

The purpose of this paper is to closely study servitization in Norwegian manufacturing. This is a highly relevant topic as Norwegian manufacturing companies are experiencing increased competition from manufacturers based in developing countries with substantially lower production cost. The thesis has been demanding and time-consuming, but it has also been inspiring and a valuable educational experience.

We would like to thank our case companies, Brunvoll, Rolls-Royce Marine, FMC Kongsberg Subsea, the Ulstein Group and Rapp Marine, for sharing valuable knowledge and experiences with us. Their contribution has been of essential importance for this study. We would also like to thank our academic advisor professor Øystein Moen at the Department of Industrial Economics and Technology Management for constructive feedback and support.

Trondheim, 30th May 2011

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## Abstract

Norwegian manufacturers are experiencing increasing competition from manufactures based in developing countries with substantially lower production costs. This increased competition forces manufacturers to differentiate and add more value to their offerings, in order to stay competitive. Servitization represents a strategy for Norwegian manufacturers to do so by expanding their business model to include services and ultimately provide solutions. Despite the evolvement of different servitization strategies among Norwegian manufacturers, the concept has yet to be properly studied in this context. On the basis of a multiple case study, this paper aims to identify why servitization is attractive for Norwegian manufacturers and how the strategy should be implemented.

A comprehensive literature study including 26 empirical articles and 20 conceptual articles was initially conducted to provide a theoretical foundation for study. Following this, five suitable Norwegian manufacturing companies were selected as case companies. Data was collected largely by interviewing managers from the five manufacturing companies, and subsequently analysed in relation to the theoretical foundation.

The study finds that servitization is attractive for Norwegian manufacturers because the strategy ensures a good alignment between the offerings and the comparative advantages of the companies, and because customers value it. Manufacturers that decide to servitize should put great emphasis on the transition required to become a servitized manufacturer. The new resources that must be developed in order to succeed with a servitization strategy, coupled with cultural and structural rigidnesses, make the required transition more problematic than companies expect.

Companies pursuing a new strategy to increase competitiveness cannot, like Resource-advantage theory of competition states, purely rely on its current comparative advantages to find it. In order to do so, they must also critically consider their ability to change and adapt to the new strategies proposed. Servitization is an attractive strategy for Norwegian manufacturers considering their comparative advantages, but when bearing in mind the dynamic capabilities required to implement it, the strategy becomes less apparent.





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## 1. Introduction

Manufacturing industries in the developed world are declining in terms of employment and profit (Neely 2008). In a globalised world where goods flow freely, manufacturers have to compete on the global market and handle the fierce competition from worldwide competitors. As manufacturers based in developing countries with substantially lower production costs enter the global market, manufactures in the developed countries struggle to compete in terms of production cost. This as well as more comprehensive customer needs and an increasingly mature and commoditised market for capital goods, forces manufacturers to be innovative in order to differentiate their products and retain profitability.

In the middle of the 1990's Rolls-Royce introduced the TotalCare™ concept in the jet engine market. Instead of just selling jet engines, Rolls-Royce broadened their business scope to selling airtime power. This new product-service concept ensured “a peace of mind” for their customers. As downtime, due to engine problems represented a huge risk for airlines, Rolls-Royce realised that by transferring the risk of an engine failure from their customers onto themselves, they would create value for all parties. By using Rolls-Royce's own extensive knowledge about their jet engines and their service network, they could utilise their economics of scope to minimise the financial and operational risk of an engine failure and undertake maintenance much more effectively than the airlines could do themselves. Thanks to the new “servitized” business model, incentives and goals, for both parties, were aligned and overall cost of flying was reduced. At the same time, Rolls-Royce managed to widen their business area, differentiate their offerings and create entry barriers to their market (Rolls-Royce 2010).

### 1.1 Servitization

Servitization is more than conventional product innovation, it can be regarded as a business model innovation, making manufacturers able to differentiate their offerings and coping with the increased competition. By definition, it represents the tendency of goods manufacturers to extend their value proposition by bundling goods and services (Bowen, Siehl et al. 1989). Servitization means increased focus on delivering solutions rather than products, optimising the offerings to customer needs. For customers it means buying solutions rather than products.

Combining services and products is becoming far more common among manufacturers in industrialised countries, where roughly 40 % all firms combine manufacturing with services (Neely 2008). Compared to China, the same figure is merely 2 %. This implies that local economic circumstances are the key driver of this trend (Neely 2008). The purpose of this paper is to closely study this servitization tendency in Norwegian manufacturing. As in other industrialised countries, servitization represents a strategy for coping with the increased global competition. Although, servitization has been discussed in a range of academic journals, it has yet to be properly discussed in a Norwegian context. Hence, this paper aims to identify why Norwegian manufacturers find servitization attractive, and how the process of servitization should be managed. This paper aims to contribute to the understanding of servitization in Norwegian manufacturing.

## **1.2 The research questions**

In order to answer this question in an intuitive manner, two research questions are formulated. The first question addresses the drivers of servitization. The second research question is concerned with how servitizing manufacturers should manage the transformation required from being a pure product manufacturer to also offer services and become more solution oriented.

RQ1: *Why is servitization an attractive strategy for Norwegian manufacturers?*

RQ2: *How should Norwegian manufacturers servitize?*

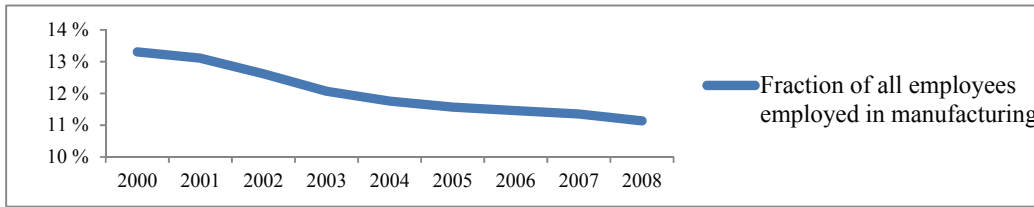
## **1.3 Why write about servitization in Norwegian manufacturing**

Even though the concept of servitization was first described in 1988 (Vandermerwe and Rada 1988), the recent commoditisation of manufactured goods has made the field increasingly relevant (Mathieu 2001). Driven by the economic circumstances and technological development, Norwegian manufacturers now have both the incentives and opportunity to broaden their offerings and deliver solutions that match customer needs. Servitization is no longer an alternative business strategy, but a possible strategy for survival (Slepnirov, Waehrens et al. 2010).

### **1.3.1 The economic circumstances**

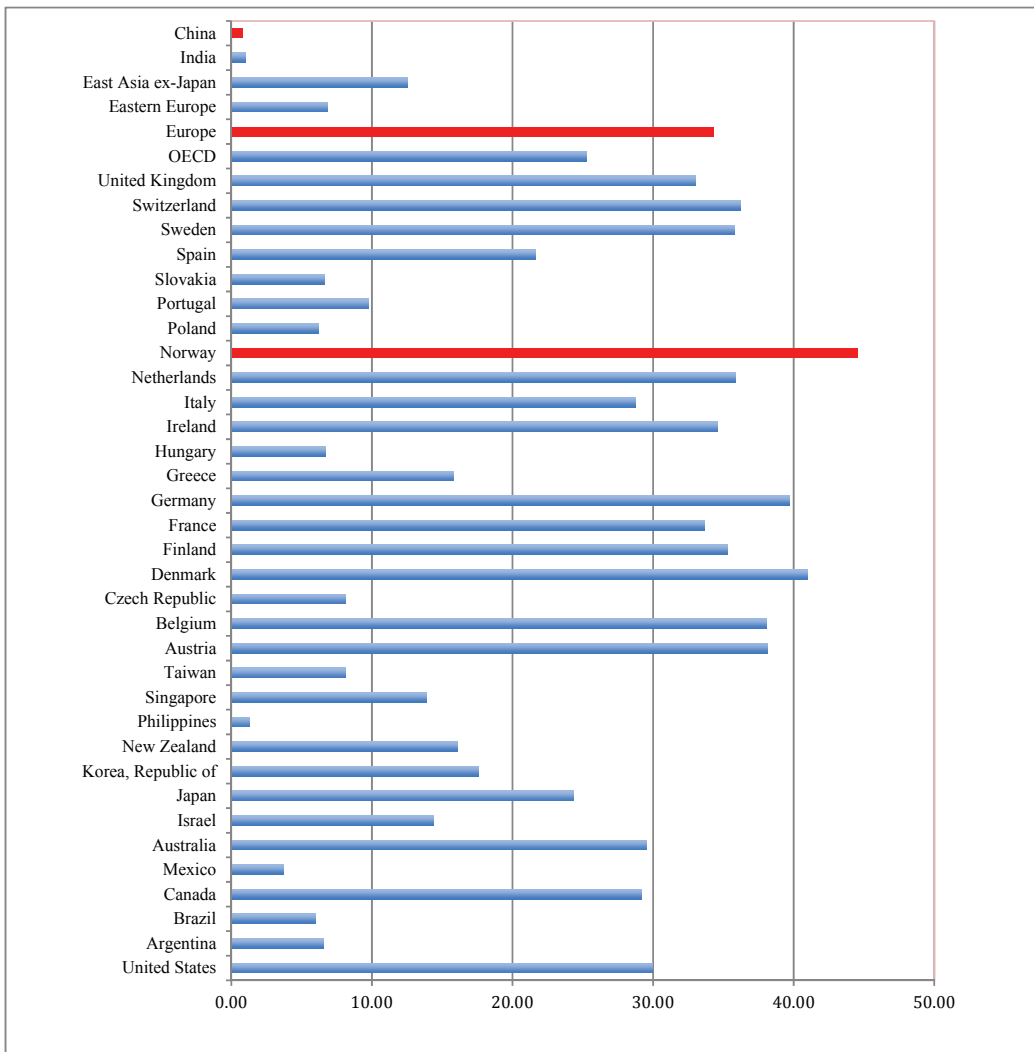
As in other industrialised countries, the manufacturing sector in Norway is declining in terms of employees and as percentage of GDP (SSB 2011). The two main reasons

for this are increasing productivity and emigration of production to low cost countries (Dierdonck 1994).



**Figure 1.1 - Employment in Norwegian manufacturing sector (Source: SSB 2011)**

There is also no dispute that Norway is a high cost country to manufacture in. Figure 1.2 clearly expresses how expensive Norwegian labour is.



**Figure 1.2 - Average hourly labour cost for all workers in manufacturing (Source: Bureau of Labour statistics 2010)**

Considering these labour costs and the increasing competition, it seems unachievable for Norwegian manufacturing companies to compete on production costs. Former CEO at Kongsberg Automotive, Olav Volldal argues that, as a rule of thumb, there is no justification for not outsourcing assembly line manufacturing if the labour costs constitute more than 10 percent of total production cost. Especially not as the quality of the end products are equally good (Thompson 2005). Nevertheless, Ådne Cappelen, a senior researcher at SSB, notices that the existing Norwegian industry, despite having the world's highest labour cost, has been able to compete surprisingly well (Haug 2011). This is also made clear by the European commission's planning and observation program, ESPON, in their measurement of competitiveness and innovation, displayed in figure 1.3. Cappelen argues that this reflects the Norwegian industries ability to restructure towards products and product related services that can withstand the labour costs (Haug 2011). Arguably, servitization is one strategy for Norwegian manufacturing companies to handle the new intensified competition. Despite the high labour cost, many Norwegian manufacturers have, by using their comparative strengths, continued to stay competitive.

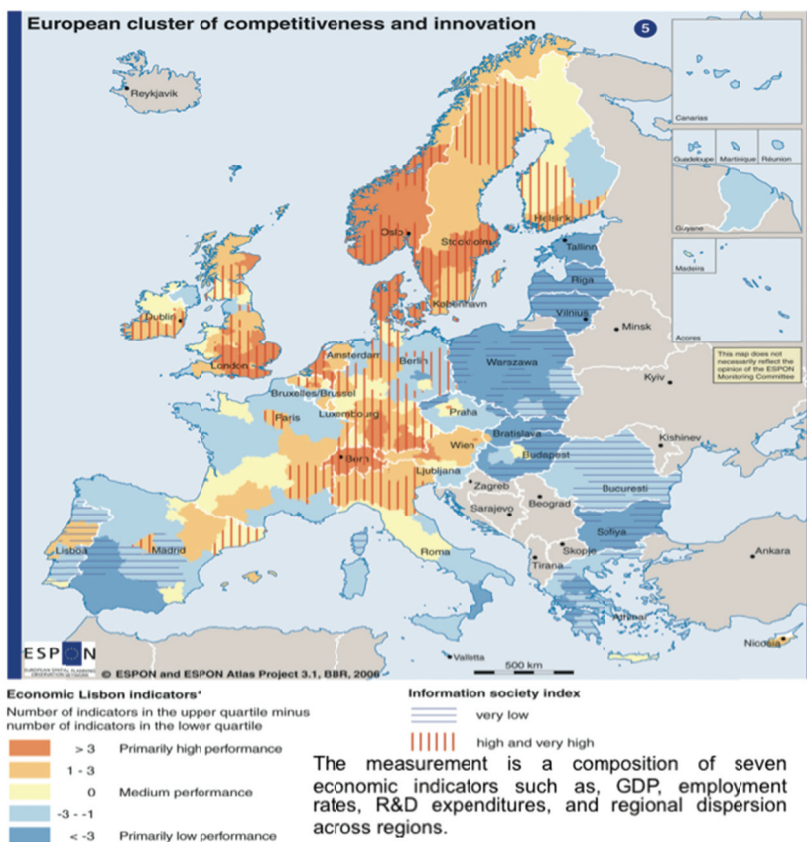


Figure 1.3 - Competitiveness and innovation in Europe (Source: ESPON 2006)



### **1.3.2 Technology**

New technology is one of the main drives of servitization. First of all, new technologies have opened the door for new solutions. Information technology has made it possible to gather and utilise information about customer behaviour, monitor equipment and optimise maintenance functions. This is resulting in a preventive rather than reactive approach to maintenance and support systems, and has made products better adapted to customer needs.

Secondly, the increasing technological complexity of products has made it harder for customers to maintain the products themselves. As products become more advanced, only those with specific product competence are capable of installing and servicing the product.

### **1.4 Literature study and Empirical study**

The first part of this study is a literature study based on academic journals. The purpose of this is to get an insight into the fields concerning servitization, by studying when servitization is attractive and how manufacturers should servitize. The literature discussion at the end of the literature study will result in several propositions with expectations as to what will be found in the empirical study. The letter P will denote the propositions. An empirical study on Norwegian manufacturing companies will further on be conducted. The focus of the case studies will be on the case companies' attraction to servitization and how the companies have servitized.

As a contribution to the emergent literature on servitization, the study will answer the research questions by combining the literature study and the empirical study.

### **1.5 The structure of this study**

In the following chapter, the first part of the literature study is presented. This chapter consists of relevant theory and a review of servitization literature. In chapter 3 the presented servitization literature is discussed in relation to theory, and several propositions are formulated.

The research methods used in this study will further be presented in chapter 4. This includes both the method used for finding relevant literature as well as how the case study itself was conducted. In chapter 5 each case company and the context of their

business is briefly presented. The subsequent chapter provides a comprehensive discussion linking the case findings and the literature study.

Finally, chapter 7 looks at the implications for management, public policy and further research and finishes the study with concluding remarks. Figure 1.4 illustrates the structure of this study.

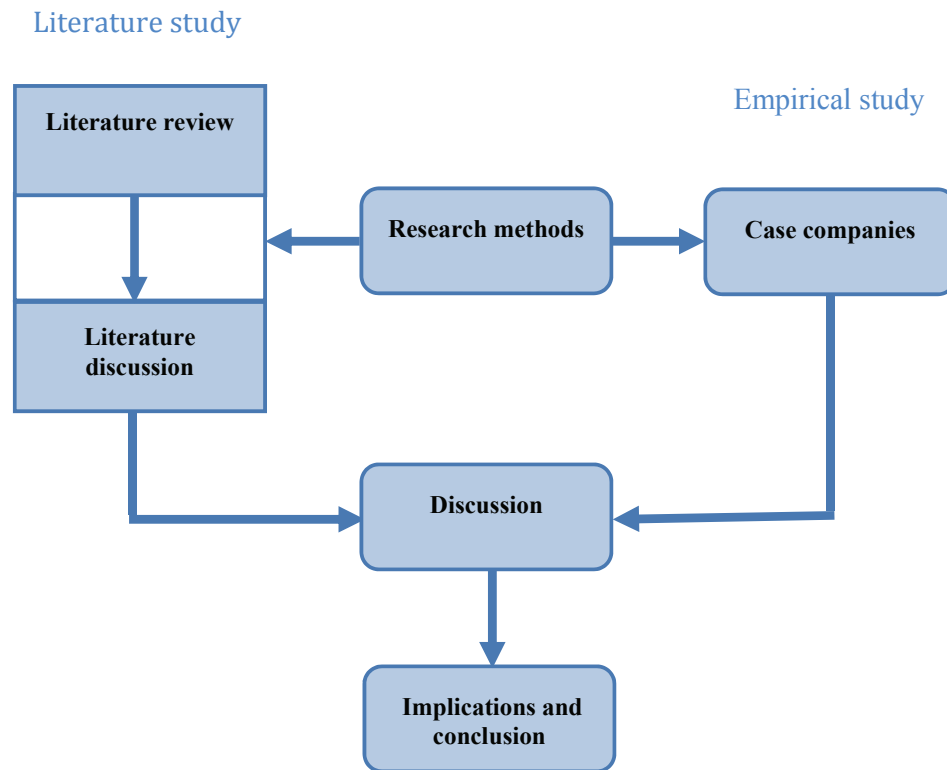


Figure 1.4 - The structure of the study

## 2. Literature review

### 2.1 Servitization

The term “servitization” is relatively new. In the late 1980’s a few academic articles started emphasising on the benefits manufacturing companies could get from upgrading their services. The first authors to use the term servitization in the context of manufacturing were Vandermerwe and Rada in 1988. They defined the term as an increased focus by manufacturers on offering “bundles” of goods and services to serve customer needs (Vandermerwe and Rada 1988). Since then, more academic literature has discussed and redefined the term “servitization”.

#### 2.1.1 Definitions within servitization

Essentially the term “servitization” has to do with the link between products and services. In manufacturing a “product” is understood as a material artefact and often referred to by academia as a “good” (Baines, Lightfoot et al. 2009). The term “service” on the other hand is more ambiguous, as it’s meaning depends on the context of its use. In this paper a service will be defined as an “economic activity that does not result in ownership of a tangible asset” (Oxford English Dictionary). In addition to being intangible, services have the attributes of being perishable and inseparable, meaning that a service cannot be stocked, and that the production and consumption of a service cannot be separated. Services also tend to be more heterogeneous than products (Åhlström and Nordin 2006).

In this paper, servitization is defined as “a business model innovation where traditional manufacturers expand the scope of their offerings by adding services towards complete solutions”. This definition is a bit broader than the definition given by Vandermerwe and Rada (1988).

Servitization is a general term for shifting focus from selling products to selling solutions, by adding services. This term includes both upstream and downstream shifts in the value chain, away from production. The former term refers to increased focus on design and R&D, while the latter term is, according to Dennis and Kambil: “The sum of all customer interactions that follow a product’s sale, delivery and installation” including training, customer’s support, warranties, maintenance, repair

and upgrades (Dennis and Kambil 2003). For practical reasons this paper will refer to these two terms as upstream and downstream servitization.

### **2.1.2 The rational of servitization**

Vandermerwe and Rada argue that there are several strategic reasons why manufacturing companies should combine products and services, through servitization. These are; to lock out competitors by establishing a closer relationship with customers, to lock in customers by creating dependencies, and to increase differentiation so that companies do not longer have to compete with homogenous products on a production cost basis (Vandermerwe and Rada 1988). Cohen, Agrawal et al. (2006) agree on the strategic rational mentioned by Vandermerwe and Rada, but adds the fact that by providing after-sales services, the company can gain a deeper understanding of customer needs and use this to sustain a competitive advantage. This coincide with the finding of Baines, Lightfoot et al. (2009) where the improved ability to respond to customer needs and the differentiating offering from competitors, were the two main motivating factors for UK manufacturers to offer services.

Jack Welch once stated, as chairman and CEO of General Electric, that the “The service market is bigger than we ever dreamt” (Gebauer, Bravo-Sanchez et al. 2008), raising the installed base argument as an economic rationale for well-established manufacturers to enter the world of services. The higher the installed-base-to-new-unit ratio, the more attractive is the after-market. US numbers suggest that for every car sold per year, there are about 13 cars in use. This combined with a stagnant product demand has pushed the economic value downstream away from manufacturing and towards service and maintenance (Wise and Baumgartner 1999). Moving downstream through servitization also tend to reduce the exposure and volatility of cash flows, and hence increasing shareholder value (Mathieu 2001).

Neely takes the benefits from servitization even further, by introducing the environmental aspect of servitization. He argues that servitization increases the environmental performance simply by providing the right amount of incentives. Instead of for example buying a washing machine, customers could pay a rent and a fixed amount per washing cycle. Customers would then be interested in minimising the number of washes in order to reduce cost, while the provider would be interested

in maximizing the product life cycle. Thus, both parties will seek to reduce the amount of waste and the environmental impact of the product (Neely 2008).

<b>Strategic</b>	<b>Economic</b>	<b>Environmental</b>
<ul style="list-style-type: none"> <li>• Lock in customers and intensify dependency</li> <li>• Lock out competitors, as services are harder to imitate</li> <li>• Increase differentiation</li> <li>• Fulfill customer demand</li> <li>• Gain insight in customer needs through a closer relationship</li> <li>• Increase reputation and brand value</li> <li>• Increase future competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Increase revenue by selling valuable knowledge rather than commoditized products</li> <li>• Installed base argument</li> <li>• Stability of revenue</li> </ul>	<ul style="list-style-type: none"> <li>• Optimise use of resources</li> <li>• Reduce total amount of waste in the value chain</li> </ul>

**Table 2.1 - The rationales of servitization**

In the study on servitization among Danish manufacturers, Slepnirov, Waehrens et al. (2010) use a u-curve relationship between value added and the value chain to rationalise servitization. The relationship is taken from Mudambi (2008) and illustrates how the economic value is distributed through the value chain of a product. As a servitization strategy seeks to re-position the company either downstream or upstream from the production stage, figure 2.1 clarifies how servitization positions manufacturers in the value adding parts of the value chain (Slepnirov, Waehrens et al. 2010).

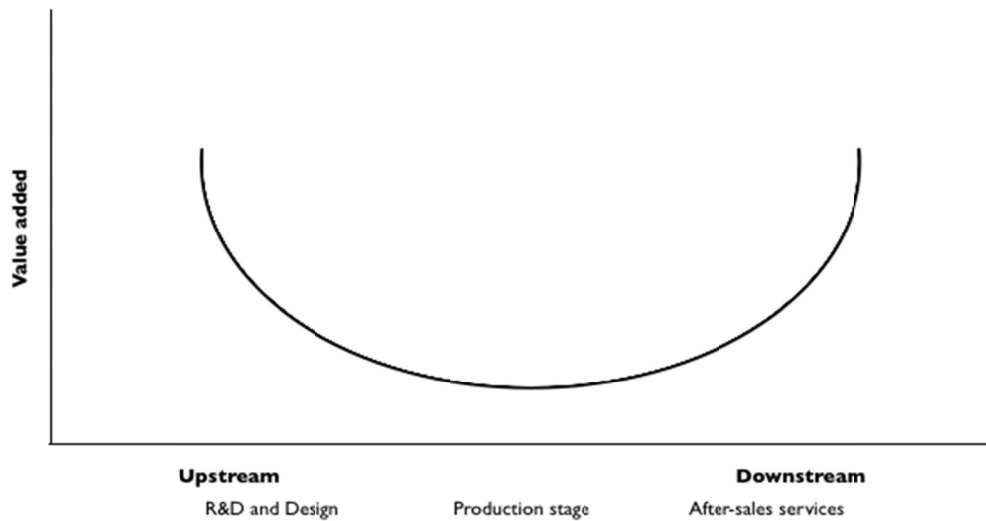


Figure 2.1 - The u-curve relationship between value added and the value chain “The smile of value creation” (Source: Mudambi 2008)

## 2.2 Theoretical background

Before presenting academic literature regarding when and how to servitize, resource-advantage theory of competition, dynamic capabilities theory and path dependencies are presented. This theoretical background will be discussed in relation to the servitization literature, in chapter three, and the data collection in chapter six.

### 2.2.1 Resource-advantage theory of competition

Resource-advantage theory of competition states that firms try to establish a competitive advantage in a marketplace by utilising their comparative advantage in resources and capabilities (Hunt and Morgan 1995). Different resources must be combined in order to form the core capabilities that establish the firm’s competitive advantage. To retain the firm’s competitive advantage scarce resources must be controlled and these resources should be used in markets where they earn the highest rents (Teece, Pisano et al. 1997).

### 2.2.2 Dynamic capabilities

While Resource-advantage theory argues that controlling scarce resources will lead to a competitive advantage, global competitive battles demonstrate that firms that stack up scarce resources not necessarily manage to form a competitive advantage. Theory of dynamic capabilities, as the name implies, is a more dynamic version of the static resource-advantage theory of competition. The theory emphasises on a firm’s ability

to reconfigure their organisation and processes to better match uncertain environments. Thereby it explains how small firms with limited resources can outperform more established firms with comparative advantages in resources and capabilities. The theory highlights that the winners in a rapidly changing global market, in the long run, are the firms that can utilise their comparative capabilities and demonstrate responsiveness, flexibility and continuously create a competitive edge (Zahra, Sapienza et al. 2006). Although studies manage to find that firms with dynamic capabilities tend to outperform others (Jantunen, Puumalainen et al. 2005), they fall short to explain how dynamic capabilities are created. Winter (2003) argues that the dynamic capabilities of a firm can be divided into different orders according to how radical changes the firm can adapt to. Firms that are trained to make small internal changes within the organisation and easily adapt to small changes in the environment, can be classified as firms capable of “first order” changes. Although these firms prove some degree of dynamic capability, they are not able to adapt to bigger, “high level” changes, such as changing the way firms undergo internal changes. Having “first level” dynamic capabilities can be advantageous adapting to small changes, but be disadvantageous in adapting to “high level” changes. The same paper further concludes that high order dynamic capabilities always are superior to low order dynamic capabilities, but that learning this capability may not always be economically justified (Winter 2003).

### **2.2.3 Path dependencies**

Path dependence is the dependence of economic outcomes on the path of previous outcomes, rather than simply on current conditions. In a path dependent process history does matter (Puffert 2010). Path dependence occurs under two conditions, contingency and self-reinforcement, and causes a state of equilibrium that is hard to escape (lock-in) in the absence of exogenous shock, as illustrated in figure 2.2 (Sydow, Schreyögg et al. 2009). Path dependence predicts lock-in only when contingent events amplified by a self-reinforcement mechanism causes alternative paths to be selected out (Vergne and Durand 2010).

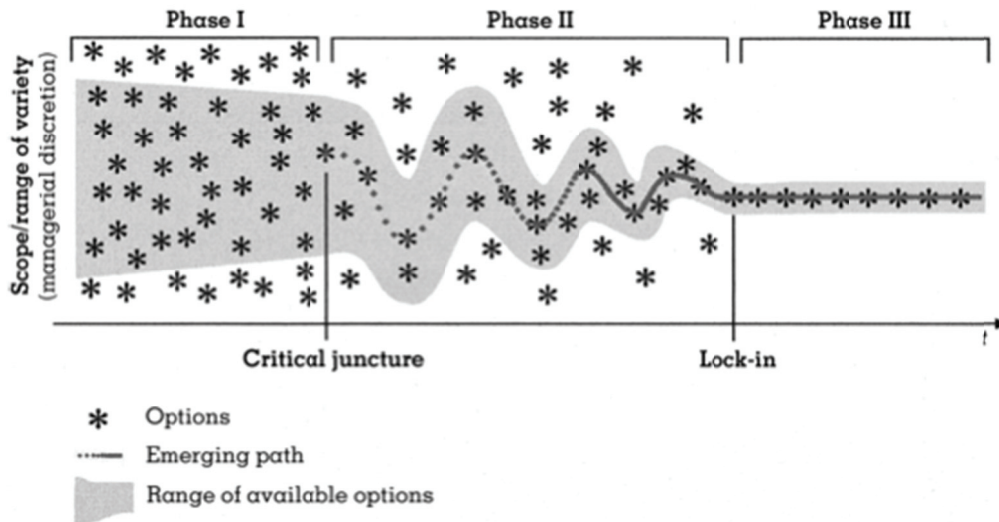


Figure 2.2 – The Constitution of an Organisational Path (Source: Sydow, Schreögg et al. 2009)

As a dynamic capability represents an ability to sense and adapt to change, path dependence can represent a threat if it in captivates a capability’s dynamic potential (Vergne and Durand 2010).

#### 2.2.4 Theoretical framework

The degree of servitization can be measured along the “product-service continuum” (Oliva and Kallenberg 2003). This continuum is illustrated in figure 2.3. The first outer point of the continuum represents a product manufacturer that produces core products, with services purely as an add-on. At this point profits and revenue are generated mainly through the company’s core products and the contribution from services is relatively low in terms of profit and customer satisfaction. The other outer point represents a service provider where the products are only an add-on to the services. These firms are more solution oriented and the main part of the value creation process is services. The process of servitization is a dynamic process where companies move rightwards along the continuum in time (Baines, Lightfoot et al. 2009).



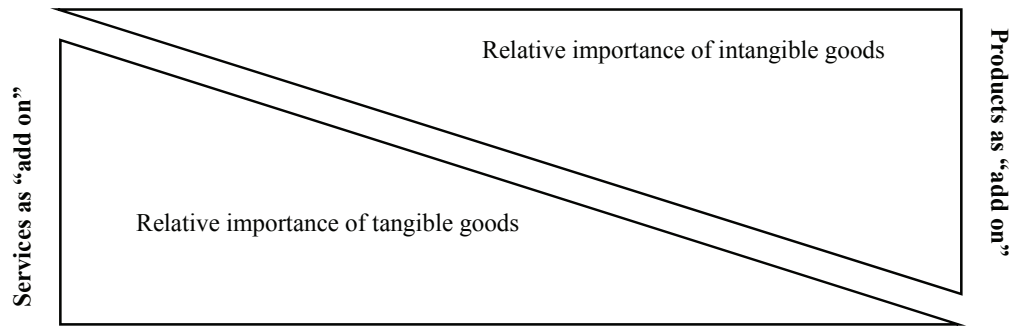


Figure 2.3 - The product-service continuum (Source: Oliva and Kallenberg 2003)

In order to structure the servitization literature, the study sorts the findings into three main categories. These are Internal, External excluding the customer, and Customer. The Internal category contains internal capabilities, organisational structure and other in-house aspects that affect a company's business. The External category includes all external aspects standing outside the walls of the company, except those regarding the customer. In this category, aspects like competitors, technology, and macroeconomic circumstances are discussed. The last category is the Customer category. This category includes all aspects of servitization concerning the customer such as customer needs, demand and customer relationship management (CRM). This framework will be used throughout the study.

Given the nature of the research questions, there will be some overlapping findings. Aspects that are found to make servitization attractive for a manufacturer can be closely linked to the how a manufacturers should servitize. This occurrence is valid across all three main categories.

## 2.3 When servitization is attractive

### 2.3.1 External

#### 2.3.1.1 Global issues

Neely's study finds that manufacturers undertaking servitization are much more common in highly developed economies than in the industrialising economies. Although there might be a range of reasons for this, the study suggests that servitization is clearly influenced by local economics circumstances (Neely 2008). Slepnirov, Waehrens et al, shares the macro point of view of Neely in explaining which external factors drive the trend of servitization in manufacturing. Their study confirms that the global trend of product manufacturing is forcing manufacturers in the developed world to rethink their position on the product-service continuum. They

argue that manufacturers in developing economies will enter the production part of manufacturing and wear down profit levels with their low cost production. Hence, manufacturers in the developed part of the world, with their relatively high production costs, need to adapt to this global trend by moving either upstream or downstream in the value chain (Slepnirov, Waehrens et al. 2010).

### **2.3.1.2 Forming a competitive advantage**

Manufacturers are mainly attracted to servitization as a mean to create profit and strengthen customer focus (Baines, Lightfoot et al. 2009). In order to exploit these profit creating opportunities of servitization successfully, manufacturers need to establish a proper alignment between the market conditions and their organisation. To do this successfully, firms need to establish a servitization strategy that uses the companies comparative advantage in resources to form a competitive advantage in the external environment (Gebauer, Bravo-Sanchez et al. 2008). The findings from Neu and Brown's study reconfirms that a manufacturer's decision regarding where to reposition themselves on the product-service continuum depends on which position will provide the best possible fit between the external environment and internal capabilities of the company. The more complex the environment is, the harder and potentially more beneficial it is to find a favourable position along the product-service continuum. The study describes the market complexity in terms of three underlying dimensions; quantity of factors involved, rate of change of these factors, and the availability of resources. Indicating that factors such as technological changes and level of competition has to be included in the decision-making process (Neu and Brown 2005). Leiringer, Green et al. agree that the importance of considering the external environment increases with the environmental complexity. Their empirical findings show that a successful servitization strategy is predominantly emergent from the external environment rather than predetermined by senior management in a top-down manner (Leiringer, Green et al. 2008). The latter suggestion partly oppose what Baines, Lightfoot et al. found in their study of UK based manufacturers. This study found that most companies had taken a "top-down" approach to identify a desired service position and that most of them saw their service strategy as successful, being resilient to competitive pressure and a key area for future growth (Baines, Lightfoot et al. 2009).

### 2.3.2 Internal

As Neu and Brown's findings indicate, the internal capabilities must be considered in relation to the external environment when deciding to reposition the company along the product-service continuum. Having numerous resources and capabilities does not make profits unless they are used to gain a competitive advantage and offer a product that is differentiated from other existing offerings (Neu and Brown 2005).

In their study of 11 German capital equipment manufacturers, Oliva and Kallenberg concluded that manufacturers hold a unique competitive advantage in serving their installed base with product related services. This advantage derives from having a large customer base with acquaintances to the manufacturer and the product. In addition, manufacturers have extensive product know-how, customer insight and a cumulative experience in product development. Their study also observed several failing companies attempting to sell advanced services without having developed the capabilities needed (Oliva and Kallenberg 2003). Johansson and Olhager (2006) add another potential competitive advantage to servitizing manufacturers by suggesting that product manufacturers intending to offer services can, under certain circumstances, develop an integrated approach for offering manufactured goods and industrial services. Provided that the manufacturing and industrial service -operation match in terms of volume and flow, the two operations can be linked and synergies, such as economics of scale, arise (Johansson and Olhager 2006). Such synergy effects might also arise from other factors than linked operations. Malleret adds that offering services is not profitable regardless of scale. Offering services becomes profitable when reaching certain thresholds when indirect costs such as network and "sitting" costs can be spread. Manufacturers may be capable of reaching these thresholds faster than competitors that do not hold this scale (Malleret 2006).

Even though these studies highlight the initial comparative and competitive advantages held by established manufacturers in offering product related services, Brax discusses a range of challenging issues that a European capital goods manufacturer encountered when servitizing. Her study underlines that servitization is not an obvious strategy just because manufacturers initially may hold some comparative advantages in the product related services. Servitizing will not simply create success for all manufacturers, because considerably more important than these initial comparative advantages, is the process of utilising them to form a competitive

advantage. For example, the ability to change the organisational mindset from product centric to service centric is absolutely essential if servitization is to be successful (Brax 2005). Neu and Brown further highlight these dynamic capabilities in their study of four goods-dominant IT companies that successfully introduced services as part of their offering. They found that the ability to align the internal capabilities with the new position along the goods-service continuum was an essential capability in itself. And that such dynamic capabilities dramatically increased the chances of a successful servitization (Neu and Brown 2005).

### 2.3.3 Customer

Although the external environment and internal capabilities are important considerations when deciding to reposition along the product-service continuum, the decision should ultimately depend on how customers value the service offering (Brax 2005). Servitization is ultimately all about understanding customer needs and expectation and meeting them when providing the service also find that. The service must be seen as a smart solution by the customer and not as an opportunistic supplier action (Brax 2005; Martinez, Bastl et al. 2010).

Cohen, Cull et al, argue, after studying Saturn's high value after-sales service, that customers value services based on how much they value the product's uptime (performance). This implies that customers value downstream services according to what the downtime of the product will cost them. This downtime cost does not purely depend on the nature of the product offered, but also on how each individual customer uses the product (Cohen, Cull et al. 2000).

According to Gebauer, Edvardsson et al. (2010), customers can benefit from upstream servitization, including turnkey solutions and design by, reducing operational risk, cutting the operational requirements, and minimising the capital employed. In addition, industrial customers can through collaboration, develop high competences that make it hard for their competitors to catch up.

As the findings of Brax (2005) stress the importance of changing the internal mindset of the servitizing manufacturer, Neely's findings indicate that the same also is valid for customers. Many customers seem to be emotionally attached to the products they buy and their mindset has to be prepared to accept that a physical product is not always necessary. The level of emotional attachment to a physical product differs

from product to product. A house owner would not easily replace his house with a rented house even though the new service would provide him the same shelter. He would simply have an emotional and cultural preference to owning his own house. Accordingly, this aspect of customer needs must also be considered before replacing a product with a service (Neely 2008). In compliance with these findings, Kindström also found that there is an aspect of customer maturity and their willingness to adapt to more advanced service offerings. As customers need to be prepared for services and the changes it will bring, the company must make customers aware of how their service-focused offering creates value (Kindström 2010).

Asking manufacturers themselves what they believe makes services attractive for customers, Baines, Lightfoot et al. (2009) discovered lower costs, minimised investments and reduced risk. This compliments the findings of Cohen, Cull et al (2000), in that the most attractive feature of offering product related services are reduced risk and costs.

## **2.4 How manufacturers should servitize**

### **2.4.1 External**

#### **2.4.1.1 Align customer criticality with offered service level**

Compared to the distribution network requirements in traditional product manufacturing, service distribution is much more complex. This is mainly due to how the nature of services differ from tangible products. The fact that a service cannot be stocked or separated from consumption causes great effort in defining, pricing, and securing the quality of the service provided. Quality controls can, in contrast to tangible products, only be done prior to the service is produced. Forecasting the demand also becomes much more important as having sufficient stocking service personnel is very costly (Åhlström and Nordin 2006). Amini, Retzlaff-Roberts et al. agree that service supply chains are significantly more complex than traditional manufacturing supply chains, but underline how this implies that a manufacturer can enjoy a formidable competitive advantage by optimising their service distribution to match customer needs (Amini, Retzlaff-Roberts et al. 2005).

When carefully studying Saturn's successful service supply chain, Cohen, Cull et al. found that the most important success factor in ensuring that the service supply chain

keeps customers happy, is aligning customer criticality of the product to the offered service level. Customer criticality is regarded as a measure of how costly the product downtime is. The study states that the customer will only value a service supply level, measured in lead-time, that matches the criticality they associate with the product. Hence, providing a service supply level that deviates from this will lead to inefficiencies because of a pointless high level of services, or by failing to fulfil customer needs (Cohen, Cull et al. 2000).

#### **2.4.1.2 Affiliations with the service supplier**

As a manufacturer servitizes, there can be a third party involved in supplying the newly offered service package to the end customer. Additionally servitization tends to tighten the relations between customers and suppliers (Åhlström and Nordin 2006). The study by Åhlström and Nordin identifies four specific problematic areas that may be encountered when a servitizing manufacturer establishes a relationship with an external supplier to provide the services being added to their offering. These are concerned with the writing of the legal agreements, specifying the service process, handling the service delivery and losing the control over the customer relationship. Their findings suggest three key critical implications for avoiding these problematic areas. First, the scope of the service supply relationship must be clearly determined. Secondly, the manufacturing companies end-customers should be involved in specifying the service. Finally, the service delivery should be defined in terms of desired outcomes rather than how the service delivery should take place (Åhlström and Nordin 2006).

#### **2.4.2 Internal**

##### **2.4.2.1 Formulate a deliberate service strategy and development process**

The service strategy defines in general, how companies differentiate themselves from their competitors by means of service offers (Gebauer, Edvardsson et al. 2010). The study by Gebauer, Edvardsson et al. argues that establishing a clear service strategy is an important success factor, enabling high service revenues in manufacturing companies. A clear service strategy will encourage companies to make the appropriated organisational arrangements and resource allocations (Gebauer, Edvardsson et al. 2010). Additionally, developing service ideas into highly accepted

service products, requires a clearly defined service-development process (Gebauer, Friedli et al. 2006).

The successful companies in the study by Gebauer, Edvardsson et al. realised that a successful service strategy cannot be developed without involving all relevant areas of the company and thereby increased acceptance of the service strategy and the commitment of the relevant business departments. It was also found important that the entire procedure (strategy analysis, development, implementation and monitoring) is systematic, transparent and incorporating frequent feedback loops (Gebauer, Edvardsson et al. 2010).

#### **2.4.2.2 Alter the corporate culture**

Oliva and Kallenberg argue that the first major challenge that manufacturing companies face when servitizing, is the required cultural transformation of the corporate culture. The core of this transformation is that manufacturing companies must learn to value services and how to sell, deliver and bill them (Oliva and Kallenberg 2003).

It was further observed by Martinez, Bastl et al. that a strongly embedded traditional manufacturing culture in the organisation hindered the transition towards provision of an integrated offering. The study highlights the importance of the product-service culture that traditional manufacturing companies need to embrace and develop into a passion for services, in order to meet customer expectations. It is also argued that culture will help fill the gaps between what an organisation can train its employees to do and what the end customer expects (Martinez, Bastl et al. 2010). Gebauer, Friedli et al. also recognises a potential clash between manufacturing values and service values, or in other words as a clash between a dominant culture and a counterculture. The managerial challenge is on the one hand to create a service culture, and on the other hand, to maintain the uneasy symbiotic relationship that exists between a dominant culture and a counter-culture. In effect, managing the relationship is a means of diffusing resistance to change by balancing manufacturing values (e.g. efficiency) and service oriented values (e.g. flexibility), rather than by totally substituting one value set for the other (Gebauer, Friedli et al. 2006). All of the successful companies that were studied by Gebauer, Friedli et al. were able to overcome the typical cultural habits of product manufacturers. Typical cultural habits

can be found at both managerial and employee levels. For example, managers have to be aware of the economic potential of extended service business and should be willing to invest resources in it. In other words, companies should change their service awareness from “non-value added” to “value-added” thinking (Gebauer, Friedli et al. 2006).

Changing employee mind-sets is directly linked to establishing a service culture in a manufacturing company. It is important to empower sales people and service technicians so that they can offer services actively. An empowerment of this kind is only possible if the employees have the right mindset. This requires a strong internal marketing, encouraging employees to get a better understanding of how customers benefit from the service. It is in other words important to change the mind-set of employees from that related to selling products to that of providing services (Gebauer, Friedli et al. 2006).

In the study by Gebauer, Edvardsson et al, from 2010, it is found that the importance of changing the corporate culture towards services depends upon the degree of servitization. Indicating that the companies should align the degree of servitization with the resources invested in changing the service orientation of the corporate culture (Gebauer, Edvardsson et al. 2010).

#### **2.4.2.3 Accumulate and retain employees with the necessary capabilities**

Martinez, Bastl et al. (2010) found that the adoption of a product-service strategy requires an acquisition of new capabilities that enable the organisation to compete in new service spaces. In Neu and Brown’s study of three goods-dominant companies, it was important for managers to use existing human resources to develop learning relationships with customers, serve as trusted advisers to customers, deliver complex services, and lead and participate in a collaborative support performance. The study also found that to be able to perform these roles, individuals need a broad base of technical expertise, appropriate behavioural competences, and a “whatever it takes” attitude. As, such, human resource strategies need to be designed to accumulate and retain frontline employees who possess these needed characteristics. The findings also suggest that a competitive advantage results when managers can utilise a full complement of capabilities (the companies comparative advantage) and provide a complex service consistently across the target market (Neu and Brown 2005).



As for the resources invested in changing the company culture, the degree of servitization is also found to be relevant for the service orientation of human resource management. The service orientation of human resource management involves: personnel recruitment, personnel training, and personnel assessment and compensation. It is argued that companies that are only offering basic services to their customers should have a matching service orientation of human resource management. For companies offering operational services in order to take over the operational risk and full responsibility for the customer's operating process should have a high service orientation on personnel assessment and compensation, but not on personnel recruitment and training (Gebauer, Edvardsson et al. 2010).

#### **2.4.2.4 Designing an appropriate service organisation**

Oliva and Kallenberg found that a critical success factor was the creation of a separate organisation to handle the service offering. In their sample, the most successful companies in extracting value from their services were those that ran their service organisation as a profit centre (or a separate business unit) with profit-and-loss responsibility. The interpretation of this finding is that the new organisation effectively protects the emerging service culture – with its metrics, control systems and incentives – from the values and incentives predominant in the manufacturing organisation (Oliva and Kallenberg 2003). A study by Neu and Brown showed contradictory findings. Through their study of three successful service development cases, they noticed that multiple business units were becoming jointly responsible for providing customers with the experience they desired from a complex system. One of the companies even “undid” the separation of their service organisation and in one of the cases, where managers did create an autonomous discrete service division, it failed. The study concludes that companies should integrate the product and service businesses and foster interfirm collaboration so that they can fully exploit the firms' knowledge and comparative advantage (Neu and Brown 2005). Neu and Brown recognises that their conclusion differs from that of Oliva and Kallenberg but argues that this is because of the case companies product dominated positions along the product-service continuum.

Gebauer, Edvardsson et al. found that there is a middle road between the findings of Oliva and Kallenberg and Neu and Brown. They argue that the decision of whether to integrate or separate the service business should take into consideration their desired

position along the product-service continuum. If a company chooses to offer basic services for the installed base in the after sales phase, to react as fast as possible to any breakdown, then the company should choose to integrate the service business. If the firm on the other hand chooses to offer advanced maintenance services to prevent any breakdowns within the after-sales phase or choose to take over the operating risk and full responsibility for the customer's operating process, then the firm should separate the service business (Gebauer, Edvardsson et al. 2010).

### **2.4.3 Customer**

#### **2.4.3.1 Establish appropriate customer interaction**

Some of the empirical studies found that, for firms to be able to expand their service offering, firms should change the focus of customer interactions from transaction- to relationship-based (Oliva and Kallenberg 2003; Brax 2005; Gebauer, Friedli et al. 2006). In the study conducted by Brax (2005) it is concluded that the implicit transaction-oriented business philosophy of the manufacturer does not support service offerings. When a company is transforming into becoming a provider of an integrated offering, a different degree of insight into the problems and applications of customers is necessary, which calls for a greater degree of cooperation between provider and its supporting network (Martinez, Bastl et al. 2010) .

Through Malleret's (2006) field study of six industrial SMEs operating in B2B services, it was concluded that the service provider must carefully design services that create value for its customers. To do so, it needs to know their key success factors, working systems, organisation and processes, i.e. it needs to maintain a close trust-based relationship with its customers, with frequent contacts (Malleret 2006).

Kindström found that it is not always appropriate to have relationship-based customer interaction. He argues that service offerings, in particular advanced service offerings, are relationship intensive, and that it may not be possible to establish good relationships with all customers. In some cases, the costs of sustaining the relationship could be greater than the reward. He proposes that managers need to segment their customers and conduct a thorough analysis of their strategic importance (Kindström 2010). Retaining relationships with some customers may even involve shifting them "back" onto a more traditional, transaction-oriented footing (Johnson and Selnes 2004).

#### **2.4.3.2 Communicate value proposition**

The study by Stremersch, Wuyts et al. concluded that industrial customers carefully evaluated the value offered by a product or service rather than its price alone. Due to this, the marketing of services should communicate a clear and substantive value proposition towards potential customers, rather than focusing on the price and functional properties of individual services (Stremersch, Wuyts et al. 2001). Malleret also found that when services are marketed, the customer must be aware of the value created. Ideally, the customer should be shown the savings it is making thanks to the product/service sold (Malleret 2006). These findings are concurrent with study done by Gebauer, Friedli et al. (2010) that showed that successful firms were able to maintain continuous contact with customers and project a specific image, which highlighted the unique value of the company's services in comparison to its competitors.

Kindström further argues that companies will need to develop their ability to promote and explain advanced service-intensive value propositions. These new offerings differ from that of traditional product offerings, and will often demand new, and creative, promotional techniques and customer education strategies (Kindström 2010). According to Gebauer, Friedli et al. (2006) the company's reputation becomes increasingly important when offering services. Because of the intangible nature of services, customers use the service provider's reputation as a proxy for evaluating the service offering.

## 3 Literature discussion

### 3.1 When servitization is attractive

#### 3.1.1 Matching the Internal capabilities with the External environment

As the increasing global competition in manufacturing is commoditising manufactured goods, it seems vital for manufacturers based in industrialised countries to differentiate their offerings seeing that they cannot compete in terms of production cost (Neely 2008). Servitization is arguably one strategy for manufacturers to differentiate their offering.

*P1: Servitization is attractive for manufactures that want to differentiate their offerings and not compete on production costs*

The conceptual foundation of this paper states that companies compete on the basis of their comparative advantages in resources and capabilities (Hunt and Morgan 1995). Manufacturers should therefore critically examine where they have a comparative advantage, and then select a strategy that utilises their comparative advantage to form a competitive advantage in the external environment (Gebauer, Bravo-Sanchez et al. 2008). The issue then is whether servitized offerings are a better match to the comparative advantages of the manufacturer. This question ultimately depends on the manufacturer considering servitization, but servitization literature broadly coincides on a range of comparative advantages that can rationalise servitization (Malleret 2006). These comparative advantages consist of a list of internal capabilities and resources a manufacturer might hold. Such internal capabilities and resources are, a large installed-base-to-new-unit ratio, customer relationships, credibility and extensive product know-how (Oliva and Kallenberg 2003). It is essential to recognise that these capabilities and resources can hold for a wide range of actors, hence, it is the relative degree of these capabilities, compared to competitors, that decided if they form a comparative advantage.

*P2: Servitization is a more attractive strategy if it can utilise a manufacturer's existing comparative advantages to form a competitive advantage*

The literature also highlights the importance of having a flexible mindset and a dynamic and adaptive organisation when servitizing. Holding some comparative

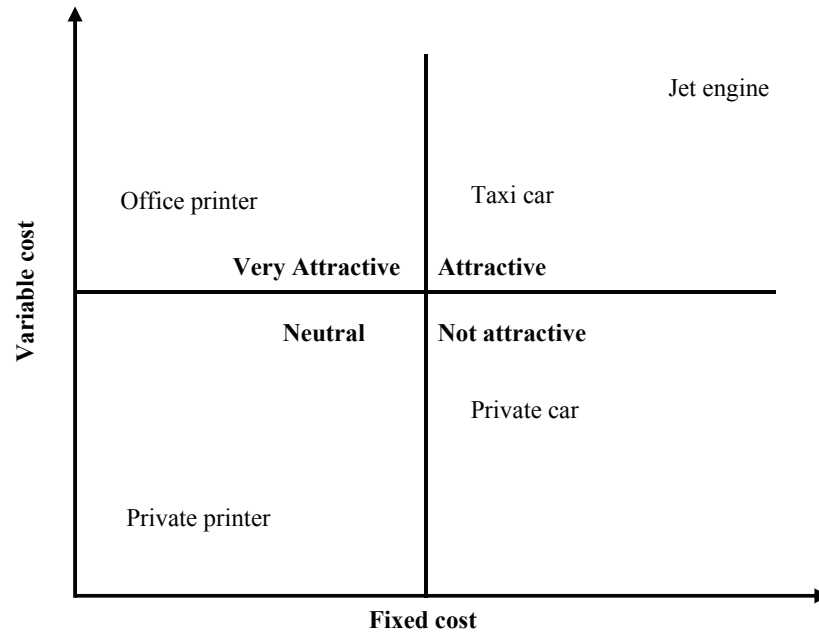
advantages will not turn into a competitive advantage unless the manufacturer can manage the transformation from a product centric to service centric organisation. Not having any competence or culture for offering services is clearly a challenge for many manufacturing companies and solving this challenge successfully, necessitates dynamic capabilities within the company (Brax 2005). Effectively, possessing this dynamic capability is a comparative advantage in itself (Neu and Brown 2005).

For manufacturing companies finding servitization as a potentially attractive strategy, proposition 2 may undoubtedly act as a showstopper. Having an existing comparative advantage in offering product related services could seem unlikely for companies that have never offered services before. In such, servitizing together with an alliance partner, with complementary capabilities, may be a possible solution. The alternative of servitizing through a hybrid structure can ensure the partnership to encompass all the resources and capabilities needed to gain a competitive advantage in offering servitized offerings.

### **3.1.2 Customer**

There are many potential benefits that manufacturers can enjoy if they succeed with their servitization strategy. Surely, servitization is not the right strategy for everyone, so manufacturers must determine if they have the right prerequisites to servitize successfully.

The first stage of this determination process is to examine customer needs. A customer need for downstream services is determined by the customer's criticality of using the product, meaning how much a sudden unavailability would cost (Cohen, Cull et al. 2000). Arguable the customer's willingness to pay for services is determined by how critical the product is for him or her. In the same manner, a manufacturer should only offer services if the willingness to pay is higher than the cost of offering the service (fixed cost). These two aspects can be summarised in the following matrix indicating that servitization is more attractive when the variable cost is high and fixed cost is low.



**Figure 3.1 – Determining the product criticality**

Figure 3.1 indicates that the criticality of a good does not simply depend on its nature, what determines the criticality is the customer dependencies. An office printer would have a much higher unavailability cost with it than a private printer would, hence a higher criticality.

Providing complete turnkey solutions and design, seems attractive if customers have a desire to reduce operational risk and resources employed. This is typically the case for complex and critical products that require a high level of specialised competence to install and operate. The competence to do so may be very costly to acquire and retain for customers, and it would therefore be appropriate to let a servitized company do it (Gebauer, Edvardsson et al. 2010). If the manufacturer provides a complete solution and takes on more risk, both the customer and the manufacturer can benefit from economies of scale and reduced transaction costs.

*P3: Servitization is a more attractive strategy for manufacturing companies if they offer products that are critical to customers*

The literature also underlines that there are other aspects of customer needs than minimising cost and risk of a product. The emotional and cultural attachment to owning a tangible product rather than paying for the intangible service it provides, is also a need that must be considered by the manufacturer (Neely 2008).

P4: *Servitization is attractive for a manufacturer if customers are culturally and emotionally set for the new offerings*

## **3.2 How manufacturers should servitize**

### **3.2.1 External**

When servitizing, manufactures often need to tighten the relationship with other suppliers. In cases where a third party is involved in delivering the new offerings, there have been problems defining exactly how such intangible offerings are to be delivered (Åhlström and Nordin 2006). Although, hiring an experienced third party to deliver service offerings may be beneficial, there is also a danger for manufacturers to lose control of what is being offered to their customers. Outsourcing the delivery of service offerings may therefore present a trade of between cost and qualifications on one side, and the risk of losing contact and control over the customer on the other side.

P5: *Involving a third party in the delivery of services might be beneficial*

### **3.2.2 Internal**

One of the main hurdles for a manufacturing company undertaking servitization is the necessary transformation of the corporate culture. A company's history creates path dependencies, which increases rigidity and makes servitization transition even harder. The reviewed articles recognise a potential clash between manufacturing values and service values. It is argued that manufacturing companies will have to acquire new resources and capabilities as well as change the existing corporate culture, when moving from a product-centred organisation to a service-oriented organisation (Oliva and Kallenberg 2003; Gebauer, Friedli et al. 2006; Martinez, Bastl et al. 2010).

Due to the very different nature of services, it is not possible to simply add services to an existing organisation without revamping it; services change too many aspects of doing business. For manufacturing companies to successfully make the transition along the product-service continuum, it is important that they are in possession of dynamic capabilities. The manufacturer must be able to realign comparative advantages with the external requirements. For mature companies, the necessary cultural change is especially difficult. Institutionalized routines, structures,

investments and relationships characterise mature organisations and create age and size related inertia that inhibits strategic change (McDougall and Oviatt 1996). Companies that are very young and not path dependent may be, due to this, in a better position to make the cultural change. Based on these arguments the following is proposed:

*P6: Changing the corporate culture to become more service oriented is often necessary when servitizing*

*P7: Path dependency can affect the success of a servitization strategy*

Not only is it extremely difficult to make the necessary transformation, it can also be detrimental to the existing competitive advantage of the company. When the focus of the company is turned towards services, a lack of focus on the core activities may reduce the overall performance of the company. Oliva and Kallenberg argue that manufacturing companies need to separate their service organisation in order to overcome the cultural hurdle. All of the successful companies that they were studying had separated their service organisation to ease the cultural difficulties (Oliva and Kallenberg 2003). Neu and Brown (2008) found on the other hand that this is not a smart move, as it will not be possible for the company to take full advantage of the comparative advantage within the company. Manufacturing companies are hence faced with a difficult trade off. If the company chooses to separate the service organisation it may create sub-optimisation and make it hard to take full advantage of their comparative advantages, which in turn may ruin their chances of harvesting the benefits of servitization. On the other hand, if companies do not separate their service organisation, they will face a difficult cultural hurdle and may risk ruining their existing competitive advantage. Gebauer, Edvardsson et al. also argue that the decision of whether to integrate or separate the service business should take into consideration their desired position along the product-service continuum (Gebauer, Edvardsson et al. 2010).

*P8: The degree of servitization affects the organising of the service activity*

The adoption of a servitization strategy requires also acquisition of new resources and capabilities (Martinez 2010, Neu and Brown 2005, Baines 2006). Employees need a broad base of technical expertise and have appropriate behavioural competences. Due



to this, human resource strategies need to be designed to accumulate and retain employees who possess these needed characteristics. Based on the above-mentioned arguments the following is proposed.

*P9: Human resource management should be service oriented*

The distinctive nature of services is also a challenge for ensuring an appropriate quality on offerings, as this can only be done prior to the service is being produced (Åhlström and Nordin 2006). As the quality on offerings does not simply depend on the quality on the tangible products that are delivered, it intensifies the importance of having well trained service people with sufficient technical know-how and social skills. Only by making sure that employees hold both technical and social competence, can the appropriate quality on offerings be ensured.

*P10: Sufficient quality should be ensured before customers receive the offerings*

When ensuring that the service supply chain keeps customers happy, it is found that it is important to align the customer criticality of the product to the offered service level. The inseparable and intangible nature of services makes servitization a challenge in terms of meeting customers demand. This implies that servitizing manufacturers must develop new forecasting mechanisms in order to optimise their resources in relation to customer demand (Cohen, Cull et al. 2000).

*P11: It is critical for manufacturers to develop forecasting mechanisms and optimise the employed resources*

### **3.2.3 Customer**

Some of the main findings from the reviewed articles showed that it is important for manufacturing companies to obtain knowledge of the external environment and customer needs, so that they can offer services that directly create value for its customers (Brax 2005; Gebauer, Friedli et al. 2006; Malleret 2006; Baines, Lightfoot et al. 2009). Even if manufacturing companies are able to offer value-creating services, it is not always the case that customers are aware of this. It is important that the marketing of services communicate a clear value proposition towards potential customers (Malleret 2006). To be able to do this, many companies will have to develop their ability to promote and explain advanced service-intensive value propositions (Kindström 2010). These arguments lead to the next proposition:

P12: *Manufacturers should actively explain the new value proposition to their customers*

Many of the reviewed articles also found that manufacturing companies undertaking servitization should have a relationship based customer interaction instead of a transaction based customer interaction (Oliva and Kallenberg 2003; Brax 2005; Gebauer, Friedli et al. 2006; Martinez, Bastl et al. 2010). However, there seems to be a consensus that relationship based customer interaction should only be used if the rewards outweigh the costs of sustaining the relationship.

P13: *Relational interaction with customers is in some cases favourable*

### **3.3 Propositions and implications for theory**

To summarise the main findings of this chapter, all the propositions proposed are summarised in table 3.1. They are grouped according to main categories, and the research question they provide insight to.

	RQ1	RQ2
External	P1: <i>Servitization is attractive for manufactures that want to differentiate their offerings and not compete on production costs</i>	P5: <i>Involving a third party in the delivery of services might be beneficial</i>
Internal	P2: <i>Servitization is a more attractive strategy if it can utilise a manufacturer's existing comparative advantages to form a competitive advantage</i>	<p>P6: <i>Changing the corporate culture to become more service oriented is often necessary when servitizing</i></p> <p>P7: <i>Path dependency can affect the success of a servitization strategy</i></p> <p>P8: <i>The degree of servitization affects the organising of the service activity</i></p> <p>P9: <i>Human resource management should be service oriented</i></p> <p>P10: <i>Sufficient quality should be ensured before customers receive the offerings</i></p> <p>P11: <i>It is critical for manufacturers to develop forecasting mechanisms and optimise the employed resources</i></p>
Customer	<p>P3: <i>Servitization is a more attractive strategy for manufacturing companies if they offer products that are critical to customers</i></p> <p>P4: <i>Servitization is attractive for a manufacturer if customers are culturally and emotionally set for the new offerings</i></p>	<p>P12: <i>Manufacturers should actively explain the new value proposition to their customers</i></p> <p>P13: <i>Relational interaction with customers is in some cases favourable</i></p>

**Table 3.1 - The propositions**

An underlying question is the theoretical implications of the findings. Linking the findings from the servitization literature with the theoretical background, it can be argued that Resource-advantage theory of competition can only partly explain why servitization is an attractive strategy for manufacturers. The literature findings agree that traditional manufacturers hold comparative advantages that could be used to form a competitive advantage through servitization. However, the findings also underline that sensing and adapting to a servitization strategy is not straightforward. In order to do so, a manufacturer must be responsive to the external environment and be able to continuously reconfigure its organisation. For traditional manufacturers, this can be even harder as path dependencies can deter manufactures ability to sense and adapt to changes. Therefore, dynamic capabilities are an important element when considering the attractiveness of servitization, and implementing it. Theory of Dynamic

capabilities can therefore, in a in a better way than Resource-advantage theory of competition, explain what strategies manufacturing companies should implement.

## **4 Research Methods**

In the following chapter the choice of research method and way of analyses will be discussed. At first the methods used for the literature review will be presented, followed by a description of the research strategy used for the empirical study. In the end, a discussion concerning the study's reliability and validity will be presented.

### **4.1 Literature study**

In order to get an overview of the academic field, which this study concerns, 26 empirical articles were selected for review. The empirical articles were all found in journals with research of a modest standard, as the leading journals do not, up to this date, address the topic of servitization. 20 conceptual articles were also reviewed to provide the authors with general background information and to form the conceptual foundation of this study. Some of the conceptual articles were in the same way as the empirical articles collected from academic journals, but for the most part they were collected from other publication forms (e.g. books, newspaper articles, unpublished working papers, etc.).

#### **4.1.1 Search strategy**

The search strategy was developed by identifying data sources, time frame and keywords/journals. At first a broad selection of databases were chosen, but after consolidating with experienced librarians the databases ProQuest and ScienceDirect were chosen. Among the databases available to NTNU students, ProQuest and ScienceDirect were said to provide the most relevant and trustworthy articles for the topic presented in this paper.

A keyword search was chosen over a journal search. This choice was made because the authors feared that by choosing some journals, vital information would be missed, as there were no apparent journals that would cover the topic sufficiently. It was thought to be better to include all journals and search for articles with relevant words in either the title or citation and abstract. Keywords that were believed to prevail relevant articles, were then identified. These words were “after-sales services AND manufacturing” and “servitization”.

#### **4.1.2 Selection of articles**

A few selection criteria were established before the search began. This was done to

secure that the search would provide the most relevant articles.

1. Only research on manufacturing companies was to be considered. Articles limited to the service industry was therefore excluded from the review. However, general studies that considered both the manufacturing and the service industry were included in the review.
2. The focus of the review was on literature published between 1995 and 2010. This timeframe was set because it was thought of providing the most relevant and up to date articles without losing important groundwork.

By searching through the chosen databases, using the keywords over the selected time period, a total number of 76 articles were uncovered. Out of these 76 articles, access was denied for 6 of them, 6 articles were duplicates and 13 articles were found to be conceptual papers. The abstract and conclusion of the remaining 51 articles were thoroughly read. Out of these, 15 were dropped due to lack of ability to contribute with information that would help answer the research questions. A manual reference list search was conducted of the remaining articles and 8 new articles were uncovered and included. These articles were chosen on the basis of which of the articles found in the reference lists were used by most of the remaining articles. This was done to secure that the most influential studies on the field were included in the review.

All of the remaining 44 articles were thoroughly read. After reviewing them, 10 articles were dropped because the authors did not see how the articles could contribute to the understanding of the problems. 8 articles were also excluded as they, despite touching upon relevant topics, revealed to have an irrelevant research area. In total 26 articles were included in the study.

#### **4.1.3 Review procedure**

The articles were coded according to the conceptual framework presented in chapter 2. This coding was done right after they were read so that the contextual understanding was captured. Also, when reading each article notes were made regarding; *authors (study)*, *journal*, *year*, *research method*, *purpose of study* and *main finding*. From this a table was created in order to get an overview and simplify the

analysis (Appendix A). All of the articles were read by both authors to ensure a satisfying level of inter-reviewer validity in the coding procedure.

## **4.2 Empirical study**

### **4.2.1 Selection of research design**

Many writers on methodological issues have found it useful to distinguish between quantitative and qualitative research (Bryman 2008). Quantitative research methods are concerned with answering questions like what, where and when, while qualitative research investigates the why and how of decision-making. The decision to adopt the one or the other strategy will not be enough for doing research. At first a framework for the collection and analysis of data must be chosen. Bryman (2008) finds five main research designs, namely: experimental design, cross-sectional design, longitudinal design, case study design and comparative design.

Yin (2009) outlines three selection criteria for research design: a) the type of research question posed b) the extent of control an investigator has over actual behavioral events c) the degree of focus on contemporary as opposed to historical events

The research questions in this study are concerned with the why and how of servitization. According to Yin (2009), why and how questions are explanatory and likely to lead to the use of case studies, experiments or longitudinal design. Furthermore, the authors were not involved in the case companies and had no control over the events. The focus was also on contemporary events with a need for only basic information on historical events. Under these circumstances the preferred research design is, according to Yin (2009), a case study design.

Through a case study design it is possible to study a specific event, person, institution or a social group. Case studies are also oriented to create insight and interpretation rather than to test hypothesis (Widding 2003). As this study strives to understand the rational and process of servitization, the choice of a case study design is supported by Widding (2003). It would also be beneficial for this study if other methods were used, such as a cross-sectional design, but this has not been possible due to limited time and resources.

There are several advantages with a case study design. First of all the data collection is characterised by closeness to actors and events, with weight on details where data and analysis incorporate the actors own views. Processes and changes over time are central (Widding 2003). Another positive feature with case studies is that it is possible to use different kinds of empirical material, like documents, interviews and observations.

Three main weaknesses with the use of a case study design have been identified. First of all, unlike other research methods, a comprehensive catalog of research designs for case studies has yet to be developed (Yin 2009). Some researchers claim that the lack of a standardised procedure gives room for the researcher to be influenced by biased views and that this again can influence the findings and conclusions. Secondly, there is a temptation to build theory, which tries to capture everything. The result can be theory, which is very rich in detail, but lacks the simplicity of overall perspective. Thirdly, the results of case studies have a weak external validity, making it incorrect to generalise them across populations.

#### **4.2.2 Case selection and representativeness**

As evidence from a multiple case design is often considered more compelling than from a single case design, the overall study is regarded as being more robust (Yin 2009). Based on this, a multiple case design has been chosen for this study. The number of cases believed to be sufficient has been decided through a discretionary judgment process. The matter was approached as a reflection of the number of case replications that satisfied the desired level of theoretical saturation for this study. The tradeoff between time and in depth analysis of each case has also affected the number cases that have been selected.

While the cases may be chosen randomly, random selection is neither necessary nor even preferable. As Pettigrew (1988) noted, given the limited number of cases, which can usually be studied, it makes sense to choose cases in which the process of interest is "transparently observable." Thus, the goal is to select cases that are likely to replicate or extend the emergent theory (Eisenhardt 1989). In order to select the specific cases a set of criteria were defined:



1. The companies had to be characterised as Norwegian manufacturing companies. This was decided both because it would be practically possible to have personal meetings with the companies, but also because Norwegian manufacturing companies are situated in a country with relatively high production costs and are hence in the position where they need to push innovation and renew themselves in order to stay competitive.
2. The companies must have changed their focus away from just production to the more value adding activities, either downstream or upstream.
3. The companies must be in charge of their own strategic decisions. They cannot be controlled by other parties domestically or internationally.
4. Each case had to contribute to the answering of the research questions.
5. Aggregated the case companies had to be situated on different “places” along the product-service continuum.

To find the most suitable case companies, multiple sources of information were used. At first professor Øystein Moen proposed two companies that he believed would be good case companies, and that would be willing and have time to engage in the research. The author’s contacts, the internet, and various corporate days held at NTNU were also exploited to find potential companies that were willing to engage in the research. Based on the information gathered, twelve companies were chosen for further research. A comprehensive research of the remaining companies resulted in four companies being dropped because they were not believed to have undertaken servitization. Of the remaining eight companies, two companies did not want to participate in the research. The six remaining companies were Rolls–Royce Marine, the Ulstein Group, Brunvoll AS, FMC Kongsberg Subsea, Rapp Marine and Glamox. After conducting a comprehensive interview with the first four companies mentioned above, the authors felt it was necessary to include another case company. After including Rapp Marine, not much new information seemed to be emerging during the coding and it was decided that theoretical saturation was reached. Due to this, Glamox was not included in the research and the case companies were hence selected.

### 4.2.3 Data collection

Yin (2009) discusses six different methods for the collection of data, namely documentation, interviews, archival records, direct observation, participant-observation and physical artefacts.

Documentary information is, according to Yin (2009), relevant to every case study topic and was also found relevant for this study. The types of documents used in this study include e-mail correspondence with the case companies, brochures, annual reports, doctoral dissertations, news clippings and other articles that appeared in the media. These documents have been useful because it has provided the authors with insight in the process of servitization, the case companies and their contextual situation. As a source of evidence documents are stable, exact and covers a broad range of information, but the information may not be lacking in bias (Yin 2009).

In this study, the main technique for the collection of data has been interviews. This coincides with Yin (2009) that states that interviews are the most important source of case study information. When doing a multiple-case study research, it is important to have some structure in the interviews in order to ensure cross-case comparability (Bryman 2008). Since the authors also started the investigation with a theoretical background and a clear research motive, semi-structured interviews were chosen for the data collection. Before conducting the interviews an interview guide was prepared (Appendix B). A list of main topics and sub-topics to be covered during the interviews were listed. The guide was reviewed several times to secure that the questions asked would help to answer the research questions, that no leading question were asked and that there were a certain amount of order on the topic areas.

Five personal interviews, with either one or two employees from the management of each case company, were conducted (table 4.1). The interviews started by the authors presenting the study and the agenda for the interview, followed by the interviewees presenting themselves and the company. The interviews were all audio-recorded in addition to notes being made during the interviews. The use of an audio-recorder may disconcert respondents and lead to vital information not being presented. However, as none of the respondents opposed to being recorded, there is no indication of vital information being left out from the interviews.

Company	Name	Title	Location	Date/ Duration
Rolls-Royce Marine	Magnar Førde	Senior Vice President Innovation & Technology - Offshore	Ålesund	01.03.2011/ 3 hours
Ulstein Group	Per Ivar Roald	Head of Accelerated Business Development	Ulsteinvik	01.03.2011/ 3 hours
Brunvoll	Terje Dyrset Per Olav Løkseth	CEO Marketing Director	Molde	02.03.2011/ 3 hours
FMC Kongsberg Subsea	Odd Gynter Olsen	After Market Business Development Management	Kongsberg	08.03.2011/ 4 hours
Rapp Marine	Tove Pettersen	CEO	Bodø	22.03.2011/ 3 hours

**Table 4.1 – Personal interviews**

The strengths of using interviews for the collection of data are the prospect of rich, in-depth information. On the other hand it may lead to response bias, inaccuracies and reactive effects (Yin 2009).

The remaining four methods of data collection, listed by Yin (2009), have not been employed in this study. There has not been any possibility to observe the situations and processes described in this study and physical artefacts have not been believed to provide any valuable insight.

#### 4.2.4 Data analysis

The analysis of data from case studies is one of the least developed and most difficult aspects of doing case studies (Yin 2009). As Miles and Huberman (1984, p. 16) wrote: "One cannot ordinarily follow how a researcher got from 3600 pages of field notes to the final conclusions." This illustrates one of the main difficulties with qualitative research, namely the enormous amounts of data. To be able to carry out a true analysis it is important that the researcher does not get captivated by the richness of the data collected, but finds a path through the thicket of prose that makes up the data (Bryman 2008). The use of case studies has been criticised by many researchers because of the difficulty with analysing methodically. Due to this it is especially important to explicitly explain the analytical process.

Yin (2009) argues that the most preferred strategy for data analysis is to follow the theoretical propositions that led to the case study. Such an approach aims at verifying, rejecting and/or developing existing theory. This study has followed an approach of relying on the theoretical propositions outlined in the literature study with the aim of developing existing theory.

As the interviews carried out in this study resulted in large amounts of unstructured data, it was necessary to examine, categorise and structure the data to be able to address the outlined research questions. The coding of data has followed the concept outlined by Eisenhardt (1989) and Miles and Huberman (1994), and is illustrated in figure 4.1. At first each transcribed text was reviewed. After this, a simple analysis sorted the statements given by the companies into, “A-categories” according to their relevance for answering research question one or two. This was an important step in the data analysis as it filtered out irrelevant information. All the A-categorised statements can be found in Appendix C. No in-depth single company analysis was conducted, as the goal of this study was not to interpret each company isolated, but to reach a higher level of abstraction concerning servitization in Norwegian manufacturing.

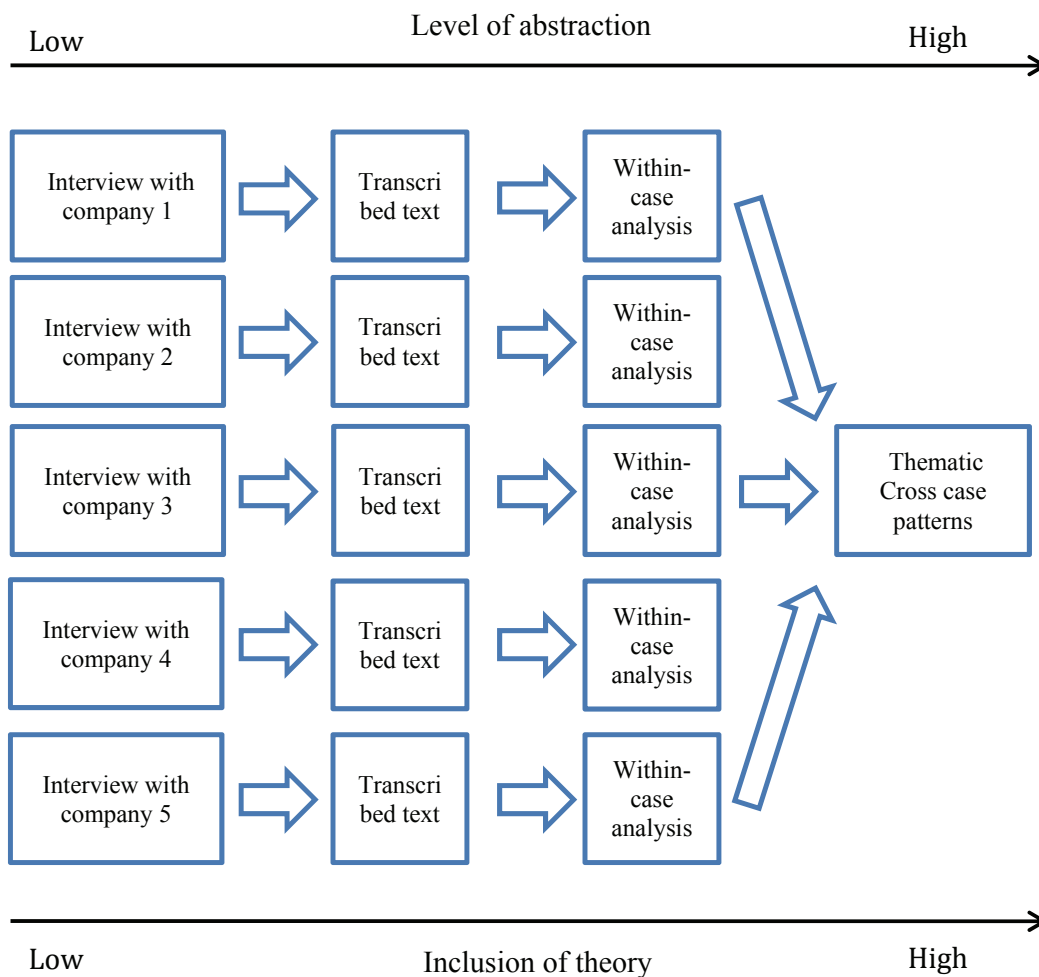


Figure 4.1 - Data analysis (Source: Widding 2003)

The next step of the analysing process was to bring the A-categorised statements to a higher level of abstraction in the search for within-group similarities and intergroup differences. The A-categorised statements from the each case were therefore organised according to main category for each research question. Based on the literature study, the main categories selected were, external, internal and customer. All statements within each main category were then further categorised under “B-categories” according to their interpretation (Appendix D). These B-categories will also be sorted into sub-categories in the discussion. Figure 4.2 shows the notation used for categorising the statements.

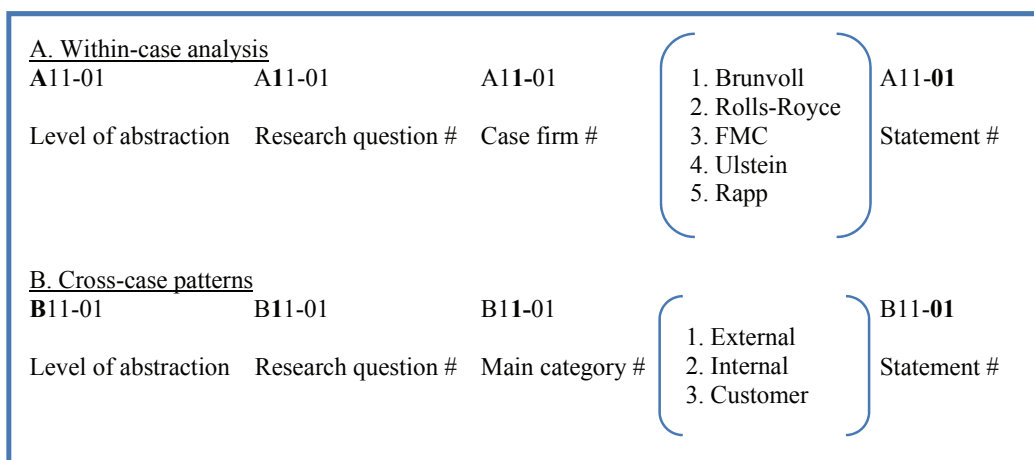


Figure 4.2 – Notation of A- and B-categories

### 4.3 Evaluation of methodology

The question of trustworthiness and credibility is an important issue that refers to the quality of a study (Yin 2009). Because of this, both the literature study and the empirical study will be evaluated in terms of reliability and validity. The literature and empirical study will be evaluated separately, but in the end a short total evaluation will be given.

#### 4.3.1 Reliability

Reliability is concerned with the question of whether the results of a study are repeatable or not. A study is reliable if the study gets the same results if repeated (Bryman 2008). Reliability is a problematic concept within social science research, because human actions are not static (Widding 2003).

#### **4.3.1.1 Literature study**

The reliability of the literature study is, arguably, at an acceptable level. Using the outlined search string and the databases ProQuest and ScienceDirect will as long as no new articles are added or old once retracted result in the same sample of articles. However, limiting the number of articles from 51 to 26 was done based on subjective preferences. Also, the process of coding each article is to some extent a subjective matter and cannot be perfectly reliable. The reliability of coding and selecting articles for this study is hence limited due to personal bias. More emphasis could have been placed on limiting personal bias by developing a clear strategy for evaluating which of the articles should be and not be included in the literary review.

#### **4.3.1.2 Empirical study**

Achieving reliability through the use of semi-structured interviews is challenging because each interview is unique. This difference can be because there are differences between interviewers in terms of the questions asked, the data collected and the way that the data is perceived. The interactive nature of the interview, the various biases and the limits that impact on human decision-making may be the cause of this.

During the interviews several factors of personal interaction may have influenced the data collection. When interviewing a representative of a company he or she may have had the incentives to talk about the business in a too positive way, which again may have resulted in a biased impression of the company. In the interview setting where personal communication is conducted, misunderstandings between the two parties may also have occurred. Only one interview was conducted with each company and for four out of the five case companies, only one person represented each company. The limited interview objects may have caused the researchers not to access all relevant information and to be presented with a biased view. The researchers may also have influenced the interview objects by asking leading questions and focusing on specific topics. This may, in turn, have affected the interview object into answering questions in a certain way.

To secure reliability of the empirical study several measures were taken. The interviews were conducted with CEOs or people with management positions. This was done in order to secure that the case company representatives were likely to possess the required information. Each interview object was also given a list of topics

prior to the interview so that they could prepare for it. An interview guide was created with an emphasis on open, non-leading questions. The researchers were also trained in the interview process and about how to reduce personal biases. This was done in order to secure that the researchers did not influence the interview objects into answering questions in a certain way. Both researchers were present at most of the interviews. This has reduced the possibility of misunderstandings or misinterpreting the data. Because much of the data is collected through interviews, it cannot be perfectly objective. But, through the systematic and comprehensive analysis of data using A- and B- categories, this source of error is reduced.

To secure an even higher reliability the researchers could have placed more emphasis on getting more than one interview object from each company. This would in a better way have secured that the researchers were presented with unbiased information.

#### **4.3.2 Validity**

Validity is concerned with the integrity of the conclusions that are generated from a piece of research. It is a measure of how the study actually answers what it intends to answer. External validity refers to the degree to which findings can be generalised across social settings, while internal validity raises the question of whether there is a good match between researchers' observations and the theoretical ideas they develop (Bryman 2008).

##### **4.3.2.1 Literature study**

The validity of the literature study is to some degree reduced due to the limited number of articles and the search strategy presented in this paper. Research in the area may have been lost due to the limited number of databases, keywords used and personal bias in the select articles. In addition, the external-validity of the resulting answers can only be as good as the literature reviewed. However, to ensure that the sample of empirical articles represents the most important and trustworthy contributions in the field, a cross-reference list evaluation was conducted. Baines, Lightfoot et al's (2009) presentation of the most important articles in the field was also checked. As all of these listed empirical articles are included in this review and a cross-reference list evaluation was conducted, the validity of the literature study is thought to be satisfying. Also, feedback from peers indicates that the face-validity is

good. Had the authors had more time and resources, more articles could have been included to further increase the validity.

#### **4.3.2.2 Empirical study**

The empirical study has included five case companies. Selecting more than five case companies could have resulted in richer data and a broader discussion. Hence, increasing the number of case companies could have enhanced the external validity. In the selection of case companies a possible error is that the case companies are not suited for the specific research questions. The data collected is then not useful in answering the research questions and it will be hard to derive results from it. A possible pitfall when conducting the interviews is also that the wrong questions could have been asked. Since a semi-structured interview was used, the interview objects were less exposed to guidance from the researchers. The result of this can have been that irrelevant information has been gathered while relevant information has been left out.

To secure validity of the empirical study several measures were taken. The number of case companies was chosen on the bases of theoretical saturation, and due to this the possibility of important findings being left out, was reduced. The potential case companies were investigated using the internet, consulting supervisor Øystein Moen and talking to the respective companies over the phone and on corporate days at NTNU. This has limited, but not eliminated the chance of the case companies being unsuitable. Scholars were also consulted in the planning of the interviews, in order to secure the quality on the research. To increase the extent to which the results match reality, triangulation was also used. The study has used a combination of personal interviews and gathering information from secondary sources. Both the use of multiple information sources and the use of multiple researchers have made it possible to crosscheck the findings and thereby increase the validity.

The generalisation of case studies is a problematic issue. This study may provide helpful guidance to other companies experiencing similar conditions, but because of many company specific factors involved, the results may not be transferable.

#### **4.3.3 Total evaluation**

Several measures were taken to correct factors that could influence the reliability and validity. However, some sources of error are still present as it was not possible to



fully eliminate them. It can be argued that the findings rely too much on the researcher's subjective views about what is important and what is not important. A perfect replication is not possible to make, as the procedures followed were neither standardised nor unbiased. Despite the weaknesses of the research design and the methods used, the trustworthiness and credibility of this study is considered satisfying.

## 5. Case descriptions

In this chapter, background information on the five case companies, Rolls–Royce Marine, Ulstein Group, Brunvoll, Rapp Marine and FMC Kongsberg Subsea will be presented. The information will provide the reader with contextual understanding of the case companies, before the empirical case findings are presented in chapter 6. The presentation of the case companies will be organised in the categories history, market and servitization. All the information given in this chapter is gathered in the interviews. Table 5.1 gives is an overview of key information from each case company.

Company	Brunvoll	Rolls –Royce Marine	FMC Technologies	Ulstein Group	Rapp Marine
<b>Industry</b>	Marine	Marine	Offshore Oil&Gas	Marine	Marine Oil&Gas
<b>Core Offerings</b>	Thrusters	Marine machinery, Ship design	Subsea solutions	Ship design	Fire Doors, Winches
<b>Main domestic location</b>	Molde	Ålesund	Kongsberg	Ulsteinvik	Bodø
<b>Established</b>	1912	1998	1974	1917	1907
<b>Employees (Global) (Norway)</b>	255 245	8500 3000	11000 1500	800 650	450 300
<b>Main domestic operations</b>	After-sales services, Manufacturing, Sales, R&D	After-sales Services, Product design, Sales	After sales service, Sales, System integration, R&D	Sales, Ship completion, Ship design	After sales-services, Product design, Sales, R&D
<b>Estimated installed base</b>	7 000	30 000	300	300	-
<b>Revenue (MNOK 2009)</b>	785	26 000	26 000	3 600	444
<b>Servitized elements in product offering</b>	After-sales services	After-sales services Collaborative product development, Product integration	After-sales services, Collaborative product development, Product integration	Collaborative product development, Consulting, Product integration	Collaborative product development, After-sales services

**Table 5.1 – Case companies overview (Source: Case interviews)**

## **5.1 Brunvoll**

### **5.1.1 History**

Andreas and Anders Brunvoll founded in 1912 what we today know as Brunvoll. In the beginning the company was located on the tip of the coast of Romsdal, namely Harøya. In 1918 the company moved to Molde and has been located there ever since. Until the mid-1960s the company developed and produced semi-diesel marine engines and twistable propellers for fishing vessels. In the 1960s Brunvoll experienced fierce competition on the diesel engines and when a customer requested a propeller that could maneuver ships to shore sideways, the company decided to change their area of business. In 1964 Brunvoll introduced an entirely new business concept and a brand new product – “thruster”. The company has since then delivered and installed over 7000 thrusters worldwide in fishing vessels, cruise ships, tugs, offshore support ships and vessels for dynamic positioning. Over the last years Brunvoll has developed a new series of thrusters with increased versatility, built on an integrated range of thruster product modules intended for heavy duty and designed for easy maintenance.

Brunvoll is today one of the world’s leading manufacturers of thruster systems, providing all that is needed to drive ships sideways. The company focuses on every aspect of the thruster system, from design and development to manufacturing. They produce innovative, high quality thrusters. Today the company produces between 250 and 300 thruster systems each year and 80 % of these are exported. As it is a privately owned company, it operates independently from other corporations. The Brunvoll family has a great affiliation to the town of Molde and does not want to move or outsource core parts of the production.

The company is a part of the world-class maritime cluster that has developed along Norway’s west coast. The maritime companies in this region work in close cooperation to produce solution packages where every component is designed for optimal integration in the final product.

### **5.1.2 Market**

The company has three to four main competitors that manufacture thruster systems for the same domestic and international market. In addition to these, they have many

small competitors that only deliver thruster systems to their own local customers. The companies delivering thruster systems are mainly based in industrialised countries, but unlike Brunvoll they have moved most of the manufacturing activities to low cost countries, and only kept the R&D activities at home.

Brunvoll's customers are ship owners of various ships, ranging from fishing vessels to large container ships. Although, the thruster systems are initially delivered to shipyards, ship owners must contact Brunvoll directly regarding their products. For most of Brunvoll's end customers the thruster system is very critical, implying that downtime costs are very high. Therefore they demand thrusters that are highly reliable.

### **5.1.3 Servitization**

Brunvoll has servitized by offering after-sales services. A 24/7-service assistance is ready to send service technicians anywhere in the world, should there be a demand for it. In addition, Brunvoll has kept all production in-house in Norway to ensure that their products hold the highest standard and because they believe that hands on experience is crucial for developing new and better thruster systems.

Brunvoll explains that they have expanded their offerings to include after-sales service because of the high margins on services and because customers have demanded it. The technological development has also contributed, by enabling them to monitor the equipment and made it easier to offer preventive services. Offering services has also helped develop closer ties to their customers.

## **5.2 Rolls-Royce Marine**

### **5.2.1 History**

Rolls-Royce Marine can trace its roots in the marine industry back to 1849. It all started when one of Sweden's first railways required a repair workshop; this workshop was the forerunner of Kamewa, the present Rolls-Royce Marine. In 1999 Rolls-Royce Marine acquired Vickers pls. Vickers had expanded its business in the period leading up to the purchase, acquiring Kamewa, a manufacturer of water jets and controlled pitch propellers, in 1996, Brown Brothers, steering gear and stabilisers manufacturer and The Ulstein Group, a major marine propulsion, shipbuilding and engineering company, in 1998. The time span from 1849 includes the development of

many ground breaking technologies, from the development of the controllable pitch propeller, tunnel thruster and nuclear propulsion for Royal Navy submarines - to marine aero-derivative gas turbines, water jets and innovative offshore vessel designs.

Rolls-Royce Marine as we know it was established in 1998. They have acquired a range of marine manufacturing companies and integrated them into one large marine company. This has made them a world leader in the development and manufacturing of ship design, marine equipment packages and system solutions for all types of marine vessels. Rolls-Royce Marine's equipment is today installed on over 30 000 vessels globally, and they have activities in 14 different locations in Norway. In addition, Rolls-Royce Marine has branches in Sweden, Finland, Poland, England, China and Korea, as well as sales and service offices in 29 countries.

### **5.2.2 Market**

The market for marine equipment is gradually being commoditised as manufacturers in industrialising countries are entering the market. Magnar Førdes, Senior Vice President of Innovation at Rolls-Royce, argues that the local competition has always been fierce as there is a long tradition for marine industries in their region. Today their biggest competitors come from developed countries, as companies from developing countries are not yet able to offer similar offerings. Wärtsilä and STX are their biggest competitors as they are offering similar solutions and have manufacturing facilities situated more or less at the same locations as Rolls-Royce Marine. They also have smaller local competitors such as Ulstein Group and Brunvoll, but these companies produce only parts of what Rolls-Royce Marine deliver.

Rolls Royce Marine's customers are mainly ship owners that operate with big fleets. Their customers are mainly situated in Europe, but come also from the US, Brazil and Singapore. They tend to use ships in offshore operations for the oil and fishing industry. Their customers have high variable costs when being out on the sea, hence, safety and reliability is highly valued. Due to the high variable cost and big fleets, the ship owners have traditionally retained a lot of product know-how and kept spare equipment and maintenance staff, in-house.

### 5.2.3 Servitization

Fierce competition from domestic and foreign companies have made it hard to differentiate individual products. Rolls-Royce Marine today offer; ship design, solution packages, long-term service agreements, through life support, support for discontinued products, as well as training from locations in 34 countries.

The two main reasons for Rolls-Royce Marine's servitization are the ability to differentiate their offerings and to focus on business areas where they have their strengths, such as customer relationships, credibility, system knowledge and R&D. As Rolls-Royce Marine cannot compete in terms of production cost against low cost manufacturers, their focuses on solutions have become more and more important. A big installed-base-to-new-unit ratio has made it attractive for them to expand their after-sales service offerings, but the tradition for keeping maintenance staff in-house among their customers, have been a hinder for servitization.

## 5.3 FMC Kongsberg Subsea

### 5.3.1 History

Following the oil discovery on the Norwegian shelf in the 1970's, the precursor of FMC Kongsberg Subsea, Kongsberg Oil was founded by Kongsberg Våpenfabrikk. The Norwegian government hoping to launch an offshore industry strongly supported the establishment. In the early years, Kongsberg Oil was given the role as a contractor despite its early efforts to become a manufacturer. This meant that Kongsberg Oil had to rely on other subsea suppliers for parts and were only to manufacture minor parts to the final installation. In the early 1980's Kongsberg Oil introduced EPC (Engineering Production and Construction) contracts and shifted the subsea supplier industry from being suppliers of parts to becoming providers of solutions. This combined with the drop in oil prices in the mid 1980's increased the interest for subsea systems, rather than gravity platforms that had long dominated the oil industry (Bjørnstad 2009). In 1986 Kongsberg Oil became Kongsberg Offshore, and in 1987 it was sold to Siemens. As a result of a tighter relationship with its supplier FMC Technologies, FMC Technologies bought Kongsberg Offshore from Siemens in 1993 as a step in offering complete subsea solutions to its customers. Since then, Kongsberg Offshore has been renamed to FMC Kongsberg Subsea and been the main subsea branch of FMC

Technologies. It has grown rapidly and become a market leader in the field of total subsea solutions.

### **5.3.2 Market**

Today, FMC Kongsberg Subsea is not only a provider of subsea solutions to the Norwegian shelf but also a major exporter. The company's main worldwide competitors are General Electric's VetcoGray, Dril-Quip, Camron and Aker Solutions offering either EPC contracts or subsea products. FMC Kongsberg Subsea were the first to introduce EPC contracts and that has arguably played a major role in becoming the market leader. Camron whom historically has been the main supplier of subsea products, has lost ground much due to their product-oriented focus. All the competitors are based in high-cost countries and resemble a fairly similar cost structure.

Their customers are oil companies owning and operating oil fields. Traditionally these companies have been fairly risk averse and stressing reliability. Hence, they are served with all the systems, equipment and installation needed on the seabed surface for oil extraction and underwater processing. In the past 10-15 years the offshore oil industry has been moving deeper and deeper under water and caused a surge in demand for subsea installation. Given the past few years' absence of new oil field discovery the main market is now to increase oil extraction from existing fields. In the years to come the large installed base of subsea installations will be in need of services and maintenance. "We have already seen this sort of demand on our oldest installations" says Odd Gynter Olsen, Head of Aftermarket Business Development at FMC Kongsberg Subsea.

### **5.3.3 Servitization**

It can be argued that FMC Kongsberg Subsea has been servitized from the beginning in the early 1970's. Its role as a contractor slowly changed towards manufacturing control systems, manifolds and subsea trees as well as integrating this with other supplied parts needed for the complete subsea system. While some subsea systems are standardised, most of them are customised. In addition, FMC Kongsberg Subsea has started moving downstream by offering maintenance and support services to its installed base. This includes reparation and system diagnostics. Due to the extensive cost of bringing an installed system to the surface this operation needs to be done by

customers. For the same reason FMC Kongsberg Subsea cannot offer full maintenance responsibility.

FMC Kongsberg Subsea's servitization has mainly been customer driven. Implying that they have changed in order to fulfil the need of their customers. Putting customers first has helped them forming today's business model and made them successful. The EPC contract is an example of responding to customer needs in order to reduce transaction cost and risk. This also made it possible for FMC Kongsberg Subsea to utilise their expertise in integrating systems. Odd Gynter Olsen argues that by letting customers specialise in their field operations and not having to integrate subsea products, FMC Kongsberg Subsea can create win-win situations, which is the only recipe for a prosperous relationship. FMC Kongsberg Subsea's aftermarket has also mainly been driven by the customers need for maintenance and support, as it seems natural to offer after-sales services with their products. They are fully aware of the possibility of charging a higher price for after sales services but argue that they must be careful in exploiting their customers.

## **5.4 The Ulstein Group**

### **5.4.1 History**

Back in 1917, Martin Ulstein founded Ulstein Mekaniske Verksteder. The company concentrated on modifying local fishing vessels from being sail based to becoming motorised. In the years to come UMV expanded gradually into shipbuilding, ship design and ship equipment manufacturing. In 1992, after 75 years of operation the company had astonishing 2800 employees where about one third were engaged with construction and repair of ships, and the rest with manufacturing of all sorts of ship equipment.

In 1997, The Ulstein group was listed on the stock exchange. A year later, Vickers, a British industrial company, acquired The Ulstein Group, and then only a couple of months later Rolls-Royce acquired Vickers. Originally, Vickers was not interested in Ulsteins shipbuilding division, including the shipyard, therefore they offered to sell this back to the Ulstein family. Idar Ulstein, one of the six children of Martin Ulstein, seized this opportunity and bought back this shipbuilding division, which at the time employed about 900 workers. Starting up the new Ulstein Group, he foresaw the



increasing shipbuilding competition from low cost countries. He therefore decided to downsize the company to about 600 workers and to specialise on building smaller vessels that very technically advanced. This was the start of the company we today know as the Ulstein Group.

#### **5.4.2 Market**

Shipyards in East Asia largely dominate the shipbuilding industry for standardised and mainstream ships. Countries like China and Korea are expanding their shipbuilding capacity every year and build relatively standardised ships on a large scale. Shipyards in high-cost countries like Norway cannot compete with these shipyards on production costs, therefore these shipbuilders are focusing on advanced offshore vessels and ship design. Hence, shipyards like Ulstein have differentiated their offerings from foreign low-cost shipyards, but are still competing more or less directly against each other. Such regional shipyards are Rolls-Royce Marine, STX Europe, Havyard and Wärtsilä.

Ulstein's customers are mainly ship-owners that deliver offshore services for the offshore oil industry. They perform a wide range of complex services such as seismic activities, operate underwater vehicles and supply platforms. These customers are subject to strict safety regulations and therefore demand reliable ships from Ulstein. Other customers are shipyards buying the design and engineering tasks from Ulstein. The domestic market is a clear driver for Ulstein, and they have a long history with local ship-owners.

Areas with similar offshore conditions as in Norway are potential markets, but historically, due to protectionism, markets like Brazil and USA have been hard to enter.

#### **5.4.3 Servitization**

After the sale of the original Ulstein Group, the new Ulstein Group was not allowed to sell ship design or expertise until 2004. Today, these upstream services are some of the main business areas of the Ulstein Group. The Ulstein Group has specialised in offering design, engineering and completion of ships, for ship-owners with very specific and complex needs. In order to best capture the needs of their customers they have recently opened a new division to assist ship-owners in specifying their needs prior to ordering a new ship. To best utilise the expertise, the Ulstein Group also

offers to install appropriate equipment packages, in order to deliver a turnkey ship to their customers. This means that the Ulstein Group, despite seldom building the hull, can offer turnkey ships to their customers. Ships demanded by the Ulstein Group tend to be unique and very reliable as they operate in the offshore industry.

Upstream margins as well as the Ulstein Group's ability to find new innovative solutions have motivated the Ulstein Group's solution oriented focus. Global competition has eroded the production margins, but designing ships is still a high margin activity. The Ulstein Group has had a long-term strategy and invested much effort in positioning themselves for the future. By offering upstream activities for the offshore industry the Ulstein Group has been able to differentiate themselves from global competition and to utilise their comparative strengths.

## **5.5 Rapp Marine**

### **5.5.1 History**

Rapp Marine was established in the city of Bodø in 1907. In the beginning they manufactured engines for fishing boats, but soon added heavy-duty winches to their production. In 1979, the company was on the verge of bankruptcy, but local investors caught the eye of Rapp Marine's winch technology and decided to buy the company. Until the inclusion of Bomek in 1982, Rapp Marine produced a wide range of boat deck equipment for small fishing vessels as well as heavy-duty winches. After that, Rapp Marine has added fire and safety doors to their range of offerings. Rapp Bomek has since mainly delivered high quality, gas proof, fire doors to the offshore oil industry. Until recently, there have been little or no synergies between these two businesses areas. However, after discovering the potential of their winches to match the requirements of the offshore oil industry, synergies such as shared customers and regulatory knowledge, has been exploited.

Today, The Rapp Marine Group is organised as several daughter companies under the holding company Rapp Marine. Hydema and Bomek are the main Norwegian branches, and the foreign daughter companies are sorted under these. Hydema can be regarded as the traditional branch, mainly delivering winches and winch systems, but also certain deck equipment for smaller fishing vessels. Rapp Bomek is the fire door

branch, delivering doors to both onshore and offshore customers. Rapp Marine Group have in total 450 employees worldwide.

### **5.5.2 Market**

The offshore oil industry is a highly risk averse industry. The industry, especially on the Norwegian shelf is dominated by strict regulations and companies are given incentives to invest in safety and preparedness for their operations. The authorities have regulations for both installations and yearly supervision. For Bomek, this means a large service market and protection from competitors based in low cost countries that cannot supply the same mean of safety as they can. Bomek has some direct competitors based elsewhere in Europe, but they have won market share in the offshore industry thanks to their customer relationships.

Hydema operates in a market that is very competitive, populated with foreign and domestic manufacturers. In the offshore oil industry, winches are used to descend ROV's (Remotely controlled vehicles) down to seabed surfaces as deep as 3000 meters. Due to the enormous variable costs that would occur if a winch stopped working during such offshore operations, these offshore customers highly value reliability. Therefore, Rapp Hydema, who cannot compete on production cost, has tried to differentiate their offerings by selling customised equipment with a high quality that reduces customer's operational risk.

In contrast to other domestic based competitors, Hydema's location excludes them from other marine clusters in Norway. While many of the other domestic boat equipment producers provide integrated equipment packages in cooperation with other suppliers, Rapp Hydema is unable to do so. This has motivated Hydema to internationalise and market their products globally. Today, they export about 70 % of their domestic production.

### **5.5.3 Servitization**

The heavy burden of safety regulations and the risk averse customers in the offshore oil industry have driven Bomek towards both upstream and downstream servitization. Rather than just producing fire doors, Bomek offers tailored fire doors to match certain regulatory requirements. In some cases Bomek has even developed the industry safety standard themselves. When selling such doors, Bomek also offers licensed service packages that meet the requirements given by the authorities. This

gives their customers the chance to buy a complete solution of fire doors that matches the national safety regulation.

Bomek's development towards fire door solutions has mostly been driven by the regulatory requirements and customers demand. They have responded fast to new demand by relying on their employee's abilities to decide what is best for the business. Both the upstream and downstream servitization in Bomek is part of many small decisions, without any parented long-term strategic thinking.

Hydema offers a 24/7 after sales service on their fishing boat equipment. This means that they have a standby service centre, providing responsive repair and maintenance services for fishing boats. The same service centre is also open for winch customers, supplying parts and tech support, but as Rapp winches have proven very reliable, this has not yet been a focus area

Hydema has, and still has a product oriented focus. The employees take great pride in their products, and have kept the production stage to Bodø, despite their clear cost disadvantage. Hydema has, as Bomek, relied on individual decision-making and lacked a parented long-term strategy. They have been responsive to customers demand and new requirements without emphasising on their long-term market position.

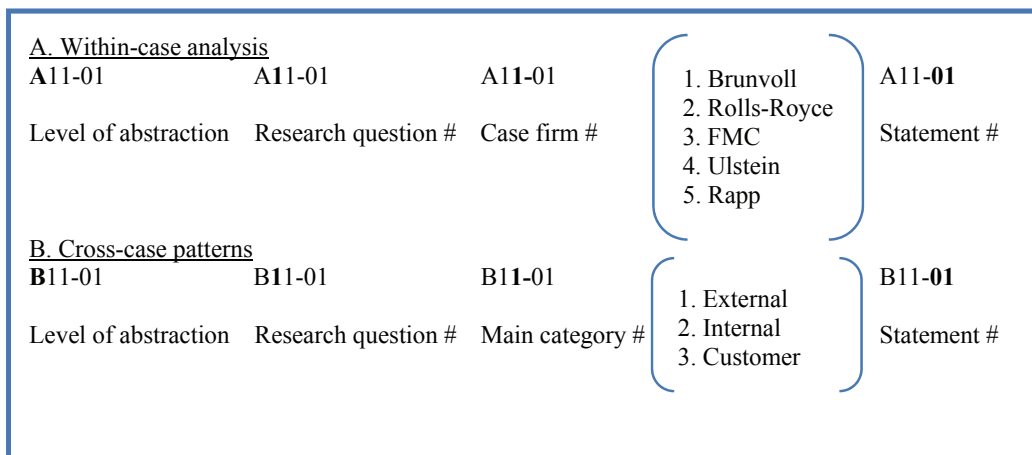
## 6. Discussion

This chapter will present the findings from the case studies and discuss them in relation to relevant theory. The objective of this discussion is to address the outlined research questions.

### 6.1 Structure of discussion

As described in chapter 4, all of the relevant statements from each case interview were grouped into A-categories. In the search for cross case patterns, all of the A-categories were further organised into B-categories. As the B-categories were created according to the same framework as the literature study, there is a transparent relationship between them. In the literature discussion, servitization literature was reviewed and discussed in relation to the theoretical background. Based on this discussion several propositions were formed. These propositions will be used as basis for the following discussion. The servitization literature, theoretical background and the proposed propositions, will be regarded as theory in this chapter.

The case companies will be presented by one name only. Rolls-Royce Marine will be referred to as Rolls-Royce, FMC Kongsberg Subsea as FMC, the Ulstein Group as Ulstein, Rapp Marine as Rapp and Brunvoll as Brunvoll. As described in chapter 4, a specific notation for the categorisation of the statements has been used (figure 4.2).



**Figure 4.2 – Notation of A- and B-categories**

In the following discussion, all B-categories will be clustered into sub-categories. All of these sub-categories will be sorted together with belonging theory into main-categories. In each of the main-categories the related proposition(s) will be presented

initially, and evaluated against the case findings in the end. The two research questions will first be discussed separately, before they are discussed collectively in a cross-sectional discussion at the end.

## 6.2 Why servitization is an attractive strategy for Norwegian manufacturers

### 6.2.1 External

From the theory, one proposition concerning the external category was proposed. P1: *Servitization is attractive for manufactures that want to differentiate their offerings and not compete on production costs.*

#### 6.2.1.1 Case findings

##### 6.2.1.1.1 Manufacturing cost

###### **B11-01: It is hard to compete on production cost because of the increasing competition and the high labour cost in Norway**

A12-01 Companies that do not have any R&D costs push the prices down and makes it impossible to compete on production cost.

A12-02 To survive we have to sell integrated solutions, because on single parts we are the most expensive provider.

A12-04 Hard competition from the domestic and international market makes it essential for us to compete on innovation and service.

A12-15 If we did not have the fierce pressure from local and international competitors, the journey towards integrated solutions would have gone much slower.

A14-01 Given our and the country's economic circumstances it seems to be the correct option to move away from labour intensive work.

A14-09 What we don't like is mass production and standardisation. We cannot compete against Chinese mass production.

A14-10 The u-curve relationship is a known fact in our industry. The production stage is highly labour intensive and very competitive.

A15-01 Given our and the countries labour costs it seems vital to move away from standardised tasks that are labour intensive. After-sales service is one of the answers to this situation.

A15-09 What we don't like is mass production and standardisation. Then we cannot compete. So far we have only started taking the easy way out. Outsourcing.

A14-26 Despite being one of the world's greatest ship builders, taking the cost in to the equation, we did not have a competitive advantage in building ships.

A21-25 We can compete on production cost because we are good at automation.

###### **B11-02: Many manufacturing goods are hard to differentiate as they are being commoditised**

A12-03 It is today hard to differentiate our products.

A12-05 There is more and more commoditisation in our industry.

A12-09 The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.

A12-15 If we did not have the firs pressure from local and international competitors, the journey towards integrated solutions would have gone much slower.

A14-42 The constant growth on the supply side makes the production stage an unprofitable business.

###### **B11-03: The margins on solutions and services are generally higher than on products**

A12-07 The higher margins on service has definitely made it attractive for us to focus on service and we often "give away" products just so that we can make money of the aftermarket.

A12-09 The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.

A12-10 Service is always good business, it has given us good margins and profit.  
A11-06 It is generally higher margins on services than on products.  
A14-11 The u-curve partly explains why we are putting our emphasis on upstream activities. The margins are high enough to justify our high labour cost.  
A14-12 We recon the high margins downstream, but unfortunately we are not in a position to exploit those margins.  
A13-07 Generally speaking, we can charge more mark-ups in the aftermarket (time monopoly). But there are also excessive risks involved. Reputation also hinders larger mark-ups.  
A13-09 We do believe in the u-curve for our business, and the industry in general. We are earning money, but it is not goldmine.  
A15-04 We believe in the u-curve relationship between margins and value chain position, and it forces us away from standardised domestic production.

**B11-04: Customers are less price-sensitive, but companies should be careful in exploiting this**  
A22-05 Even though our customers are not price sensitive on services due to their high variable costs, it is important not to charge a too high price so that they feel tricked.  
A11-10 Customers are not price sensitive when it comes to service and spare parts.  
A23-46 We do have the possibility to extract larger profits for some while buy charging a lot more for services, but this would backfire on us in the long run.

The case companies share the opinion that the high labour cost in Norway is driving manufacturing away from the low skilled, labour intensive stages of production. All case companies besides FMC state that they are competing against companies with lower production cost. As Per Ivar Roald, from Ulstein puts it: “Given our and the country’s economic circumstances, it seems to be the correct option to move away from labour intensive work”. According to him, local economic circumstances and the constant growth on the supply side, causing commoditisation, are the main drivers of their servitization.

Rolls-Royce shares the view that the high labour cost is a key driver, but underlines that this is not the only reason for the differences in cost structure between companies. They state that many of the foreign manufacturers, unlike them, do not have costly R&D departments that must be included in the cost estimates.

All the case companies all the margins on upstream and downstream activities of manufacturing to be higher. As a consequence they are all interested in positioning themselves into a market where the price level is still high enough to justify their cost level. For Rolls-Royce and Ulstein this has been the key driver for servitization. Rolls-Royce also makes it clear that they are turning their focus to both up and downstream activities for extracting profits, and that the production stage itself is not something they are capable of earning profits on. The lower price sensitivity on service offerings also justifies selling products at “give away” prices to extract profits

from the service add-ons. However, they add that they must be careful not to misuse this market power.

#### 6.2.1.1.2 Differentiation

##### **B11-05: Servitization offers new possibilities to differentiate offerings**

A12-04 Hard competition from the domestic and international market makes it essential for us to compete on innovation and service.

A12-14 One of the main advantages with offering integrated solutions and service is the ability to differentiate and compete on something else than price.

A14-04 Globally services and design have help us position ourselves away from foreign competitors.

A14-05 On a local/domestic scale we have to push ourselves to the limits to handle the competition. Locally we have some direct competitors.

A14-06 Focusing on design and high-end solutions differentiated us from others. At least for some time.

A15-11 Safety regulations and other external factors have formed our business very much and differentiated us from our global competitors.

A23-38 We have still not seen what you refer to as the service paradox. Maybe because we really covered a good spot in the market.

##### **B11-06: Servitized offerings are harder to imitate**

A14-40 Our low cost competitors can manufacture products, but they cannot copy our innovative capabilities in design.

A13-06 The investment and recruitment needed to copy our competitive advantage in knowledge is very large compared to the scale of revenues, hence it works as an entry barrier.

A14-39 Our ability to think innovative cannot be copied; hence we are better protected against copycats, doing what we do now.

##### **B11-07: Servitization offers manufacturing companies a new market and growth opportunities**

A13-10 The demand for new installations is currently large and arguably at its peak. But the demand is falling and will continue to fall. This makes our aftermarket our future market.

A23-39 In the future we are forecast that the aftermarket will grow larger.

A23-40 Our direct competitors are also shifting towards services. This is now surprise, as customers now know what they want.

A23-43 Also, the sale and production of new installations will come to its natural end. We are now well positioned for the aftermarket.

A23-44 We have not yet determined what to do when all production of new installations stops. But the aftermarket is one opportunity. At least in the short run.

##### **B11-08: By offering services and complete solutions it is possible to lock-in customers**

A11-09 When offering services it is much easier to lock-in customers.

A12-19 Our customers don't like it, but with offering integrated solutions, learning centres, as well as services, we are able to lock in our customers.

##### **B11-09: Companies can lock in customers by strategically selling products at give-away prices**

A22-21 We often "give away" the product so that we will get the aftermarket.

A21-08 We sometimes give away the product just so that we can get the aftermarket.

A25-28 From time to time we sell seek to sell strategic products in order to capture a potential long-term customer for both new products and services. Or even to brand our self to a third party customer.

According to all five case companies, servitization has widened the business scope and increased the possibility to differentiate their offerings. In turn this has made it possible to find a market position that is less exposed to competition and more aligned with their capabilities and resources. As a result of this wider scope of business, both FMC and Ulstein point out that their offerings have become harder to imitated, stating



that other may copy their products, but that copying a solution or a service is much more difficult.

FMC also emphasises that the aftermarket is an obvious market for future growth, and that it is not unlikely that this will be their key market someday. They are also highly aware of their opportunity to extract high profits from their installed base as they have, what they regard as, a monopoly when it comes to offering maintenance services to their subsea solutions. Although this lock-in effect can be highly profitable they remark that they should be very careful in exploiting this power, as it could backfire on their reputation in the long run. Brunvoll and Rolls-Royce also express awareness of a lock-in effect. They both emphasise how customers buying products from them are locked into buying their after-sales services, while Rolls-Royce also express that they can lock-in customers by offering them training related to the usage of their products.

#### 6.2.1.1.3 Technology

<p><b>B11-10: New technology has made it possible to offer more efficient services and solutions</b> A12-08 New technology of monitoring our products has made it possible for us to reduce the variable cost of our customers. A11-02 The technology has made it possible to offer service in a new way. A11-05 Condition monitoring has opened the door to a new way of offering service.</p> <p><b>B11-11: Increasing product complexity creates new demand for service offerings</b> A12-12 The technology is becoming so advanced, so there is a new demand for training of our customers' personnel. A11-03 The technology is developing rapidly.</p> <p><b>B11-12: Low customer product competence increases the attractiveness of servitization</b> A12-24 Solution packages work in the airplane industry and not for us because of the strict regulations and the demands for capital investments, take for example Norwegian, they are a small organisation that need someone with the right competence to maintain their plains (The marine industry is 20 years behind). A15-40 Our Bomek customers cannot do perform the services themselves, as they need to be certified.</p>
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Rolls-Royce emphasise that also technology has been a driving force of servitization. As products become more and more technologically advanced, the maintenance personnel need more and more competence. They argue that this makes their customers dependent on them for services and installations. How dependent customers are on their suppliers, depends on the customer and on the industry. Although their customers traditionally have kept maintenance tasks in-house, the technological development is making it harder for them to keep doing so.

Brunvoll shares the view of technology as a driver of servitization by underlining how new technology, especially information technology, has made it possible to monitor equipment usage in a new way. Logging and monitoring product usage makes them able to perform preventive rather than reactive services, which means saving their customers for very costly downtime.

#### 6.2.1.1.4 Cluster

**B11-13: Being part of a cluster makes servitization more feasible and attractive**  
A15-15 Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions.  
A22-55 Being part of a cluster is really important with a servitized business model.  
A25-18 We cannot change (“servitize”) alone. The whole chain around us must be alone. We are not big enough to do it, and we lack overview to exploit it.  
A25-21 Not being part of a business cluster is a clear weakness that makes us unable to offer complete solutions. Having suppliers and partners in a cluster is critical to offer this.  
A22-36 The culture and environment in Sunnmøre has helped us become the company we are today (Culture).  
A22-39 The cluster, local customers and banks have been essential for us to develop into a solution provider, we have relied on these actors to take some of the risk.  
A22-20 To solve our problem with lack of qualified engineers we could move to other countries, but the problem is that they do not have the culture as we have here, we need the culture and cluster. We cannot live isolated.

According to Rolls-Royce, their position in the marine cluster on Sunnmøre is an important facilitator for tight relationships between suppliers, customers and competitors. For Rolls-Royce, the close relationship between suppliers, investors and banks has proven essential for developing complete solutions. Rapp, which is not part of a cluster, underlines that they lack the ability to take part in the development of integrated solutions because of their exclusion from the cluster. According to them, not being part of a cluster, limits their servitization.

#### 6.2.1.2 Discussion

Generally, the case findings seem to coincide with theory regarding how the external factors rationalise servitization. However, the case companies have indeed provided some valuable new insight to theory on external factors that make servitization an attractive strategy for Norwegian manufacturers.

Theory and case finding coincide on the high manufacturing cost as a driving force for servitization among Norwegian manufacturers. The labour cost in Norway, especially for low and medium skilled labour are pushing manufacturers to find new ways of justifying their high cost levels. The case companies and the theory both

agree that margins are higher in up- and downstream stages of production, rationalising the focus on the upstream and downstream activities of manufacturing. The latter findings also act in accordance with Slepnirov, Waehrens et al.'s (2010) study among Danish servitizing manufacturers.

To protect their businesses the companies try their best to offer something that is differentiated from what other companies offer. Especially, from what low cost manufactures can and do offer. All the case companies have used servitization as a strategy to differentiate their offerings. Even though servitization seems valid for many Norwegian manufactures, it should be noticed that it is not only a strategy for differentiating offerings away from global manufacturers. The wider business scope increases the number of variables to differentiate offerings on. This implies that the potential to differentiate from local manufacturers also increases with servitization.

The case findings have also added some new insight beyond theory. The role of technology as a driver for servitization is further underlined from the case findings. It is indicated that technology both creates new demand for services and complete solutions, and makes it possible to provide after-sales services efficiently. The former argument has been shown to depend on the customer's tradition for keeping service competence in-house, but the technological development is pushing customers towards buying services and solution packages.

Additionally, the case findings highlight the importance of being part of a cluster when servitizing. The tight relationship with local investors, suppliers and customers is argued to facilitate a holistic pursuit for better solutions. Hence, clusters as arguably an important catalyst for value creation obtained through servitization. Considering that there are many industry clusters scattered around in Norway, this should support servitization as an attractive strategy for Norwegian manufactures.

All the case companies regard the external factors as given and unchangeable. But interestingly, they differ in how they emphasise on the external circumstances. The companies putting most emphasis on the external circumstances when rationalising their strategy are also the companies that give the impression of having a well-established servitization strategy. The interpretation of this is far from unambiguous,

but it can imply that companies weighting the external circumstances, are more inclined to servitize.

## 6.2.2 Internal

From the theory, one proposition concerning the internal category was proposed.

P2: *Servitization is a more attractive strategy if it can utilise a manufacturer's existing comparative advantages to form a competitive advantage.*

### 6.2.2.1 Case findings

#### 6.2.2.1.1 Comparative advantage in capabilities

##### **B12-01: Servitization facilitates low scale and competence intensive offerings**

A11-19 We produce in small series and customise to fit the customer.

A15-02 Our competitive advantage is to deliver high quality and tailor made equipment and tailor made equipment for fishing vessels (Hydema). This drives us towards after-sales services and solution orientation.

A15-06 Service requires high competent people and hence it justifies our high cost and high competent people.

A15-24 To make customer specified products does not differentiate us from other competitors (Bomek), but makes us able to utilise our competence.

A13-17 The customer relationship depends on each customer. This is because we make specific solutions.

A14-14 We want to be where you have to be innovative to do well. Design and solution focus is helping us get there.

A15-01 Given our and the countries labour costs it seems vital to move away from standardised tasks that are labour intensive. After-sales service is one of the answers to this situation.

A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

##### **B12-02: By servitizing companies can better utilise their comparative advantages in customer relation and innovative capabilities**

A14-08 We like big waves and big challenges. This makes room for innovative solutions.

A14-14 We want to be where you have to be innovative to do well. Design and solution focus is helping us get there.

A15-02 Our competitive advantage is to deliver high quality and tailor made equipment and tailor made equipment for fishing vessels (Hydema). This drives us towards after-sales services and solution orientation.

A15-06 Service requires high competent people and hence it justifies our high cost and high competent people.

A15-07 We have the potential for getting competitive high competent people but not competitive production workers.

A15-24 To make customer specified products does not differentiate us from other competitors (Bomek), but makes us able to utilise our competence.

A13-22 By utilising our competence through our service oriented business model, we can take more responsibility and create win- win solutions.

A25-08 Service need high competence and produce high income, hence we can justify hiring expensive Norwegian resources.

A14-16 Focusing on solution through design is our chance for survival.

A14-02 Our comparative advantage is our ability to find new solutions and customer relation.

A14-41 Our informal organisation makes is an innovative strength relative to low cost production countries.

A13-26 Our company culture was rather a driving force then a showstopper for realising the aftermarket potential.

A14-27 We focus on the upstream market, not because that is what we do best, but because that is what we do best compared to others.

A13-33 Our capabilities together with customer demand, the main drivers for offering aftermarket services and EPC contracts.

A13-47 Having a home market and a close relationship to our customers have been an important factor for developing advanced subsea solutions.

**B12-03: An informal culture and short communication lines make servitization attractive**

A11-18 Our comparative advantage is the lack of corporate layers and lean and flexible organisation.

A11-24 The small size of the company makes the communication lines shorter and makes it easier to offer a good service function.

A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

Ulstein, FMC and Rapp state that their comparative capabilities are to find innovative and customer oriented solutions. Despite the high labour cost in Norway, they argue that high skilled labour is still competitive, especially in tasks that require finding new innovative solutions. This combined with the high labour cost of semi-skilled labour, has motivated them to focus on more competence intensive offerings. All the case companies are becoming more high-skilled labour intensive, but they differ in their strategies to do so.

High-competent labour is not the only comparative advantage pointed out. Ulstein state that their tradition of having an informal culture creates an innovative environment that facilitates innovation. FMC focuses on their relation to customers and the importance of having a home market. According to them, companies can use servitization to protect their domestic market from foreign competitors. In their case, the presence of the home market has been a vast argument for intensifying customer relationships through servitization.

As all the companies have increased their business scope towards solution, and they confirm that servitization provides a better match between their comparative capabilities and their offerings. FMC, Rapp, Rolls-Royce and Ulstein have all engaged in a solution oriented focus, and convey that this has been partly because it utilises their strengths better than traditional manufacturing. Ulstein and Rolls-Royce argue that by focusing on design they have to be more innovative and increase customer contact, hence, making use of their comparative advantages. FMC add that their solution focus is much more competence intensive, while Rapp underlines that offering services requires high-competence people and that this justifies the high labour costs. Even though only some of the case companies have introduced after-

sales services, all of them comment that this is an appropriate strategy, given the capabilities of Norwegian manufacturing.

#### 6.2.2.1.2 Comparative advantage in resources

##### **B12-04: Having a large (and aging) installed-base-to-new-units ratio increases the attractiveness of downstream servitization**

A11-01 When the IB increased, we increased the service function (IB = 7000).

A14-15 Our installed base is rather irrelevant as we are not interested in the aftermarket. The only thing we can offer here is the retrofitting.

A14-38 All the support functions and new units are part of the emphasis on solutions and design. To be able to profit from design, we need to reach a certain scale.

A12-06 A big IB has made it possible to expand our service offering (30 000 +).

A15-28 Having a long history with customers and a large installed base makes it easier to sell after sales services.

A13-34 Our installed base is partly locked-in in to our business. So increasing our IB is a good move for the future aftermarket.

A13-12 The large installed base combined with falling demand and aging installations makes the aftermarket potential huge.

##### **B12-05: Manufacturer's extensive product know-how makes them favourable to offer product related services.**

A11-20 We know our products better than any other and are hence the best suited to offer services.

A11-21 Since we have our own production we are competent to offer services (learning effect).

A11-22 We can quickly produce parts that our customers need and are hence the best to offer services to our customers.

A14-30 Still, after shifting upstream in the value chain, we find it very useful to have production stage experience.

A12-31 We have the documentation, detailed knowledge, history, spare parts and we know the production. We are the best at offering service to our products.

A15-23 We have an advantage in delivering after-sales services because we make the doors and hence can fix them as well (Bomek).

A15-30 Production facility is very important for the product development process. It also helps a great lot having hands on experience. This is another advantage we have in offering services.

A13-23 Our main competitive advantages are systems knowledge, testing and quality capability as well as reputation and customers. This makes servitization attractive.

##### **B12-06: Servitization can dilute the core competence in the short term**

A14-37 Diluting our competitive advantage in ship building was an issue, but we regarded this more as a minor short term hinder, not at showstopper.

A13-29 With limited human competent resources there is always a risk of diluting core competence.

A14-32 We knew it would be a tough process shifting our business more upstream. But, we were sure it would make sense in the long term.

Brunvoll, FMC, Rapp and Rolls-Royce whom all have introduced at after-sales services, convey that their installed base is a big rationale for them to do so. Rapp points out that the installed base in fact includes several rationales. Not only does it create a protected market, it is also a big reference base and a starting point for retaining customer relations. Furthermore Rapp argues that being a manufacturer adds creditability to their service offerings, and unconsciously makes them the preferred service provider among their product customers.

Product and customer know-how is also pointed out to make servitization attractive for the case companies. Ulstein underlines this by arguing that their hands on experience of building ships has provided them with vital knowledge to the upstream stages such as design and engineering. Rapp and Brunvoll add that hands on experience of manufacturing are also advantageous when offering after sales services. They even state that keeping some production in house is beneficial just to retain it as a learning arena.

According to FMC, their main resource advantages are today, system knowledge, reputation, and relation to customer. All these provide them with rationales for upstream servitization, because system solutions are more knowledge intensive and require a tighter collaboration with customer. However, FMC also express a danger of expanding their business scope with limited resources. They argue that, without sufficient resources, there is a risk of diluting core competence.

Although it can be argued that manufacturers should keep doing what they do, if they have a competitive advantage, Ulstein argue that the comparative advantages in resources and capabilities should be weighted the most. They started focusing on upstream activities in a time when they were among the best ship manufactures in the world. Even though they had a competitive advantage in building ships at the time, they chose to gradually servitize. This was done because it was believed to be better aligned with the company's relative strengths, and hence would provide them with a more sustainable competitive advantage.

#### **6.2.2.2 Discussion**

In compliance to theory, it seems that the case companies have servitized because they have comparative advantages in resources and capabilities to do so. A common argument for servitization among the case companies is that it utilises their innovative capabilities, and is more knowledge intensive than traditional manufacturing. Servitization intensifies the importance of having a tight relationship with customers, proximity and cultural equalities. These advantages can be used to increase customer loyalty by hindering foreign competitors from entering their home markets.

The case findings also indicate that the companies have resources that further rationalise upstream and downstream servitization. The installed base argument is one of them, which gives manufacturers the advantage of having a pool of customers that rely on their products. Manufacturers having a large installed base also have accumulated product expertise and credibility among their customers. In compliance with Johansson and Olhager (2006) the case findings suggest that manufacturers can potentially extract synergies between manufacturing and service operations through economics of scale and scope. Such synergies can enable the manufacturer to deliver the new offerings at more efficiently and effectively than the customer (or anyone else) can provide themselves.

In sum, having proximity to the customers, innovative capabilities, being relatively abundant on high-skilled labour, product know-how and a large installed base-to-new-unit ratio, form a comparative advantage that can be utilised through servitization. Manufacturers considering to servitize, must judge whether or not they hold more of these resources and capabilities, than both domestic and foreign competitors. It can also be argued that as long as the manufacturer can utilise its strongest comparative advantages through servitization, those resources that are easier to obtain should be given less importance. As the case of Ulstein indicates, the existing competitive advantages should even be sacrificed for developing new competitive advantages that are better aligned with their strongest comparative advantages. Arguably, the existing competitive advantages and existing resources can be a hinder for servitization, as servitization would weaken the short-term competitiveness at the expense of long-term competitiveness.

Interestingly, as servitization is a strategy that expands the business scope, it may oppose the traditional view that companies should specialise in certain activities. The case findings indicate that there is a danger of diluting core competence when expanding the business scope. However, all the case companies have found servitization to be an attractive strategy despite of this. Accordingly, it can be argued that manufacturers that servitize should ensure that they have sufficient resources, or be able to extract enough synergies from existing resources, to do so.



Arguably, activities that require high-skilled labour and innovativeness are what Norwegian industries can compete on. These comparative advantages make it attractive for them to differentiate their offerings away from price sensitive standardised products towards unique and competence intensive offerings that requires innovativeness and tight customer relationships. As Resource-advantage theory of competition states, companies should utilise their comparative advantages to form a competitive advantage in the marketplace. For the case companies, servitization is arguably a strategy that can utilise the comparative advantages to form a competitive advantage. Combining theory and case findings, argues that servitization is an attractive strategy for Norwegian manufactures.

### 6.2.3 Customer

From the theory, two propositions concerning the customer category were proposed. P3: *Servitization is a more attractive strategy for manufacturing companies if they offer products that are critical to customers*, P4: *Servitization is attractive for a manufacturer if customers are culturally and emotionally set for the new offerings*.

#### 6.2.3.1 Case findings

##### 6.2.3.1.1 Critical products

<p><b>B13-01: Servitization is attractive when customers have high variable costs</b></p> <p>A15-08 External Norwegian safety regulations make creates the after-market of services.</p> <p>A15-11 Safety regulations and other external factors have formed our business very much and differentiated us from our global competitors.</p> <p>A15-12 Regulatory factors have driven us to where we are today, and fortunately we have been very reactive.</p> <p>A15-13 In the case of Bomek, the external environment has opened the chance for us to take a unique market position in the domestic market as well as differentiating us in the global market.</p> <p>A12-23 Our customers have very high variable costs, but the criticality varies from customer to customer.</p> <p>A12-24 Service packages work in the airplane industry and not for us because of the strict regulations and the demands for capital investments, take for example Norwegian, they are a small organisation that need someone with the right competence to maintain their plains (The marine industry is 20 years behind).</p> <p>A12-27 For us to offer service packages we need to monitor our products and we need customers that do not find it profitable to do it themselves.</p> <p>A13-14 The downtime cost for the customers are seriously high, but so is the cost of bringing up the subsea installations.</p> <p>A14-44 The larger the risks involved for our customers, the more we are preferred. This makes customers willing to pay.</p> <p><b>B13-02: Risk averse customers make servitization more attractive</b></p> <p>A15-16 Having very risk averse oil industry customers, having high day prices, makes it easier to sell high quality products and after sales services.</p> <p>A15-22 We have our comparative advantage in safety and regulatory competence and are determined to use this in the aftermarket for fire doors (Bomek).</p>
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A11-13 Customers choose our services because of their uncertainty and risk.  
 A14-21 In total, our new way of doing business reduced customer risk of ordering something that is not needed.  
 A14-44 The larger the risks involved for our customers, the more we are preferred. This makes customers willing to pay.  
 A15-37 Despite not having any accidents for a long time, our Bomek customers in the oil industry are very precaution and risk averse. They choose us.  
 A13-03 The decision to start with EPC contracts has shown to be a wise one as it reduced the risk in a very risk averse industry.  
 A13-15 Our customers have always been highly risk averse, hence offering of EPC contracts matched customers' demands.  
 A11-10 Customers are not price sensitive when it comes to service and spare parts.  
 A12-27 For us to offer service packages we need to monitor our products and we need customers that do not find it profitable to do it themselves.  
 A14-45 As well as for design, the customers is willing to pay for integrated solutions.  
 A13-13 Our customer's willingness to pay for after sales services are huge, but we limit us due to our reputation and future sales.  
 A11-23 We would like to, but cannot offer these so called service packages because it is too big a risk for us.

All the case companies in this study state that their products are somehow critical to customers, meaning that the costs and consequences of a breakdown are large. The findings unambiguously underline how product criticality has a considerable effect on how customers value complete solutions and after-sales services.

FMC argue that the downtime cost of their product is very high for their customers, and that this has made customers inclined to buy complete subsea solutions. In addition to having large downtime costs, Rapp underlines how their oil industry customers are under regulatory requirements to minimise the operational risk involved. This makes them risk averse, and attracts them even more to complete and trustworthy solutions. FMC, whom also serve customers in the oil industry, state that the combination of offering critical products to risk averse customers are the perfect match for servitized offerings. As it creates value to customers, their willingness to pay is high.

Ulstein and Brunvoll emphasise that their customers prefer them due to their ability to reduce risk. Ulstein also state that they have customers that are under regulatory restrictions and that regulations result in more risk averse customers, which in turn is beneficial for them. In Ulstein's case, more emphasis on design has reduced the customer's risk of buying something that does not match their needs or that cannot be licenced according to industry regulations.

Although, product criticality and risk aversion are mentioned as reasons to servitize among the case companies, none of them have taken the step to offer a complete uptime solution that eliminates customer risk. FMC and Brunvoll argue that they would like transfer more risk from customers over to them, but that they are not capable of taking all the operating risk of their products. Rolls-Royce, which in the airline branch have offered a complete uptime solution, argue that this could be done in the marine industry as well, but that customer traditions in the marine industry are not set for it.

#### 6.2.3.1.2 Matching customer needs

<p><b>B13-03: Servitization is more attractive when it can fulfil and unfulfilled customer need</b></p> <p>A14-18 By focusing on design, we offered better solution to customer demand.</p> <p>A14-20 One of our new departments, ADB is purely created to suit an unfulfilled customer need.</p> <p>A15-05 The external environment forces Hydema to deliver more tailor-made products and less mass-produced equipment. Nevertheless, we do have some basis for all our products.</p> <p>A15-34 Our offerings vary a great lot from customers to customers. We have to individually sense each situation and determine what kind of product we can sell.</p> <p>A13-19 By following our philosophy we try to for fill customers need, even if the customers do not specify them themselves.</p> <p>A15-36 Our changes are all, undoubtedly, been a result of customer needs and requirements. Even regulations have first been incorporated in our business, as customers have demanded it.</p> <p>A13-16 Both our servitization strategies, firms EPC and increased focus on the aftermarket have mainly been driven by customer needs.</p> <p>A13-18 We always try to focus on customer's long time success. EPC and subsea services are both part of this philosophy. We put customers first. Win-win situation is the only recipe for success.</p> <p>A15-32 In the case of Bomek we have been fortunated and responded well to our customers demand. This has driven Bomek to offer service packages today.</p> <p>A11-11 It is because customers demand service from us that we offer it. It creates value for us when it creates value for them.</p> <p>A11-14 We offer services to make our customers happy and satisfied.</p> <p>A12-21 We have chosen to offer solution packages after a tight collaboration with our customers and together we have found out that it is most beneficial for our customers that we offer these packages.</p> <p>A15-33 Relationship to customers means everything. Hence, we listen and offer what they ask for ++. We focus on offering what they need in terms of the product.</p> <p><b>B13-04: Servitization requires customers that are ready and cultivated for the new offerings</b></p> <p>A11-12 Today customers are not ready for service-packages, but there is a tendency towards it.</p> <p>A12-18 We are ready to offer service packages, but are customers are not, due to the marine tradition of having the knowledge to fix the problems themselves.</p> <p>A12-20 Many operators on boats do not like us to monitor their operations, this holds the servitization process back because if we were allowed to do this we could be able to tell the owners of the boats that you should do service on your both within 3 months and this would have then been win – win.</p> <p>A12-22 (When talking of service packages): Our customers are professional with a high level of knowledge and they want to control their own maintenance costs.</p> <p><b>B13-05: Servitization can create a win-win situation as the incentives between the company and their customers become aligned</b></p> <p>A13-22 By utilising our competence through our service oriented business model, we can take more responsibility and create win- win solutions.</p> <p>A11-08 To be able to offer service packages and create a win-win situation, the customer must be able to see the value of the service offerings.</p>
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A23-29 One time one of our customers expressed “It was about time that you offered to help us with maintaining the installation”. This expresses their readiness for it. They had a need, and helping them fulfil this is a potential win-win.

**B13-06: The offerings should fulfil individual customer need**

A14-18 By focusing on design, we offered better solution to customer demand.

A24-28 The new focus on design and solutions has been well received by our customers. To be successful customers must be ready and in need for it.

A23-25 We could potentially take more risk and offer uptime, but what we offer has to match the customer demands.

All case companies state that the new offerings must be based on a customer needs, in order to add value. Brunvoll expresses that a service only creates value for them if it creates value for their customers. FMC also argue that customer needs are the main reason why they offer what they do today. In their case, through offering complete packages, their customers can focus on their main operations without devoting time and resources to the integration of subsea installations. By meeting customer requirements and utilising their competence they aim to create win-win solutions. To FMC, win-win situations are the only recipe for success.

Although customer needs can make servitization attractive, customers have also hindered servitization. Rolls-Royce makes the case that they could offer more value creating servitized offerings, if customers would let them. They have considered offering preventive maintenance services, but as this would mean that they would be monitoring the customer’s equipment usage, their customers rejected this. Accordingly, Rolls-Royce argue that customer’s tradition and cultural preferences can be a hinder in introducing value creating offerings.

While the majority of the cases have customers demanding after-sales service, FMC and Ulstein both succeeded in revealing customer needs upstream to the production stage. FMC’s Odd Gynter Olsen states that he was astonished by how their customers had needs that FMC could easily fulfil, but that neither them nor the customer had bothered to reveal this before. Ulstein on the other hand revealed that their customers were in need of a consultancy service that could help them determine what kind of ship they really needed, based on their financial situation and offshore operations.

### **6.2.3.2 Discussion**

Theory suggests that servitization is attractive for manufactures that offer products that are critical for their customers. This is indeed confirmed by the case findings.

Critical products tend to cause a customer need for product related services that reduces risk and cost of unforeseen product downtime. The result is often servitized offerings such as stand-by services, preventive maintenance or solution packages. This however requires that the manufacturer due have the possibility to take on the risk that is being transferred. The case findings do reveal that the limited ability to take on risk, have hindered servitization.

An interesting case finding that is not brought up in theory, is how the authoritarian safety regulations within Norwegian industries have made it mandatory to reduce the risk of unfortunate events. Arguably, this has made many domestic industries increasingly risk averse. This is particularly apparent for the Norwegian offshore industry. The results have been customers that are even more devoted to reduce risk, thereby increasing their need for servitized offerings. As a consequence, the case companies, whom are supplying these domestic customers with critical products, have found servitization increasingly attractive.

Even though, risk averseness and product criticality enhances the customer need for service offerings, it is ultimately customers that decide whether or not the new offering is needed. Product criticality and risk aversion tend to increase the potential for value creating services, but if the customer neither accepts nor perceives the value creation of the new offering, there may not be much to gain from servitization. As one of the case companies clearly shows, offerings that could have been value creating can be rejected due to customers individual preferences. In compliance with Neely (2008), this suggests that manufacturers must consider cultural and emotional preferences.

The case findings also show how customers value product related services despite being critically dependent on the product, simply because manufacturers can offer needed services more efficiently. Through alignment of incentives and better resource utilisation, manufacturers can offer lower total cost of ownership for all parties involved.

Interestingly, the most common aspect among the case companies seem to be their history of offering products that are critical for customers. All the case companies

convey that their products have been positioned towards customers that greatly value quality and reliability. It can be argued that high production cost has strained Norwegian manufactures to produce products that are very reliable, in order to justify the premium price. Combining this with customers that are devoted to reduce risk, help explain why servitization is an attractive strategy for Norwegian manufacturers.

### 6.3 How Norwegian manufacturers should servitize

#### 6.3.1 External

From the theory, one proposition concerning the external category was proposed. P5: *Involving a third party in the delivery of services might be beneficial.*

##### 6.3.1.1 Case findings

###### 6.3.1.1.1 Interaction with other actors

<p><b>B21-01: Companies should collaborate with other actors in the supply chain</b> A23-16 Becoming solution oriented has increased the degree of collaboration with other suppliers. A23-18 Moving towards solutions and services, we are making closer relationships with our suppliers and our customers. A22-53 When expanding, it has been hard to get suppliers with the right quality and to keep on giving the right quality. A23-17 Offering EPC and installation services put us responsible for our supplier's quality. This we have to accept. A15-15 Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions. A22-55 Being part of a cluster is really important with a servitized business model. A25-21 Not being part of a business is a clear weakness that makes us unable to offer complete solutions. Having suppliers and partner in a cluster is critical to offer this.</p> <p><b>B21-02: Strategic alliances can be helpful when servitizing</b> A25-11 Local agents help us get contact with international customers by connecting to them after their social rules.</p>
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FMC, Rolls–Royce and Rapp stress the importance of collaborating with other actors in the supply chain. The case findings show that the companies situated in clusters, close to both competitors and customers, exploit the opportunity to cooperate with the other actors. Rolls-Royce has through the cooperation with other actors in their cluster been able to offer solution packages. Only one of the case companies is not a part of a cluster (Rapp), and they clearly express the difficulty of being on the outside. CEO at Rapp, Tove Pettersen states the following: "Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions."

Involving a third party when servitizing is also an option, but the only company using some form of third part involvement is Rapp, which uses local agents in order to capture international customers. None of the case companies use or use a third party for the delivery of services.

#### **6.3.1.2 Discussion**

The case findings found it beneficial for companies undertaking servitization to collaborate with other actors. This coincides with the findings of Åhlström and Nordin (2006), which found that servitizing companies tend to have tighter relationships with other actors. Only one case company is not part of a cluster and they experience difficulties with being on the outside. They are not able to engage with their customers, competitors and suppliers in the same manner as the once situated in the cluster.

In Norway there are several industry clusters. This opens up the door for mutual collaboration between manufacturing sectors, including manufacturers, industry customers and suppliers. Companies that are in a cluster should take advantage of this position and engage with other actors in offering solutions. Becoming part of a cluster for companies situated geographically far from a relevant cluster is not easy. It is important that these companies strive to be part of an environment and not isolate themselves psychologically.

When undertaking servitization, Åhlström and Nordin (2006) also propose the possibility of involving a third party in the delivery of services. In this study, however, none of the case companies have outsourced the delivery of services. The reason for this is to a large extent because they fear losing control over their offerings. Services are the face of the company and hence a vital link between the company and customers. The findings show, in other words, that the costs of outsourcing the service delivery outweigh the benefits. Based on this, it can be argued that it is best for companies to keep the delivery of services in-house.

#### **6.3.2 Internal**

From the theory, the internal category has the majority of the propositions. P6: *Changing the corporate culture to become more service oriented is often necessary*

when servitizing, P7: Path dependency can affect the success of a servitization strategy, P8: The degree of servitization affects the organizing of the service activity, P9: Human resource management should be service oriented, P10: Sufficient quality should be ensured before customers receive the offerings, P11: It is critical for manufacturers to develop forecasting mechanisms and optimise the employed resources.

### 6.3.2.1 Case findings

#### 6.3.2.1.1 Corporate culture

<p><b>B22-01: Service oriented culture is beneficial</b>  A25-14 Offering services when you have such a product-oriented culture is hard, and maybe not right. Our culture has got us where we are today, and we cannot simply transform it.  A22-32 As important as changing the organisational structure to better knowledge transfer and synergies is to change people's attitudes (Culture).  A24-15 The paradox is that, the better people are in doing what they are doing, the harder it is to make them do something new.  A23-33 We have not seen any big cultural clashes after introducing the aftermarket emphasis. It is rather the other way around.</p> <p><b>B22-02: Servitization requires a customer-oriented culture</b>  A23-01 As our offerings are diverse, our customer-oriented culture is our service strategy.  A23-15 As all our installations are highly specialised, our services cannot be standardised and therefore they depend on our service culture.  A23-32 We have come a long way with our solutions oriented culture, and increasing our aftermarket is a natural part of that culture.  A22-14 Little can be done in the office, we need to be out working together with our customers.  A23-24 In the long term, we believe that a smile and customer orientation will be more profitable than contract focus.</p> <p><b>B22-03: Companies should strive to be flexible</b>  A21-11 It is positive to be a relatively small company like us, because it is easy to make fast decisions and this helps us respond to customer demands faster.  A21-13 We are able to deliver a service quality that our competitors cannot, due to our small company size.  A21-16 The customer has one contact person in the company and always contacts this person  A21-17 We rotate the employees in production and service.  A21-34 If the demand for service suddenly increases, then we take people from the production and send them out on service assignments.  A21-40 The in-house production is important because it is possible to quickly produce spare parts.  A25-15 Our history makes us proud and gives us the moral to stay competitive despite our weaknesses. But it also creates a strong path dependency that hinders change.  A22-23 Quality and flexibility is what is important for us.  A11-18 The lack of corporate layers makes our organisation lean and flexible. This is a clear advantage.</p> <p><b>B22-04: Path dependency may hinder servitization</b>  A14-28 Path dependency was a clear showstopper for our shift of emphasis. No one likes to stop doing what he is good at.  A14-29 We can imagine that Greenfield servitization would have been easier. But then we would have lacked basic shipbuilding experience.  A15-18 Our ad hoc business development and extensive cultural boundaries are the basis for all our innovations. This may cause pros and cons.</p>
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A15-19 Or ad hoc and cultural history make innovations synonym with product innovations. This may hinder business innovations such as servitization.  
 A15-20 Our operational focus on production and sales may have hindered us in lifting our eyes and realise the servitization opportunities earlier.  
 A22-40 Since we are such a big company it is hard for us to change, the lines for making a decision is long and the communication is hard, due to this it is important for us to have long-term strategies.

All five case companies found it important to change the mind-sets of their employees. As Magnar Førde at Rolls–Royce puts it: “As important as changing the organisational structure to better knowledge transfer and synergies is to change peoples attitudes.” The CEO at Brunvoll, Terje Dyrseth, points out that one of their success factors is the flexibility of their company. If the demand for services suddenly increases they will take people from the production and send them out on service assignments. FMC also emphasises that the culture must change to be more customer oriented. Per Ivar Roald from Ulstein, states the importance of changing the corporate culture, but expresses a clear problem when trying to change the corporate culture: “The paradox is that, the better people are in doing what they are doing, the harder it is to make them do something new.” Rolls–Royce’s big and mature organisation has also caused problems when they have tried to change people’s mindsets.

### 6.3.2.1.2 Organisational structure

**B22-05: The organisation of the service division**  
 A21-26 The service department is not run as a cost/profit centre because making losses on the product and earnings on the service had been difficult to justify.  
 A23-06 A problem with separated service and production is the problems in determining if an income is to be placed into the service or production part.  
 A23-07 The same problem with dividing incomes goes for costs as well. For example when equipment is reproduced and used by the service division.  
 A24-09 Having different divisions for each business unit have created some “walls” between them. This creates some sub-optimisation.  
 A25-17 Having after-sales services and productions as separated departments will not create sub-optimisation despite wanting to maximise their own department, that are all Rapp!  
 A22-25 Our production is separated from sales and service.  
 A22-31 Our service department is organised as a responsible for their own costs and profits as is also all of the other areas of the business.  
 A23-05 The service and production is separated cost/profit centres. So profitability can be tracked.  
 A24-06 We did not have big changes in the company structure. Design and solutions has always been a separated division.  
 A24-10 The positive of having cost/profit separated design and production is the ability to measure where to put our extra resources.  
 A14-34 Today the design and shipbuilding are separated cost/profit divisions. We hope to drive synergies from having both at the same location, But we can and should be better at doing so.  
 A23-05 The service and production is separated cost/profit centres. So profitability can be tracked  
 A22-34 When we are as big as we are now it is a dream to think that service can be directly included, it needs its own organisation.  
 A25-16 Changes in business calls for changes in the organisation. We are now organising our firms by business areas rather den geographically to hinder sub-optimisation.

**B22-06: It is beneficial to have a flat organisational structure**

A22-35 What has made us so successful is the flat hierarchical structure where it is easy to go and talk with your boss.  
A22-41 The communication between service employees and the management is hard, to solve this it is important for the management to get out of their offices and starts talking to people.  
A22-46 The flat hierarchical structure and easy communication lines in our company and cluster has been essential for our success.  
A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

The case companies differ in the way of organising their service division. Rolls–Royce and FMC have organised their service division as a cost/profit centre, while Brunvoll and Rapp have chosen to integrate their service division. The companies state that a cost/profit division makes it possible to track profitability. At the same time it is argued that a cost/profit division makes it difficult to justify making losses on products and earnings on services. It also creates problems in determining if an income is to be placed into the service or production part. Rolls–Royce state that they had no choice in the way of organising their service division. As Magnar Førde from Rolls-Royce puts it: ”When we are as big as we are now it is a dream to think that service can be directly included, it needs its own organisation.” They argue that this is a good solution because it makes it easy to measure where to invest their resources, but are fully aware that it creates “walls” between the departments. These “walls” make it harder for them to exploit potential synergies between their activities.

The case findings also indicate that a flat hierarchical structure is beneficial when companies are following a servitized business model. Both Rolls–Royce and Ulstein point out that their flat and informal structure has contributed to their success. As Per Ivar Roald at Ulstein puts it: “Our informal organisation makes it an innovative strength relative to low cost production countries.”

### 6.3.2.1.3 Learning and knowledge management

**B22-07: Important to ensure close collaboration and knowledge sharing between departments**  
A22-26 The service employees get involved when the product testing begins, so that they get familiar with the products.  
A22-27 We should get better at knowledge sharing between our departments.  
A23-11 Transferring technical to know-how to service personnel is an area we could improve on.  
A21-15 We have a really good cooperation between the sales and service departments.  
A21-23 The interaction and cooperation between sales, service and production is very important.  
A24-07 Despite being different companies we seek to keep the doors between them open to allow learning and competence creation.

**B22-08: The products should support servitization**  
A21-18 The products are produced so that they can easily be maintained and done service on, this is important.

A22-22 When we design our products we think of making them easy to do maintenance on, we are also thinking more and more towards modules.

A22-29 If we make products that are hard to do service on then rumours will go in the market right away and we will lose out.

**B22-09: Continuous learning processes within the organisation should be established**

A21-44 Our service technicians are in a continuous learning process. When they are not on an assignment they are often schooled in the production.

A21-45 The people that work in the service department need completely different skills than are need in production.

A21-49 We should offer our service technicians more in how to dress, act and handle other cultures.

A25-06 We offer a lot of technical training to ensure that our service people can fix the problems they face.

A22-18 Our service employees get courses continuously.

A22-30 It is hard to create bonds and transfer knowledge between production and service much because the service employees are seldom home, to better this situation we have built training centres and electronic learning devices.

A24-41 In order to handle the upstream tasks, we needed to increase our general level of education.

A21-47 A challenge with service employees is that there is so much tacit knowledge that you cannot teach them, but that they have to know.

A24-01 Focusing on upstream segments, early saw the need for more social skills.

All of the case companies highlight the importance of open doors between departments, but state that this is not always as easy in practise as it is in theory. Rolls-Royce include their service technicians in the testing of their products so that they can obtain the necessary knowledge in order to deliver service of a sufficient quality. As their service technicians are seldom home, it is a challenge for them to transfer knowledge between their production and service departments. To better this situation they have built training centres and electronic learning devices. Brunvoll also state that cooperation between sales, production and service departments is important, and especially important is it that the service department cooperates with the design department so that the products that are designed can easily be done service on. For Ulstein, “open doors” between departments is also important in order to enable learning and competence creation.

#### 6.3.2.1.4 Core competence

**B22-10: Core competence should be kept in-house**

A24-25 When moving upstream and outsourcing production, we have to be careful not to let go of our core competence . This is a constant issue to solve.

A22-17 In the future it is important that we produce our core products in-house and have the assembly line in-house to keep the innovative spirit alive and so that our service employees can have detailed knowledge of the products.

A24-23 We do not wish to quit producing/building ships totally. This because it gives us hands on experience and because sometimes we have to build specialised parts ourselves.

A21-35 If we outsource core parts of our production we will lose our competence in delivering services because it is our learning arena.

When servitizing Ulstein, Brunvoll and Rolls-Royce found it important not to let go of core competences. Brunvoll and Rolls–Royce express the importance of keeping the production of core parts in-house in order to acquire the necessary product knowledge, which again is a vital learning area for both innovation and services. Without the control of these parts Brunvoll and Rolls-Royce fear they will lose their innovative spirit and competence in delivering services.

### 6.3.2.1.5 Human resource management

<p><b>B22-11: The organisation should acquire new (social) capabilities</b></p> <p>A21-42 We school our own service technicians and they need to learn about our products, assembly, management and customer contact.</p> <p>A21-45 The people that work in the service department need completely different skills than are need in production.</p> <p>A21-48 Those in services must be more independent and representative. It is important that they dress and act, and that they can deal with other cultures in a good way.</p> <p>A25-01 Focusing on downstream activities we have clearly seen the need for other personal competences than those we had.</p> <p>A25-02 Being more customers oriented have caused issues as we have problem hiring resources with technical knowhow and social competence.</p> <p>A25-03 Technical knowhow is still the most important quality, as hiring pure sales people have shown to be a waste.</p> <p>A24-02 We required social skill through hiring and teaching.</p> <p>A24-12 Designing ships according to customer conversation is totally different then welding metal. Hence it requires some different skills.</p> <p>A24-41 In order to handle the upstream tasks, we needed to increase our general level of education</p> <p>A14-36 Increasing the customer relationship, we have recognised the need for social skills. This lack has been reduced through hiring and teaching.</p> <p>A21-54 Compared to our competitors our service technicians have knowledge in many areas</p> <p>A21-57 The staff that will provide services need to understand the whole system area and have the ability to communicate this to the customer.</p> <p>A25-08 Service need high competence and produce high income, hence we can justify hiring expensive Norwegian resources.</p> <p>A25-10 To ensure we have the right service people we pay them well. All of them need to have hands on experience form production.</p> <p>A22-19 It is a long process to be able to work as a service employee with us, you need to start as a production worker because you need to know the product.</p> <p>A22-47 The skills and values of service employees are different from that of the production employees</p> <p>A22-49 Our service employees need to have knowledge in management, culture, customer relationship and of course know the product.</p> <p>A23-02 Despite having been customer solution oriented for a long time, we still lack some social skills at some engineering personnel. Customers let us know where we lack these skills.</p> <p><b>B22-12: It is important to attract and keep qualified service employees.</b></p> <p>A21-27 It is very important to have a good HR strategy and good benefits for the employees so that you can stop them from leaving for the offshore industry.</p> <p>A21-32 Our biggest challenge is to build a big enough service team and get a hold of people with the right knowledge and skills.</p> <p>A21-50 We experience a great deal of problems with service employees in other countries.</p> <p>A22-50 It is hard for us to get a hold of people with the right knowledge and experience for our service department.</p> <p>A22-51 We fear to lose our core competence if we are not able to get people with the right knowledge and attitudes.</p>
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All of the five case companies state that servitization brings along the need for people with new knowledge and attitudes. As Magnar Førde from Rolls-Royce puts it: “The skills and values of service employees are different from that of the production employees. Our service employees need to have knowledge in management, culture, customer relationship and of course know the product.” Ulstein also express that, as designing ships according to customer specifications is totally different from welding metal, it requires different skills.

The findings also showed that the companies struggle to get people with the right qualities. Being more customer oriented have caused problems for Rapp, as they have problems hiring resources with technical know-how and with the right social capabilities. Rolls–Royce also express a fear of losing some of their core competence if they are not able to get people with the right knowledge and attitudes. Brunvoll further state that some of the problem of finding qualified service employees is due to the tacit knowledge that service employees need to know.

All five case companies recruit and train their employees in terms of getting employees with these new preferred qualities. Rapp further states that they pay service employees more than their production employees in order to secure the right people for the service assignments. Brunvoll also highlight the importance of having good benefits for their service employees in order to retain them.

#### 6.3.2.1.6 Service quality

<p><b>B22-13: Sufficient quality on service offerings must be ensured before delivery</b></p> <p>A21-50 We experience a great deal of problems with service employees in other countries.</p> <p>A21-51 We do not have a systematic quality control of the service we deliver, questionnaires is nothing we do.</p> <p>A21-52 We are good at getting to know our employees and in this way, have a quality control.</p> <p>A25-05 To provide the technical service, be able to sell and having social skill is much to ask. Hence we need 100 % trustable people.</p> <p>A25-07 The lack of ability to perform quality control on the Rapp service makes us even more caution about whom we are sending out.</p> <p>A22-13 We are not systematically monitoring the quality on our service, this is hard, but every two years an independent firm asks our customers to figure this out, we also talk to our customers and hope that they tell us if something is bad.</p> <p>A22-42 We have formal reporting forms that is supposed to be filled out after completing a service assignment, but this is seldom done right.</p> <p>A23-13 We can and do perform massive quality controls on products, but on the social part, we depend on our people.</p> <p>A24-30 Performing quality management on a design service is not as easy as in product, because much of what we delivers cannot be produced and checked before it is delivered.</p>
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A24-31 In order to assure acceptable quality on all our services we try to select the right people for the right team. Further then that we do not have a report system.

A24-32 Quality management on services are much harder than on tangible products, because the product created in collaboration with customers.

A24-33 Quality control on social experiences as designing in teams should be done prior to “production” to ensure that it is good enough. This is at least how we do it. There is a potential for improving here.

A25-09 Service margins and our reputation of quality make high competent service personnel vital.

A21-59 Service is the best marketer for our company.

The findings revile that the companies experience problems with quality control on services. Since services are produced in cooperation with customers, the quality control has proved to be much harder than on tangible products. To better this Rapp, Brunvoll and Ulstein highlight the importance of sending qualified and trusted people out on service assignments. As the CEO at Rapp, Tove Pettersen puts it: “The lack of ability to perform quality control on the Rapp service makes us even more caution about whom we are sending out.” Rolls–Royce hires an independent company every two years to collect data from their customers on how satisfied they are with their offerings. A system where their service employees can report on how the assignments have gone is also in place, but they state that this is only partly working as hoped.

### 6.3.2.1.7 Forecasting

**B22-14: Offerings and customer criticality should be aligned**

A23-03 The cost of having stand by service personnel is large. But so is the downtime cost of customers. This could and should probably be optimised.

**B22-15: New systems for forecasting demand should be developed**

A21-31 We have no systems for forecasting the service demand, we forecast service demand by looking at how many systems we have sold the previous years.

A21-33 We have some continual contact with our A-customers, so that we can plan and forecast some service demand.

A22-12 We need to be better at analysing our data so that we can tell our customers that in x months you need to have service on this product and then they can plan maintenance and do not need to end an important operation suddenly.

A22-44 To estimate service demand we use databases and look at trends, but it is really hell to figure this out.

A23-08 Our maybe main hurdle with offering after sales service is the lack of ability to forecast and plan demand and production of services.

A23-09 In order to adapt our capacity to demand, in the aftermarket we collect information and experience, but we lack a system to do so. We should improve!

FMC highlight the importance of aligning offerings to customer criticality. The amount of resources employed should reflect the down time cost of their customers. To be able to do this, companies need to forecast service demand. FMC and Brunvoll admit that they do not have formal systems for the forecasting of service demand, but express that they have a need for it. To get an idea of the future service demand, they

just look at how many products they have sold and then forecast service demand based on previous experience. Rolls–Royce has a more formal system, using databases and looking at trends, but state that forecasting service demand is extremely difficult. As Magnar Førde at Rolls–Royce puts it: “To estimate service demand we use databases and look at trends, but it is really hell to figure this out.” The downside of failing to forecast service demand somewhat accurately is according to FMC the huge costs of having standby personnel. Rolls-Royce also state that there is much value in being able to tell customers unsolicited when they need service. By offering preventive services, customers can avoid suddenly having to end important operations to get service on their equipment. This is also supported by Brunvoll, which keeps in continuous contact with their A-customers in order to predict service demand.

#### **6.3.2.2 Discussion**

In accordance with the findings of Oliva and Kallenberg (2003) and Martinez, Bastl et al. (2010), the study found that traditional manufacturing companies should put great emphasis on changing the mindsets of their employees in order to meet customer expectations. Establishing an appropriate culture will help fill the gap between what an organisation can train its employees to do, and what the end customer expects. For companies that servitize, it is important to balance manufacturing values and service values and not substitute the one for the other. It is important for these companies to develop a passion for services and to become more flexible and customer oriented. Companies wishing to change their corporate culture should use resources on internal marketing and encourage employees to get a better understanding of how customers benefit from the offerings. The case findings also recognise a potential problem when trying to change the corporate culture. Companies burdened by routines, structures, investments and relationships, may struggle to change the existing corporate culture. Companies that do have these characteristics can to some degree, be path dependent, and might struggle more than other companies in making this transition. These companies should therefore invest more time and resources to internal marketing, to overcome the cultural hurdle.

Companies undertaking servitization should also make a conscious choice of how their service division should be organised. If companies organise it as a cost/profit centre it is possible to track profitability, appoint appropriate resources and overcome

the cultural hurdle. On the other hand, such an organisation can create walls between departments, sub-optimisations and hinder cooperation and the exploitation of synergies. The findings showed that the two companies that were by far the biggest companies, and that had moved the most rightwards on the product-service continuum, had organised their service division as a cost/profit centre. The other two companies, which were considerably smaller and that had not moved as far on the product-service continuum, had integrated their service division. The degree of servitization and the size of the company seem in other words to be deciding factors. The theory in this area is split; some have found that it is best to always separate the service division while some state the opposite. This study supports the findings of Gebauer, Edvardsson et al. (2010), as it is found that the decision of whether to integrate or separate the service business should take into consideration the desired position along the product-service continuum. The theory did not mention the size of the companies as a deciding factor. Nonetheless, based on the findings of this study, this factor should also be considered when deciding the organising of the service division.

A tight collaboration between departments is also found important for companies undertaking servitization. This applies especially to the departments' production and service, but also to design and sales. Service technicians should work together with production in order to get familiar with the products they will perform service on. It is important that the service and production department work closely with the design department, so that the designers can get input on how to design products that can easily be produced and done maintenance/service on. When selling products, the sales department should cooperate with the service department to ensure that they have the resources and abilities to offer the needed service level. It is interesting to note that the theory does not address the process of knowledge sharing within servitized companies.

This form of knowledge sharing should not be a one-time occurrence. In accordance with Gebauer, Edvardsson et al. (2010), it is found important for companies to ensure a continuous learning process for their employees. To enable this, the integration of the service department and a flat and informal organisation will, according to the case findings, be beneficial. The findings also demonstrate that having access to core



product knowledge is an important learning arena for companies, and contributes in a positive way to the innovative ability of the company and competence in delivering services. This indicates that companies will still need to have some control of the production of core parts when servitizing.

In accordance with Martinez, Bastl et al. (2010), Neu and Brown (2005) and Baines (2006) employees with new social capabilities are important for traditional manufacturing companies in order to succeed with servitization. The skills demanded in production are not the same as the skills demanded for employees working close to customers. In addition to a broad base of technical expertise they need an appropriate behavioural competence, and a “whatever it takes” attitude. As, such, it is important that human resource strategies are designed to accumulate and retain frontline employees who possess these needed characteristics.

Since services are produced in cooperation with customers, the findings show that companies must ensure a sufficient quality on their service offerings before the service is produced. This supports the findings of Åhlstöm and Nordin (2006) and emphasises the importance of getting and retaining employees with the necessary skills. Service employees are the face of the company, and if they do not deliver service offerings of a sufficient quality, it will affect the reputation of the company. As customers are more sensitive when it comes to service offerings than tangible products, there is no room for delivering inadequate quality. Companies that undertake servitization need to secure a sufficient quality on all offerings before they are delivered to the customer. Getting feedback from customers is also important for companies in order to improve their servitized offerings and deliver a sufficient quality. A tight collaboration with customers will make it easier for companies to get constructive feedback on their offerings and is hence beneficial.

The case findings illustrate, in accordance with Cohen, Cull et al. (2000), that as the costs of having both too much resources employed and too little resources employed are high, it is important to be able to forecast service demand somewhat accurately. It is also found that if companies can provide their customers with preventive maintenance (tell their customers in advance when they will need service), it will save both the company and the customer for time and resources. It will in other words

create a win-win situation for both parties. Unfortunately, the forecasting of service demand is found to be a difficult task and the case findings did not reveal any one good way to do this. Based on this, it is important for companies to match employed resources to customer criticality, and predict service demand by developing appropriate forecasting mechanism.

### 6.3.3 Customer

From the theory, two propositions concerning the customer category were proposed.

P12: *Manufacturers should actively explain the new value proposition to their customers*, P13: *Relational interaction with customers is in some cases favourable*.

#### 6.3.3.1 Case findings

##### 6.3.3.1.1 Customer relationship

###### **B23-01: Servitization increases the importance of customer relationship**

A25-13 Services have increased the importance of having relations to customers. And vice versa, increased relationships have made it possible to sell more (services ++).

A25-12 It is an art to manage social relationships according to local standards while delivering services. Very demanding but essential.

A25-26 An example of our customer relationship is my colleagues 50 th. birthday, where about half of the guests were former or potential customers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

A23-24 In the long term, we believe that a smile and customer orientation will be more profitable than contract focus.

A23-12 Our customers are very quality demanding, so they let us know if something is not satisfying. This helps us improve.

A22-08 It is important that we get feedback from our customers on how it is to do maintenance and service on our equipment so that we can feed it back to our designers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

###### **B23-02: Companies should strive to have relational interaction with their customers**

A24-26 Our customer relationships are still mainly transactional, but they are much closer than before. With some of our customers we hold a long history and a relational relationship.

A21-02 We are not able to have relational interaction with all of our customers because we have too many customers (ca. 150).

A21-03 We should be better to keep in contact with our customers.

A22-03 We often visit or call our customers (or customers that we want to acquire) with no other agenda than to maintain and build a relationship.

A22-04 We have few, but good customers. This way we can focus our attention and closely work together with our customers.

A22-16 When we started with integrated solutions we went from transactional to relational interaction with our customers.

A23-23 We wish to deliver good, successful solutions to customers. Therefore we are not too focused on the contract.

A24-03 Each customer relationship is unique; some tend to be more relational while some are more contractual.

A21-01 Whether we have transaction or relational interaction depends on the customer

A22-06 If our customers use our equipment seldom we do not have the resources to use our time on them, because building relationships takes a long time

A15-34 Our offerings vary a great lot from customer to customer. E have to individually sense each situation and determine what kind of product we can sell

**B23-03: It is beneficial to collaborate tightly with customers**

A22-02 A tight collaboration with our customers is essential.

A22-07 Customers close by are really important to use because they are a testing ground for us, we go to these when we need to test equipment, this involves risk for them and we need them to take it.

A22-14 Little can be done in the office, we need to be out working together with our customers.

A22-39 The cluster, local customers and banks have been essential for us to develop into a solution provider, we have relied on these actors to take some of the risk.

A25-26 An example of our customer relationship is my colleagues 50th. Birthday, where about half of the guests were former or potential customers.

A23-12 Our customers are very quality demanding, so they let us know if something is not satisfying. This helps us improve.

A22-08 It is important that we get feedback from our customers on how it is to do maintenance and service on our equipment so that we can feed it back to our designers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

**B23-04: Prioritise those customers that can be retained for a long time**

A21-05 We are not able to choose our customers, but we prefer those that have an aftermarket.

A22-01 We choose our customers based on the size of their aftermarket.

A22-06 If our customers use our equipment seldom we do not have the resources to use our time on them, because building relationships takes a long time.

**B23-05: Reveal customer needs**

A23-28 Often our customers know very well what need to be done, but still they have not done it or asked for it.

A23-29 One time one of our customers expressed “It was about time that you offered to help us with maintaining the installation”. This expresses their readiness for it. They had a need.

A23-30 Our experience tells us that our customers are so taken up by their day-to-day operational tasks that they forget to ask us for help, or even look for better solutions.

A25-25 We cannot explain the customer what is best, rather it’s the other way around.

A13-20 We can become even better to respond to customer needs. As the dentist that always recommends you is mainly been driven by customer needs.

All five case companies find it important to increase interaction with their customers, but to what extent, varies among the companies. Ulstein have mainly transactional interaction with their customers, but they have moved much closer to relational interaction than before. Brunvoll have in accordance with Ulstein, still transactional interaction, but they have relational interaction with their most important customers. Rapp, FMC and Rolls-Royce have moved the most towards relational interaction. The CEO of Rapp, Tove Pettersen, underlines this by adding that, “An example of our customer relationship is my colleagues 50<sup>th</sup> birthday, where about half of the guests were former or potential customers”. Rolls–Royce, which have few but very large customers, have relational interaction with all of their customers.

Both Rolls–Royce and FMC state that close customer interaction is important in order to get feedback on their offerings. This is because the companies can continuously work together with their customers in order to improve their offerings. Rolls–Royce

has increased their customer interaction tremendously and relies today on their customers to do some of the product testing. By interacting more with customers, FMC also state that it is easier for them to find out what their customers really want and need. On the other hand, FMC and Brunvoll highlight that increasing customer interacting requires both time and resources and that this is costly. Brunvoll expresses that they would like to increase their customer interaction, but that they do not have enough resources to do so.

#### 6.3.3.1.2 Marketing of offerings

**B23-06: Companies should market their offerings and show the customers the value of the offering**

A22-09 We use a lot of time to show our customers the value of something in-tangible, this is hard, due to the old norms in the industry.

A22-10 We work hard to school our customers of the benefits of buying our integrated solutions and services, we must always prove and show them that we have the competence that they need, we need to build credibility.

Rolls-Royce state that their customers do not always see the value of their offerings and especially offerings that are intangible. They claim that some of the reason why their customers do not see the value unaided is due to old norms in the industry. Many of their customers are used to having own maintenance people and have difficulties with realising the value of letting others do it. Rolls-Royce uses a lot of time and resources on building credibility and showing their customers the value of their offerings. The other case companies do not use a lot of time and resources on the marketing of their new offerings.

#### 6.3.3.2 Discussion

The findings on customer relationship coincide with theory, and highlight the importance of relational customer interaction. When a company is servitizing, a different degree of insight into the problems and applications of customers is necessary, and this requires a greater degree of cooperation. In accordance with Kindström (2010), even though having relationship-based customer interaction is found to be beneficial, it is not always economically justifiable. In some cases, the cost of sustaining the relationship is found to be greater than the reward. Due to this, companies should segment their customers and find out which are of strategic importance, and establish relational interaction with these customers.

While the theory is concerned with the marketing of the new offerings, this cannot be said for all of the case companies. Only one case company express that they are using a lot of time and resources in this area. Arguably, as this is the company that has moved most rightwards on the product-service continuum, it can indicate that the other companies have not yet realised the benefits of actively marketing their new offerings. Even though the case findings are split, it is obvious that customers must be aware of the value created if companies are to succeed. Ideally, the customer should be shown the reduced cost of ownership thanks to the product/service. In order to do this, companies will have to develop their ability to promote and explain value propositions. These new offerings differ from that of traditional product offerings, and may require new ways of marketing. Companies must also prove to their customers that they are the right company for the job and time should be spent on building credibility with customers. In accordance with building customer relationships these things take time and money, so companies should target their marketing towards customers that are of strategic importance.

#### **6.4 Cross-sectional discussion**

Like theory, the case findings show that when companies analyse the attractiveness of servitization they must also analyse their ability to implement such a strategy. Unless companies are aware of how to servitize, they cannot be sure that the strategy is attractive. Hence, the answer to why servitization is attractive for Norwegian manufacturers and how it should be implemented is not quite separable.

Based on the case findings it seems appropriate to divide the factors affecting why and how to servitize, into exogenous and endogenous factors. Manufacturers considering servitization must first consider the factors that are given and that cannot be altered by themselves. These exogenous factors represent the context in which the company operates. This context includes economic and technological circumstances as well as customer preferences. According to the case findings, the exogenous factors affecting Norwegian manufactures are in favour of a servitization strategy.

Secondly, the endogenous factors are those that can be altered by the company. Corporate culture, in-house processes and internal resources are factors that can be added or changed by the manufacturer, some easier than others. While internal

capabilities, can be hard or even impossible to change, internal resources such as product know-how or service experience can be taught or even provided through collaboration and alliances. Even though endogenous factors can be developed or added, it is advantageous to possess as many of them as possible, before servitizing. Especially, those that are hard to acquire. The case companies all altered several aspects of their business when implementing servitization, but none of them relied on third parties to supplement the service function. This indicates that certain endogenous resources, such as a service function, are more important to develop and keep in-house.

The case findings show that servitization is a difficult process that requires companies to be dynamic enough to adapt to the exogenous factors by altering the endogenous factors. All the exogenous factors and certain endogenous factors rationalised servitization for the case companies, but dependencies both limited their selection of servitization strategies and affected the company's ability to adapt to the new strategy. This indicates that Norwegian manufacturers find servitization attractive based on their comparative advantages, customer needs and external aspects, but that they often underestimate the need for dynamic capabilities when considering to implement a servitization strategy.

## **7. Implications and conclusion**

### **7.1 Implications for management**

Instead of relying on product innovation to increase competitiveness, servitization is a business model innovation that does so by combining product and services. By broadening the value-proposition towards offering solutions, servitization can better utilise company strengths, and bring along strategic and economical benefits for Norwegian manufacturers.

However, servitization can be a risky strategy, as it requires managers to change several aspects of their company. Therefore managers must consider the company's ability to adapt to the new strategy before deciding to implement it.

#### **7.1.1 Analyse the company's comparative capabilities**

In order to increase profit through servitization, manufacturers must be capable of providing offerings more efficiently than the customer or anyone else can. Norwegian manufactures, with high labour cost, should consider positioning themselves away from semi-skilled labour intensive stages of production, towards stages that are better aligned with the company's strengths. Norwegian manufacturers are likely to have comparative advantages, in innovativeness, product competence and customer relationships, which could be utilised through servitizing. Managers evaluating a servitization strategy must critically consider how they can employ such a strategy to provide a better alignment between their comparative advantages and their offerings.

As servitization widens the business scope, chances are that the new offering will be well differentiated, making it less exposed for direct competition and more likely that the manufacturer is the most efficient provider.

#### **7.1.2 Match offerings with customer needs**

When introducing a new servitized offering, managers must ensure that the offering is aligned with customer preferences and creates value for the customer. Whereas it is hard to generalise customer preferences, it should be noted that there is a great potential to create value in relation to products that are critical for the customer. This implies that, for products where the consequences of unforeseen downtime are considerable, there is a great chance for adding value through servitization. If the

customer has a risk averse relationship to the product, there is an even greater chance that the new offering is valued. The study has shown that customers become more risk averse when exposed to authoritarian health, environment and safety regulations, something that is quite common among Norwegian industrial customers. However, in order to gain from providing such offerings, it can be required that the company is in a position to take on the some of the customer's downtime risk.

### **7.1.3 Ensure sufficient resources**

As a servitization strategy expands the company's business scope, there is a risk of diluting the core competence of the company. Even though managers find servitization to be an attractive strategy, sufficient initial investments of resources are needed. Managers should therefore ensure that they have available resources before employing the new strategy.

### **7.1.4 Extract synergies from existing resources**

By extracting synergies from existing resources, managers reduce the need for new resources, and increase the likelihood of providing the new offering better and more efficiently than anyone else. Existing resource such as, an installed base, tight customer relationships and extensive product know-how, should be utilised to provide a competitive edge. Having an installed base can provide rich data about the customer's need for services that can be used to pool service demand and provide preventive rather than reactive services. Well-established customer relationships can help develop and add credibility to the new offering. Having extensive product know-how and competence makes the manufacturer able to specialise and pool competence, thereby minimising the need for stand-by competence. By keeping the new business model close to the product base, all these "natural" advantages will provide an economics of scope and help the extraction of synergies.

### **7.1.5 Obtain the required knowledge**

Servitizing will also require new knowledge and resources. The skills demanded in production are not the same as the skills demanded for employees working close to customers. Employees will need to possess new skills and attitudes in areas such as: management, culture, and customer relationships, in addition to product know-how. Since service offerings are produced simultaneously with customer delivery, managers must also ensure a sufficient quality on their service offerings before the



service is produced. This further emphasises the importance of managers acquiring and retaining people with the necessary skills.

#### **7.1.6 Ensure learning and knowledge sharing**

In order for employees to acquire the necessary skills, and for companies to take full advantage of the synergies within the organisation, managers must ensure knowledge sharing and establish a continuous learning process within the company. To enable this, managers should facilitate a flat organisational structure and keep control of the production of core products in-house. Having access to in-house production will be an important learning arena for innovation and the service delivery.

#### **7.1.7 Create an appropriate culture**

Managers should be aware of the necessary cultural transition from being a traditional manufacturing company to becoming a servitized company. Rigidity and a product-oriented culture make it hard to develop a new service oriented culture, which is needed in order to meet customer expectations. It is important that companies become more flexible and customer oriented when servitizing, and develop a passion for offering services. Establishing an appropriate culture will help fill the gap between what managers can train its employees to do, and what the customer expects. In order to establish an appropriate culture, managers should use resources on internal marketing and encourage employees to get a better understanding of how customers benefit from the new offerings.

#### **7.1.8 Design an appropriate service organisation**

Companies undertaking downstream servitization should also make a conscious choice of how their service division should be organised. If managers organise it as a separate cost/profit centre it is possible to track profitability, appoint appropriate resources and more easily overcome the cultural hurdle. On the other hand, such an organisation can create walls between departments, sub-optimisations and hinder cooperation and the exploitation of synergies. This is a trade-off that needs to be evaluated by managers. The study shows that large companies that have moved far on the product-service continuum have found it beneficial to organise the service division as a cost/profit centre, as this ease the cultural hurdle. While, companies that are small in size, and have not moved far on the product-service continuum, have

emphasised the extraction of synergies and found it beneficial to integrate the service division.

An option can be to outsource the service delivery, but as the service delivery is a vital link between the company and customers, it is advisable for managers to keep the service function in-house. Customers are very subjective when evaluating the service offering, so if managers outsource the service delivery they will lose too much control over the customer's perception of the company and its offerings.

#### **7.1.9 Increase interaction with other actors**

Close interaction with customers, suppliers and competitors, is beneficial when servitizing. When a company is servitizing, a different degree of insight into the problems and applications of customers is necessary, and this requires a greater degree of cooperation. Due to this, managers should segment their customers and find out which are of strategic importance, and establish relational interaction with these customers. Establishing close relationships with customers will also help managers in the forecasting of service demand. As the forecasting of service demand is found to be challenging, this should be an important motivator for the establishment of relational customer interaction.

Companies that are part of a cluster should take advantage of this position and engage with the other actors and collectively develop more value creating solutions for the customers. Companies not part of a cluster should strive to be part of an environment and not isolate themselves psychologically.

#### **7.1.10 Actively market offerings**

Customers do not always see the value of offerings and especially offerings that are intangible. Due to this, it is important to actively explain the value of the new offerings. The new servitized offerings differ from that of traditional product offerings, and managers must therefore establish new ways of marketing and improve their ability to promote and explain the value proposition. Because these things take time and money, managers should target their marketing towards customers that are of strategic importance.

## 7.2 Implications for further research

The concept of servitization was first introduced by Vandermerwe and Rada (1988) and increasing attention has been directed towards this concept over the past decade. However, the amount of research and the amount of published literature on servitization is still limited and stretches across a range of academic journals. As servitization is a broad concept including innovation management, operation management and service management, the concept touches many academic fields, making it difficult for one field to get the totality of it. Arguably, this can explain why the concept has so far been given so little attention, and that no academic field has yet fully embraced it. For further research it is therefore vital that the concept of servitization is studied holistically, without restricting it to a certain academic field.

Interestingly, the case findings reveal some important aspects that are not mentioned in servitization literature. First of all, the importance of clusters as a facilitator of solution-oriented collaboration, is underlined by the case findings. Secondly, the reviewed servitization literature does not seem to be concerned with the risk of diluting core competence as a result of the business scope expansion following a servitization strategy. Seen that this oppose the traditional view that manufacturers should specialise, it seems odd that this aspect is omitted. Also, the role of in-house production as an important learning arena for innovation and service delivery, and the necessary processes of knowledge sharing across business activities to enable the extraction of synergies, is not weighted in literature. All these aspects represent exciting areas for further research.

The reviewed literature on servitization and the case findings, discuss the issue of involving a third party in service delivery. Whereas, the literature only shed light on the problem of involving a third party as a service supplier, the case findings firmly argue that the delivery of services should be kept in-house. Also, on the issue of designing an appropriate service division, the case findings add company size as an additional dimension in determining the optimal service organisation. As both these case findings compliment the literature findings, they should be areas for further research.

The theoretical implications of the literature findings are discussed in section 3.3. After analysing the case findings, the allegation that theory of Dynamic capabilities

can in a better way than Resource-advantage theory of competition explain what strategies manufacturers should implement, is further supported. These theoretical implications should also be examined by further research.

At last, it should be underlined that this is a qualitative study and that the findings lack external validity. Hence, it would be an interesting area for further quantitative research to examine the generalizability and the correlation, of and between the aspects made known in this study. An obvious research objective would be to examine the relationship between servitization and performance among Norwegian manufacturers.

### **7.3 Implications for public policy**

There is a trend among manufacturers in the developed world to shift their focus towards offering solutions. For the government to facilitate this shift, they should ease competence development and the collaboration between actors within industry sectors, including manufacturers, industry customers and research institutions.

The challenges for many companies are to obtain the necessary competence, and to find collaborative partners in order to develop cross-company solutions. To develop competence on the field of servitization and increase cross-company collaboration, the government should facilitate information exchanges such as forums within industry sectors. Here, companies can learn from industry experts, research institutions, and exchange valuable insights with other companies and possibly find new actors to collaborate with. It will be especially important to incorporate companies situated outside of clusters that have limited possibilities of collaborating with other actors. Also, in order to develop the general competence level on servitization, the government should also provide funding for research projects within and across areas such as innovation management, operations management and service management.

### **7.4 Conclusion**

Traditionally, Norwegian manufacturers have created value through cost reduction and product differentiation, and gained market share through geographical expansions. However, increased global competition has commoditised manufactured goods and squeezed product margins. Consequently, Norwegian manufacturers need

alternative ways to increase the value added and to differentiate their offerings. By breaking the traditional boundaries of manufacturing, servitization represents such an opportunity. This study argues that servitization is an attractive strategy because it can enable manufacturers to better utilize all their company's strengths to efficiently fulfil customer needs.

However, servitization is not a straightforward strategy as it can result in more complexity and risk for manufacturing companies. To harvest the benefits of servitization, it is important that manufacturers recognise the right servitization strategy and manage the transition that is required. In reality these strains are difficult to fulfill. Nevertheless, as competitive pressure increases, servitization represents an attractive strategy for Norwegian manufacturers to stay competitive.

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## **Appendix A**

Table of the articles included in the literature review.

Study	Research Method	Purpose of study	Main Findings
Gebauer, Edvardsson, Gustafsson and Witell (2010) Robinson, Clarke-Hill and Clarkson (2002)	Sample of 195 European manufacturing companies. Questionnaires and interviews. Quantitative and qualitative. In-depth interviews with three commodity chemical producers.	How do different service strategies correspond with different configurations of organisational design factors? Identify those business attributes that were perceived as important and the relationship of those attributes to perceived business performance.	<p><b>Internal:</b> The decision to integrate or separate the service business should take into consideration the type of service strategy used to move along the transition line from products to services (contrasting views to Oliva and Kallenberg (2003) and Neu and Brown (2005))</p> <p><b>External:</b> Commodities are no longer anchored at the tangible dominant end of the service continuum but are more appropriately positioned either in the middle ground or even towards the service-dominant end of the continuum. The key service attributes are relationship oriented (commodities: not possible to manipulate the core products attributes).</p>
Stremersch, Wuyts and Frambach (2001)	Qualitative. 15 interviews with CEOs of service companies within 3 different industries. 12 expert interviews.	Obtain enhanced insight in the factors and conditions that underlie the purchase of a full-service contract as well as DMU members' roles in this type of purchase.	<p><b>Customer:</b> Both evaluation criteria, total cost and plant performance, are significantly more important than specific maintenance costs in the evaluation of full-service contracts.</p> <p><b>Customer:</b> Investment in increased plant performance and decreased plant cost are more effective than investments in decreased maintenance cost. Information detail and reputation of contractor is important.</p>
Gebauer and Friedli (2005)	Case studies of German and Swiss product manufacturers. Semi-structured interviews and action research.	Provide a better understanding of necessary changes in behavioural processes and to demonstrate their impact on transition at the implementation level.	<p><b>Internal:</b> 1. Establish "value-added" managerial service awareness 2. Change managerial role understanding – from traditional customer support to business manager 3. Establish "value-added" employee service awareness 4. Change employee role understanding – from selling products to providing services.</p>
Cavallieri, Gaiardelli and Ierace (2007)	Qualitative. Case study of three companies operating in the automotive and motorbike sectors.	How a company can adopt a consistent design of its performance measurement system, in strict accordance with the business strategy it pursues.	<p><b>Internal:</b> Focuses on different servitization strategies. Business generator: Focus on contribution margin, customer satisfaction, dealer satisfaction. Brand fostering: Focus on customer satisfaction, service delivery performance, abandon rate, time to market for a new service. Cash generator: Fill rate, stock rotation index.</p>
Malleret (2006)	Qualitative. Interviews with the management team of six firms.	Aim to describe the accounting and commercial practises that could affect the profitability of additional services in SME's.	<p><b>Customer:</b> Services must create value for customers. To do so companies need to maintain a close trust-based relationship with its customers. The customer must be aware of the value created.</p> <p><b>External/Internal:</b> Service activities become profitable only when specific thresholds have been passed, both in terms of volume and organisation.</p>
Baines, Lightfoot, Peppard, Johnson, Tiwari and Shehab (2009)	Qualitative. In-depth case study of a single company.	How to provide an efficient and effective service delivery system that is integrated into original equipment manufacture?	<p><b>External/Internal/Consumer:</b> Characteristics of companies with track-records of achieving business success through providing a portfolio of product related services (product-centric servitized operations SBU) Ex. Tend to need workers with high levels of product knowledge and relationship development capabilities, tend to have strong interaction with customers through relationships based on product availability and performance.</p>

Study	Research Method	Purpose of study	Main Findings
Cohen, Cull, Willen and Lee (2000)	Qualitative. In-depth case study of the company Saturn.	Details the thinking that turned supply chain innovation into brand loyalty.	<b>External:</b> 1. Use performance metrics to measure the value the SC delivers to the end customer 2. Set specific targets for the value consistent with the business strategy and reflective of the products' criticality to customers 3. Communicate the goals to intermediate customers and suppliers 4. Identify how the intermediate customers and suppliers contribute to the delivery of end-customer value 5. Set explicit cost and service performance goals 6. Adopt a service strategy that matches the criticality of the product to the customer improvement. <b>Internal:</b> Product manufacturers have unique advantages when serving their IB.
Oliva and Kallenberg (2003)	Inter-disciplinary research approach that included interviews (11 German capital equipment manufacturers).	Identifying the dimensions considered when creating a service organisation in the context of a manufacturing company, and successful strategies to navigate the transition.	<b>Internal/Customer:</b> Successful organisations have a deliberate, systematic and well-structured transformation effort. 1. Consolidating product-related services 2. Entering the IB service market 3. Expand to relationship-based or process-centred services 4. Taking over end-user's operation.
Åhlström and Nordin (2006)	Qualitative case interviews.	Exploring the problems that arise when establishing service supply relationships and their dependence on the servitization stage.	<b>External:</b> Argues that the nature of service is fundamentally different from those of a product known to manufacturers, mainly due to the attributes of perishability, inseparability and intangibility. These differences in attributes cause complications in defining the service process and managing the service relationship.
Johansson and Olhager (2005)	Qualitative single case study.	Establish guidelines for when it is possible to link the production process and service process into one integrated service package.	<b>Internal:</b> Argues that the production process and service providing process can be link in order to create economics of scale internally within the organisation by an integrated manufacturing and service strategy. This requires a match between the processes on areas of flow and structure/Volume.
Leiringer, Green and Raja (2009) Gebauer, Bravo-Sanchez and Fleisch (2008)	Qualitative single longitudinal case study of a UK based construction company. Qualitative interview form Western-European manufacturing industries.	To explore the empirical reality of through-life value creation in construction. Categorising the service strategies that enable firms to move along the product – service continuum and for aligning the service strategy with the organisation and the external environment.	<b>External:</b> Shows that a servitization strategy not necessarily predetermined by senior management, but rather a bottom-up reaction to trends in the external environment (market), and that because of this the firms internal resources breadth of capabilities are the key to long term success. <b>External:</b> Indicates three distinctive categories of service strategies; After-sales service provider, Customer support provider and Development partner which differs in terms of value propositions, organisational requirements and competitive intensity. Further on, market performance level for each category is quantified. At last the paper highlights the point that there is no recipe for optimal position along the transition line, as the market/external environment is always changing.
Wilson (1999)	Qualitative in-depth case study of a medium sized Swedish engineering firm with after-sales service expertise.	To identify important variables associated with after-sales services in an international distribution network.	<b>External:</b> Emphasises on the differences in the requirements for a product distribution network versus those for an after-sale service distribution. Argues that the service provider needs to adapt to the local culture and expectation level, thus concludes that the larger the psychic distance between customer and provider, the bigger is the chance for a third party service provider.

Study	Research Method	Purpose of study	Main Findings
Wilson, Boström and Lundin (1999)	Qualitative in-depth case study of a Swedish capital goods manufacturer. Observations and interviews.	To collect and identify differences in communication and expectations patterns across the world with respect to after-sale activity.	<b>Customer:</b> General differences in service expectations and communication patterns were noted at selected sites worldwide. Concludes that adapting the after-sale services to local culture, knowledge and customer expectations is very important in providing the desired level of service quality.
Brax (2005)	Qualitative single case study of a European capital goods manufacturers that experienced a lack of profits after servitizing.	Paradoxes and challenges when a manufacturer becomes a service provider. Brings into light that servitization is not some easy way to gain profit and success.	<b>Customer:</b> Ultimately servitization is all about understanding customer needs and expectations and meeting them when providing the service. The service must be seen as a smart solution by the customer and not as an opportunistic supplier action. <b>Internal:</b> To introduce a service as an add-on is inadequate as providing services requires a totally different mindset then supplying a product.
Tan, Marzen, McAlloone and Evans (2010)	Qualitative case studies of two Danish B2B manufacturing firms, refrigeration and furniture.	Examines the steps for designing and developing service for manufacturing firms.	<b>Internal:</b> Identifies the span from product oriented strategy to customer oriented strategy, rather than the product – service continuum (Oliva and Kallenberg(2003)). Presents two different development strategies for integrating products and services, both depending on being service oriented and redefining customer relationships.
Gebauer, Friedli and Fleisch (2006)	Extensive benchmarking project identifying five successful service implementations and not so successful form Swiss and German manufacturing. The five successful where object for further research.	Provide better understanding of the necessary changes in a company's organisation and customer relation and how these factors impact service revenue.	<b>Customer:</b> Emphasises deeply on understanding customer needs before developing a value proposition and the service business model. Focuses on the relationship based customer interaction. <b>Internal:</b> Change the culture and mindset of the manufacturing company to “value added” and service based. Establish a separate organisation with profit- loss responsibility. Involve employees.
Kindström (2010)	Qualitative case study of seven manufacturing companies that all have announced their intentions of becoming service oriented.	Address how companies can best take advantage of a new service based business model.	<b>External/Internal/Customer:</b> Takes a holistic view of implementing a service based business model. Argues for seeing the service oriented move as a change in business model, thus all parts of the business model must change: the value proposition, revenue mechanism, value chain, value network, competitive strategy and target market.
Amini, Retzlaff-Roberts and Beinstock (2004)	Qualitative single case study of a medical diagnostics manufacturer.	Discusses the competitive value of having a good reverse logistics operation for short cycle repair time service.	<b>External:</b> The paper argues that offering your customer a good reverse supply chain is considerably more complex than a good manufacturing supply chain. Therefore such a reverse supply chain offers a considerably stronger competitive advantage. The study shows how an optimal reverse supply chain can be constructed to mathematical modelling and integer programming.

Study	Research Method	Purpose of study	Main Findings
Brown and Neu (2005)	Multi case study of four Fortune 500 firms in which B2B service development consisted with aligning strategy with a complex market.	To illustrate how successful B2B service developers in goods-dominant firms manages to align strategy with the external environment and adapt organisational factors.	<p><b>External:</b> Categorises the complexity of the external environment in the dimensions; technology and heterogeneity, rate of change and availability of resources.</p> <p><b>Internal:</b> Focus on aligning the strategy with the (exogenous) market, at the same time as the strategy is aligned with organisational strengths. Proper alignment is essential for success.</p>
Baines, Lightfoot, Bendettini, Whitney and Kay (2009)	Questionnaires. UK-based manufacturers in the B2B sector.	Questions the extent, form, and motivations of the service-led competitive strategies.	<p><b>Customer:</b> Manufacturers believe that their customers are mainly attracted to services as a means to reduce costs, investments and risks.</p> <p><b>External/Internal/Customer:</b> Most manufacturers see their service strategy as successful, being resilient to economic downturns and competitive pressure, and key to future business growth</p>
Kay (2009), Slepniov, Waehrens, Johansen (2010)	Qualitative study of five Danish manufacturers.	Seeks to identify how traditional manufacturers can and do recoup with desired levels of return through servitization.	<p><b>External:</b> Increased competition in product manufacturing and the increased offshoring and outsourcing forces developed world manufacturers to reposition themselves, either upstream or downstream, both in which the term servitization can be used. Shows how Danish manufacturers have repositioned themselves by taking different positions along the “value added U-curve”.</p>
Martinez, Bastl, Kingston, Evans (2009)	Case study of one manufacturing company. Semi-structured interview.	What are the challenges confronted by organisations when transforming from being a “product-centred” to being a “servitized” organisation?	<p><b>External/Internal:</b> Challenges within servitization: (1) Embedded product-service culture; (2) Delivery of integrated offerings; (3) Internal processes and capabilities; (4) Strategic alignment; (5) Supplier relationship</p>
Löftberg, Witell, Gustafsson (2010)	Three in-depth case studies of OEM's and eight of their suppliers.	To investigate how and why service strategies differ depending on the manufacturers position in the supply chain.	<p><b>Internal:</b> Indicates that the service strategy implemented by manufacturers depend upon their position in the supply chain. The main reason for this is the differences in customer demand, product characteristics and size of the company. Two different service strategies were found; After-sales services (downstream) and development partners (upstream).</p>
Neely (2008)	Quantitative study, where 10028 manufacturing companies from 25 developed economies were examined.	Provide empirical evidence on the trend of servitization in the manufacturing industry.	<p><b>External:</b> Argues, based on statistical figures that manufacturing companies in the developed world are adopting a range of servitization strategies. The performances of servitized companies are ambiguous.</p>

## Appendix B

The interview guide (will be presented in Norwegian)

### 1. Innledning

- Takke for bistand
- Agenda for møtet
- Få tillatelse til bruk av diktafon

### 2. Firmaets bakgrunnsinformasjon

#### 2.1 Utvikling av firma og bransjen

- Kjernevirksomhetsområdet
- Konkurransesituasjon
- Teknologitviking

#### 2.2 Marked

- Mettet marked, lite differensieringsmulighet
- IB
- Volatil kontantstrøm

#### 2.3 Kunder

- Kundekrav → hva tilbys hvilke kunder
- Kundeforhold (transaksjon/relasjon)
- Kundekostnader (variable/faste/risiko)
- Kundeinformasjon (anskaffelse)

#### 2.4 Konkurransesituasjon

- Konkurrenter

#### 2.5 Verdikjeden

- Marginer i kjeden

#### 2.6 Organisering

- Interaksjon/samarbeid
- Design/service/produksjon

### 3. Hvorfor norske produsenter velger å servitisere

#### Eksternt:

##### 3.1 Eksterne faktorer

- konkurranse situasjon, hjemme og i utlandet (u-kurva).
- Framtidig bransjeutsikter
- Nye muligheter som følge av ny teknologi
- Marginer
- Strategiske grunner (Lock-in, differensiering, Innovasjonsevne)

- Framtidig konkurransekraft

### **Kunder:**

#### **3.2 Kundebehov**

- Eksisterende eller nytt kundebehov
- Kritikalitet, høye variable kostnader hos ulike kunder
- Faste kostnader
- Potensielle vinn-vinn

#### **3.3 Verdiskaping**

- Overføring av kundes risiko til dere = Vinn-Vinn (risk aversjon)
- Vinn-Vinn etter sammenfallende incentiver
- Kvalitet

### **Internt:**

#### **3.4 Egenskaper og styrker**

- Relative fordeler/styrker
- Strategisk posisjonering mot andre aktører
- Installed base
- Selge (dyre) tjenester istedenfor (bilige) produkter
- Trengte organisasjonen en omstrukturering?

#### **3.5 Path Dependency**

- Path dependency (internt og eksternt)
- Bedriftskultur

#### **3.6 Negative sider**

- Utvanning av core competence
- Ressurser brukt andre steder

## **4. Hvordan norske produksjonsbedrifter løser utfordringene forbundet med å servitizere**

### **Internt:**

#### **4.1 Tydelig plan**

- Hvordan kom dere fram til planen (strategien)
- Grad av kundekontakt og servicegrad, tilpasset kundene.
- Klar service strategi (i alle ledd)
- Servicetilpasset produkt
- Grad av kundekontakt og service grad (responsivness)

#### **4.2 Strukturelle endringer**

- Belønning for service innovasjon
- Sammenslåing av servicepersonell
- Service som eget cost/profit senter!
- Lokke over ansatte til serviceavdelingen
- Nye målekort for lønnsomheten til service/design-virksomheten

#### **4.3 Kultivering**

- Produksjonsverdier (effektivitet) vs service verdier (fleksibilitet)
- Fluktusjon i etterspørsel

#### **4.4 Ny kunnskap og egenskaper**

- Opplæring og motivasjon for ansatte
- Nye rekrutteringer
- Mer sentralt å samle informasjon om etterspørsel og behov.

#### **4.5 Problemer**

- Interne stridigheter mellom avdelingene
- ”For sånn har vi alltid gjort” problemer (path dependency)/gubbekultur
- Kvalitetskontroll
- Annet

#### **Eksternt:**

#### **4.6 eksterne samarbeidspartnerne**

- Ekstern serviceleverandør
- Endringer i verdikjeden
- Konkurrenter
- Posisjonering

#### **Kunder:**

#### **4.7 Forhold til kunden**

- Transaksjonsbasert til relasjonsbasert
- Tettere samarbeid med kunden som utviklingspartner
- Kontinuerlig innhenting av kundebehov
- Utfordringer i kontroll av etterspørsel.. it-verktøy?

#### **4.8 markedsføring**

- Få kunden til å verdsette det ikke fysiske (bet. villighet for tjenester)
- Endre kundens syn på bedriften
- Kundens vurdering : Inkonsistent eller naturlig forretningsområde (brand)
- Opplæring av kunden
- Tilegne seg nye kunder

#### **4.9 Kvalitetskontroll**

- Nye rutiner for kvalitetskontroll

### **5. Utfallet**

#### **5.1 Resultat**

- Omsetning og profitt
- Strategisk
- Kort eller langsiktig horisont?
- Færre/flere konkurrenter
- Service paradoks (høyere omsetning, men lavere lønnsomhet)
- ROI



## Appendix C

### A-categories

#### A-categories Brunvoll

Represented by CEO Terje Dyrseth and Marketing Director Per Olav Løkseth  
Molde, 2.March 2011 from 12.30 – 15.30.

<b>A11-01</b> When the IB increased, we increased the service function (IB = 7000).	<b>A11-02</b> The technology has made it possible to offer service in a new way.	<b>A11-03</b> The technology is developing rapidly.	<b>A11-04</b> The margins on our products are blueberries compared to other systems on boats.	<b>A11-05</b> Condition monitoring has opened the door to a new way of offering service.
<b>A11-06</b> It is generally higher margins on services than on products.	<b>A11-07</b> The margins on products and services vary with the market.	<b>A11-08</b> To be able to offer service packages and create a win-win situation, the customer must be able to see the value of service offerings.	<b>A11-09</b> When offering services it is much easier to lock-in customers.	<b>A11-10</b> Customers are not price sensitive when it comes to service and spare parts.
<b>A11-11</b> It is because customers demand service from us that we offer it. It creates value for us when it creates value for them.	<b>A11-12</b> Today customers are not ready for service-packages, but there is a tendency towards it.	<b>A11-13</b> Customers choose our services because of their uncertainty and risk.	<b>A11-14</b> We offer services to make our customers happy and satisfied.	<b>A11-15</b> Many of our customers want experts in the field and they choose our service function because of that.
<b>A11-16</b> Customers choose our service because we come prepared with the necessary spare parts, tools and drawings on assignments.	<b>A11-17</b> Our comp. adv: Knowledge, experience and expertise in all the disciplines that comprise the product.	<b>A11-18</b> Our comp. adv: The lack of corporate layers makes our organisation lean and flexible.	<b>A11-19</b> We produce in small series and customise to fit the customer.	<b>A11-20</b> We know our products better than any other and are hence the best suited to offer services.
<b>A11-21</b> Since we have our own production we are competent to offer services (learning effect).	<b>A11-22</b> We can quickly produce parts that our customers need and are hence the best to offer services to our customers.	<b>A11-23</b> We would like to, but we cannot offer these so called service packages because it is too big a risk for us.	<b>A11-24</b> The small size of the company makes the communication lines shorter and makes it easier to offer a good service function.	

<b>A21-01</b> Whether we have transaction or relational interaction depends on the customer.	<b>A21-02</b> We are not able to have relational interaction with all of our customers because we have too many customers (ca. 150).	<b>A21-03</b> We should be better to keep in contact with our customers.	<b>A21-04</b> We are not able to keep more in contact with our customers due to shortage of resources.	<b>A21-05</b> We are not able to choose our customers, but we prefer those that have an aftermarket.
<b>A21-06</b> We are not lecturing our customers on what services that they should have and that we can offer.	<b>A21-07</b> We do not want to push services on our customers, they have to come to us.	<b>A21-08</b> We sometimes give away the product just so that we can get the aftermarket.	<b>A21-09</b> We have and believe that universal rates on services are important because it is important to be consistent.	<b>A21-10</b> It is the interaction between the people who possess the competence that make up the competitiveness.
<b>A21-11</b> It is positive to be a relatively small company like us, because it is easy to make fast decisions and this helps us respond to customer demands faster.	<b>A21-12</b> It is positive to be a relatively small company like us, because the communication lines work faster and better.	<b>A21-13</b> We are able to deliver a service quality that our competitors cannot, due to our small company size.	<b>A21-14</b> Production is not situated at the same place as sales and service.	<b>A21-15</b> We have a really good cooperation between the sales and service departments.
<b>A21-16</b> The customer has one contact person in the company and always contacts this person.	<b>A21-17</b> We rotate the employees in production and service.	<b>A21-18</b> The products are produced so that they can easily be maintained and done service on, this is important.	<b>A21-19</b> The design division needs to think of which machines we already have so that we do not need to purchase new ones.	<b>A21-20</b> The company has grown organically and this has made it painless to both have production and service.
<b>A21-21</b> We do not give up drawings and information about our products, because then others will not be as good at repairing our equipment.	<b>A21-22</b> It is important that we come prepared when we are delivering services, we need to bring the appropriate spare parts, tools and drawings.	<b>A21-23</b> The interaction and cooperation between sales, service and production is very important.	<b>A21-24</b> We have a clear service strategy, but we should be better at developing our service concept further.	<b>A21-25</b> We can compete on production cost because we are good at automation.
<b>A21-26</b> The service department is not run as a cost/profit centre because making losses on the product and earnings on the service had been difficult to justify.	<b>A21-27</b> It is very important to have a good HR strategy and good benefits for the employees so that you can stop them from leaving for the offshore industry.	<b>A21-28</b> Everybody in the organisation get the same type of bonuses, so that no one feels badly treated.	<b>A21-29</b> No special bonus is rewarded to service employees, but I can see the benefits of rewarding the really good once, but we cannot do that.	<b>A21-30</b> We have had no cultural difficulties as we have grown so organically.

<b>A21-31</b> We have no systems for forecasting the service demand, we forecast service demand by looking at how many systems we have sold the previous years.	<b>A21-32</b> Our biggest challenge is to build a big enough service team and get a hold of people with the right knowledge and skills.	<b>A21-33</b> We have some continual contact with our A-customers, so that we can plan and forecast some service demand.	<b>A21-34</b> If the demand for service suddenly increases, then we take people from the production and send them out on service assignments.	<b>A21-35</b> If we outsource core parts of our production we will lose our competence in delivering services because it is our learning arena.
<b>A21-36</b> We only forecast spare parts.	<b>A21-37</b> We have one main hub for all of our operations including service and that is in Molde, this is important to get an overview.	<b>A21-38</b> We have service stations across the world, but everything is run from Molde.	<b>A21-39</b> It is important to have spare parts in storage, this is in Molde.	<b>A21-40</b> The in-house production is important because it is possible to quickly produce spare parts.
<b>A21-41</b> To be able to keep track of every thruster that we have produced and done maintenance on we keep track of everything from Molde.	<b>A21-42</b> We school our own service technicians and they need to learn about our products, assembly, management and customer contact.	<b>A21-43</b> Our service technicians have often started to work in the production, but then moved over to the service department.	<b>A21-44</b> Our service technicians are in a continuous learning process. When they are not on an assignment they are often schooled in the production.	<b>A21-45</b> The people that work in the service department need completely different skills than are need in production.
<b>A21-46</b> We have not always given our service employees courses in ex. Management, but now we do.	<b>A21-47</b> A challenge with service employees is that there is so much tacit knowledge that you can not teach them, but that they have to know.	<b>A21-48</b> Those in service must be more independent and representative. It is important that they dress and act, and that they can deal with other cultures in a good way.	<b>A21-49</b> We should offer our service technicians more in how to dress, act and handle other cultures.	<b>A21-50</b> We experience a great deal of problems with service employees in other countries.
<b>A21-51</b> We do not have a systematic quality control of the service we deliver, questionnaires is nothing we do.	<b>A21-52</b> We are good at getting to know our employees and in this way, have a quality control.	<b>A21-53</b> Department managers also give feedback on their service employees as a way to secure quality in the service product.	<b>A21-54</b> Compared to our competitors our service technicians have knowledge in many areas.	<b>A21-55</b> We keep spare parts from our old models.
<b>A21-56</b> Production in-house is a learning arena for expertise in service.	<b>A21-57</b> The staff that will provide services need to understand the whole system area and have the ability to communicate this to the customer.	<b>A21-58</b> Outsourcing weakens the skills base and ability to provide prompt service.	<b>A21-59</b> Service is the best marketer for our company.	

## A-categories Rolls – Royce Marine

Represented by Head of Business Development, Dr. Magnar Førde.  
Ålesund 1.March 2011 from 08.00 – 11.30

<p><b>A12-01</b> Companies that do not have any R&amp;D costs push the prices down and make it impossible to compete on production cost.</p>	<p><b>A12-02</b> To survive we have to sell integrated solutions, because on single parts we are the most expensive provider.</p>	<p><b>A12-03</b> It is today hard to differentiate our products.</p>	<p><b>A12-04</b> Hard competition from the domestic and international market makes it essential for us to compete on innovation and service.</p>	<p><b>A12-05</b> There is more and more commoditisation in our industry.</p>
<p><b>A12-06</b> A big IB has made it possible to expand our service offering (30 000 +).</p>	<p><b>A12-07</b> The higher margins on service has definitely made it attractive for us to focus on service and we often “give away” products just so that we can make money of the aftermarket.</p>	<p><b>A12-08</b> New technology of monitoring our products has made it possible for us to reduce the variable cost of our customers.</p>	<p><b>A12-09</b> The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.</p>	<p><b>A12-10</b> Service is always good business, it has given us good margins and profit.</p>
<p><b>A12-11</b> A problem with moving in the value chain is that we need to watch out so that we are not competing with our own customers.</p>	<p><b>A12-12</b> The technology is becoming so advanced, so there is a new demand for training of our customer’s personnel.</p>	<p><b>A12-13</b> Access to capital has made it possible for us to start with integrated products and expand our service concept.</p>	<p><b>A12-14</b> One of the main advantages with offering integrated solutions and service is the ability to differentiate and compete on something else than price.</p>	<p><b>A12-15</b> If we did not have the fierce pressure from local and international competitors, the journey towards integrated solutions would have gone much slower.</p>
<p><b>A12-16</b> Service pirates stops us from grabbing the full potential of the service market.</p>	<p><b>A12-17</b> The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.</p>	<p><b>A12-18</b> We are ready to offer service packages, but are customers are not, due to the marine tradition of having the knowledge to fix the problems themselves.</p>	<p><b>A12-19</b> Our customers don’t like it, but with offering integrated solutions, learning centres, as well as services, we are able to lock in our customers.</p>	<p><b>A12-20</b> Many operators on boats do not like us to monitor their operations, this holds the servitization process back because if we were allowed to do this we could be able to tell the owners of the boats that you should do service on your both within 3 months and this would have then been win – win.</p>

<b>A12-21</b> We have chosen to offer solution packages after a tight collaboration with our customers and together we have found out that it is most beneficial for our customers that we offer these packages.	<b>A12-22</b> (When talking of service packages): Our customers are professional with a high level of knowledge and they want to control their maintenance own costs.	<b>A12-23</b> Our customers have very high variable costs, but the criticality varies from customer to customer.	<b>A12-24</b> Solution packages work in the airplane industry and not for us because of the strict regulations and the demands for capital investments, take for example Norwegian, they are a small organisation that need someone with the right competence to maintain their plains (The marine industry is 20 years behind).	<b>A12-25</b> One of the main advantages with offering integrated solutions and service is that we get a much better customer relationship, we can better find out what they want and they can push us to innovate.
<b>A12-26</b> We have 20 customers, which have big fleets.	<b>A12-27</b> For us to offer service packages we need to monitor our products and we need customers that do not find it profitable to do it themselves.	<b>A12-28</b> Our customers are not price sensitive on service due to their high variable costs.	<b>A12-29</b> We offer our customers integrated solutions to make the everyday life easier for our customers.	<b>A12-30</b> Our competitive advantage is today that we offer integrated solutions.
<b>A12-31</b> We have the documentation, detailed knowledge, history, spare parts and we know the production. We are the best at offering service to our products.	<b>A12-32</b> The initial building of service centres is not so expensive, what are expensive are the capital investments (Spare parts).	<b>A12-33</b> We get our investments in service facilities and equipment back within 5 years.	<b>A12-34</b> It has its disadvantages with being such a big company as we are due to the long communication lines, this complicates the decision making process and made it hard for us to change direction.	<b>A12-35</b>

<b>A22-01</b> We choose our customers based on the size of their aftermarket.	<b>A22-02</b> A tight collaboration with our customers is essential.	<b>A22-03</b> We often visit or call our customers (or customers that we want to acquire) with no other agenda than to maintain and build a relationship.	<b>A22-04</b> We have few, but good customers. This way we can focus our attention and closely work together with our customers.	<b>A22-05</b> Even though our customers are not price sensitive on services due to their high variable costs, it is important not to charge a too high price so that they feel tricked.
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<p><b>A22-06</b> If our customers use our equipment seldom we do not have the resources to use our time on them, because building relationships takes a long time.</p>	<p><b>A22-07</b> Customers close by are really important to use because they are testing ground for us, we go to these when we need to test equipment, this involves risk for them and we need them to take it.</p>	<p><b>A22-08</b> It is important that we get feedback from our customers on how it is to do maintenance and service on our equipment so that we can feed it back to our designers.</p>	<p><b>A22-09</b> We use a lot of time to show our customers the value of something in tangible, this is hard, due to the old norms in the industry.</p>	<p><b>A22-10</b> We work hard to school our customers of the benefits of buying our integrated solutions and services, we must always prove and show them that we have the competence that they need, we need to build credibility.</p>
<p><b>A22-11</b> Operators on boats do not like to be monitored (this is different from the airplane industry where this is standard) and this old norm stops us from offering our customers better service.</p>	<p><b>A22-12</b> We need to be better at analysing our data so that we can tell our customers that in x months you need to have service on this product and then they can plan maintenance and do not need to end an important operation suddenly.</p>	<p><b>A22-13</b> We are not systematically monitoring the quality on our service, this is hard, but every two years an independent firm asks our customers to figure this out, we also talk to our customers and hope that they tell us if something is bad.</p>	<p><b>A22-14</b> Little can be done in the office, we need to be out working together with our customers.</p>	<p><b>A22-15</b> The clue is to have good customers that want to work together to find better solutions.</p>
<p><b>A22-16</b> When we started with integrated solutions we went from transactional to relational interaction with our customers.</p>	<p><b>A22-17</b> In the future it is important that we produce our core products in-house and have the assembly line in-house to keep the innovative spirit alive and so that our service employees can have detailed knowledge of the products.</p>	<p><b>A22-18</b> Our service employees get courses continuously.</p>	<p><b>A22-19</b> It is a long process to be able to work as a service employee with us, you need to start as a production worker, because you need to know the product.</p>	<p><b>A22-20</b> To solve our problem with lack of qualified engineers we could move to other countries, but the problem is that they do not have the culture as we have here, we need the culture and cluster. We cannot live isolated.</p>

<b>A22-21</b> We often “give away” the product so that we will get the aftermarket.	<b>A22-22</b> When we design our products we think of making them easy to do maintenance on, we are also thinking more and more towards modules.	<b>A22-23</b> Quality and flexibility is what is important for us.	<b>A22-24</b> It is important to keep track of profits on products and services and find out which products provide us with the highest service benefits so that we can decide which price we want to charge.	<b>A22-25</b> Our production is separated from sales and service.
<b>A22-26</b> The service employees get involved when the product testing begins, so that they get familiar with the products.	<b>A22-27</b> We should get better at knowledge sharing between our departments.	<b>A22-28</b> The interaction between the service and design department is important to be able to make the products better for service and maintenance.	<b>A22-29</b> If we make products that are hard to do service on then rumours will go in the market right away and we will lose out.	<b>A22-30</b> It is hard to create bonds and transfer knowledge between production and service much because the service employees are seldom home, to better this situation we have built training centres and electronic learning devices.
<b>A22-31</b> Our service department is organised as a responsible for their own costs and profits as are also all of the other areas of the business.	<b>A22-32</b> As important as changing the organisational structure to better knowledge transfer and synergies is to change people’s attitudes (Culture).	<b>A22-33</b> Commando lines are important when it comes to service employees because it is important for them to have one unit/person to deal with.	<b>A22-34</b> When we are as big as we are now it is a dream to think that service can be directly included, it needs its own organisation.	<b>A22-35</b> What has made us so successful is the flat hierarchical structure where it is easy to go and talk with your boss.
<b>A22-36</b> The culture and environment in Sunnmøre has helped us become the company we are today (Culture).	<b>A22-37</b> Due to the culture in Sunnmøre it has been easy for us to get financing and this has made it possible for us to expand.	<b>A22-38</b> In our cluster we are not the highest educated people, but we people with knowledge of culture, management and working in a complicated world and this is important knowledge for our service employees.	<b>A22-39</b> The cluster, local customers and banks have been essential for us to develop into a solution provider. We have relied on these actors to take some of the risk.	<b>A22-40</b> Since we are such a big company it is hard for us to change, the lines for making a decision is long and the communication is hard, due to this it is important for us to have long-term strategies.

<p><b>A22-41</b> The communication between service employees and the management is hard, to solve this it is important for the management to get out of their offices and starts talking to people.</p>	<p><b>A22-42</b> We have formal reporting forms that are supposed to be filled out after completing a service assignment, but this is seldom done right.</p>	<p><b>A22-43</b> We have no special bonus solutions for our service employees, even though it would be nice to award our really good employees.</p>	<p><b>A22-44</b> To estimate service demand we use databases and look at trends, but it is really hell to figure this out.</p>	<p><b>A22-45</b> If there is not much to do for our service employees we get them over in other positions.</p>
<p><b>A22-46</b> The flat hierarchical structure and easy communication lines in our company and cluster has been essential for our success.</p>	<p><b>A22-47</b> The skills and values of service employees are different from that of the production employees.</p>	<p><b>A22-48</b> It has been harder to estimate service demand than we thought, but we have gradually become better and better at this.</p>	<p><b>A22-49</b> Our service employees need to have knowledge in management, culture, customer relationship and of course know the product.</p>	<p><b>A22-50</b> It is hard for us to get a hold of people with the right knowledge and experience for our service department.</p>
<p><b>A22-51</b> We fear to lose our core competence if we are not able to get people with the right knowledge and attitudes.</p>	<p><b>A22-52</b> We fear the Detroit syndrom since we are such a big organisation.</p>	<p><b>A22-53</b> When expanding it has been hard to get suppliers with the right quality and to keep on giving the right quality.</p>	<p><b>A22-54</b> When we have moved along the value chain it has been really important for us not to compete against our own customers.</p>	<p><b>A22-55</b> Being part of a cluster is really important with a servitized business model.</p>



## A-categories FMC Kongsberg Subsea

Represented by After Sales Business Development Manager Odd Gynter Olsen.  
Kongsberg, 8.March 2011 from 11.00 – 15.00

<p><b>A13-01</b> The increased emphasis on the after-market is not primarily driven by the competition from low cost countries.</p>	<p><b>A13-02</b> Relative to many other companies, we have the system and solutions knowledge. Hence we are more solutions providers than a product manufacturer.</p>	<p><b>A13-03</b> The decision to start with EPC contracts have shown to be a wise one as it reduced the risk in a very risk averse industry.</p>	<p><b>A13-04</b> The cost of our EPC contract and the subsea surface system is not large compare to the cost if all the subsea installation. Hence, we cannot take total responsibility for the installation.</p>	<p><b>A13-05</b> We mostly do not fear potential competition from low cost countries, because our relationships and products are knowledge intensive and the scale to small.</p>
<p><b>A13-06</b> The investment and recruitment needed to copy our competitive advantage in knowledge is to very large compared to the scale of revenues, hence it works as an entry barrier.</p>	<p><b>A13-07</b> Generally speaking, we can charge more mark-ups in the aftermarket (time monopoly). But there are also excessive risks involved. Reputation also hinders larger mark-ups.</p>	<p><b>A13-08</b> We are more or less in direct competition with four – five high cost companies. Our market share is roughly 40%.</p>	<p><b>A13-09</b> We do believe in the u-curve for our business, and the industry in general. We are earning money, but it is not goldmine.</p>	<p><b>A13-10</b> The demand for new installations is currently large and arguably at its peak. But the demand is falling and will continue to fall. This makes our aftermarket our future market.</p>
<p><b>A13-11</b> We have a good Installed base ratio, as no, even on its peak about 300/20 total to yearly installations.</p>	<p><b>A13-12</b> The large installed base combined with falling demand and aging installations makes the aftermarket potential huge!</p>	<p><b>A13-13</b> Our customer's willingness to pay for after sales services are huge, but we limit us due to our reputation and future sales.</p>	<p><b>A13-14</b> The downtime cost for the customers are seriously high, but so is the cost of bringing up the subsea installations.</p>	<p><b>A13-15</b> Our customers have always been highly risk averse, hence offering of EPC contracts matched customer's demands.</p>
<p><b>A13-16</b> Both our servitization strategies, firms EPC and increased focus on the aftermarket, have mainly been driven by customer needs.</p>	<p><b>A13-17</b> The customer relationship depends on each customer. This is because we make specific solutions.</p>	<p><b>A13-18</b> We always try to focus on customer's long time success. EPC and subsea services are both part of this philosophy. We put customers first. Win-win situation is the only recipe for success.</p>	<p><b>A13-19</b> By following our philosophy we try to for fill customers need, Even if the customers do not specify them themselves.</p>	<p><b>A13-20</b> We can become even better to respond to customer needs. As the dentist that always recommends you to get your teeth's checked.</p>

<b>A13-21</b> We put customers first, and when customers needed after sales services, we responded.	<b>A13-22</b> By utilising our competence through our service oriented business model, we can take more responsibility and create win- win solutions.	<b>A13-23</b> Our main competitive advantages are systems knowledge, testing and quality capability as well as reputation and customers. This makes servitization attractive.	<b>A13-24</b> Still, despite the rational drivers of EPC and aftermarket. It can be argued that we did not plan it this way, it just happened.	<b>A13-25</b> Limited human resources are one of the main forces holding us back on after sales services.
<b>A13-26</b> Our company culture was rather a driving force than a showstopper for realising the aftermarket potential.	<b>A13-27</b> We want to ensure that the service personnel hold FMC standard, by making them work in production.	<b>A13-28</b> Having a culture for putting customers first has made us successful. Still our service culture can still improve.	<b>A13-29</b> With limited human competent resources there is always a risk of diluting core competence.	<b>A13-30</b> Not everyone is suited for being sent off to customers, but we still value engineering competence higher than service competence.
<b>A13-31</b> The decision to increase emphasis on services came in a top-down manner.	<b>A13-32</b> But how long term and how early the decision was made are discussable.	<b>A13-33</b> Our capabilities together with customer demand, the main drivers for offering aftermarket services and EPC contracts.	<b>A13-34</b> Our installed base is partly locked-in in to our business. So increasing our IB is a good move for the future aftermarket.	

<b>A23-01</b> As our offerings are diverse, our customer-oriented culture is our service strategy.	<b>A23-02</b> Despite having been customer solution oriented for a long time, we still lack some social skills at some engineering personnel. Customers let us know where we lack these skills.	<b>A23-03</b> The cost of having stand by service personnel is large. But so is the downtime cost of customers. This could and should probably be optimised.	<b>A23-04</b> We are not able to keep more in contact with our customers due to shortage of resources.	<b>A23-05</b> The service and production is separated cost/profit centres. So profitability can be tracked.
<b>A23-06</b> A problem with separated service and production is the problems in determining if an income is to be placed into the service or production part.	<b>A23-07</b> The same problem with dividing incomes goes for costs as well. For example if equipment is reproduced and used by the service division.	<b>A23-08</b> Our maybe main hurdle with offering after sales service is the lack of ability to forecast and plan demand and production of services.	<b>A23-09</b> In order to adapt our capacity to demand, in the aftermarket we collect information and experience, but we lack a system to do so. We should improve!	<b>A23-10</b> We can never know when the tire punctures. But, nevertheless, some forecasting is better than nothing.

<b>A23-11</b> Transferring technical to know-how to service personnel is an area we could improve on.	<b>A23-12</b> Our customers are very quality demanding, so they let us know if something is not satisfying. This helps us improve..	<b>A23-13</b> We can and do perform massive quality controls on products, but on the social part, we depend on our people.	<b>A23-14</b> We have more service location in order to be nearer the customer. This is important for providing sufficient service to our customers to succeed.	<b>A23-15</b> As all our installations are highly specialised, our services cannot be standardised and therefore they depend on our service culture.
<b>A23-16</b> Becoming solution oriented has increased the degree of collaboration with other suppliers.	<b>A23-17</b> Offering EPC and installation services put us responsible for our supplier's quality. This we have to accept.	<b>A23-18</b> Moving towards solutions and services, we are making closer relationships with our suppliers and our customers.	<b>A23-19</b> Being a top-down decision, the introduction of the service emphasis could have been communicated in a better way towards employees.	<b>A23-20</b> It did take some time to make our employees used to the now business area. But such things always take time. It is a time and effort consuming process.
<b>A23-21</b> Although our customers might profit on uptime and outsourcing some risk, we cannot offer something he is not ready for.	<b>A23-22</b> Rather than us, we think it is the industry that is path dependent. This implies caution when we introduce new business models.	<b>A23-23</b> We wish to deliver good, successful solutions to customers. Therefore we are not too focused on the contract.	<b>A23-24</b> In the long term, we believe that a smile and customer orientation will be more profitable then contract focus.	<b>A23-25</b> We could potentially take more risk and offer uptime, but what we offer has to match the customer demands.
<b>A23-26</b> We were initially curious to how our customer would welcome our presents in the aftermarket. We did not do much to marked it, but it worked very well. The customers where ready for it!	<b>A23-27</b> It is surprising to see how ready and willing our customers are to by for services, given that they did not demand it. I thing we really hit a customer need.	<b>A23-28</b> Often our customers know very well what need to be done, but still they have not done it or asked for it.	<b>A23-29</b> One time one of our customers expressed "It was about time that you offered to help us with maintaining the installation". This expresses their readiness for it. They had a need, and helping them fulfil this is a potential win-win.	<b>A23-30</b> Our experience tells us that our customers are so taken up by their day-to-day operational tasks that they forget to ask us for help, or even look for better solutions.
<b>A23-31</b> We will help them find better solutions, that is are our mission. This is not an easy mission.	<b>A23-32</b> We have come a long way with our solutions oriented culture, and increasing our aftermarket is a natural part of that culture.	<b>A23-33</b> We have not seen any big cultural clashes after introducing the aftermarket emphasis. It is rather the other way around.	<b>A23-34</b> If we always can see what the customers need to be successful, even before they ask for them themselves. We will always be successful.	<b>A23-35</b> The ability to lay one step ahead is the only way to always be a market leader. If you are always the best, you are the best.

<p><b>A23-36</b> Our strategy to offer EPC contracts has been a huge success. From being a market outsider we are now the market leader.</p>	<p><b>A23-37</b> Increasing focus on the aftermarket has so far been very profitable.</p>	<p><b>A23-38</b> We have still not seen what you refer to as the service paradox. Maybe because we really covered a good spot in the market.</p>	<p><b>A23-39</b> In the future we are forecast that the aftermarket will grow larger.</p>	<p><b>A23-40</b> Our direct competitors are also shifting towards services. This is now surprise, as customers now know what they want.</p>
<p><b>A23-41</b> We think that our recent success has much to do with having a company culture that matches our offerings and also the customers like it.</p>	<p><b>A23-42</b> Today the aftermarket provide about 50 % of our revenues, but this is expected to increase as our IB grows larger and service is needed.</p>	<p><b>A23-43</b> Also, the sale and production of new installations will come to its natural end. We are now well positioned for the aftermarket.</p>	<p><b>A23-44</b> We have not yet determined what to do when all production of new installations stops. But the aftermarket is one opportunity. At least in the short run.</p>	<p><b>A23-45</b> We believe that our customer's success drives our success and future. Hence we help them with that. This is our long-term strategy and vision.</p>
<p><b>A23-46</b> We do have the possibility to extract larger profits for some while buy charging a lot more for services, but this would backfire on us in the long run.</p>	<p><b>A23-47</b> Having a home market and a close relationship to our customers have been an important factor for developing advanced subsea solutions.</p>			

## A-categories The Ulstein Group

Represented by head of accelerated business development, Per Ivar Roald.  
Ulsteinvik, 1. March 2011 from 12.00 – 15.30

<b>A14-01</b> Given our and the country's economic circumstances it seems to be the correct option to move away from labour intensive work.	<b>A14-02</b> Our comparative advantage is our ability to find new solutions and customer relation.	<b>A14-03</b> Focusing on our best capabilities and reducing the use of our weaknesses has brought us to do what we do today.	<b>A14-04</b> Globally services and design have help us position ourselves away from foreign competitors.	<b>A14-05</b> On a local/domestic scale we have to push ourselves to the limits to handle the competition. Locally we have some direct competitors.
<b>A14-06</b> Focusing on design and high-end solutions differentiated us from others. At least for some time.	<b>A14-07</b> The main challenge is to always offer something different or better. Our survival depends on this ability.	<b>A14-08</b> We like big waves and big challenges. This makes room for innovative solutions.	<b>A14-09</b> What we don't like is mass production and standardisation. We cannot compete against Chinese mass production.	<b>A14-10</b> The u-curve relationship is a known fact in our industry. The production stage is highly labour intensive and very competitive.
<b>A14-11</b> The u-curve partly explains why we are putting our emphasis on upstream activities. The margins are high enough to justify our high labour cost.	<b>A14-12</b> We recon the high margins downstream, but unfortunately we are not in a position to exploit those margins.	<b>A14-13</b> In short, what is driving us upstream is our relative competences and the margins.	<b>A14-14</b> We want to be where you have to be innovative to do well. Design and solution focus is helping us get there.	<b>A14-15</b> Our installed base is rather irrelevant as we are not interested in the aftermarket. The only thing we can offer here is the retrofitting.
<b>A14-16</b> Focusing on solution through design is our chance for survival.	<b>A14-17</b> Our local present provides us with a continuous relationship with customers.	<b>A14-18</b> By focusing on design, we offered better solution to customer demand.	<b>A14-19</b> Customers demand comes from the need to tackle harder challenges in economically efficient way.	<b>A14-20</b> One of our new departments, ADB is purely created to suit an unfulfilled customer need.
<b>A14-21</b> In total, our new way of doing business reduced customer risk of ordering something that is not needed.	<b>A14-22</b> By designing ships that are highly specialised and adapted to specifications that we help customers specify.	<b>A14-23</b> We seek to create win-win situations, which we in turn seeks to take our revenue on. Our long-term thinking makes us capable of doing this, because we have the incentives to truly do a great job.	<b>A14-24</b> As we are dependent orders. Design makes us able to create closer relations with the customers. This is critical for getting orders.	<b>A14-25</b> CRM is an important part of our business, because we must fight for every order.

<b>A14-26</b> Despite being one of the world's greatest ship builders, taking the cost in to the equation, we did not have a competitive advantage in building ships.	<b>A14-27</b> We focus on the upstream market, not because that is what we do best, but because that is what we do best compared to others.	<b>A14-28</b> Path dependency was a clear showstopper for our shift of emphasis. No one likes to stop doing what he is good at.	<b>A14-29</b> We can imagine that Greenfield servitization would have been easier. But then we would have lacked basic shipbuilding experience.	<b>A14-30</b> Still, after shifting upstream in the value chain, we find it very useful to have production stage experience.
<b>A14-31</b> The decision to increase emphasis upstream came in a top-down manner. And the decision had a long time horizon.	<b>A14-32</b> We knew it would be a tough process shifting our business more upstream. But we were sure it would make sense in the long term.	<b>A14-33</b> One of our main products today, the X-bow is a result of the shifting emphasis. This underlines the positive outcomes.	<b>A14-34</b> Today the design and shipbuilding are separated cost/profit divisions. We hope to drive synergies from having both at the same location. But we can and should be better at doing so.	<b>A14-35</b> The shipbuilding and design centre are in practical to different companies located the same place. On paper the doors between them are open. But in reality they are half closed.
<b>A14-36</b> Increasing the customer relationship, we have recognised the need for social skills. This lack has been reduced through hiring and teaching.	<b>A14-37</b> Diluting our competitive advantage in shipbuilding was an issue, but we regarded this more as a minor short term hinder, not at showstopper.	<b>A14-38</b> All the support functions and new units are part of the emphasis on solutions and design. To be able to profit from design, we need to reach a certain scale.	<b>A14-39</b> Our ability to think innovative cannot be copied; hence we are better protected against copycats, doing what we do now.	<b>A14-40</b> Our low cost competitors can manufacture products, but they cannot copy our innovative capabilities in design.
<b>A14-41</b> Our informal organisation makes is an innovative strength relative to low cost production countries.	<b>A14-42</b> The constant growth on the supply side makes the production stage an unprofitable business.	<b>A14-43</b> Do to the problems is specifying what the product is in design and solution, there is a risk hence customers prefer companies with a long and good reputation.	<b>A14-44</b> The larger the risks involved for our customers, the more we are preferred. This makes customers willing to pay.	<b>A14-45</b> As well as for design, the customers was willing to pay for integrated solutions

<b>A24-01</b> Focusing on upstream segments, early saw the need for more social skills.	<b>A24-02</b> We required social skill through hiring and teaching.	<b>A24-03</b> Each customer relationship is unique; some tend to be more relational while some are more contractual.	<b>A24-04</b> We did not have a clear service strategy form the beginning, but merely an idea and intuition. The rest has developed organically.	<b>A24-05</b> Thanks to our shipbuilding (Production) business, we were able to grow organically.
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<b>A24-06</b> We did not have big changes in the company structure. Design and solutions has always been a separated division.	<b>A24-07</b> Despite being different companies we seek to keep the doors between them open to allow learning and competence creation.	<b>A24-08</b> We were very luck with our timing. As the shift of emphasis came in a boom, we could simply acquire needed skill/resources through hiring.	<b>A24-09</b> Having different divisions for each business unit have created some “walls” between them. This creates some sub-optimisation.	<b>A24-10</b> The positive of having cost/profit separated design and production is the ability to measure where to put our extra resources.
<b>A24-11</b> An increasing organisational challenge is how to integrate foreign workers into the Ulstein culture.	<b>A24-12</b> Designing ships according to customer conversation is totally different then welding metal. Hence it requires some different skills.	<b>A24-13</b> The buy ups of foreign afflictions have been a cultural and quality wise challenge.	<b>A24-14</b> Our informal organisation makes it an innovative strength relative to low cost production countries.	<b>A24-15</b> The paradox is that, the better people are in doing what they are doing, the harder it is to make them do something new.
<b>A24-16</b> We have several business models in delivering ships. This has different effect on suppliers and customers.	<b>A24-17</b> In orders where we deliver complete ships and outsource the building we have to carefully select shipyards that cannot take our place.	<b>A24-18</b> In a competitive environment as shipbuilding, we must position ourselves such that we do add value to the product.	<b>A24-19</b> Unless we provide value to the end product, the business is not sustainable for us.	<b>A24-20</b> After developing competence and reputation for ship design, it is critical to develop a large enough scale so we can increase profitability.
<b>A24-21</b> After positioned ourselves in the design market, we must arrange global sales so that we can use our designs as much as possible.	<b>A24-22</b> For single quantity, high tech ships we can profit from producing the ship ourselves. This justifies keeping the production facility and competence.	<b>A24-23</b> We do not wish to quit producing/building ships totally. This because it gives us hands on experience and because sometimes we have to build specialised parts ourselves.	<b>A24-24</b> Buying up other firms is part of our strategy to get use of our design competence on a larger scale. This is part of our long terms growth strategy.	<b>A24-25</b> When moving upstream and outsourcing production, we have to be careful not to let go of our core competence. This is a constant issue to solve.
<b>A24-26</b> Our customer relationships are still mainly transactional, but they are much closer than before. With some of our customers we hold a long history and a relational relationship.	<b>A24-27</b> The volatility of orders and cash flow has not changed after as a result of our solution orientation.	<b>A24-28</b> The new focus on design and solutions has been well received by our customers. To be successful customers must be ready and in need for it.	<b>A24-29</b> We hope and believe that the customers associate our name and brand with ships designing capability.	<b>A24-30</b> Performing quality management on a design service is not as easy as in product, because much of what we delivers cannot be produced and checked before it is delivered.

<p><b>A24-31</b> In order to assure acceptable quality on all our services we try to select the right people for the right team. Further then that we do not have a report system.</p>	<p><b>A24-32</b> Quality management on services are much harder than on tangible products, because it is created in collaboration with customers.</p>	<p><b>A24-33</b> Quality control on social experiences as designing in teams should be done prior to “production” to ensure that it is good enough. This it at least how we do it. There is a potential for improving here.</p>	<p><b>A24-34</b> Although we can satisfy our customers well today, we are afraid of having all our eggs in one market. This is the biggest “hake” with focusing on selective customers.</p>	<p><b>A24-35</b> When making strategic changes, it is outmost important to communicate the changes and why they are taking place. Understand that people precept things differently.</p>
<p><b>A24-36</b> Repositioning ourselves along the value chain has had its cost, but we are much better position for the future now than before.</p>	<p><b>A24-37</b> Arguably we have not seen all the benefits from the investment in upstream business segments. This takes time</p>	<p><b>A24-38</b> The change of emphasis and business model was arguably done to change for long-term profit. It is still too early to tell what the result of the investment will be.</p>	<p><b>A24-39</b> So far we are quite sure the changes we have made have been, and will show to be successful in the future. Because we are better positioned and have higher earnings.</p>	<p><b>A24-40</b> In this industry it’s hard to say what our state would have been if we had not done what we did. Nevertheless the future remains unknown.</p>
<p><b>A24-41</b> In order to handle the upstream tasks, we needed to increase our general level of education.</p>	<p><b>A24-42</b> We have learned and now understand that clear communication towards employees is outmost important and very easy to underestimate.</p>	<p><b>A24-43</b></p>	<p><b>A24-44</b></p>	<p><b>A24-45</b></p>



## A-categories Rapp Marine

Represented by CEO Tove Pettersen.  
Bodø, 22. March 2011 from 08.30 – 11.30

<p><b>A15-01</b> Given our and the countries labour costs it seems vital to move away from standardised tasks that are labour intensive. After-sales service is one of the answers to this situation.</p>	<p><b>A15-02</b> Our competitive advantage is to deliver high quality and tailor made equipment and tailor made equipment for fishing vessels (Hydema). This drives us towards ass and solution orientation.</p>	<p><b>A15-03</b> Bomek has its main competitive advantage in making the safest doors according to the highest Norwegian standard. In cases we are the standard it selves.</p>	<p><b>A15-04</b> We believe in the u-curve relationship between margins and value chain position, and it forces us away from standardised domestic production.</p>	<p><b>A15-05</b> The external environment forces Hydema to delivered more tailor-made products and less mass-produced equipment. Nevertheless, we do have some basis for all our products.</p>
<p><b>A15-06</b> Service requires high competent people and hence it justifies our high cost and high competent people.</p>	<p><b>A15-07</b> We have the potential for getting competitive high competent people but not competitive production workers.</p>	<p><b>A15-08</b> External Norwegian safety regulations make creates the after-market of services.</p>	<p><b>A15-09</b> What we don't like is mass production and standardisation. Then we cannot compete. So far we have only started taking the easy way out. Outsourcing.</p>	<p><b>A15-10</b> Outsourcing production and focusing on sales, services and product development is the straightforward way of dealing with our economic circumstances.</p>
<p><b>A15-11</b> Safety regulations and other external factors have formed our business very much and differentiated us from our global competitors.</p>	<p><b>A15-12</b> Regulatory factors have driven us to where we are today, and fortunately we have been very reactive.</p>	<p><b>A15-13</b> In the case of Bomek, the external environment has opened the chance for us to take a unique market position in the domestic market as well as differentiating us in the global market.</p>	<p><b>A15-14</b> Now and in the in the future a head we see after-sales service in relation to external regulation as a big potential aftermarket.</p>	<p><b>A15-15</b> Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions.</p>
<p><b>A15-16</b> Having very risk averse oil industry customers, having high day prices, makes it easier to sell high quality products and after sales services.</p>	<p><b>A15-17</b> Our Bomek customers cannot do perform the services themselves as they need to be certified.</p>	<p><b>A15-18</b> Our ad hoc business development and extensive cultural boundaries are the basis for all our innovations. This may cause pros and cons.</p>	<p><b>A15-19</b> Or ad hoc and cultural history make innovations synonym with product innovations. This may hinder business innovations such as servitization.</p>	<p><b>A15-20</b> Our operational focus on production and sales may have hindered us in lifting our eyes and realise the servitization opportunities earlier.</p>

<p><b>A15-21</b> The long lifetime on our ship equipment have made our after-sales emphasis very small (Hydema). We haven't really examined the option of this market.</p>	<p><b>A15-22</b> We have our comparative advantage in safety and regulatory competence and are determined to use this in the aftermarket for fire doors (Bomek).</p>	<p><b>A15-23</b> We have an advantage in delivering after-sales services because we make the doors and hence can fix them as well (Bomek).</p>	<p><b>A15-24</b> To make customer specified products does not differentiate us from other competitors (Bomek), but makes us able to utilise our competence.</p>	<p><b>A15-25</b> We still have a production oriented culture and focus, but we are exploring the growth opportunities for services. For the moment Bomek Ass is the main service area.</p>
<p><b>A15-26</b> Our current strategic position is the sum of many small individual choices. We have been driven by individual gut feelings, but this is changing and we wish to develop more long term planning.</p>	<p><b>A15-27</b> Our geographic location also makes transport a big issue. We have large transportation costs. More emphasis on services and knowledge should ease this burden.</p>	<p><b>A15-28</b> Having a long history with customers and a large installed base makes it easier to sell after sales services.</p>	<p><b>A15-29</b> Our people and their attitude is our strength. They are the driving force of the Rapp Marine Group.</p>	<p><b>A15-30</b> Having a production facility is very important for the product development process. It also helps a great lot having hands on experience. This is another advantage we have in offering services.</p>
<p><b>A15-31</b> The ISO 9000 certification is a result of this customer demand that we saw and reacted on. Being more proactive we may have done this before and used is as a sales argument.</p>	<p><b>A15-32</b> In the case of Bomek we have been fortunate and responded well to our customers demand. This has driven Bomek to offer service packages today.</p>	<p><b>A15-33</b> Relationship to customers means everything. Hence, we listen and offer what they as for ++. We focus on offering what they need in terms of the product.</p>	<p><b>A15-34</b> Our offerings vary a great lot from customers to customers. We have to individually sense each situation and determine what kind of product we can sell.</p>	<p><b>A15-35</b> A more proactive focus may rather than reactive relations to customer may have increased our business innovations towards services and solutions rather than tangible products.</p>
<p><b>A15-36</b> Our changes are all undoubtedly been a result of customer needs and requirements. Even regulations have first been incorporated in our business, as customers have demanded it.</p>	<p><b>A15-37</b> Despite not having any accidents for a long time, our Bomek customers in the oil industry are very precaution and risk averse. They choose us.</p>	<p><b>A15-38</b> For Bomek, we do not need to extensively brand and pursue our customers as we are now in a very good position for winning the order for safe fire doors. We simply make the safest fire doors.</p>	<p><b>A15-39</b> The challenge with Bomek is to get as many service contracts as possible. Arguably choosing us a service supplier should maximise utility for us and customers.</p>	

<b>A25-01</b> Focusing on downstream activities we have clearly seen the need for other personal competences than those we had.	<b>A25-02</b> Being more customer oriented have caused issues as we have problem hiring resources with technical knowhow and social competence.	<b>A25-03</b> Technical knowhow is still the most important quality, as hiring pure sales people have shown to be a waste.	<b>A25-04</b> We have never had a clear service strategy, and the development has been ad hock. It has worked as we have the right people.	<b>A25-05</b> To provide the technical service, be able to sell and having social skill is much to ask. Hence we need 100 % trustable people.
<b>A25-06</b> We offer a lot of technical training to ensure that our service people can fix the problems they face.	<b>A25-07</b> The lack of ability to perform quality control on the Rapp service makes us even more caution about whom we are sending out.	<b>A25-08</b> Service need high competence and produce high income, hence we can justify hiring expensive Norwegian resources.	<b>A25-09</b> Service margins and our reputation of quality make high competent service personnel, vital!	<b>A25-10</b> To ensure we have the right service people we pay them well. All of them need to have hands on experience form production.
<b>A25-11</b> Local agents help us get contact with international customers by connecting to them after their social rules.	<b>A25-12</b> It is an art to manage social relationships according to local standards while delivering services. Very demanding but essential.	<b>A25-13</b> Services have increased the importance of having relations to customers. And vice versa, increased relationships have made it possible to sell more (services ++).	<b>A25-14</b> Offering services when you have such a product-oriented culture is hard, and maybe not right. Our culture has got us where we are today, and we cannot simply transform it.	<b>A25-15</b> Our history makes us proud and gives us the moral to stay competitive despite our weaknesses. But it also creates a strong path dependency that hinders change.
<b>A25-16</b> Changes in business calls for changes in the organisation. We are now organising our firms by business areas rather den geographically to hinder sub-optimisation.	<b>A25-17</b> Having after-sales services and productions as separated departments will not create sub-optimisation despite wanting to maximise their own department, that are all Rapp!	<b>A25-18</b> We cannot change ("servitize") alone. The whole chain around us must be alone. We are not big enough to do it, and we lack overview to exploit it.	<b>A25-19</b> Fining: Servitization demands some "free" resources and time. Simply doing it as a last minute survival or by chance is risky. And you fall in the traps.	<b>A25-20</b> For Bomek external environment, ass has come naturally and driven the process of after-sales services.
<b>A25-21</b> Not being part of a business cluster is a clear weakness that makes us unable to offer complete solutions. Having suppliers and partners in a cluster is critical to offer this.	<b>A25-22</b> Having competitors better positioned geographically makes it clear what we can and cannot do.	<b>A25-23</b> Having implemented ISO standards and more systems that where needed to stay sustainable even when the starters and the old "Rapp generation" are leaving, have caused more overheads.	<b>A25-24</b> These systems are needed to for long terms/strategic thinking and the survival of Rapp in terms of employees, staying competitive and keeping knowledge within the organisation.	<b>A25-25</b> We cannot explain the customer what is best, rather it's the other way around.

<p><b>A25-26</b> An example of our customer relationship is my colleagues 50 th. Birthday, where about half of the guests were former or potential customers.</p>	<p><b>A25-27</b> In the industry of winches, it is very much “You like me, I like you, let’s make a trade”. We have to play by the rule when we are so small. Hence the size matters.</p>	<p><b>A25-28</b> From time to time we sell seek to sell strategic products in order to capture a potential long-term customer for both new products and services. Or even to brand our self to a third party customer.</p>	<p><b>A25-29</b> We reckon that renting out winches could be a win-win opportunity, but having tried it in the US we have not though anything more about it. The customers don’t seem ready.</p>	
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## Appendix D

### B-categories

#### B – categories RQ1

##### B11 – External

###### **B11-01: It is hard to compete on production cost because of the increasing competition and the high labour cost in Norway**

A12-01 Companies that do not have any R&D costs push the prices down and makes it impossible to compete on production cost.

A12-02 To survive we have to sell integrated solutions, because on single parts we are the most expensive provider.

A12-04 Hard competition from the domestic and international market makes it essential for us to compete on innovation and service.

A12-15 If we did not have the fierce pressure from local and international competitors, the journey towards integrated solutions would have gone much slower.

A14-01 Given our and the country's economic circumstances it seems to be the correct option to move away from labour intensive work.

A14-09 What we don't like is mass production and standardisation. We cannot compete against Chinese mass production.

A14-10 The u-curve relationship is a known fact in our industry. The production stage is highly labour intensive and very competitive.

A15-01 Given our and the countries labour costs it seems vital to move away from standardised tasks that are labour intensive. After-sales service is one of the answers to this situation.

A15-09 What we don't like is mass production and standardisation. Then we cannot compete. So far we have only started taking the easy way out. Outsourcing.

A14-26 Despite being one of the world's greatest ship builders, taking the cost in to the equation, we did not have a competitive advantage in building ships.

A21-25 We can compete on production cost because we are good at automation.

###### **B11-02: Many manufacturing goods are hard to differentiate as they are being commoditised**

A12-03 It is today hard to differentiate our products.

A12-05 There is more and more commoditisation in our industry.

A12-09 The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.

A12-15 If we did not have the fierce pressure from local and international competitors, the journey towards integrated solutions would have gone much slower.

A14-42 The constant growth on the supply side makes the production stage an unprofitable business.

###### **B11-03: The margins on solutions and services are generally higher than on products**

A12-07 The higher margins on service has definitely made it attractive for us to focus on service and we often "give away" products just so that we can make money of the aftermarket.

A12-09 The margins have been squeezed on products, so it has been natural for us to focus more and more on service and design.

A12-10 Service is always good business, it has given us good margins and profit.

A11-06 It is generally higher margins on services than on products.

A14-11 The u-curve partly explains why we are putting our emphasis on upstream activities. The margins are high enough to justify our high labour cost.

A14-12 We recon the high margins downstream, but unfortunately we are not in a position to exploit those margins.

A13-07 Generally speaking, we can charge more mark-ups in the aftermarket (time monopoly). But there are also excessive risks involved. Reputation also hinders larger mark-ups.

A13-09 We do believe in the u-curve for our business, and the industry in general. We are earning money, but it is not goldmine.

A15-04 We believe in the u-curve relationship between margins and value chain position, and it forces us away from standardised domestic production.

**B11-04: Customers are less price-sensitive, but companies should be careful in exploiting this**

A22-05 Even though our customers are not price sensitive on services due to their high variable costs, it is important not to charge a too high price so that they feel tricked.

A11-10 Customers are not price sensitive when it comes to service and spare parts.

A23-46 We do have the possibility to extract larger profits for some while buy charging a lot more for services, but this would backfire on us in the long run.

**B11-05: Servitization offers new possibilities to differentiate offerings**

A12-04 Hard competition from the domestic and international market makes it essential for us to compete on innovation and service.

A12-14 One of the main advantages with offering integrated solutions and service is the ability to differentiate and compete on something else than price.

A14-04 Globally services and design have help us position ourselves away from foreign competitors.

A14-05 On a local/domestic scale we have to push ourselves to the limits to handle the competition. Locally we have some direct competitors.

A14-06 Focusing on design and high-end solutions differentiated us from others. At least for some time.

A15-11 Safety regulations and other external factors have formed our business very much and differentiated us from our global competitors.

A23-38 We have still not seen what you refer to as the service paradox. Maybe because we really covered a good spot in the market.

**B11-06: Servitized offerings are harder to imitate**

A14-40 Our low cost competitors can manufacture products, but they cannot copy our innovative capabilities in design.

A13-06 The investment and recruitment needed to copy our competitive advantage in knowledge is very large compared to the scale of revenues, hence it works as an entry barrier.

A14-39 Our ability to think innovative cannot be copied; hence we are better protected against copycats, doing what we do now.

**B11-07: Servitization offers manufacturing companies a new market and growth opportunities**

A13-10 The demand for new installations is currently large and arguably at its peak. But the demand is falling and will continue to fall. This makes our aftermarket our future market.

A23-39 In the future we are forecast that the aftermarket will grow larger.

A23-40 Our direct competitors are also shifting towards services. This is now surprise, as customers now know what they want.

A23-43 Also, the sale and production of new installations will come to its natural end. We are now well positioned for the aftermarket.

A23-44 We have not yet determined what to do when all production of new installations stops. But the aftermarket is one opportunity. At least in the short run.

**B11-08: By offering services and complete solutions it is possible to lock-in customers**

A11-09 When offering services it is much easier to lock-in customers.

A12-19 Our customers don't like it, but with offering integrated solutions, learning centres, as well as services, we are able to lock in our customers.

**B11-09: Companies can lock in customers by strategically selling products at give away prices**

A22-21 We often "give away" the product so that we will get the aftermarket.

A21-08 We sometimes give away the product just so that we can get the aftermarket.

A25-28 From time to time we sell seek to sell strategic products in order to capture a potential long-term customer for both new products and services. Or even to brand our self to a third party customer.

**B11-10: New technology has made it possible to offer more efficient services and solutions**

A12-08 New technology of monitoring our products has made it possible for us to reduce the variable cost of our customers.

A11-02 The technology has made it possible to offer service in a new way.

A11-05 Condition monitoring has opened the door to a new way of offering service.

**B11-11: Increasing product complexity creates new demand for service offerings**

A12-12 The technology is becoming so advanced, so there is a new demand for training of our customers' personnel.

A11-03 The technology is developing rapidly.

**B11-12: Low customer product competence increases the attractiveness of servitization**

A12-24 Solution packages work in the airplane industry and not for us because of the strict regulations and the demands for capital investments, take for example Norwegian, they are a small organisation that need someone with the right competence to maintain their plains (The marine industry is 20 years behind).

A15-40 Our Bomek customers cannot do perform the services themselves, as they need to be certified.

**B11-13: Being part of a cluster makes servitization more feasible and attractive**

A15-15 Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions.

A22-55 Being part of a cluster is really important with a servitized business model.

A25-18 We cannot change ("servitize") alone. The whole chain around us must be alone. We are not big enough to do it, and we lack overview to exploit it.

A25-21 Not being part of a business cluster is a clear weakness that makes us unable to offer complete solutions. Having suppliers and partners in a cluster is critical to offer this.

A22-36 The culture and environment in Sunnmøre has helped us become the company we are today (Culture).

A22-39 The cluster, local customers and banks have been essential for us to develop into a solution provider, we have relied on these actors to take some of the risk.

A22-20 To solve our problem with lack of qualified engineers we could move to other countries, but the problem is that they do not have the culture as we have here, we need the culture and cluster. We cannot live isolated.

**B12 – Internal**

**B12-01: Servitization facilitates low scale and competence intensive offerings**

A11-19 We produce in small series and customise to fit the customer.

A15-02 Our competitive advantage is to deliver high quality and tailor made equipment and tailor made equipment for fishing vessels (Hydema). This drives us towards after-sales services and solution orientation.

A15-06 Service requires high competent people and hence it justifies our high cost and high competent people.

A15-24 To make customer specified products does not differentiate us from other competitors (Bomek), but makes us able to utilise our competence.

A13-17 The customer relationship depends on each customer. This is because we make specific solutions.

A14-14 We want to be where you have to be innovative to do well. Design and solution focus is helping us get there.

A15-01 Given our and the countries labour costs it seems vital to move away from standardised tasks that are labour intensive. After-sales service is one of the answers to this situation.

A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

**B12-02: By servitizing companies can better utilise their comparative advantages in customer relation and innovative capabilities**

A14-08 We like big waves and big challenges. This makes room for innovative solutions.

A14-14 We want to be where you have to be innovative to do well. Design and solution focus is helping us get there.

A15-02 Our competitive advantage is to deliver high quality and tailor made equipment and tailor made equipment for fishing vessels (Hydema). This drives us towards after-sales services and solution orientation.

A15-06 Service requires high competent people and hence it justifies our high cost and high competent people.

A15-07 We have the potential for getting competitive high competent people but not competitive production workers.

A15-24 To make customer specified products does not differentiate us from other competitors (Bomek), but makes us able to utilise our competence.

A13-22 By utilising our competence through our service oriented business model, we can take more responsibility and create win- win solutions.

A25-08 Service need high competence and produce high income, hence we can justify hiring expensive Norwegian resources.

A14-16 Focusing on solution through design is our chance for survival.

A14-02 Our comparative advantage is our ability to find new solutions and customer relation.

A14-41 Our informal organisation makes is an innovative strength relative to low cost production countries.

A13-26 Our company culture was rather a driving force then a showstopper for realising the aftermarket potential.

A14-27 We focus on the upstream market, not because that is what we do best, but because that is what we do best compared to others.

A13-33 Our capabilities together with customer demand, the main drivers for offering after market services and EPC contracts.

A13-47 Having a home market and a close relationship to our customers have been an important factor for developing advanced subsea solutions.

#### **B12-03: An informal culture and short communication lines make servitization attractive**

A11-18 Our comparative advantage is the lack of corporate layers and lean and flexible organisation.

A11-24 The small size of the company makes the communication lines shorter and makes it easier to offer a good service function.

A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

#### **B12-04: Having a large (and aging) installed-base-to-new-unit ratio increases the attractiveness of downstream servitization**

A11-01 When the IB increased, we increased the service function (IB = 7000).

A14-15 Our installed base is rather irrelevant as we are not interested in the aftermarket. The only thing we can offer here is the retrofitting.

A14-38 All the support functions and new units are part of the emphasis on solutions and design. To be able to profit from design, we need to reach a certain scale.

A12-06 A big IB has made it possible to expand our service offering (30 000 +).

A15-28 Having a long history with customers and a large installed base makes it easier to sell after sales services.

A13-34 Our installed base is partly locked-in in to our business. So increasing our IB is a good move for the future aftermarket.

A13-12 The large installed base combined with falling demand and aging installations makes the aftermarket potential huge.

#### **B12-05: Manufacturer's extensive product know-how makes them favourable to offer product related services.**

A11-20 We know our products better than any other and are hence the best suited to offer services.

A11-21 Since we have our own production we are competent to offer services (learning effect).

A11-22 We can quickly produce parts that our customers need and are hence the best to offer services to our customers.

A14-30 Still, after shifting upstream in the value chain, we find it very useful to have production stage experience.

A12-31 We have the documentation, detailed knowledge, history, spare parts and we know the production. We are the best at offering service to our products.

A15-23 We have an advantage in delivering after-sales services because we make the doors and hence can fix them as well (Bomek).

A15-30 Production facility is very important for the product development process. It also helps a great lot having hands on experience. This is another advantage we have in offering services.

A13-23 Our main competitive advantages are systems knowledge, testing and quality capability as well as reputation and customers. This makes servitization attractive.

#### **B12-06: Servitization can dilute the core competence in the short term**



A14-37 Diluting our competitive advantage in ship building was an issue, but we regarded this more as a minor short term hinder, not at showstopper.

A13-29 With limited human competent resources there is always a risk of diluting core competence.

A14-32 We knew it would be a tough process shifting our business more upstream. But, we were sure it would make sense in the long term.

## **B13 – Customer**

### **B13-01: Servitization is attractive when customers have high variable costs**

A15-08 External Norwegian safety regulations make creates the after-market of services.

A15-11 Safety regulations and other external factors have formed our business very much and differentiated us from our global competitors.

A15-12 Regulatory factors have driven us to where we are today, and fortunately we have been very reactive.

A15-13 In the case of Bomek, the external environment has opened the chance for us to take a unique market position in the domestic market as well as differentiating us in the global market.

A12-23 Our customers have very high variable costs, but the criticality varies from customer to customer.

A12-24 Service packages work in the airplane industry and not for us because of the strict regulations and the demands for capital investments, take for example Norwegian, they are a small organisation that need someone with the right competence to maintain their plains (The marine industry is 20 years behind).

A12-27 For us to offer service packages we need to monitor our products and we need customers that do not find it profitable to do it themselves.

A13-14 The downtime cost for the customers are seriously high, but so is the cost of bringing up the subsea installations.

A14-44 The larger the risks involved for our customers, the more we are preferred. This makes customers willing to pay.

### **B13-02: Risk averse customers make servitization more attractive**

A15-16 Having very risk averse oil industry customers, having high day prices, makes it easier to sell high quality products and after sales services.

A15-22 We have our comparative advantage in safety and regulatory competence and are determined to use this in the aftermarket for fire doors (Bomek).

A11-13 Customers choose our services because of their uncertainty and risk.

A14-21 In total, our new way of doing business reduced customer risk of ordering something that is not needed.

A14-44 The larger the risks involved for our customers, the more we are preferred. This makes customers willing to pay.

A15-37 Despite not having any accidents for a long time, our Bomek customers in the oil industry are very precaution and risk averse. They choose us.

A13-03 The decision to start with EPC contracts has shown to be a wise one as it reduced the risk in a very risk averse industry.

A13-15 Our customers have always been highly risk averse, hence offering of EPC contracts matched customers demands.

A11-10 Customers are not price sensitive when it comes to service and spare parts.

A12-27 For us to offer service packages we need to monitor our products and we need customers that do not find it profitable to do it themselves.

A14-45 As well as for design, the customers is willing to pay for integrated solutions.

A13-13 Our customer's willingness to pay for after sales services are huge, but we limit us due to our reputation and future sales.

A11-23 We would like to, but cannot offer these so called service packages because it is too big a risk for us.

### **B13-03: Servitization is more attractive when it can fulfil and unfulfilled customer need**

A14-18 By focusing on design, we offered better solution to customer demand.

A14-20 One of our new departments, ADB is purely created to suit an unfulfilled customer need.

A15-05 The external environment forces Hydema to deliver more tailor-made products and less mass-produced equipment. Nevertheless, we do have some basis for all our products.

A15-34 Our offerings vary a great lot from customers to customers. We have to individually sense each situation and determine what kind of product we can sell.

A13-19 By following our philosophy we try to fill customers need, even if the customers do not specify them themselves.

A15-36 Our changes are all, undoubtedly, been a result of customer needs and requirements. Even regulations have first been incorporated in our business, as customers have demanded it.

A13-16 Both our servitization strategies, firms EPC and increased focus on the aftermarket have mainly been driven by customer needs.

A13-18 We always try to focus on customer's long time success. EPC and subsea services are both part of this philosophy. We put customers first. Win-win situation is the only recipe for success.

A15-32 In the case of Bomek we have been fortunate and responded well to our customers demand. This has driven Bomek to offer service packages today.

A11-11 It is because customers demand service from us that we offer it. It creates value for us when it creates value for them.

A11-14 We offer services to make our customers happy and satisfied.

A12-21 We have chosen to offer solution packages after a tight collaboration with our customers and together we have found out that it is most beneficial for our customers that we offer these packages.

A15-33 Relationship to customers means everything. Hence, we listen and offer what they ask for ++. We focus on offering what they need in terms of the product.

#### **B13-04: Servitization requires customers that are ready and cultivated for the new offerings**

A11-12 Today customers are not ready for service-packages, but there is a tendency towards it.

A12-18 We are ready to offer service packages, but are customers are not, due to the marine tradition of having the knowledge to fix the problems themselves.

A12-20 Many operators on boats do not like us to monitor their operations, this holds the servitization process back because if we were allowed to do this we could be able to tell the owners of the boats that you should do service on your both within 3 months and this would have then been win – win.

A12-22 (When talking of service packages): Our customers are professional with a high level of knowledge and they want to control their own maintenance costs.

#### **B13-05: Servitization can create a win-win situation as the incentives between the company and their customers become aligned**

A13-22 By utilising our competence through our service oriented business model, we can take more responsibility and create win- win solutions.

A11-08 To be able to offer service packages and create a win-win situation, the customer must be able to see the value of the service offerings.

A23-29 One time one of our customers expressed “It was about time that you offered to help us with maintaining the installation”. This expresses their readiness for it. They had a need, and helping them fulfil this is a potential win-win.

#### **B13-06: The offerings should fulfil individual customer need**

A14-18 By focusing on design, we offered better solution to customer demand.

A24-28 The new focus on design and solutions has been well received by our customers. To be successful customers must be ready and in need for it.

A23-25 We could potentially take more risk and offer uptime, but what we offer has to match the customer demands.

## **B – categories RQ2**

### **B21 – External**

#### **B21-01: Companies should collaborate with other actors in the supply chain**

A23-16 Becoming solution oriented has increased the degree of collaboration with other suppliers.

A23-18 Moving towards solutions and services, we are making closer relationships with our suppliers and our customers.

A22-53 When expanding, it has been hard to get suppliers with the right quality and to keep on giving the right quality.

A23-17 Offering EPC and installation services put us responsible for our supplier's quality. This we have to accept.

A15-15 Our geographic position outside the shipbuilding cluster is a hinder for offering complete ship equipment solutions.

A22-55 Being part of a cluster is really important with a servitized business model.

A25-21 Not being part of a business is a clear weakness that makes us unable to offer complete solutions. Having suppliers and partner in a cluster is critical to offer this.

#### **B21-02: Strategic alliances can be helpful when servitizing**

A25-11 Local agents help us get contact with international customers by connecting to them after their social rules.

### **B22 – Internal**

#### **B22-01: Service oriented culture is beneficial**

A25-14 Offering services when you have such a product-oriented culture is hard, and maybe not right. Our culture has got us where we are today, and we cannot simply transform it.

A22-32 As important as changing the organisational structure to better knowledge transfer and synergies is to change people's attitudes (Culture).

A24-15 The paradox is that, the better people are in doing what they are doing, the harder it is to make them do something new.

A23-33 We have not seen any big cultural clashes after introducing the aftermarket emphasis. It is rather the other way around.

#### **B22-02: Servitization requires a customer-oriented culture**

A23-01 As our offerings are diverse, our customer-oriented culture is our service strategy.

A23-15 As all our installations are highly specialised, our services cannot be standardised and therefore they depend on our service culture.

A23-32 We have come a long way with our solutions oriented culture, and increasing our aftermarket is a natural part of that culture.

A22-14 Little can be done in the office, we need to be out working together with our customers.

A23-24 In the long term, we believe that a smile and customer orientation will be more profitable then contract focus.

#### **B22-03: Companies should strive to be flexible**

A21-11 It is positive to be a relatively small company like us, because it is easy to make fast decisions and this helps us respond to customer demands faster.

A21-13 We are able to deliver a service quality that our competitors cannot, due to our small company size.

A21-16 The customer has one contact person in the company and always contacts this person

A21-17 We rotate the employees in production and service.

A21-34 If the demand for service suddenly increases, then we take people from the production and send them out on service assignments.

A21-40 The in-house production is important because it is possible to quickly produce spare parts.

A25-15 Our history makes us proud and gives us the moral to stay competitive despite our weaknesses. But it also creates a strong path dependency that hinders change.

A22-23 Quality and flexibility is what is important for us.

A11-18 The lack of corporate layers makes our organisation lean and flexible. This is a clear advantage.

#### **B22-04: Path dependency may hinder servitization**

A14-28 Path dependency was a clear showstopper for our shift of emphasis. No one likes to stop doing what he is good at.

A14-29 We can imagine that Greenfield servitization would have been easier. But then we would have lacked basic shipbuilding experience.

A15-18 Our ad hoc business development and extensive cultural boundaries are the basis for all our innovations. This may cause pros and cons.

A15-19 Or ad hoc and cultural history make innovations synonym with product innovations. This may hinder business innovations such as servitization.

A15-20 Our operational focus on production and sales may have hindered us in lifting our eyes and realise the servitization opportunities earlier.

A22-40 Since we are such a big company it is hard for us to change, the lines for making a decision is long and the communication is hard, due to this it is important for us to have long-term strategies.

**B22-05: The organisation of the service division**

A21-26 The service department is not run as a cost/profit centre because making losses on the product and earnings on the service had been difficult to justify.

A23-06 A problem with separated service and production is the problems in determining if an income is to be placed into the service or production part.

A23-07 The same problem with dividing incomes goes for costs as well. For example when equipment is reproduced and used by the service division.

A24-09 Having different divisions for each business unit have created some “walls” between them. This creates some sub-optimisation.

A25-17 Having after-sales services and productions as separated departments will not create sub-optimisation despite wanting to maximise their own department, that are all Rapp!

A22-25 Our production is separated from sales and service.

A22-31 Our service department is organised as a responsible for their own costs and profits as is also all of the other areas of the business.

A23-05 The service and production is separated cost/profit centres. So profitability can be tracked.

A24-06 We did not have big changes in the company structure. Design and solutions has always been a separated division.

A24-10 The positive of having cost/profit separated design and production is the ability to measure where to put our extra resources.

A14-34 Today the design and shipbuilding are separated cost/profit divisions. We hope to drive synergies from having both at the same location, But we can and should be better at doing so.

A23-05 The service and production is separated cost/profit centres. So profitability can be tracked

A22-34 When we are as big as we are now it is a dream to think that service can be directly included, it needs its own organisation.

A25-16 Changes in business calls for changes in the organisation. We are now organising our firms by business areas rather den geographically to hinder sub-optimisation.

**B22-06: It is beneficial to have a flat organisational structure**

A22-35 What has made us so successful is the flat hierarchical structure where it is easy to go and talk with your boss.

A22-41 The communication between service employees and the management is hard, to solve this it is important for the management to get out of their offices and starts talking to people.

A22-46 The flat hierarchical structure and easy communication lines in our company and cluster has been essential for our success.

A24-14 Our informal organisation makes it an innovative strength relative to low cost production countries.

**B22-07: Important to ensure close collaboration and knowledge sharing between departments**

A22-26 The service employees get involved when the product testing begins, so that they get familiar with the products.

A22-27 We should get better at knowledge sharing between our departments.

A23-11 Transferring technical to know-how to service personnel is an area we could improve on.

A21-15 We have a really good cooperation between the sales and service departments.

A21-23 The interaction and cooperation between sales, service and production is very important.

A24-07 Despite being different companies we seek to keep the doors between them open to allow learning and competence creation.

**B22-08: The products should support servitization**

A21-18 The products are produced so that they can easily be maintained and done service on, this is important.

A22-22 When we design our products we think of making them easy to do maintenance on, we are also thinking more and more towards modules.

A22-29 If we make products that are hard to do service on then rumours will go in the market right away and we will lose out.

**B22-09: Continuous learning processes within the organisation should be established**

A21-44 Our service technicians are in a continuous learning process. When they are not on an assignment they are often schooled in the production.

A21-45 The people that work in the service department need completely different skills than are need in production.

A21-49 We should offer our service technicians more in how to dress, act and handle other cultures.

A25-06 We offer a lot of technical training to ensure that our service people can fix the problems they face.

A22-18 Our service employees get courses continuously.

A22-30 It is hard to create bonds and transfer knowledge between production and service much because the service employees are seldom home, to better this situation we have built training centres and electronic learning devices.

A24-41 In order to handle the upstream tasks, we needed to increase our general level of education.

A21-47 A challenge with service employees is that there is so much tacit knowledge that you cannot teach them, but that they have to know.

A24-01 Focusing on upstream segments, early saw the need for more social skills.

#### **B22-10: Core competence should be kept in-house**

A24-25 When moving upstream and outsourcing production, we have to be careful not to let go of our core competence . This is a constant issue to solve.

A22-17 In the future it is important that we produce our core products in-house and have the assembly line in-house to keep the innovative spirit alive and so that our service employees can have detailed knowledge of the products.

A24-23 We do not wish to quit producing/building ships totally. This because it gives us hands on experience and because sometimes we have to build specialized parts ourselves.

A21-35 If we outsource core parts of our production we will lose our competence in delivering services because it is our learning arena.

#### **B22-11: The organisation should acquire new (social) capabilities**

A21-42 We school our own service technicians and they need to learn about our products, assembly, management and customer contact.

A21-45 The people that work in the service department need completely different skills than are need in production.

A21-48 Those in services must be more independent and representative. It is important that they dress and act, and that they can deal with other cultures in a good way.

A25-01 Focusing on downstream activities we have clearly seen the need for other personal competences than those we had.

A25-02 Being more customers oriented have caused issues as we have problem hiring resources with technical knowhow and social competence.

A25-03 Technical knowhow is still the most important quality, as hiring pure sales people have shown to be a waste.

A24-02 We required social skill through hiring and teaching.

A24-12 Designing ships according to customer conversation is totally different then welding metal. Hence it requires some different skills.

A24-41 In order to handle the upstream tasks, we needed to increase our general level of education

A14-36 Increasing the customer relationship, we have recognised the need for social skills. This lack has been reduced through hiring and teaching.

A21-54 Compared to our competitors our service technicians have knowledge in many areas

A21-57 The staff that will provide services need to understand the whole system area and have the ability to communicate this to the customer.

A25-08 Service need high competence and produce high income, hence we can justify hiring expensive Norwegian resources.

A25-10 To ensure we have the right service people we pay them well. All of them need to have hands on experience form production.

A22-19 It is a long process to be able to work as a service employee with us, you need to start as a production worker because you need to know the product.

A22-47 The skills and values of service employees are different from that of the production employees

A22-49 Our service employees need to have knowledge in management, culture, customer relationship and of course know the product.

A23-02 Despite having been customer solution oriented for a long time, we still lack some social skills at some engineering personnel. Customers let us know where we lack these skills.

**B22-12: It is important to attract and keep qualified service employees.**

A21-27 It is very important to have a good HR strategy and good benefits for the employees so that you can stop them from leaving for the offshore industry.

A21-32 Our biggest challenge is to build a big enough service team and get a hold of people with the right knowledge and skills.

A21-50 We experience a great deal of problems with service employees in other countries.

A22-50 It is hard for us to get a hold of people with the right knowledge and experience for our service department.

A22-51 We fear to lose our core competence if we are not able to get people with the right knowledge and attitudes.

**B22-13: Sufficient quality on service offerings must be ensured before delivery**

A21-50 We experience a great deal of problems with service employees in other countries.

A21-51 We do not have a systematic quality control of the service we deliver, questionnaires is nothing we do.

A21-52 We are good at getting to know our employees and in this way, have a quality control.

A25-05 To provide the technical service, be able to sell and having social skill is much to ask. Hence we need 100 % trustable people.

A25-07 The lack of ability to perform quality control on the Rapp service makes us even more caution about whom we are sending out.

A22-13 We are not systematically monitoring the quality on our service, this is hard, but every two years an independent firm asks our customers to figure this out, we also talk to our customers and hope that they tell us if something is bad.

A22-42 We have formal reporting forms that is supposed to be filled out after completing a service assignment, but this is seldom done right.

A23-13 We can and do perform massive quality controls on products, but on the social part, we depend on our people.

A24-30 Performing quality management on a design service is not as easy as in product, because much of what we delivers cannot be produced and checked before it is delivered.

A24-31 In order to assure acceptable quality on all our services we try to select the right people for the right team. Further then that we do not have a report system.

A24-32 Quality management on services are much harder than on tangible products, because the product created in collaboration with customers.

A24-33 Quality control on social experiences as designing in teams should be done prior to "production" to ensure that it is good enough. This is at least how we do it. There is a potential for improving here.

A25-09 Service margins and our reputation of quality make high competent service personnel vital.

A21-59Service is the best marketer for our company.

**B22-14: Offerings and customer criticality should be aligned**

A23-03 The cost of having stand by service personnel is large. But so is the downtime cost of customers. This could and should probably be optimised.

**B22-15: New systems for forecasting demand should be developed**

A21-31 We have no systems for forecasting the service demand, we forecast service demand by looking at how many systems we have sold the previous years.

A21-33 We have some continual contact with our A-customers, so that we can plan and forecast some service demand.

A22-12 We need to be better at analysing our data so that we can tell our customers that in x months you need to have service on this product and then they can plan maintenance and do not need to end an important operation suddenly.

A22-44 To estimate service demand we use databases and look at trends, but it is really hell to figure this out.

A23-08 Our maybe main hurdle with offering after sales service is the lack of ability to forecast and plan demand and production of services.

A23-09 In order to adapt our capacity to demand, in the aftermarket we collect information and experience, but we lack a system to do so. We should improve!

## B23 – Customer

### **B23-01: Servitization increases the importance of customer relationship**

A25-13 Services have increased the importance of having relations to customers. And vice versa, increased relationships have made it possible to sell more (services ++).

A25-12 It is an art to manage social relationships according to local standards while delivering services. Very demanding but essential.

A25-26 An example of our customer relationship is my colleagues 50 th. birthday, where about half of the guests were former or potential customers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

A23-24 In the long term, we believe that a smile and customer orientation will be more profitable than contract focus.

A23-12 Our customers are very quality demanding, so they let us know if something is not satisfying. This helps us improve.

A22-08 It is important that we get feedback from our customers on how it is to do maintenance and service on our equipment so that we can feed it back to our designers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

### **B23-02: Companies should strive to have relational interaction with their customers**

A24-26 Our customer relationships are still mainly transactional, but they are much closer than before. With some of our customers we hold a long history and a relational relationship.

A21-02 We are not able to have relational interaction with all of our customers because we have too many customers (ca. 150).

A21-03 We should be better to keep in contact with our customers.

A22-03 We often visit or call our customers (or customers that we want to acquire) with no other agenda than to maintain and build a relationship.

A22-04 We have few, but good customers. This way we can focus our attention and closely work together with our customers.

A22-16 When we started with integrated solutions we went from transactional to relational interaction with our customers.

A23-23 We wish to deliver good, successful solutions to customers. Therefore we are not too focused on the contract.

A24-03 Each customer relationship is unique; some tend to be more relational while some are more contractual.

A21-01 Whether we have transaction or relational interaction depends on the customer

A22-06 If our customers use our equipment seldom we do not have the resources to use our time on them, because building relationships takes a long time

A15-34 Our offerings vary a great lot from customer to customer. E have to individually sense each situation and determine what kind of product we can sell

### **B23-03: It is beneficial to collaborate tightly with customers**

A22-02 A tight collaboration with our customers is essential.

A22-07 Customers close by are really important to use because they are a testing ground for us, we go to these when we need to test equipment, this involves risk for them and we need them to take it.

A22-14 Little can be done in the office, we need to be out working together with our customers.

A22-39 The cluster, local customers and banks have been essential for us to develop into a solution provider, we have relied on these actors to take some of the risk.

A25-26 An example of our customer relationship is my colleagues 50th. Birthday, where about half of the guests were former or potential customers.

A23-12 Our customers are very quality demanding, so they let us know if something is not satisfying. This helps us improve.

A22-08 It is important that we get feedback from our customers on how it is to do maintenance and service on our equipment so that we can feed it back to our designers.

A22-14 Little can be done in the office, we need to be out working together with our customers.

### **B23-04: Prioritise those customers that can be retained for a long time**

A21-05 We are not able to choose our customers, but we prefer those that have an aftermarket.

A22-01 We choose our customers based on the size of their aftermarket.

A22-06 If our customers use our equipment seldom we do not have the resources to use our time on them, because building relationships takes a long time.

**B23-05: Reveal customer needs**

A23-28 Often our customers know very well what need to be done, but still they have not done it or asked for it.

A23-29 One time one of our customers expressed “It was about time that you offered to help us with maintaining the installation”. This expresses their readiness for it. They had a need, and helping them fulfil this is a potential win-win.

A23-30 Our experience tells us that our customers are so taken up by their day-to-day operational tasks that they forget to ask us for help, or even look for better solutions.

A25-25 We cannot explain the customer what is best, rather it’s the other way around.

A13-20 We can become even better to respond to customer needs. As the dentist that always recommends you is mainly been driven by customer needs.

**B23-06: Companies should market their offerings and show the customers the value of the offering**

A22-09 We use a lot of time to show our customers the value of something in-tangible, this is hard, due to the old norms in the industry.

A22-10 We work hard to school our customers of the benefits of buying our integrated solutions and services, we must always prove and show them that we have the competence that they need, we need to build credibility.