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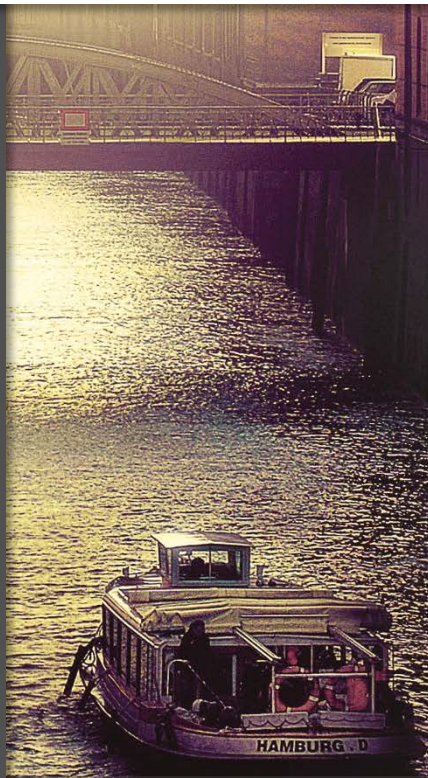

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Business Model Innovation: A Case of the Offshore Lifting Equipment Supplier

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The purpose of this paper is to present the background for and the process of development of an Internet of Things (IoT) business model (BM) for a Norwegian offshore lifting equipment supplier. The paper presents both challenges and new opportunities connected to the case company's transition towards IoT, service-based BM. The research methodology is a single case study research. The research approach involves four steps: theoretical discussion; a case study; analysis of the case study, and conclusions. The results show that development of an IoT BM by the case company led to new possibilities for monetization of data and offering new services. The authors suggest that manufacturing companies considering transition towards IoT BM focus on the overall IoT business case rather than on Local IoT solution return on investment (ROI). Studies analyzing the development process and results of implementation of IoT BMs by manufacturing companies are scarce. This paper aims to partially fill this gap by analyzing the experience of a real-world company that has developed and implemented the IoT BM. The research is limited to a single case company. Although the case company has developed and implemented its IoT BM, it is still in the transition process. For now, the company has not yet managed to get its new product rented out, which also creates limitations for drawing conclusions. This research contributes to the understanding of IoT BMs and assists managers who are responsible for developing and implementing IoT BMs.

Keywords: Internet of Things; Business models; Servitization; Engineer-to-Order

1 Introduction

Developing a sound BM is one of the key factors for achieving success in any kind of business. Many companies tend to focus on technology innovation while paying less attention to BM innovation. Chesbrough (2010, p.354) argues that "mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model". This idea is also shared by Amit and Zott (2012) who claim that managers should consider the opportunities offered by BM innovation to complement, if not substitute for, innovation in products or processes.

AXTech, a Norwegian company based in Molde, has been delivering customized heavy-duty lifting and material handling equipment since 2004. The equipment is produced in low volumes, is capital-intensive and is designed for specific needs of customers in the oil and gas industry. This form of production, where the customer order decoupling point is located at the product design stage, is called engineer-to-order (ETO) manufacturing (Olhager, 2003).

A sharp decline in oil prices (from $115 per barrel in June 2014 to under $35 at the end of February 2016 (Rogoff, 2016)) has led to a significant reduction of demand for advanced equipment from the companies operating in the oil and gas sector. Under these circumstances, in the beginning of 2015 the focal company has started to develop a new BM based on renting out of advanced lifting equipment, as an alternative to a traditional model of just selling it. By offering such a solution, the focal company tried to address the customers' reduced ability to invest money in the pricey equipment. The first piece of equipment produced by the focal company under this new BM was a lifting tower Litjkaren that was ready for market in November 2016. The tower has a lifting capacity of 25 tons, is very fast to mobilize and can be steered remotely from the focal company's headquarters in Molde. The biggest challenge the focal company faces now is, however, to reach the "right" customers and get Litjkaren to market.

The focal company's management is therefore currently paying much attention to further development and refinement of their new BM. In this respect, an Internet of Things (IoT) BM development process suggested by Slama, Puhlmann et al. (2015) as part of their "Ignite | IoT Strategy Execution" methodology was applied to re-consider the focal company's new "rental" BM.

The purpose of this paper is to describe the core elements of the IoT solution the Litjkaren's BM is based on. However, we have paid most of our attention to

such elements of the IoT BM as marketing channels, customer relationships, cost structure and revenue streams, local and overall ROI of an IoT solution, as well as to nonmonetary effects of the new IoT BM.

The remainder of this paper is structured as following. In section 2, we provide a definition of the main terms and concepts used in this research. In section 3, we discuss our method. In Section 4, we present our findings and present how an IoT BM development process was adopted by the case company. Finally, in Section 5, we suggest implications for our research, outline the limitations of our study and suggest further research.

2 Theoretical background

In this chapter, we will briefly discuss the state-of-the-art literature on BM and business model innovation (BMI). Then we will take a closer look at service BMs. Further, we will discuss IoT BM development process as a part of the "Ignite | IoT Strategy Execution" methodology (Slama, Puhlmann et al., 2015). Finally, we will look at the literature discussing the challenges of getting new products and services to market, specifically as a result of BMI or development of new BM.

2.1 Business models and business model innovation

BM and BMI are studied widely and we have by no means explored all of it in this research. In the next sections, we will outline the areas we have focused on.

A recent study by Foss and Saebi (2017) shows that concepts of BM and BMI over the last 15 years have gained a lot of attention both among researchers and practitioners. Despite that attention, there is still much ambiguity with respect to what BM and BMI are.

In different sources BM is defined as either a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method, a framework, a pattern and a set (Zott, Amit et al., 2011). Amit and Zott (2012, p.42), for instance, define BM as a "system of interconnected and interdependent activities that determines the way the company "does business" with its customers, partners and vendors".

When it comes to BMI, Foss and Saebi (2017) identified two research streams: one research stream views BMI as a process, and another views it as an outcome. For instance, Bucherer, Eisert et al. (2012, p.184) define BMI as "a process that deliberately changes the core elements of a firm and its business logic", while Gambardella and McGahan (2010, p.263) state that BMI "occurs when a firm adopts a novel approach to commercializing its underlying assets".

Despite the increasing focus from researchers and practitioners on BM and BMI, many BMI attempts fail. One of the greatest challenges is that "business models by their very nature are designed not to change, and they become less flexible and more resistant to change as they develop over time" (Christensen, Bartman et al., 2016). They suggest that a BM consists of the following elements: value proposition, resources, processes and the profit formula. They also claim that a BM *travels a journey* through three stages: 1) creation; 2) sustaining innovation; and 3) efficiency. They conclude that the only innovations that can be performed in the existing BM *naturally* are "those that build on and improve the existing BM and accelerate its progress along the journey", and thus, in order to achieve successful BMI, the firms have to "focus on creating new BMs, rather than changing existing ones" (Christensen, Bartman et al., 2016).

Further, according to (Amit and Zott, 2012, p.44) BMI can occur in several ways: 1) "by adding novel activities" *(content);* 2) "by linking activities in novel ways" (*structure*); 3) "by changing one or more parties that perform any of the activities" (*governance*). They have also identified four major value drivers of BMs: 1) novelty ("the degree of [BMI]"); 2) lock-in ("[BM] activities that create switching costs or incentives for [BM] participants to stay"); 3) complementarities ("value-enhancing effect of interdependencies between [BM] activities"); and 4) "efficiency" (cost savings through the interconnections of the activity system) (Amit and Zott, 2012, p.45).

Despite the aforementioned ambiguity regarding what BMI is, the majority of researchers agree on that BMI is essential for any company striving for growth and better financial performance. Some even argue that BMI can be more efficient than product, process or technology innovation (Amit and Zott, 2012, Chesbrough, 2010).

2.2 Service business models/servitization

Nowadays, pushed by market conditions, competition and new customer demands, many manufacturing companies are moving towards BMs based on services (Kindström, 2010). This process is often referred to as "servitization" (Kastalli and Van Looy, 2013). Examples of services that can be offered by "product-based" companies include support and service contracts, monitoring and control services, process consulting, maintenance contracts, equipment rental etc.

Kindström (2010) analyzed aspects and challenges of companies moving towards service-based BMs. He argues that for established "product-based" companies, servitization can be considered as an evolutionary change. The challenge the companies moving towards service-based BMs often face is the need to develop both products and services simultaneously. Kindström analyzed such elements of service-based BMs as 'value proposition', 'revenue mechanisms', 'value chain', 'value network', 'competitive strategy' and 'target market', and came to conclusion that in order to shift to service-based BM, companies must change all elements of their BMs. In particular, he suggests companies moving towards service-based BM: to focus on developing relationship-building competences (with regards to both customers and suppliers); be more aware of the customer's processes (because of the need to interact with the customer in sales, delivery and post-delivery stages); to design a dynamic portfolio adaptable to needs of different customer segments; to focus on creating a service delivery infrastructure; and to focus on "developing new revenue mechanisms based on customer operations and profitability" (which may lead to cultural change in the organization) (Kindström, 2010, p.489).

Despite the growing popularity of servitization, its impact on the manufacturing firms' performance still remains an open question. Contrary to the expected economic benefits of servitization, some studies show implementation problems that can lead to the manufacturing businesses' performance decline, so-called "servitization paradox" (Kastalli and Van Looy, 2013). In order to overcome this "servitization paradox", Kastalli and Van Looy (2013) recommend service-oriented manufacturing firms the following: adopt an integrated product-service BM; implement practices that generate customer proximity; and consider necessary investments in services in order to achieve long-term profitability.

2.3 IoT business model development

Recently, proliferation of such concepts as Internet of Things (IoT), Industrial Internet, Industry 4.0 has gone viral. These concepts are interchangeably used in the context of and in connection to the new wave of disruptive changes. For manufacturing companies, the spread of IoT means first and foremost the acceleration of the shift towards integrated product-service offerings (Slama, Puhlmann et al., 2015). This transition is in line with what we have discussed in the previous section about *servitization*.

To help companies define their IoT strategies and prepare for IoT adoption, as well as to create and manage a portfolio of IoT projects, Slama, Puhlmann et al. (2015) developed a methodology called *Ignite | IoT Strategy Execution*. This methodology includes such stages as IoT opportunity identification, IoT opportunity management and Initiation. The IoT BM development is considered as a part of the IoT opportunity management stage. Here, Slama, Puhlmann et al. (2015) refer to the *IoT BM builder* developed by Bosch Software Innovations, as the *best-practice*.

The *IoT BM builder* is based on the widely used Osterwalder's *Business Model Canvas* (Osterwalder and Pigneur, 2010), and addresses such IoT-specific aspects as need for clear partner value proposition (since IoT solutions often depend on partner ecosystem) and the use of data derived from connected things and services based on top of this information (Slama, Puhlmann et al., 2015). In particular, the IoT BM builder suggests calculating the total cost of ownership (TCO) for the solution across all partners involved and "define the return model by allocating the returns among the stakeholders in a fair manner", which requires cost transparency and trust in the IoT ecosystem (Slama, Puhlmann et al., 2015, p.191). In addition, the IoT BM builder emphasizes the importance of documenting nonmonetary effects of a BM, such as new market entry, accessing new technology, coming up with new ideas and new BMs (Slama, Puhlmann et al., 2015).

This said, from practitioner's perspective, successful transformation to new, IoT BMs strongly depends on the company's ability to effectively adapt its marketing and sales strategies to their new products and services. However, the literature addressing challenges manufacturing companies face in their sales and marketing operations and customer relationship management as a result of BMI or deployment of new BMs, is scarce. This is especially noticeable with regards to service and IoT BMs.

It is evident that servitization leads to considerable transformation of how manufacturing companies sell their products and services. This involves the need for the sales teams to adjust their sales strategy. Slama, Puhlmann et al. (2015) suggest that incentive models based on upfront revenues need to be substituted by the models that support recurring revenues. In addition, marketing teams will need to utilize product usage data to carry out effective marketing campaigns for different market segments. Another driver for adjusting sales and marketing strategies of manufacturers is increasing demand for customized products, which implies that products need to be sold before they have been produced.

Baines and W. Lightfoot (2013) completed a study exploring practices and technologies successfully servitized manufacturers use in the delivery of advanced services. Among other practices, efficient customer relationships were identified as one of the factors for successful delivery of advanced services. They further point out that moving away from a "transactional approach to doing business, to one where there are strong relationships in place throughout the life-cycle of the service offering" can be seen as a "necessity for the service delivery rather than a feature of the offering" (Baines and W. Lightfoot, 2013, p.21).

3 Research objectives and methodological approach

Based on the theoretical foundations built in the previous chapter, our research aims to identify the core elements of developing an IoT BM. We have paid most of our attention to elements such as marketing channels, customer relationships, cost structure and revenue streams, local and overall ROI of an IoT solution, as well as to nonmonetary effects of the new IoT BM. Since this is an explorative form of research, a qualitative research method was chosen. Qualitative research can be done in several ways, which include ethnography, grounded theory, narrative analysis, case study analysis etc. (Guest, Namey et al., 2013). This research conducts early theory building through empirical case study. Yin (2013) states that a case study investigates a contemporary phenomenon in its natural setting and the outcome is on relevant theories generated from understanding gained through observing actual practice. We selected our case based on the opportunity to study the development process of an IoT BM and its opportunities and challenges. Data was mainly qualitative and collected through semi-structured interviews, observations and discussions. In particular, in the period between February and May of 2017 there were conducted four interviews with the CEO of

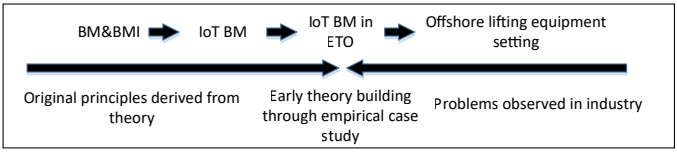

Figure 1: Methodological approach

the case company, each of which had a duration of approximately two hours. The first interview was dedicated to discussion about the strategic situation and main objectives of the focal company. In the second and the third interviews the desired properties and the technical solution of the focal company's new product (lifting tower "Litjkaren"), as well as the process of development and implementation of the new BM, were discussed. The results of these interviews were used as input in sections 4.1. and 4.2. In the last interview, the short-term costs and revenue streams, as well as the new product's long-term effects for the focal company and its customers, were discussed. The data gathered during this last interview was used in section 4.3. Secondary data such as case company's steering board documents, technical product documentation etc. were also gathered and used in sections 4.1, 4.2 and 4.3. In addition, the second author is the CEO of the case company and was part of the entire IoT BM development process. Our methodological approach as shown in Figure 1, is based on the theory of BM and BMI, and in more recent years IoT BM and follows Dubois and Gadde (2002) suggestion of systematic combining logic, where concepts and frameworks evolve during confrontation with case context and relevant literature throughout the research process. The arena for the empirical work in this paper is the ETO industry, more specifically the design and production of offshore lifting equipment.

The research question for this paper is therefore as follows: How to empirically investigate the development of an IoT BM within the specific setting of offshore lifting equipment?

3.1 Case company

In order to allow a better understanding of the case company we will give a detailed description in the following section. AXTech provides engineered and

specialized heavy lifting equipment for the marine and offshore industry. The company provides the equipment on an ETO basis meaning that the equipment delivered involves project specific engineering to incorporate client, and to some extent supplier, specific functionality and performance. Fabrication, assembly and final product testing are managed through selected subcontractors worldwide.

Traditionally, since start-up in 2004, the focal company has focused on a BM that allows the company to be competitive by the four strategic standard pillars for development: Technology, Products, Organization (structure) and Market. The market (client base) has traditionally sent in Requests for Quote (RFQs) or Invitations to Tender (ITTs) that are a variety of detailed (or not so detailed) functional specifications. The bidding process can be quite comprehensive and involves substantial conceptual Front End Engineering and Design (FEED) at own risk, i.e. "no cure no pay". The actual value proposition is historically focused on a particular portfolio of products. Services offered are also targeted towards the very same installed base of products.

Typical products include winch systems, A-Frame/LARS, module handling. Core in-house technologies incorporate mechanical and structural design, advanced analysis, electric, hydraulic and automation skills in addition to particular skills within contract management, finance and fabrication. The focal company's portfolio of products has developed over years to suit specific market needs related to advanced material handling between offshore construction vessels, the sea and the seabed. The base of knowledge (within the company) is also used to explore new market opportunities. It is worth mentioning that some key personnel (owners, seniors) have a long personal track record for working within this type of industry. The history of the company must be understood with this particular background and understanding of the industry particulars.

At peak, the focal company counted some 90 employees located in Norway and Poland. As of today, the company counts less than 60 people whereas 38 people are located within Norway.

4 Results and discussion

In this chapter, to understand the background for development of a new BM solution and implementation of a new rental BM (Litjkaren) we will give a detailed

description of the strategic situation and main objectives of the focal company. Further, we will present the process and results of development and implementation of the IoT, service-based BM by the case company. Finally, we will discuss the challenges as well as new opportunities connected to the focal company's transition towards the new BM.

4.1 Strategic situation and main objectives of the company

During 2014, the market changed dramatically for AXTech. From constant overload in demand, where the company struggled to get hold of sufficient engineering capacity, the amount of realistic new project potentials was drastically reduced. In addition, most of the typical clients of the company were suddenly struggling with financial liquidity. The dominant North Sea energy company launched a new cost-cutting regime to be able to cope with the changed market conditions. This regime implied 20% cost reduction by innovation, 20% by industrialization and further 20% by efficiency. The simple outcome would be to get the same services for half the cost (0.8x0.8x0.8=0.5). The focal company was confident that the company's competence and know-how was still attractive but had to be offered in a different way. By re-identifying its core technology vital for future success, the company launched a development program called Litjkaren, or by some called The Little Swinger. Litjkaren will allow the users to rent the full function of subsea module handling instead of specifying, buying and installing the equipment onto a vessel. A prime idea was to utilize whatever knowledge gained over years related both to the build and to the operational aspects of such equipment. The equipment is, due to its accurate heave compensation functionality, heavily instrumented and this allows the potential services to be further optimized. Since most of the focal company's clients faced cash-flow challenges, it was important that the equipment should be ready for use within extremely short time.

Based on a completely new BM (service proposition), the following 12 key properties were identified as shown in figure 2.

To be built by the focal company's internal, high-end standards Litjkaren should, among other things, be cost-effective, be able to operate in harsh weather conditions, have a modular structure, be transport-friendly, be quick to mobilize (installed on a vessel), be maintenance-friendly, be rugged (robust) and have as minimal environmental footprint as possible.

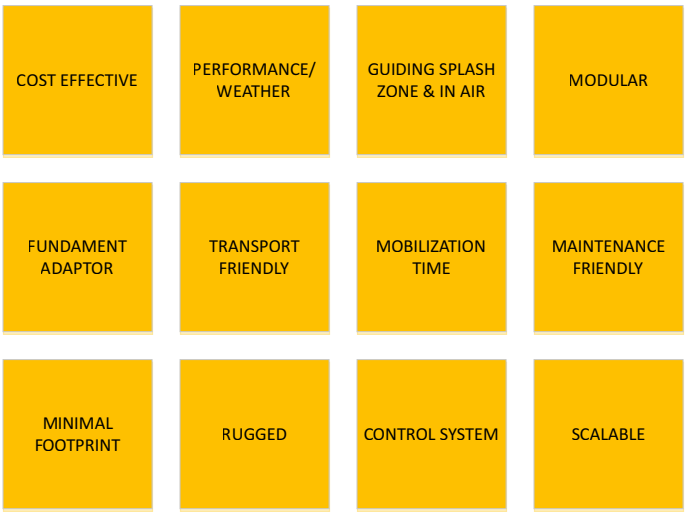

Figure 2: Litjkaren's desired properties

The desired properties became sub-targets for further enhancement of offered services and to better utilize the information provided through the applied controls system.

Services offered to include Front-End Engineering Design (FEED), vessel integration, optional support structure, installation/mobilization, operation, maintenance, de-mobilization and storage. The FEED would then incorporate the focal company's understanding of how to optimize the equipment to any type of vessel as a suitable working platform.

Due to the nature of offering this concept as a service, the focal company had to encounter a variety of vessels. The focal company also had to consider vessels without a "moon-pool" (a shaft through the bottom of a ship for lowering and raising the equipment into or from the water), which is traditionally used for subsea module handling and to incorporate features that allow for proper guiding at the vessel's side.

Remote diagnostics and operation were also to be offered as various apps or add-ons to the controls system.

Another feature that was discussed was the focal company's ability to enhance the complete operation by tapping into the vessel's existing Dynamic Positioning (DP) system and by that further enhance operational properties. The focal company has previously developed advanced in-house software that provides detailed understanding of a vessel's property (behavior) in combination with such specialized equipment installed. This allows the focal company to optimize the operation towards specific needs. For instance, the vessel owner may ask "Can I recover a 20t module in such defined sea condition?" The focal company's system will then optimize not only the equipment, but also the vessel (heading, draft etc.) for the conditions given and to provide a clear answer. Also by accumulative knowledge the focal company may also suggest for the vessel owner to optimize the vessel for further enhancement (like roll/pitch dampening system etc.)

The actual equipment in discussion is a lifting tower designed for safe handling of subsea modules and tools between a vessel operation in open sea (harsh weather conditions) and the seabed (figure 3).

This incorporates heave compensated winch systems in addition to various means of guides to secure the object from any kind of operational damage. The tower size and capacity are defined by a careful evaluation of available common modules used for such application.

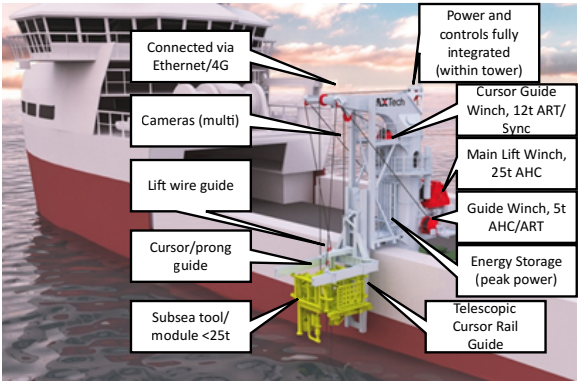

Figure 3: Litjkaren: technical solution

Layered architecture of digital technology consists of four layers: devices, networks, services and contents (Yoo, Henfridsson et al., 2010). Below we briefly characterize each of these layers in Litjkaren's architecture.

Device Layer: Sensors/Equipment. The equipment is fully instrumented to the extent that all relevant parameters are fully monitored and controlled. Access to relevant data is available both through local application servers and by remote servers via satellite network or 4G communication links.

Network Layer: 4G/Ethernet

Service Layer: Knowledge base (people), in-house developed tools for optimized operational properties.

Content Layer: Analysis, optimized operations data, remote operation concept (app), preventive and corrective maintenance system.

4.2 Developing and Implementing the IoT BM

For the development of the product, it was necessary to get a full overview of the BM and look for both internal improvements and for potential new business based on the fact that the equipment now was fully connected.

Internal Improvements. A core element for the design was to implement and improve on existing solutions for improved maintenance. As the plan was to rent out the equipment, the focal company needed to secure an improved Overall Equipment Effectiveness (OEE). Examples of such improvements are remote monitoring and efficient maintenance programs.

In addition, by avoiding expensive and, to some extent, excessive client specifications the focal company was able to enhance overall quality by focusing purely on function, reliability and connectivity. Overall target was to gain quality improvements.

New business. Through IoT opportunity analysis there were also evaluated new business opportunities that could be developed within this project. The project provided new business opportunities both as a product-centric BM but also as a new service-centric BM. The idea was to focus on the product itself (fully optimized) and at the same time allow this particular product to form a central part of the services offered. Revenue would then be generated from not just the actual rental but also the substantial amount of added services needed. Examples of such additional services are wire spooling and condition monitoring non-destructive testing (NDT) services.

The revised BM can be described as outlined in the three phases of the Innovation Project Canvas with Asset Integration Architecture (AIA) developed by Five I's Innovation Management GmbH (Slama, Puhlmann et al., 2015, p.188). The first phase is to develop the actual value proposition with a repeating review of the client, client needs, market trends and competition. For the focal company, this incorporated an evaluation of competitive designs and how to secure that the final concept could provide a competitive edge not only by functionality but also by net investment (cost).

In the second phase, there is an evaluation of the actual solutions offered. For the focal company, it was important to offer the full comprehensive service, like a payment per lift/operation as this would allow also new clients with less capacity to incorporate this function as a part of their own ambition. By doing this, the focal company could enter a position in which the more senior clients would

regard the concept also as a threat to their own business, because operators of smaller and less expensive vessels would now be able to offer advanced subsea lifting without the need to either invest in or operate the actual equipment.

This allows the services offered to be differentiated and adjusted towards each specific client. The concept of remote operation is something that will enhance the value proposition significantly and this subject is currently jointly discussed with relevant Remotely Operated Vehicle (ROV) services providers. The third step is to move forward on the development of the services to be offered.

Marketing and sales of such a comprehensive and highly technical service package is something that requires careful planning and continued efforts over time. The focal company's method is built on the well-used word of trust. As most of this type of equipment is normally presented as ideas on drawings and storyboards, the focal company was eager to present the very real thing. Key clients were invited either individually or in groups so that all operational properties could be demonstrated. Another important method for telling the story is to attend technological conferences and have papers presented. The focal company strongly believes in building trust by personal attendance but in this case, a digital marketing strategy was also formed to make sure the concept made known to the public. LinkedIn, Facebook and electronic white-papers were all part of this strategy.

4.3 Challenges and Opportunities

In Figures 4 and 5 below, we briefly analyze Litjkaren's short-term costs and revenue streams ("local ROI"), as well as the solution's long-term effects for the focal company and its customers ("overall IoT business case") as suggested by Slama, Puhlmann et al. (2015).

When launching Litjkaren, the focal company's management consciously accepted high risk of having negative "local ROI" of the new BM in the short run. This was due to high upfront capital expenditure (CAPEX) in both hardware and software and operating expenditure (OPEX) connected to maintenance, repair and operations of Litjkaren – in the situation of absence of specific customers. Once rented out, it was planned that Litjkaren would generate both upfront revenues such as payment per mobilization/integration/demobilization, as well as recurring revenues such as daily rent, service and remote operations payments (Figure 4).

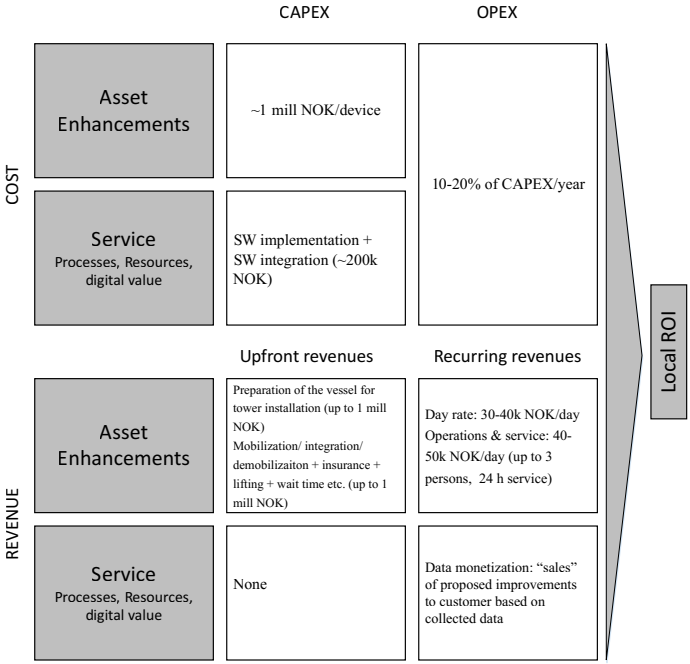

Figure 4: Local IoT solution ROI,Litjkaren (based on (Slama, Puhlmann et al., 2015))

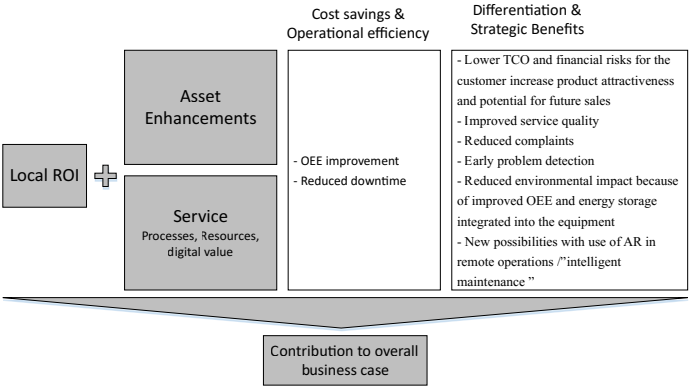

Figure 5: Overall IoT business case, Litjkaren (based on (Slama, Puhlmann et al., 2015))

From the overall business case perspective, in the long run, the new solution was supposed to lead to substantial strategic benefits for the focal company (Figure 5). New rental BM would mean lower total customer's costs of ownership (TCO) of the solution and would decrease customer's financial risks connected to ownership of the pricey equipment. The new solution would also provide for early problem detection and thus help increase overall equipment effectiveness (OEE). In addition, development of Litjkaren has led to a new idea for enhancing maintainability by implementing Augmented Reality (AR) technology. Since the tower is designed to be maintained with a minimum amount of personnel, the focal company needs to ensure specialist assistance and guidance on rather complicated machinery and controls. An internal AR project is now formally initiated to explore these opportunities as something that can add up to the value proposed. At start, the focal company could not see the ROI for this investment, but as the technology becomes more practical in use, the company now assumes that also clients are more willing to pay for such services.

5 Closing remarks

Despite the ambiguity regarding what BMI is, the majority of researchers agree on that BMI is essential for any company striving for growth and better financial performance. In recent years, BMs based on services have gained a big popularity (and many have proven successful) among many manufacturing companies. A powerful push to the manufacturing companies' transition towards service-based BMs, or so-called "servitization", was given by the rapid development of the IoT.

In response to new market conditions and in anticipation of new customer demands, the focal company started developing a product based on a completely new, service-based, IoT BM.

At the point as this research was ended, Litjkaren was not assigned for any particular work. The market situation seems to be still at a stage where the existing fleet of equipment/vessels has covered the needs of such subsea projects. It is a fact that most of this work has been performed with significantly larger equipment than strictly needed. Over time, the focal company is confident that there will be a market for smaller light-weight systems that can be rented for a fraction of the investment price needed when a full-size tower is integrated on a vessel.

For the focal company this project has been a good opportunity to further explore new business potentials and to enhance the applied technology. Exploring the business of servitization has introduced new thinking on how to enhance the value proposed.

Finally, how to promote BMI would appear to be critical business management skills. The authors regard the measurement of effectiveness of BMI to be dependent on empirical observation and more similar research is needed. As this reseach is limited to a single case, the research team is currently exploring the possibilities to re-apply the suggested concept of developing and implementing the IoT BM to several companies supplying advanced offshore equipment.

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