

Åge Gjøsæter

Stord/Haugesund University College

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Strategic Innovations in Offshore Shipping: A Comparative Case-Study of Organizational Strategizing Processes Aimed at Realizing Environmentally Sustainable and Profitable Services

Abstract

The purpose of the paper is to investigate how two Norwegian shipping companies servicing the offshore petroleum strategize environmentally sustainable shipping services, while maintaining a reasonable profit margin. The research question guiding the paper is how the companies proceed to realize the stated objective and in which ways their chosen strategic approaches may be seen to explain success or failure in achieving the two-fold strategic goal. The empirical contexts are case studies of how the two firms, from different points of departure, develop a strategic objective to realize environmentally sustainable and profitable offshore shipping services, but differ in how they approach strategizing their ideas. By describing and analyzing the innovations processes from the strategic idea to organizational praxis in lieu of strategic and operational activities and actions, the paper advances our knowledge about challenges related to transforming innovations into reality. The paper particularly discusses the role of firm resources and business models in strategizing the two-fold objective of environmental sustainability and profitability.

Key Words: Offshore Shipping, Strategic Innovations, Environmental Sustainability, Profitability, Strategizing, Firm Resources, Business Models.

Introduction

Sustainable maritime shipping has become a key concern, supported by national and international organizations like the Norwegian Ship-owners Association (NSA) and the International Maritime Organization (IMO) (e.g. (Behring, 2012; Henriksen, 2014; Sampson, Bloor, Baker and Dahlgren, 2015; Uygur, Musluk and Ilbey, 2015). In its most recent environmental strategy the NSA states as its long-term aim that Norwegian shipping and offshore entrepreneurial activities shall not expose environmentally damaging releases neither to sea nor to air. The purpose of this paper is to investigate how two Norwegian shipping companies servicing the offshore petroleum industry strategize environmentally sustainable shipping services, while maintaining a reasonable profit margin. In the paper we explore how the two firms, from different points of departure, develop objectives to create environmentally sustainable and profitable offshore shipping, but differ in how they proceed to transform the strategic objectives into organizational and operational reality. The research questions guiding the paper are how the companies strategize environmentally sustainable and profitable offshore shipping services and in which ways the chosen strategic approaches may explain success or failure in achieving the two-fold objective. The challenges of realizing the stated goals are discussed with reference to firm resources and the role of business models in bringing value to customers and other stakeholders.

Further knowledge about realizing environmentally sustainable and profitable services is particularly relevant for shipping organizations that are predicted to increase its toxic emissions to sea and earth from 3 % of the releases of detrimental emissions in the world in 2013 to 6 % in 2020 (Helfre and Couto Boot, 2013), but also for organizations outside the shipping industry confronted by similar challenges.

The remaining part of the paper is organized as follows. First we describe the theoretical perspectives on which the paper is founded. Thereafter we present the methodological approach for empirically exploring the stated research question. Then we describe the cases constituting the empirical basis for the research, followed by a presentation of the findings. Finally we discuss our findings and identify implications, contributions and avenues for further research.

Theoretical Perspectives

Conceptually the paper is founded on the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991), but also draws on strategy-as-practice theory (Whittington 1996) to explain success or failure in transforming the two-fold strategic objective of environmentally sustainable and profitable shipping services into organizational and operational reality. Firm resources include all assets, capabilities, organizational processes, firm attributes, knowledge etc. controlled by a firm to conceive of and implement strategies that improve its efficiency and effectiveness (e.g. Daft, 1983).

Developing organizational capabilities is not, however, simply a matter of assembling a team of resources. The capabilities of a firm also involve complex patterns of coordination between people - and between people and other resources, including construction of interacting organizational routines (Grant, 1991). In addition it is also a question of being able to adapt to technological and market changes in dynamic ways (Teece et al., 1997). Dynamic capabilities include timely responsiveness and innovative actions and activities to improve the competitiveness of the firm (Whittington, 2004).

An activity-based view on leadership of strategic innovation processes is specifically concerned with the empirical study of “practice” as a flow of activity, addressing *“the detailed processes and practices that constitute the day- to- day activities of organizational life and which relate to strategic outcome”* (Johnson et al., 2003: 3). *“It is what managers do and what they manage. It is also what organizational actors engage in more widely”* (Ibid: 15). Transforming strategic innovations into organizational reality is, therefore, a phenomenon involving a wide distribution of activities, including interactions both inside and between the firm and the external environment.

The term “innovation” is predominantly linked to the research and development associated with creating new products and services to achieve competitive advantages and to gain market share (Armbruster et al., 2008). With reference to Schumpeter (1934) and other innovation researchers (e.g. Totterdell et al., 2002), an innovation can be considered to be a complex phenomenon including technical (new products and new production methods) as well as managerial innovations (new markets, news sources of supply and new forms of organization). A key challenge in organizational innovation processes is striking a balance between technological innovations and implementation of the innovations into organizational and operations activities and routines, or between exploration and exploitation (March, 1991). Maintaining an appropriate balance between exploration and

exploitation is a primary factor in system survival and prosperity, stated as an ambidextrous challenge (Duncan, 1976).

Profiting from innovations presupposes that a firm manages to capture a portion of the increased value that the innovations create. Capturing a reasonable portion of the increased value created are particularly challenging in times of rapid technological change (O'Reilly III and Tushman, 2008). Capturing value in regimes of rapid change depends in large measure on honing internal technological, organizational and managerial processes. Whether a firm's competitive advantage is eroded depends on how dynamic the firm or organization is in tune with the market. Attaining a reasonable return from the innovative endeavors, therefore, explicitly or implicitly presupposes a business model that describes the design and architecture of the value creation, delivery and capture mechanisms it employs (Chesbrough, 2007; Zott and Amit, 2010). The essence of a business model is defining the manner by which an enterprise delivers values to customers, entices customers to pay for values, and converts payments to profit (Teece, 2010). More precisely a business model articulates the value proposition, identifies a market segment, defines the structure of the value creation and distributes the offerings and details the revenue mechanism(s) (Chesbrough, 2010). Thus, business modeling is a way of inducing a holistic approach to how to make business out of the innovations, including value creation (for the customers) as well as value capture (for the company), in our cases from providing environmentally sustainable shipping services.

Methodological Approach

An exploratory case study approach was chosen for researching the stated research question due to a lack of in-depth knowledge about organizational innovation processes aimed at realizing environmentally sustainable and profitable offshore shipping, and thus making it impossible to advance well-grounded a-priori hypotheses (Andersen, 1997; George and Bennet, 2005). In this research a qualitative methodological approach was chosen because we wanted to obtain a more thorough understanding of the organizational innovation processes within the two case companies than a quantitative methodological approach would allow (Miles and Huberman, 1994; Ghauri and Grønhaug, 2010). The methodical approach was chosen with the objective of providing primary data in a way that is rather rare within strategic innovation research, mostly conducted as surveys investigating relations between in advance established dependent and independent variables (Revang and Olaisen, 2014). The research ambition was not only to approach, but also to look inside the "the black box" (Brown and Duguid, 2000) of the innovation processes within the two case companies, providing a richer understanding of the activities and actions during the phases of innovation (Osborne, 2008).

For researching the innovation case within company A, "*a green operations campaign*" focused on operational optimization, a "cases-in-the- case" research design (Yin, 2004) encompassing four vessels as units of observation, was chosen. This included in-depth interviews with onshore managers as well as officers and crews on board the four vessels, and the collection of secondary data from various internal and external data sources spanning the years from 2009 up till today. The planning and execution of interviews were as follows: A first meeting was scheduled with the project leader of the campaign. The purpose of this meeting was to obtain an overview of the campaign as well as to establish a relationship with the company for obtaining access to the four vessels selected to be part of the research. Before as well as after this meeting with the project leader, secondary

data was collected for obtaining more information about the campaign from internal company documents and annual reports, as well as newspaper accounts. On the basis of the data from the conversation with the project leader as well as information obtained from secondary data sources, a semi-structured interview guide was developed.

Appointments for conducting interviews on board the selected vessels were arranged in cooperation with the project leader for the campaign and scheduled to take place when the vessels were approaching a port that was most convenient for parties. The interviews lasted from one to three hours, followed by a guided tour around the vessels that also included short conversations with the crews. Eight interviews were carried out altogether. After the interviews with the management and crews on board the four vessels a final interview lasting for a whole day was conducted with onshore management, reviewing, discussing, and verifying significant findings so far.

The case constituting the empirical basis for the research within company B were pioneering technical innovations aimed at developing machinery systems for offshore service vessels that used liquefied natural gas (LNG) as fuel instead of diesel. For researching the innovation processes, primary as well as secondary data were collected. Secondary data was collected from internal company documents and annual reports, as well as newspaper accounts. Further, in-depth interviews with onshore managers as well as managers on board the vessels including captains and chief engineers, were conducted. The planning and execution of interviews was as follows: A first meeting was scheduled with the technical manager of the company as leader of the LNG-project, and his assistant. The purpose of this first meeting was to obtain an overview of the innovation processes as well as to establish a relationship with the company for obtaining access to investigate the stated research question empirically. On the basis of the data from the conversation with the project leader and his assistant as well as information obtained from secondary data sources, a semi-structured interview guide was developed. Appointments for conducting interviews were provided for in cooperation with an administrative coordinator appointed for planning the interviews. A total of ten interviews were conducted. The interviews lasted for about one hour, carried out over a period of three weeks, as was most convenient for the interviewees. For practical reasons two of the interviews were conducted by telephone with specific efforts made to maintain the quality of the data-collection during the interviews.

The interviews within both case companies were carried out in a way that allowed for and encouraged discussion of interesting topics that emerged during the interviews instead of strictly following the in advance established interview guide (Fontana and Frey, 1994/2000, in Postholm, 2010). Through the discussions with the interviewees additional qualitative insights into activities and actions during the innovation processes were obtained, including challenges and obstructions encountered. The interviews were tape-recorded, transcribed and subsequently interpreted based on additional notes taken during the interviews by one of the two interviewers.

The Innovation Cases

Case A: "The Green Operations Campaign"

The innovation case within company A was a campaign to reduce consumption of fuel on board the offshore service vessels. The campaign starting in the 4th quarter of 2009 was motivated by a Norwegian governmental incentive scheme allowing for tax-deductions for shipping companies for

initiatives to reduce environmental emissions. The initial aspiration of the firm was to reduce the total consumption of diesel fuel used by the fleet of vessels by some percent, initially without an exact target. After a while, however, the ambition level was specified to a 10-20 % reduction, or up to 20,000 tons (equaling 23,000,000 liters) a year*. The reduction in fuel consumption was to be achieved by carrying out fuel-saving “green operations” on board the vessels. A “green operation” was defined as a savings of 500 liters (or 0.5 m³) of diesel fuel in a specific operational achievement during a day. By carrying out various forms of fuel-saving operations the company was to care for the

*[https:// www.company.no](https://www.company.no), a, retrieved on 10th December 2014.

external environment while at the same time trying to build a competitive advantage by operating in a more cost effective way, in addition to branding itself as a “green” shipping company.

In 2011 the company extended the campaign by introducing a new environmental concept for the company’s fleet. The concept was named Climate Neutral Operations (CNO). The objective was to compensate for the exhaust emissions from the fleet of vessels, as well as to introduce the opportunity for their customers to contract climate-neutral ships**, implying that the cost reductions due to a decrease in the use of diesel fuel were to be shared equally between the customers contracting a vessel and contributions to the Norwegian Rainforest Foundation as a donor to the United Nations Rainforest Foundation.

The environmental efforts of the company have been recognized at the national as well as the international level. The Norwegian Minister of Environmental and International Development expressed in an announcement that he was impressed by the company’s environmental work, emphasizing the importance of taking the initiative to such an important and forward-thinking environmental model as the CNO-concept, which is ahead of both the current market and regulatory requirements. In 2014 the company was also listed on the exclusive CDP Climate Performance Leadership Index for 2014 with the best score***. The Global Performance Leadership Index is based on an assessment of environmental efforts of major companies in the world, a rating done both to highlight the environmental performances of the companies and to provide investors with the opportunity to assess the environmental profile they choose to invest in. Company A was one of three companies from Norway included on the list, and the only shipping company.

Case company A was established in the 1960s as a family firm and is today still owned and controlled by the founder’s family. The firm has today approximately 2000 employees (including onshore and offshore personnel), and a fleet of 50 offshore service vessels altogether. The fleet is made up of construction service vessels, anchor handling vessels, as well as platform supply vessels. To run the fuel-saving campaign a project leader was hired from outside the company. The project leader reports to the managing director and works in close cooperation both with the top management team of the company and the operational staff.

Results of the Innovations processes

During 2010 fuel-savings of about 10 % were achieved compared to before the campaign was launched. Since then fuel savings have gradually increased year by year up to and including 2013, when the savings leveled out at a 25-30 % reduction. The corresponding reductions in environmental emissions include among others nitrogen and CO₂. The yearly reduction in diesel costs is estimated at

NOK 25-30 million, or USD 4-5 million. In addition the maintenance costs have been reduced because of less wear and tear on the engines, simply due to less use of the engines of the four vessels. It should be noted that these achievements have been realized without any additional capital investments and, thus, constitutes a purely managerial innovation represented by a better utilization

**[https:// www.company a. no/climate-neutral-network](https://www.company.a.no/climate-neutral-network), retrieved on 11th December 2014.

***<https://www.cdp.net/en-US/Pages>, retrieved on 11th December 2014.

of existing equipment due to better operational routines executed by motivated and well trained management and crews on board the vessels and among the on-shore management team.

Case B: Innovation of new LNG-Technology

Case B was pioneering innovation processes aimed at developing LNG-operated machinery systems for offshore service vessels. The initial trigger for the innovations was the sharp rise in oil prices in 1999. One of the consequences of this rise was a corresponding increase in diesel fuel costs, leading to serious concern about how to reduce the costs of fuel. Company B decided to investigate if LNG might be used as marine fuel for their ships, based among others on the considerations that this type of fuel was cheaper than diesel fuel as well as had the greatest potential for reduction of emissions to air, particularly CO₂. LNG consists mainly of methane (CH₄), and has previously been used in steam boilers, gas turbines and different types of diesel engines. Furthermore, a ferry using LNG as fuel instead of diesel had been put into operation on the north-western part of Norway, drawing the attention towards the possibility that LNG might also be applied for fueling of offshore service vessels. Together with Norwegian authorities, a local yard as well as technical consulting companies within the adjacent cluster of maritime organizations, the company in 1999 started the pioneering innovation processes aimed at developing the first offshore supply vessel in the world fueled by LNG. In 2003 the vessel was ready for being put into operation in the North Sea. Partly subsidized by Norwegian governmental grants, company B during the next ten years invested in further four LNG-propelled vessels, implying that the company now has a total of five vessels operating on LNG instead of diesel fuel.

The origin of company B is similar to that of company A. It was also established in the 1960ies, by two brothers, but started up as a fishing company. During the 1970ies the company entered the offshore market, and by the end of the 1970ies the company operated a fleet of three vessels servicing the offshore petroleum industry. Today the fleet totals 25 vessels made up of platform supply vessels, subsea vessels and seismic vessels. The total number of employees is about 900 on- and offshore. The company is owned by the founder's family****. A key characteristic of the company is that it always has been in the forefront regarding environmental sustainability. To our knowledge no other offshore shipping company in the world has been prepared to support technological innovation processes by way of capital investments aimed at realizing environmentally sustainable shipping to the same extent as company B.

Results of the Innovation Processes

The environmental efforts of the company have resulted in significant reductions of releases of detrimental emissions from the vessels operating on LNG instead of diesel fuel. The reduction of detrimental emissions has increased gradually from 2003 when the first LNG- operated vessel was put into operation and up till today when there are 5 LNG-fueled vessels in operation, now totaling a reduction of 20-25 % compared to being fueled by diesel****). The use of LNG as fuel instead of diesel has resulted in about 80 % less releases of nitrogen and about 20 % less CO₂. The consequent reduction in fuel costs for the company's fleet of vessels is stated at about NOK 10- 12 million, or

****[https://www. company b. no](https://www.company.b.no), retrieved on 10th December 2014.

about USD 2 million, on a yearly basis.

It is emphasized that the innovation processes of company B are very distinct from company A's innovation processes in that they are technologically driven and include a significant capital investment in new technology reflecting a long-term technical commitment to LNG as fuel.

Below the comparative findings regarding how the two companies proceeded to implement environmentally sustainable and profitable shipping services are presented.

Findings

Case A

The campaign to operate the fleet of offshore service vessels in a more environmentally sustainable way launched by company A starting in 4th quarter of 2009 was primarily motivated by governmental grants allowing for tax deductions for initiatives to reduce detrimental emissions to sea and air from marine shipping. The stated objective to realize environmentally sustainable shipping by carrying out fuel-saving operations on board the vessels resonated with prevailing societal trends and values. It quickly became a salient issue within the offshore shipping industry, recognized at the national as well as the international level. The creation and promotion of a strategic idea for which the time was right, was, therefore, a vital precondition for making the "green operations" campaign an environmental and as well as a financial success, as confirmed by one of the interviewee: *"the campaign would probably not have become so successful if launched at an earlier stage."*

The strategic objective was supported by the development of a goal-oriented and innovative contractual arrangement that supported the acting out fuel-saving "green" operations. The contractual arrangement was based on the idea that 50 % of the cost-savings obtained through carrying out fuel-saving operations were to the benefit of the customers contracting a vessel, and the other 50 % of the savings were to be assigned to the Norwegian Rainforest Foundation. In collaboration with its customers the company was to compensate for its environmentally damaging emissions by investing in and supporting projects that were certified for CO₂ cuts in accordance with the United Nations climate quotas. Through this contractual arrangement the customers were made financial benefactors of the "green operations" campaign. At the same time the strategic objective to operate the vessels in an environmentally sustainable way was linked to the preservation of rainforests. In addition the establishment of the CNO concept in 2011 provided for making the customers even more involved in the company's environmental work. The CNO concept was supposed to provide for climate-neutral shipping as a commercially profitable measure for the company as well as for their customers through creating environmentally sustainable shipping while

at the same time capturing a reasonable portion of the more environmental-friendly services provided.

A further key precondition for acting out the strategic idea was concretizing how environmentally sustainable offshore shipping services might be realized on board the vessels. In this respect an invitation was sent to captains on board the vessels from the project leader of the campaign, inviting them in coming up with proposals for how the “green operations” idea might be transformed into operative reality. As a response to the invitation about 150 proposals came up. The proposals were compressed to seven main categories of fuel-saving operations, as a cooperative effort between onshore and offshore management. The repertoire of fuel-saving “green operations” established was: anchoring, drift, reducing transit speed, green dynamic positioning, stopping the main engine, optimizing trim, and reducing electrical consumption. The menu bridged the strategic objective and concrete actions and activities on board the vessels to realize the idea, thus constituting the “aim and fire” of concrete operational actions and activities, as confirmed by a captain: *“We also did a lot of this before, but now it was systemized.... The concretizing processes have bridged the strategic idea and how to operate in an environmentally sustainable way on board the ships.”*

Implementing environmentally sustainable and profitable offshore shipping presupposed that the captain on board a vessel, in close cooperation with management and crew, had to have his “hands on” operational activities, conducting “green” fuel-saving operations whenever an opportunity for suspending the normal way of operating the vessel arose. In addition the customer contracting a vessel had to agree with initiating a fuel-saving operation. In the beginning the customers were, however, hesitant supporters of the campaign. Promotion of the idea towards customers for making them stakeholders in the campaign was, therefore, an important activity, initially focusing mainly on the cost savings to be achieved. Gradually, however, the customers realized that the “green operations” initiative constituted a win-win project, and little by little became supporters of the campaign. Thus, acting out fuel-saving “green operations” presupposed close contact with the customers on a day-to-day basis to decide if any fuel-saving operations should be carried out, while at the same time taking into consideration the operational risks involved by carrying out one or more “green operations”, as described by a chief mate: *“We discuss with the customer whenever there is an opportunity. There is a continuous dialog regarding what is going to happen during the day, particularly at the morning meeting, and then we decide if we for example can shut down one engine or more.”* Thus, executing fuel-saving operations demanded campaigning for the strategic idea as an environmental as well as a financial issue, despite the fact that half of the cost savings obtained through carrying out “green operations” were of direct financial benefit to the customers.

Further, maintaining momentum in acting out environmentally sustainable and profitable offshore shipping was facilitated by organizing the “green operations campaign” as an internal competition among vessels. The “green” fuel-saving operations carried out were recorded on a daily basis and reported to the project leader. The project leader reported accumulated “green operations” achieved by each vessel on a quarterly basis. The number one vessel for a quarter was awarded a small amount to its welfare fund. In addition the crews on board the three best vessels were awarded T-shirts marked with a “green operations” symbol. Furthermore, a vessel that managed to achieve the target of 200 fuel-saving operations during a year receives a green flag to be hung from the mast showing that her crew had a strong focus on “green operations” in their day-to-day work. The internal competition encouraged managers and crews on board a vessel to continually look for new ways of operating the vessels in environmentally sustainable ways, as verified by a chief

engineer: *“Carrying out fuel-saving operations has become an internal competition where one does not want to appear too low on the quarterly reports stating ‘green operations’ carried out.”*

Achieving environmentally sustainable and profitable offshore shipping called for leadership of the innovation processes, more or less on a day-to-day basis. First and foremost realizing the strategic objective demanded leadership for shaping alignment around the two-fold objective of environmental sustainability and profitability. In this respect caring for the external environment was an idea that resonated with prevailing societal trends and values. However, acting out environmentally sustainable operation of the vessels also called for leadership capabilities to infuse the strategic idea into the actual strategy making processes, presupposing that the organizational strategizing were enacted on a continuous basis. This included top management’s detached coping acts as well as the crews on board the vessels carrying out “green operations” as practical coping acts. Realizing environmentally sustainable and profitable offshore shipping, thus, presupposed an evolving and dynamic organizational activity system over time.

Case B

A key antecedent for company B’s technological innovation processes aimed at realizing LNG-fueled offshore service vessels was its history as an entrepreneurial “down to the trawl” fishing operation dependent on the natural resources provided by the sea, demanding that the company also cared for the environment in addition to operating in a profitable way. A statement of the late founder of the company referred to by one of the interviewees confirms that business is *“.....in any case not only financial results*. The statement indicates that the founder wanted the company to attain more than pure business goals. Another interviewee expressed that the founder wanted to be a pioneer in realizing environmentally sustainable maritime shipping: *“.....he wanted to bring the shipping industry on a more environmental-friendly track. Therefore we take responsibility for developing and using technology in a new way that saves the earth for unnecessary environmentally detrimental emissions.”*

The spirit of the founding brother, who died in 2002, has lived on, and the company has been prepared to financially support environmental-friendly technological work substantially over the years, particularly campaigned by the chief technical officer that worked closely with the founder during the early years of innovation processes. The technological innovation processes were above all welcomed by the onshore engineering staff, considering the LNG-project as an interesting and challenging technological endeavor, and LNG as the *“the bridging fuel”* between diesel and future, more environmental-friendly forms of energy. An interviewee characterized the LNG venture as the company’s *“moon landing project”*; a journey he wanted to take part in. The strategic ambition to operate offshore service vessels on LNG constituted a technological challenge that generated extra energy among the engineering staff. Even further, the company’s environmental efforts created organizational pride and made it more attractive to join the firm, as stated by one of the interviewees: *“our innovative efforts take the industry a step forward every time.”* The environmental efforts of the company also resonated with stated organizational values; responsible, good seamanship, integrity, passionate, innovative, sobriety and commitment. In addition, environmentally sustainable shipping contained an ethical aspect related to caring for the external environment as a moral foundation of the technological innovation-drive.

However, innovation of LNG-fueled vessels also rested on the technical resources within the adjacent maritime cluster comprising among others companies within the consulting industry, maritime motor industry as well as competitors within the offshore shipping industry. The resources provided for knowledge sharing, complementing the case company’s technological knowledge base. In addition the company as a pioneer and first-mover within the offshore shipping industry to operate offshore service vessels on LNG was involved in establishing rules and regulations for LNG operations of

****<https://www.issuu./company.b> no, retrieved on 10th December 2014.

offshore service vessels, in cooperation with the Norwegian Maritime Authority. The involvement in this work contributed even further to creating momentum in the technological innovation processes.

An additional promoter of the technical innovation processes was the progressing competitive situation within the offshore shipping industry, comprising national as well as international competitors. International competitors to a larger extent benefited from employing offshore crews that were less costly than Norwegian crews. The customers, on the other hand, were primarily interested in getting an offshore service job done as cost-effectively as possible, caring less about environmentally damaging emissions. Even though the company branded itself as an outstanding environmentally responsible company, the corporate image gained as an environmentally responsible company only partly provided for capturing a reasonable profit from the more environmental-friendly offshore shipping services provided. Table 1 contains a summary of actions and activities in Strategizing Environmentally Sustainable and Profitable Offshore Shipping Services within company A and company B.

The “green operations” campaign within company A

Stating of a strategic objective to operate the fleet of vessels environmentally sustainable by carrying out fuel-saving “green operations” on board the vessels, thus also providing for more cost effective operation of the fleet of vessels (with the project leader as the “brain” behind the innovative idea, and how to act it out).

Constructing of an innovative and overarching business model that aligned financial and environmental objectives, providing for a win-win convention between the company and the customers.

Concretizing of how to carry out “green operations” on board the vessels, acted out as a cooperative effort between onshore and offshore management.

Designing and following-up a result-orientated and accountable organizational system for recording fuel-saving “green-operations” carried out on a regular basis.

Arranging for competition among the vessels in carrying out the most “green operations” as well as for maintaining momentum in the organizational strategizing processes.

Leadership of the innovation processes on a day- to- day basis, from launching of the strategic idea to acting it out as practical coping activities on board the vessels.

Innovation of LNG-operated offshore service vessels within company B

Stating of a strategic objective to become a pioneer and first-mover in realizing LNG-fueled offshore service vessels.

Encouraging the development of in-house technical engineering capabilities to explore environmentally sustainable LNG-propelled machinery systems (with the chief technical officer as a key champion and promoter).

Cooperating extensively with consultants and motor companies within the adjacent maritime cluster for complementing the in-house technical knowledge to explore LNG-operated offshore service vessels.

Considering the LNG-project as a means to creating and keeping extra energy among the onshore engineering staff, in addition to creating competitive advantages.

Sustaining the innovation project aimed at realizing LNG-fueled offshore vessels even though the customers were reluctant to pay anything extra for the more environmental-friendly offshore shipping services provided.

Table 1. Actions and Activities during the Strategizing Processes.

The summary shows that company A's idea to operate the fleet of offshore service vessels environmentally sustainable while at the same time capture a reasonable margin from the innovative efforts gradually emerged as a strategic ambition, empowered by prevailing societal trends and values regarding environmental sustainability. Realization of environmentally sustainable offshore shipping services was supported by the construction of an innovative and overarching business model that provided for alignment of financial and environmental objectives, and that created a win-win situation between the company and their customers. Concretizing how the strategic objective might be made actionable on board the vessels while at the same time winning managers and crews on board the vessels as committed organizational practitioners, constituted key activities and actions in transforming the strategic idea into operative reality. In addition, designing a result-orientated and accountable system for recording fuel-saving operations achieved as well as providing for competition among the vessels in carrying out the most "green operations", infused continuous momentum into organizational strategizing processes.

Company B's approach to realize environmentally sustainable shipping rested first and foremost on technological innovations into LNG as fuel for the vessels instead of diesel. Innovation of LNG-fueled offshore vessels constituted an interesting technological challenge particularly for the engineering staff at the onshore site, believing in LNG as the bridging fuel between diesel fuel and future, more environmental-friendly forms of energy for marine vessels. The in-house technological innovation resources were complimented by technical resources within the adjacent maritime cluster. As a first-mover in developing and using LNG-fueled offshore service vessels the company gained significant attention and goodwill from customers and other stakeholders, branding itself as an outstanding environmentally responsible shipping company. The corporate social image gained did not, however, in itself provide for capturing of a reasonable share of the more environmental-friendly shipping services created. The customers supported the environmental efforts in word, but were not without conditions willing to pay anything extra for the more environmental-friendly services provided.

Discussion and Implications

The research question guiding the paper was how the two case companies strategize environmentally sustainable and profitable offshore shipping services, and in which ways their chosen strategic approaches may be seen to explain success or failure in achieving the two-fold strategic objective. Company A's success in realizing environmentally sustainable and profitable offshore shipping might be explained by unique organizational resources (Wernerfelt, 1984; Barney, 1991), rooted in the company's history as a dynamic and business-orientated firm capable of

adapting to changing markets and environmental trends and conditions. The idiographic organizational resources and capabilities constituted key preconditions for being able to mobilize management and crews on board the vessels to change existing operational routines (Grant, 1991), and to institutionalize new environmentally sustainable procedures that provided for acting out of environmental-friendly operation of the vessels through carrying out “green operations” on board the vessels. Key practices enabling enactment of “green operations” were concretizing the construction of a repertoire for how to act out “green” fuel-saving operations, as well as providing for appropriate balancing of exploration and exploitation activities (March, 1991), operationally and commercially. The operational strategy making processes were supported by the construction of an innovative business model. The business model provided for that 50 % of the cost savings obtained by carrying out fuel-saving operations on board the vessels were to the benefit of the customers and 50 % were paid to the Norwegian Rainforest Foundation. The contractual arrangement at the same time acted as a canvas for sharpening the business idea to achieve environmentally sustainable and profitable shipping services. Because the organizational innovation processes rested on unique and “sticky” organizational resources (Teece, 2013), the innovation processes were not easily copied by competitors within the offshore shipping industry.

Company B, on the other hand, struggled to achieve a reasonable profit from its innovations into NGL-fueled offshore shipping services. The innovation processes aimed at becoming a pioneer and first-mover in realizing LNG-fueled offshore service vessels were for the most part focused on technical aspects (Gilbert, 2005), and less on capturing a reasonable profit from the innovations. The technical achievements into LNG-technology might be seen to have that led the company into a success syndrome (March 1991; Tushman and O’Reilly, 1996; Audia et al., 2000). The success created a locked- in organizational path dependence (Nelson and Winter, 1982; Sydow et al., 2009) that caused the company to continue along the chosen technical innovation path, focusing less on a corresponding innovation of their business model to capture a reasonable profit from the innovation into LNG-fueled offshore service vessels. In addition, capturing a reasonable financial margin from the technological innovations were constrained by the lack of governing national and international rules and regulations regarding environmentally sustainable shipping (Sjaafjell, 2015), making the customers reluctant to be pay anything extra for the more environmental-friendly offshore shipping services provided without conditions. Even further the technological achievements into LNG-fueled offshore service vessels were the result of more or less open innovations processes within the maritime cluster (Chesbrough, 2003; Grønhaug, 2013); innovations that more easily might be copied by the competitors than company A’s innovations processes that to a larger extent rested on idiographic organizational resources (Wernerfelt, 1984).

The research reveals that orchestrating technical firm assets and resources do not necessarily guarantee business success (e.g. He and Wong, 2004). Capturing a reasonable profit from technological innovations presupposes a value proposition that responds to perceived customer needs and that invites customers to take responsibility for the detrimental externalities caused by the services provided in a commercially attractive way. Transforming of environmental-friendly technological innovations into reasonable profitability constitutes a technical *as well as* a managerial challenge (Schumpeter, 1934), demanding alignment of corporate strategy and an appropriate business model defining the “go to market” and capturing values strategies (Teece, 2010). A proper business model is supposed to address the actual business issues at stake, reflecting an activity system perspective that encourages systemic and holistic thinking in business model design, instead

of concentrating on technological choices isolated (Teece, 2014). As stated by Chesbrough (2010: 354) *“a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model”*.

Even though business models might serve a positive and powerful role in corporate management (Shafer, Smith and Linder, 2005), opportunistically interpreted business models carry the promise of making strategy making easier by avoiding complex strategic analysis (Ghezzi, 2014). If used unlinked to corporate strategy work, they risk leading to a piecemeal approach to strategic choices as well as creating and capturing values from innovation efforts. Strategizing processes go well beyond designing a business model to sketch a business idea and presuppose firm capabilities to sensing, seizing and transforming strategic innovations into practice through coherent actions (Teece, 2014). Challenges and activities in strategizing environmentally-sustainable and profitable shipping services are, among others, experimenting with and exploiting new business opportunities, balancing the use of resources, as well as achieving coherence between leadership, culture, and employee commitment, together shaping key strategizing actions (Achtenhagen et al., 2013). Nonetheless, business models can have a significant role in strategic management as long as they are properly included in the corporate strategy making work, as a checklist to sharpen business ideas and to take value creation and capture into fair account. In addition the business model could also serve to support strategy execution, and, in turn, strategic innovation, because operating or changing a strategy essentially refers to acting on the business model's components (Ghezzi, 2013), from strategy to business models and onto tactics (Casadesus-Masanell and Ricart, 2013). This again requires co-evolution of value capture and value creation (Pitelis, 2005), and constitutes a dynamic leadership challenge to sensing and seizing opportunities and refiguring firm resources (Foss and Stieglitz, 2014, Hock, 2015). Refiguring firm resources again calls for configuring and orchestration of top managements' capabilities and a firm's dominant logic (Kor and Mesko, 2013), in our case particularly made evident from company B's reliance on technical innovation efforts to realize the stated strategic objective of environmental sustainability and profitability.

Further, the research illustrates that strategizing environmentally sustainable and profitable shipping is a dynamic leadership challenge (Jansen et al., 2009), pointing to the dangers inherent in strategic approaches founded on a too long perspective in today's turbulent business environment. In this research this is particularly made evident through company B's exploration of LNG-fueled offshore service vessels in anticipation of governing rules and regulations that would support innovation of environmentally sustainable shipping. Even though it might be argued that the technical innovational efforts have put the firm into a state where it is now better positioned for future competition within offshore shipping because of the innovative renewal of the fleet of vessels (Revang and Olaisen, 2014), this possible effect is highly reliant on the future market within offshore shipping. The same are the increased technical capabilities of the firm; capabilities that might be valuable for future innovation projects. The findings support the growing innovation literature stressing the importance of a dynamic, multilevel and multifunctional focus on innovation processes within organizational contexts (Jansen et al., 2009; Teece, 2010; Kaplan, 2012), pointing among others to the importance of the absorptive within a company.

Contributions and Further Research

The comparative case study contributes to a richer understanding and empirical assessment of challenges related to strategizing environmentally sustainable and profitable offshore shipping. The research particularly points to the importance of aligning corporate strategies with a business model approach that addresses key value propositions at stake (Chesbrough, 2007). As a mediating vehicle between financial and non-financial outputs (Chesbrough and Rosenbloom, 2002), a business model constitutes a boundary spanning instrument that goes beyond the more limited ambidextrous challenges related to balancing and integrating exploration and exploitation (March 1991), providing for a complementary perspective on organizational innovation processes. This again constitutes a dynamic leadership challenge to sensing and seizing opportunities that is dependent on organizational resources and capabilities as well as a firm's dominant logic (Kor and Mesko, 2013).

The findings in the paper limited to two offshore shipping companies provide several areas for further research. One proposal is to investigate the relation between corporate strategies and business model innovations in further detail, including the effects of explorative innovation efforts on material and immaterial resources within several offshore shipping companies. Another area for further research might be to investigate ambidextrous challenges in transforming strategic innovations into organizational reality within shipping organizations. A third area for research might be to investigate the role of governing rules and regulations in promoting and constraining innovation of environmentally sustainable and profitable shipping services, among other by introduction of emission control areas for enforcing greener shipping (Uygur et al. 2015; Sampson et al. 2015). An even further area for research might be to investigate cultural values as promoters and/or constrainters of organizational innovation processes (e.g. Kleiner, 2013). Finally, challenges related to cooperation among functional areas and disciplines within a firm and/or actors outside the company to realize environmentally sustainable and profitable shipping, is a proposal for further research, in line with among others Tidd and Bessant (2013) and Salojarvi et al. (2015). The proposed studies might particularly contribute to the growing body of research within the innovation field focusing on how to profit from environmentally sustainable innovations within shipping (e.g. Doganova and Eyquem-Renault, 2008; Teece, 2010; Boons and Ludeke-Freund, 2013; Amit and Zott, 2012).

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