The short sea shipowner taking on new waves of innovation

Master's thesis

by

Felix Wrede

Faculty of Science and Engineering

Laboratory of Industrial Management

Åbo Akademi University

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Abstract

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Thesis advisor: PhD, Docent, Research Leader at Laboratory of Industrial Management, Magnus Gustafsson, Åbo Akademi University

The Baltic short sea shipping ecosystem suffers from low utilization of vessels and other inefficiencies, which has an effect on both costs and profitability for most actors in the ecosystem. Simply put, if the shipowner operates with low utilization of his vessels, the costs associated with low utilization must be forced on the customer or the shipowner will go out of business in the long run.

The aim of this research has been to analyze the shipowner’s business model and activities directly affecting the shipowner, describe possible disruptions in the ecosystem, analyze how the disruptions affect the shipowner and propose new business model and rearrangement of activities dependent on said disruptions for the shipowner. The study utilizes action research and participatory action research to take advantage of the knowledge and ideas obtained as a participant in the field.

The main findings in this study are that there is no “quick fix” to raise the utilization of vessels, but that it might be in the shipowner’s interest to further investigate and try to take advantage of discussed disruptions and to prepare to rearrange and change activities dependent on how the disruptions turn out.

Referat

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Short sea shipping-ekosystemet i Östersjön dras med låg utnyttjandegrad av fartyg och andra ineffektiviteter, vilket påverkar både kostnader och lönsamhet för de flesta aktörer i ekosystemet. Om redaren dras med låg utnyttjandegrad för sina fartyg kommer de kostnader som uppstår i och med den låga utnyttjandegraden i det långa loppet antingen tas av kunden eller så kommer redaren att gå i konkurs.

Syftet med studien har varit att analysera redarens affärsmodell och de aktiviteter som berör redaren, beskriva möjliga förändringar i ekosystemet, analysera hur förändringarna påverkar redaren och föreslå en affärsmodell för redaren samt föreslå hur redaren kunde omorganisera de aktiviteter som är beroende av förändringarna. Studien bygger på åtgärdsforsking och deltagande åtgärdsforskning för att kunna utnyttja kunskap och idéer erhållna som deltagare i området.

De viktigaste undersökningsresultaten i denna studie är att det inte finns ett enkelt sätt att höja utnyttjandegraden av fartyg. Det kan dock löna sig för redaren att vidare undersöka och dra nytta av de förändringar som sker i marknaden samt förbereda sig att omorganisera och förändra sina aktiviteter beroende på hur marknadsförändringarna utfaller.

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Contents

Abbreviations and definitions

C/P: charterparty, contract between the charterer and the shipowner
Sshex: loading and unloading laytime terms, Saturdays, Sundays and holidays excluded
TEU: containers, twenty-foot equivalent unit
Bunkers: any amount of marine gas oil
ETS: EU emissions trading system

1 Introduction

1.1 Background

It has been identified that short sea shipping in the Baltic Sea is not efficient. This can be seen in e.g. low vessel utilization and long port call durations (Gustafsson, Nokelainen, Tsvetkova, & Wiström, 2017). The utilization of vessels in the Baltic Sea short sea shipping industry is low with vessels only sailing around 200 days per year. When the vessels sail, more than half of them are empty at least 40% of the time (Gustafsson, Nokelainen, Tsvetkova, & Wiström, 2017). Vessels are sailing long ballast voyages, have long and unpredictable turn-around times in ports and are at times stationary waiting for orders. The high fixed costs of operating a vessel combined with a low efficiency leads to unnecessary costly logistics for the industry or shipowners operating at a loss or low profitability. Vessels are not always well matched to cargos available and a vessel will often carry only part of the available capacity.

Shipowners have low insight into possible shipments and through used channels will only see a fraction of possible shipments in the market. This, in turn, leads to non-optimal vessel schedules and sub-optimal vessel operation. The current situation is the result of market dynamics and information flow between actors. At this point, information holding parties are not benefitting from releasing market information they know. Cargo owners might hold order information close to their chest because of competition incentives. Also, brokers' business model leads to protecting the information they have.

The shipowner's operations are characterized by not performing efficiently with regards to overall utilization. This can be seen in the shipowners' profitability, as well as their operations. In the stage of shipping operations, the results of the inefficiencies are seen and are been worked with. The operations department of the shipowner will try to gather knowledge of the situation for each vessel at all times, but finding reliable information

is often a problem. Also, the accuracy in speculating how current and future voyages will perform can be troublesome.

Due to the lack of transparency and inability to properly match vessels to cargos, there is both an opportunity and a need for new methods to broke cargos and vessels. However, with the help of new information technologies and the development of systems with a focus on solving the lack of transparency and the problem of matching vessels and cargos, there are now digital solutions to these problems. An electronic marketplace, with proper fundamental principles, can solve the problem of transparency by forcing participants to offer enough information for proper matching when participating in the market.

Due to the many variables involved and the complexity the factor of time presents to building a functioning time table for a fleet of vessels, there is an opportunity to enhance the planning phase of the vessels' time table. One way of testing the possible cargos with their time tables against vessels is through simulation. With the help of simulation, one can run through the possible matchings of cargos against vessels with regard to limits in time and capacity.

Information transparency is an enabler for proper simulation. The result of the simulation can then be presented through an electronic marketplace as shipment suggestions. This result not only includes a match of a vessel and a cargo but is a way to present a way of utilizing the available vessels at a higher rate.

A trend that can be connected to the utilization of vessel capacity is the ever-growing emphasis on the lowering of global emissions with a focus on CO_2-emissions. The shipping sector is with time scrutinized more and more on their green performance (Grammenos, 2010). This can also be witnessed in consumer trends.

1.2 Problematization

Information in short sea shipping does not move to those who need it. In the most effective setup, there would be full transparency as every voyage needs to be considered against every vessel on the market. Voyages need to be planned in combination where discharging and loading of the next cargo in the same port is to strive for. Shifting to the next nearby port will always be more time consuming and increase the risk of a vessel not keeping its schedule. Also, the normal administration is a burden, estimated at 3-5% of the total cost.

Lack of transparency is one of the biggest issues in the strive for higher utilization of available cargo-carrying capacity. This is not true only in the case of meddling shipments but also in operations of vessels and ports. Even though trying to perform the vessel schedule is the main focus of a ship operator, decisions that are negative for the overall efficiency will be made. This can be due to not having information about a situation in the complex system of operations.

Not only is the information transparency a problem, but vessels are often sailing with a cargo amount that is far below the carrying capacity of the vessel. This effect on utilization of tonnage is arguably not seen in common statistics, where a vessel most often is considered loaded or not loaded.

1.3 Aim

The aim of this thesis is to analyze the impact of introducing an electronic marketplace for sea freight on the ship operator's business model by doing the following:

1. Analyze the shipowner's business model and activities directly affecting the shipowner
2. Describe possible disruptions in the ecosystem
3. Analyze how the disruptions affect the shipowner

4. Propose a new business model and rearrangement of activities dependent on said disruptions for the shipowner

There are some inefficiencies in short sea shipping that are partly described in the background chapter. To solve these inefficiencies and utilization problems with regard to the shipowner, it is important to take a closer look at the shipowner's business model and the surrounding activities that are tied to the shipowner and affect the shipowner directly. The next step for surrounding businesses is to utilize new technologies, trends and disruptions for their and the business ecosystem's benefit. Here the shipowner needs to know how he will be affected by said changes and how to adapt to them. Due to disruptions some activities will change regarding how they are performed and by who. Here the shipowner should investigate how their business model could be developed e.g. with regard to monetizing low emission freight. This is then linked to how the performed activities in the business ecosystem are performed and how the activities should be rearranged between actors.

As mentioned in the background chapter, the low utilization of capacity needs to be solved to give better return on investment, better green performance and to ensure that the shipowner stays relevant in the future.

2 Theory

2.1 Business ecosystem and information flow

Businesses act in a network with other actors. These networks of actors are complex, and it remains near impossible to answer the question of what company will survive and thrive if only comparing companies head-to-head. For a systematic approach to strategy, a company can be viewed as a part of a business ecosystem instead of as a member of an industry. In a business ecosystem, innovation can be the core around which companies coevolve by working cooperatively and competitively. A business ecosystem moves from a random collection of elements towards a structured community from the original swirl of capital, customer interest and talent coming from new innovations. The business ecosystem follows the following stages: birth, expansion, leadership and self-renewal or death. (Moore, 1993)

We can notice that the short sea shipping ecosystem is mature, and it is difficult for it to reinvent itself. However, there are some new ideas emerging mostly in the area of digitalization and communication.

The short sea shipping ecosystem is between the leadership and self-renewal stage. At the leadership stage, cooperative challenges include how to provide a compelling vision for the future that encourages suppliers and customers to work together to continue improving the complete offer.

The competitive challenges at this stage include maintaining strong bargaining power in relation to other players in the ecosystems, including key customers and valued suppliers (Moore, 1993). The shipowner's bargaining power has varied considerably depending on the business cycle and the oversupply of vessels on the market.

In the self-renewal stage, cooperative challenges include working with innovators to bring new ideas to the existing ecosystem. Innovation can be seen in digitalization with

applications of autonomous vessels and better information systems. Competitive challenges in the self-renewal stage include maintaining high barriers for entry to prevent other innovators from building alternative ecosystems and maintaining high customer switching costs (lock-in) to buy time to incorporate new ideas into your own products and services. (Moore, 1993)

The business ecosystem approach brings forward the possibility of coevolution. This is an important point considering the challenges the shipping industry is facing. To face new competition, companies need to find leadership that can renew the ecosystem as the future of short sea shipping shipowners depends on it.

The result of coevolution has been that companies in most sectors have been shifting focus from competing based on efficiency and effectiveness, to a focus on continuous innovation. With a higher degree of innovation, businesses have discovered that they cannot work and make an impact on their own. An example of this is that every advance needs supporting innovations for the advance to benefit the customers. Advances do not work in a vacuum but must coevolve between firms as no company has all the required knowledge and ability to manage necessary resources for the whole system. This, in turn, can have the effect that a solution for a customer needs participation from up to hundreds of specialized contributors. (Moore, 2006).

The ideal leaders in the business ecosystem coenvision and comanage coevolution among its members. These members of a successful business ecosystem cocreate its future. However, even when it is clear for observers that a certain business ecosystem is desirable, leaders will often not be able to create this new and workable business ecosystem due to lack of political capital (Moore, 2006).

For companies to coevolve their goods and services they need to find ways to align their visions. However, there are some reasons why it is hard to recognize how business leadership acts because (Moore, 2006):

1. Strategies are kept secret by companies, even investors and employees might be kept uninformed
2. Even if the strategies are shared by executives they can be acting intuitively or only with a partial understanding of their actions.
3. Traditional economic theory does not focus on the business ecosystem as a distinct form of organization. Courts and policymakers have benefited from years of research focusing on ideal markets and firms and their failure.

It would be useful to have the same look on business ecosystems as businesses and markets regarding what is useful and what will lead to a failure. Tactics that at first glance seem too collusive, coercive or discriminatory can serve the public interest and tactics that at first glance seem open and inclusive might have detrimental consequences. (Moore, 2006)

There are three different types of business ecosystem generations. (Moore, 2013):

1. A generation with a focus on rapid development of technology. To keep up with development, companies need to do effective partnering. This can be aided by good coordination of investments.
2. This generation strives for creating something greater than the sum of its parts. This is done through open sourcing and networking, one could call it peer production. To enable collaboration and initiate social movements one needs to streamline the networks.
3. In the third generation the elements from previous generations are combined. Managing and applying capital will be a key factor, as well as promoting growth of social movements and change.

Modern communities of leaders mix these generations and apply them to business systems. Moore describes key leadership lessons from his study of the modern technological communities (Moore, 2013):

1. When facing stagnation: demand disruption.
2. Explore solutions to problems beyond the edge.
3. Non-inclusiveness can lead to problems. Share access and expand personal opportunities.
4. The ecosystem needs to be included in every product and service. Use the potential of products and services as a marketplace for other products and services.
5. Science and engineering in universities and private labs are a rich source of ideas. However, the process is slow in bringing these ideas out in the field. Those who understand the industrial situation and those who understand the idea need to collaborate.
6. Greed and too high a focus on revenue and profit can bring an ecosystem to its knees.
7. Open up your ecosystem or platform to hinder stagnation but still defend it when needed.
8. Ideas need to be expressed with maturity. Great ideas can fall flat without care.

The lesson "demand disruption" could be applied to the short sea shipping ecosystem as it fits to the notion of technology stagnation and markets not giving us what we want. Customers can insist on suppliers to form a business ecosystem that is collaborative and idea-sharing. Banding together and exercising that buying power can significantly encourage open ecological change. (Moore, 2013)

To "explore beyond the edge", one must look at the problems that do not lie within our current business landscape but beyond it. To enable the opportunities that lie beyond the limited landscape we must start by mapping problems and cataloguing existing pain. In the connected community, leaders and heads of ecosystem development are focusing on identifying the pain points for their customers. The connected community puts its effort and attention towards the pull from the edges of its comfort zone and customers beyond its current frontiers. (Moore, 2013)

2.2 Business models and Activity systems

To analyze the short sea shipping ecosystem, investigating the smaller parts and how they are linked is crucial. It can be useful to look into the business models involved in the ecosystem. The business model describes how the company undertakes its business to meet the needs of its customers. Here the business model has two goals, to create value and set aside proceedings for the firm in question. Another perspective is to look at what the firm is selling and the activities that are needed for that. (Zott & Amit, 2010)

If the firm's objective is to use a business opportunity to create value through its value proposition, a key part will be the activities performed to fulfill the objectives. An activity in the focal firm's business model can be viewed as the engagement of human, physical and/or capital resources of any party to serve a specific purpose. The firm's set of interdependent organizational activities performed by the firm, its partners, vendors and customers can be seen as an activity system. (Zott & Amit, 2010)

A business model can be seen as either a set of transactions or an activity system (Zott & Amit, 2010). Answering the questions on how to build a business model, understanding the industry and key drivers for value in that industry include knowing the activities that are the basis for delivering value to the customers. This can also include impacts on the activities. An example would be how the internet impacts the activities of an Internet based company. (Afuah & Tucci, 2003)

For the shipowner and other relevant businesses, the functions of the business model become interesting and can be formulated by different means (Chesbrough & Rosenbloom, 2002):

- Articulate the value proposition, i.e. the value created for users by the offering based on the technology;

- Identify a market segment, i.e. the users to whom the technology is useful and for what purpose, and specify the revenue generation mechanism(s) for the firm;
- Define the structure of the value chain within the firm required to create and distribute the offering, and determine the complementary assets needed to support the firm's position in this chain;
- Estimate the cost structure and profit potential of producing the offering, given the value proposition and value chain structure chosen;
- Describe the position of the firm within the value network linking suppliers and customers, including identification of potential complementors and competitors;
- Formulate the competitive strategy by which the innovating firm will gain and hold advantage over rivals

The choice of business model leads to choosing different sets of activities and resources to perform them. Either the company will choose to do this internally or through cooperation with partners, customers or suppliers. Each choice will affect the potential of the firm; capital expenditures, prices, margins, customers and competitors. The design of the business model is a key decision and a very difficult task for managers who are set to redo their old model. Once activities are in place and resources have been developed, the template will be very difficult to change due to resistance to change and inertia. (Zott & Amit, 2010)

This in turn leads to the need for managers to have a conceptual toolkit for developing future business models. Tools to analyze and improve upon current designs are also needed to prepare the business model for the future. The tools need to have a focus on system-level design instead of focusing on partial optimization. (Zott & Amit, 2010)

The activities are linked through interdependencies and provide insight into the processes involved in enabling the evolution of the focal firm's activity system as the competitive environment changes. The interdependencies in the purposeful design are

created by the managers and entrepreneurs that shape and design the organizational activities that links it into a system. The activities relevant to the focal firm's business model will be performed either by the firm itself or by partners, customers or suppliers. The architecture of how the focal firm's activities are set up, how they are linked and who performs them, shows how the firm is attached to its ecology. The choice of business model will determine the potential for the firm's ability to create and capture value. With a stronger implied competition comes difficulty in appropriating value. Here, the revenue model becomes important with its pricing strategy for specific products and services. (Zott & Amit, 2010)

As the business model is aimed for creating the highest total value, it lays the foundations for the size of the revenue-pie for the firm. The greater the value created by the firm, the higher the bargaining power is for the firm in question. The amount of value obtained, in turn, is dependent on the revenue model or strategy. The value created from an activity system perspective by a business is dependent on the following design elements (Zott & Amit, 2010):

1. Novelty (new transaction structures, new transaction content, new participants and more)
2. Lock-in: Switching costs (loyalty programs, dominant design, trust, customization and more)
3. Complementarities (Between products and services (vertical vs horizontal), between on-line and off-line assets, between technologies, between activities)
4. Efficiency (search cost, selection range, symmetric information, simplicity, speed, scale economies)

2.3 Shipping economics

Shipping market cycles

Shipping is an asset-heavy industry while also tightly linked to the business cycle. The supply of vessels is lagging behind the business cycle. Supply of capacity stays the same

in the short run and the lead time for delivery of a new vessel is a question of years. (Drobetz, Haller, & Meier, 2016)

It has been shown that ship investment in dry bulk ships is predictable and follows a boom-bust cycle. High current ship earnings are associated with higher ship prices and higher industry investment. However, the high earnings predict low future returns on capital. For the years 1976 - 2010 it was estimated that one year forward, returns range from -36% to +24%. Fluctuation in short-term lease rates is not a predictor for future returns. It can be argued that overinvestment booms come from firms extrapolating the expected profits into the future. (Greenwood & Hanson, 2015)

However, shipping market cycles are the driving force behind chartering and investment, determining the overall cash flow. Overinvestment in shipping has been repetitive and can be harmful for industry returns. This could be due to either lack of investment memory or the competitive nature of shipping markets. History is filled with numerous crises that can be blamed more on excessive ordering than any other factor. (Grammenos, 2010)

In behavioral finance there are models in which market participants extrapolate unusually high profits. Overcorrection evidence shows that over longer horizons security prices overreact to consistent patterns of news pointing in the same direction (Barberis, Shleifer, & Vishny, 1998). Also, businesses tend to overestimate inventory requirements and cut back too much during recessions (Kitchin, 1923).

Economic shocks will also have a big importance for the shipping market, such as the oil crises of 1973 and 1979, the Asia Crisis in 1997 and the Gulf War in 1990-1991. Even though there are too many variables to predict cycles accurately, there are key factors for how the market will react. An apparent lesson from historical analysis of shipping cycles is the extent to which the market is driven by supply-side factors. Analysts conclude that shipowners order at the top of the cycle and try to tighten expenditures at the bottom. (Grammenos, 2010)

As can be seen in the figure below, spot prices for time charter have been varying throughout the years and show a boom-bust character. The time charter prices reflect the supply and demand for the vessels:

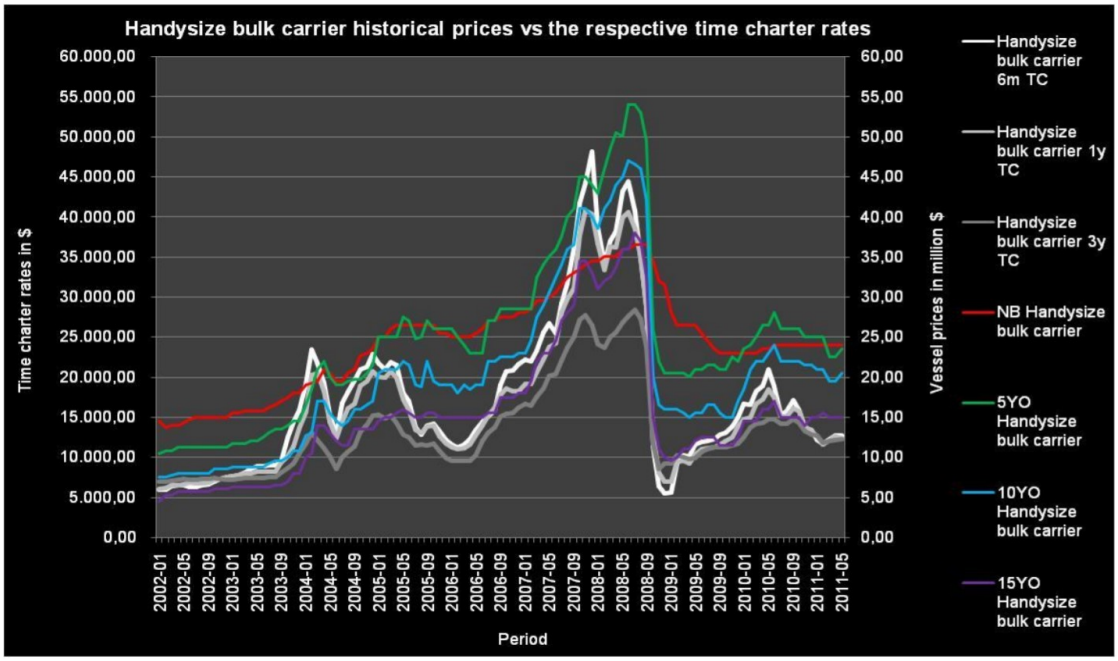

Figure 1 Handysize bulk carrier newbuilding and second-hand prices and time charter rates (Stasinopoulos, 2011).

Short sea freight rates can be forced down by three powerful factors:

1. Hard competition by many small operators of chartered tonnage
2. The road alternative to short sea shipping
3. The buying power of the large cargo generators in the bulk segment

Greening of the shipping market

It has become apparent that even though there is more pressure towards lowering emissions in the shipping market, shipping companies struggle and find it nigh on impossible to actually profit from better green performance. This is indeed hindering

lowering of the emissions in the shipping market and the drive towards lower emissions for goods delivered. Environmental standards have not helped in this case. On the other hand, there have been negative consumer reactions towards perceived abusers of the environment, see cases: Exxon Valdez, British Petroleum and Volkswagen. The polemical discussions on the account of exhaust emissions will sharpen the shipping industry to improve its green performance. (Grammenos, 2010)

The financial crisis of 2008 and the situation for shipowners afterwards has led to cost cutting in the shipping market. The cost cutting has taken place in order for companies in the shipping sector to avoid bankruptcy and stay relevant among its peers price wise. The cost-conscious competition has steered the focus away from lowering of emissions. By the same logic emission regulation will lead to higher costs. (Grammenos, 2010)

Green performance

Shipping is coming under environmental scrutiny and increased forces towards quality shipping have manifested since year 2000. However, these forces will be increasingly challenged by the need for economic survival. Clear economic incentives for lowering emissions are often hard to find. The problem with shipping emissions is two-sided. As shipping is responsible for some 4.5% of total CO_2 emissions it is also the prime mover of world trade tonnages. Therefore, one can assume that the total emissions from shipping will always be higher than other modes. (Grammenos, 2010)

Marketing the green image

The shipowner can benefit from a greener image by exuding a green image regarding fuel consumption, reduced exhaust emissions of greenhouse gases and minimized oil spills. It is questionable if this is successfully practiced as the green image in shipping is now mostly viewed as a marketing ploy. The shipping industry, under scrutiny, has moved towards a proactive marketing stance. This is a good starting point and a green "higher ground" makes for a good marketing opportunity. (Grammenos, 2010)

There are also other concepts already in use in the shipping industry that the shipowner could utilize in marketing:

1. Cold ironing

Here the vessel utilizes shoreside power as a substitute for the diesel generator on board. An example of this is the 2007 built 8500 TEU box ship, Xin Ya Zhou, which while visiting Port of Los Angeles avoided emitting more than a ton of NOx and particulate matter by shutting down the vessel's auxiliary engines and switching to shoreside electricity. (Bunkerworld, 2018)

2. Motorways of the Sea

This concept aims to introduce new intermodal maritime-based logistic chains in Europe. The expected benefits are that these chains would be both more sustainable and commercially more efficient than road-only transport. It is also expected that this concept will improve access to the European markets and relieve the over-stretched European road system. (European Commission, 2018)

Grimaldi looks at this concept as a tool for modal re-balance. Looking at the numbers, the concept motorways of the sea has been a success. In 2005 this system transported over 45 million freight tons which equals 90 billion tons/kilometers, 7.5 times as much as the target set by the European Commission. This traffic would otherwise congest and pollute European motorways. (Grammenos, 2010)

2.4 Research approach

This study utilizes action research to study the shipowners' business. This is done through participative observations by working in the operations department of a

shipowner and working in the team developing an electronic marketplace for the short sea shipping market.

Action research is the most suitable methodology because of its practice of participation. This study is thoroughly based on participation in the field.

Within an action research project, inquiry and action evolve and address questions and issues that are significant for those who participate as co-researchers. Communities go through cycles of action and reflection: in action phases practices are tested and evidence gathered; in reflection stages evidence is reflected upon and made sense of and further action is planned. The cycles are: acting and integrate knowing and acting, therefore action research does not have to address the gap between knowing and doing. (Reason & Bradbury, 2008)

Through multiple cycles of these action research stages, improvements to the knowledge and understanding of those involved in the inquiry leads to social action, and reflections on actions lead to new understanding, which in turn opens up new areas of inquiry (Greenwood & Levin, 1998). This iterative process forms the foundation for continual improvement (Kemmis & McTaggart, 2005).

Participatory action research, earlier known as research in action, makes research contextual, and roles of the researcher and the researched can be interchanged (Reason & Bradbury, 2008). Here researchers enter into a collaborative partnership to facilitate improved practice through direct application (Carr & Kemmins, 1986). In the inquiry stage, researchers and participants identify a shared practical problem and methods to collectively address that problem (Mackenzie et al., 2012). One of the practical and unsolved problems that all parties identify is the low utilization of vessel capacity.

3 Case: coasters in the short sea shipping ecosystem

This part of the study aims to explore activities that are central to the shipowner and is mostly based on participation in the shipowner's operations and a team of developers for an electronic cargo brokerage platform.

3.1 Port call

The port call efficiency is a problem for the shipowner and there is much room for improvement in e.g. the administration of the port call. This can be observed for the dry bulk and general cargo vessels operating in the Baltic Sea, where about half of the vessels spend at least 40% of their time in ports. Another problem is the first-come-first-served system in the ports that leads to vessels rushing to port to then wait. (Gustafsson, Nokelainen, Tsvetkova, & Wiström, 2017)

The shipowner's vessel schedule is highly dependent on the schedule of the port call. The port call becomes more and more important with shorter voyages and tighter vessel schedule. Knowing and managing the vessel schedule is of highest importance for the shipowner. Therefore, the shipowner tries to get hold of the port call schedule as early as possible with as reliable information as is available. The shipowner will try to push for an estimated time of completion/sailing to have the port agent committed to a quick turn-around time. The communication between the shipowner and the port agent starts from a couple of days to a week ahead. First, the shipowner wants to ensure there are no extra surprises, e.g. broken equipment, lack of workforce or an overbooked port schedule.

The first communication between the shipowner and the agent is usually through the shipowner's voyage update. The voyage update is always sent to the involved port agents and this is primarily how they follow the development of the voyage. As the vessel arrives close to port, the agent takes on the responsibility of communicating the

voyage update. The first update made by the agent includes an estimated time of sailing, unless there is hindrance and greater unknowns of the schedule of port operations. With the vessel in port the agent communicates with the vessel operator as well as directly with the captain. As the port operations proceeds the estimated time of sailing is updated by the vessel agent.

The vessel agent has his own schedule for the vessels he is responsible for and plans his schedule according to the port's own schedule. However, in small ports there might be only one vessel agent. The agent considers the changing port schedule as well as the changing schedule for the voyage and with it the vessel's expected time of arrival, which, in turn, leads to new time schedule planning for the shipowner. The port plan for the vessel is dependent on factors and risks that the agent must take into account. As an example of this, an agent with a vessel loading fertilizers in bulk with open hatches will be well updated on the weather forecast because of the moisture sensitivity of the cargo. Depending on the situation, some risks are both more probable to materialize and of higher importance.

The optimal performance and execution of the port operations, without unplanned failures, depends on several factors such as loading and unloading rate, availability of stevedores, berths and cranes. Optimizing this workflow, even without taking uncertainty factors into consideration, remains challenging.

Ports generally communicate their schedule regarding ongoing voyages to involved shippers, receivers and shipowners. Shippers will check the availability of the port when planning the voyage, but availability will only be communicated upon request for potential shipment. This leads to low knowledge of availability in ports through the logistical chain. With ports only communicating a yes or no upon request, optimization of voyages and matching becomes more difficult than it would have to be. Constant manual following up on the port schedule is the only way for the shipowner to have some idea of how the port visit will turn out for the vessel.

The execution of the port call is highly dependent on smooth and functional communication. An illustration of the port call communication from a shipowner's point of view can be found below:

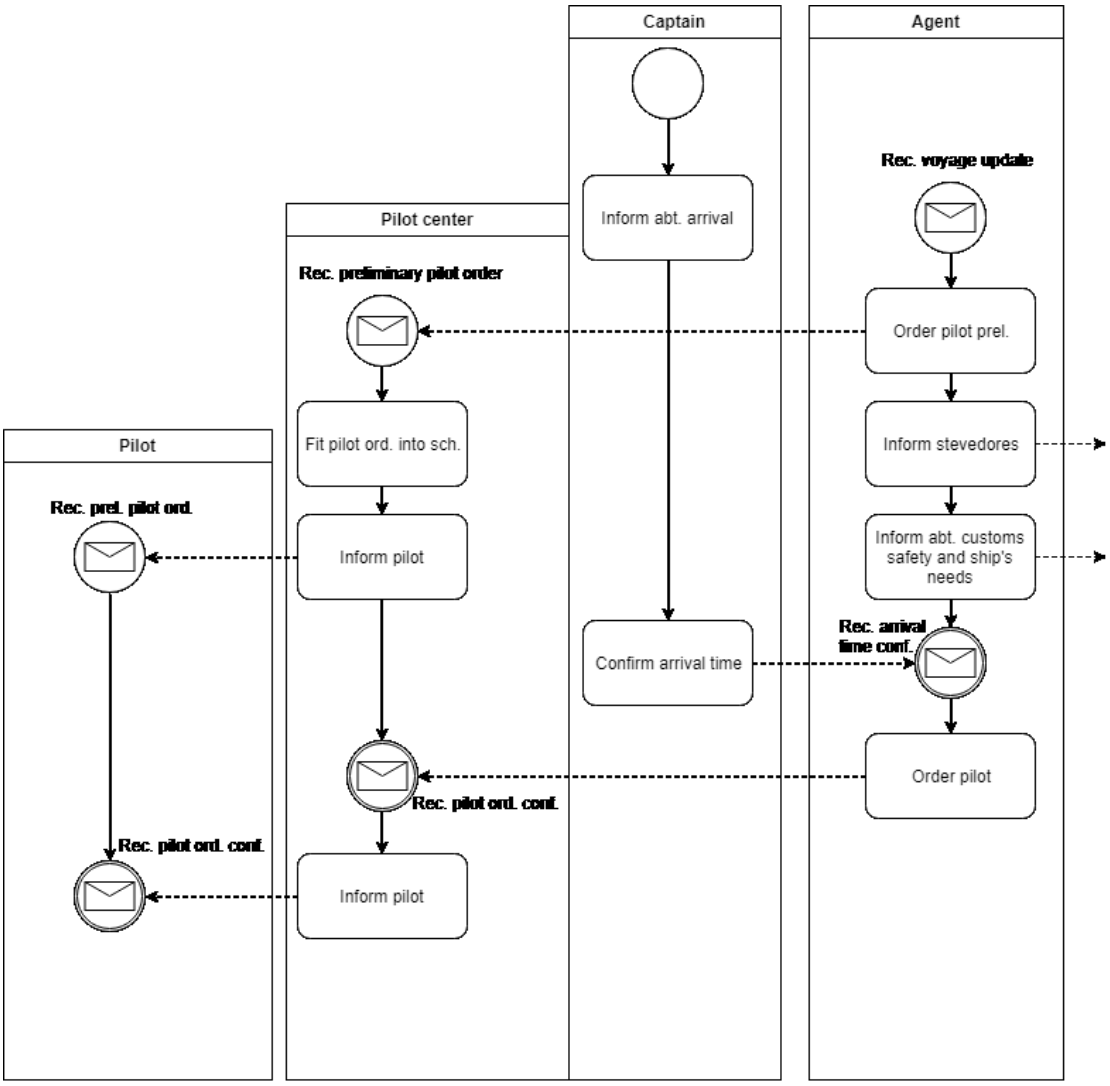

Figure 2 Information flow for arrival to port

As can be seen in the communications diagram above, there is much manual work going into communication before the vessel arrives to port. Furthermore, there is no common communication platform in use; instead a combination of email, telephone and radio is used.

3.2 Selling freights and fitting freights into the fleet schedule

This is an activity performed by the shipowner. The shipowner probes the market for freights through brokers, shippers, charterers and in some cases consignees. The most important objectives for the shipowner's chartering department is to find freights, fit them into the vessels' schedule, negotiate terms and price of the C/P. Each freight is considered as its own case or entity as it is the main subject of a C/P.

Each shipment depends on the other shipments that the vessel is to perform. Their dependency is managed through the shipowner's vessel schedule. The vessel schedule is the shipowner's internal model for future and ongoing freights. It consists of the shipowner's vessels with assigned voyages and their timespan. The voyage schedule for the vessels is formed continuously by the shipowner's chartering department. Voyages are planned from days up to a month forward, depending on the market situation and type of voyage. Certainty of good execution of a voyage is time dependent. The closer in time the voyage is the more certain is the outcome. In the same way voyages cannot be booked too closely or too far ahead. This uncertainty is mostly found in shipowner's operations and operations of ports. As certainty of execution grows one can argue that the voyages to be performed can be packed closer together. The shipowner's chartering department must split their attention between communicating, negotiating and planning.

At the moment the shipowner broadcasts their available open positions but not necessarily the current positions of the vessels and seldom schedules for the vessels. It is not in the shipowner's interest to share more information than he must, even though better optimization of the logistic chain could be achieved with higher information transparency.

3.3 Broking, facilitating the shipment

The bulk market has its own brokers: the dry cargo brokers. Dry cargo brokers either search for vessels to transport goods or search for goods to be transported by vessel.

This depends on if the principal is a shipper or a shipowner. Typical for the Baltic Sea bulk market is a cargo broker searching for vessels. The broker is central in the current market, the centrality is the broker's main operating tool. If the shipper was in contact with and knew all shipowners, the shipper would not have a big need for a broker. The broker is the key to finding suitable vessels.

The broker is central in the short sea shipping ecosystem and so are his activities. The activity of the broker can consist of:

1. Broadcasting available shipments and queries for offer
2. Broadcasting available vessels
3. Building a network of shippers and shipowners
4. Negotiating terms
5. Following up on execution as the commission may depend on it

When the broker broadcasts available shipments it is usually by query for offer through email. This can also be done by telephone. This takes a lot of time and effort and it can be difficult to communicate the right information.

At the moment the broker's network is a value-adding factor to his services. The network is the multiplier for the reach the broker has when trying to find fitting vessels and cargo. The size of the network in turn is limited by the effort the broker is able to put into building the network through conventional tools. With a common marketplace the broker's role would change significantly.

When the broker is looking for a vessel to transport a shipment he will be dependent on his relationship with the cargo owner. If brokers have full authority in negotiating the C/P for the shipment, they will negotiate offers directly. However, in many cases, brokers only have authority to transmit information but not to commit to and negotiate on contracts. This can be due to the fact that the cargo owner or shipper needs to be in full control of the negotiating process to ensure the best price and execution. Only brokers that have earned enough trust will have full authority on negotiating and closing

deals, and this only when it fits the shipper's way of working. Otherwise the brokers will only transmit information through their network and let shippers make or accept shipment offers.

Not only is the broker's commission dependent on payment of the freight but also his reputation of broking working deals. Freight payment is usually done a few days after the issuing of a bill of lading. Payment terms depend on the reputation of the shipper and the relationship between the shipper and the shipowner.

The broker's centrality in the market shows how the market in its current form is decentralized. Information about vessel availability and shipment need is not widely distributed but rather only available to a few parties. One could consider this a network of clusters. The fragmentation of information could have a negative effect on the efficiency and utilization of vessels. A low transparency of market information suggests that not all parties in the market can take part of the information. The shipowner can only try to match the cargos made available to him against his vessels. This in turn leads to very few vessels being test-matched against a cargo available on the market.

In the current form of the market, a broker is competing for the best performance against other brokers in delivering the most value for the charterer. Value for the charterer provided by the broker can be a low price for the freight, good negotiation of contract terms, reliability of the shipowner, how fast the broker can find the right vessel and a good long-term relationship with shipowners.

As mentioned earlier, the broker's biggest asset is their network of contacts, especially shipowners that they can break cargo to. This is one of the main reasons for the charterer to use a broker. The broker checks with shipowners in his network if they have open positions when there is a shipment to be shipped.

To reach as many relevant shipowners with the shipment enquiry as possible is in the charterers interest. There is a higher chance of finding a good match if the message reaches as many shipowners as possible. This in turn can lead to the charterer using

several brokers to break a cargo. However, with several brokers involved, the negotiation freedom of the broker will be limited so that no two brokers can commit to a C/P on behalf of the charterer at the same time. The limited negotiation freedom can have adverse effects for the charterer. With limited negotiation freedom and the risk of the cargo being brokered through another channel, the broker might not see the benefit of putting in a big effort towards finding the right shipowner. Below is an illustration of the network a cargo can utilize:

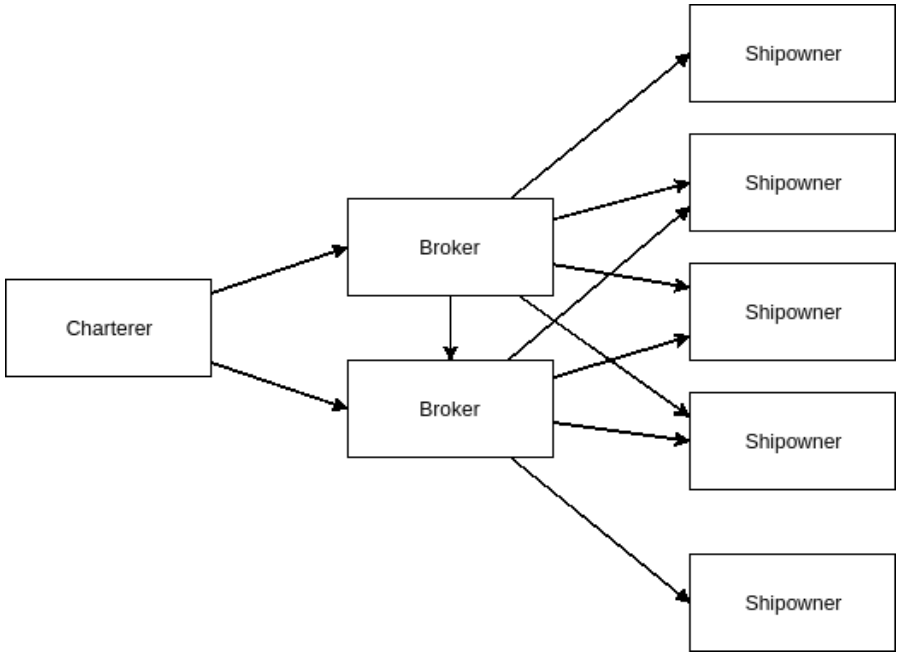

Figure 3 The current network when a shipment is brokered

If the charterer utilizes multiple brokers to break the same cargo, the shipowner can at times be contacted by different brokers for the same cargo on the market. This has a great effect on the credibility of both the broker and the shipper.

At times the broker will not find a shipowner that can ship the cargo. Here the broker can use another broker to find a suitable vessel. In extreme cases a shipowner might break the cargo to another shipowner. This can lead to rising costs for either the shipowner or the shipper if a double commission or address fee is added to the price.

There are some pitfalls in the current way of communication and the information flow in this network can be hard to control or keep track of. As it is now, it is hard for the charterer to know the market situation before there is any response to their enquiry. Also, the shipowner might find communication troublesome with regards to the quality of the information received as well as not knowing how their offer is received by the charterer.

3.4 Vessel Operations

Shipowners operate the vessels to perform as a planned schedule. In due time, when a vessel has been fixed for a voyage, the vessel will be given voyage orders for a freight with information regarding ports, laycan, loading terms, agents and special requirements which can include e.g. draft restrictions.

Closer to arrival, still several days ahead of the port call, port operation prospects are communicated by agents to concerned parties as a separate plan. This is the time plan for port operations and it is subject to the changing schedule in the whole port and vessels' arrival. These prospects are subject to change as unforeseen things occur, at least until the vessel has sailed from the same port. For 3000t to 5000t lots stevedores typically need 10 to 25 hours to load or discharge a vessel. This is the main port operation the port call is focused on.

The figure below illustrates the communication logic for managing and executing a voyage from the shipowner's point of view:

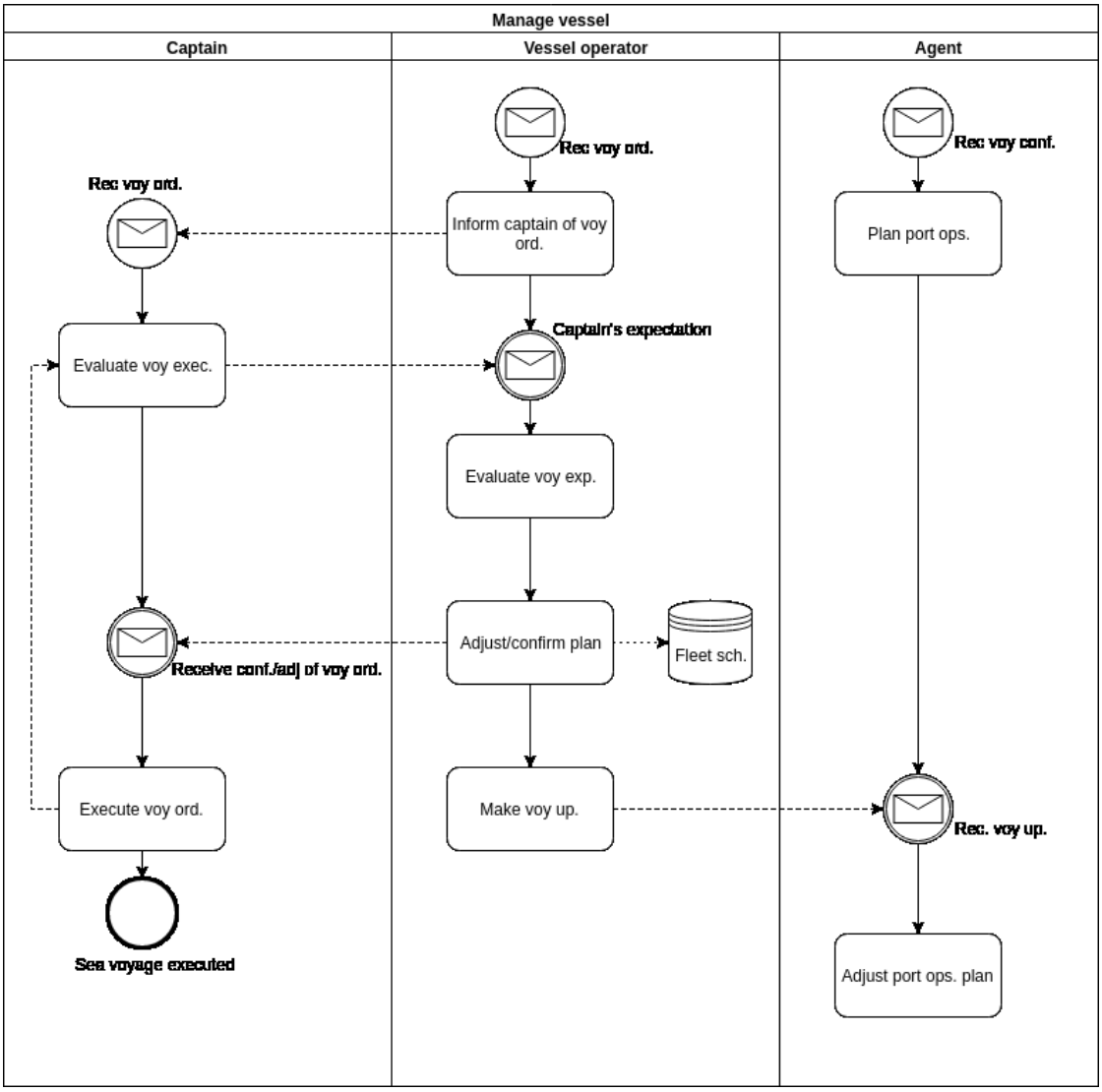

Figure 4 Voyage management from the shipowner's point of view

Figure 4 represents how voyages are managed after they have been booked. The shipowner is represented by the captain and vessel operator.

The approach in this diagram in figure 4 is to look at how the vessel is managed for a voyage. The timeline for one vessel has voyages in sequence. Each particular voyage can, and probably will, have an effect on the rest of the fleet schedule. This is dependent on how the voyage is performed and operated. Therefore, the fleet schedule is continually adjusted. The vessel schedule is the main tool for the shipowner's operations and planning. Because of the time sequence and the interdependence of voyages and

vessels, the systems become complex with only a few vessels and voyages. Voyage execution is also affected by a possible lack of information between the shipowner and the agent. Issues in communication can arise from problematic incentives. The shipowner can be better of by communicating their best-case scenario rather than the most probable scenario. Also, potential problems might not be communicated and therefore the other party will not be well prepared for them.

The schedule for the port is at many times not optimal for a fast turnaround of the vessel. This can be due to incentives and unforeseen events. The nature of unforeseen events leads to them being hard to list. These events are especially noteworthy when they occur when they will have the greatest impact. The events have their greatest impact when they result in a large delay and further delays in the fleet schedule. This can be at the end of port operations or at the end of the working week, resulting in the vessel staying in the port over the weekend. However, some factors for delay are more common than others. Port operations are often delayed due to weather that can compromise the quality of the cargo, rain being the most common type of weather to compromise the quality. There are many cargo types sensitive to rain, e.g. grains and fertilizers.

Often the equipment in the ports is not well maintained or too old because of incentives and economics. This leads to a higher probability of equipment breaking. As many of the ports involved in short sea shipping are small, there is little to no backup equipment available. Events that lead to some other vessels' delay will most often lead to a delay for the vessels scheduled after them in the same port. Ports do not have the capability to handle these kinds of issues in a satisfactory way when it comes to limiting turnaround time.

Other vessels' schedules in port can be troublesome for the shipowner\s vessel in question. When the port is crowded with vessels, the timetable for the shipowner's vessel in question is often delayed. Other vessels' timetables are typically not communicated more than one or two days in advance.

Incentives for port operations:

The stevedores are usually paid on a per tonnage basis, this incentivizes work to be planned as conveniently and cheaply as possible while still performing according to terms. This means that there is no hurry of operations except when the risk of passing the limit in laytime approaches.

Performance-based pay could help the current situation so that agents and stevedores could also reap the benefits of a shorter turnaround time. One way of doing this is to start using a dispatch rate for these smaller lots as well.

Because of the tight schedule of short sea vessels, overtime payment is often used for quicker completion. This is a flexible option as it can be negotiated on a case-by-case - basis. However, overtime is not very reliable as a method to hurry up port operations as it is often not an alternative at ports or availability might not be known until a couple of hours ahead of planned overtime. Therefore, the shipowner still must plan for the risk of delay in port operations even though it would later turn out that the option of overtime is available and used.

Delayed port operations can also affect the next voyage as the voyage schedule for a vessel needs to be tightly planned to be profitable. An example of this is when there is such a delay that the loading or discharging of the vessel is not completed on a Friday and the port operation's terms are sshex, the vessel can then be forced to stay in port waiting for continued loading or discharging on Monday. This can have the effect of making the next voyage and meeting its canceling day impossible.

3.5 Current contracts

The earning logic for the shipowner is dependent on the contracts in use. The most typical charter party for short sea shipping is the voyage charter. The voyage charter is a contract for the carriage of a stated quantity and type of cargo, by a named vessel between named ports for an agreed price, called freight. It is the most widespread form of chartering. There are two forms of voyage charter:

a) The entire ship is chartered for the transport of a full cargo with particulars for either a well determined voyage, a voyage to go and return, a series of specific voyages or a round trip with different harbors and the right for the charterer to load and discharge.

b) Part of the ship is chartered for the transport of a certain shipment or part cargo.

If the ship is chartered entirely, the agreement will usually be noted by a charter party, although, under certain legislations, this agreement may also be materialized by other means, even by testimony. Usually, under a voyage charter both the fixed costs and the variable costs are at the expense of the shipowner. In the contract of affreightment it is clearly stipulated who must pay the cargo handling cost. (Maritimeknowhow, 2018)

Current voyage charter parties can be troublesome regarding how vessels approach port. This is partly due to how laytime is typically calculated in e.g. the Gencon C/P (Bimco, 2018). The laytime calculation is subject to a vessel's arrival which is determined on the vessel's notice of readiness, terms in the C/P and the statement of facts for the port call. Efficiency of the port call and terms in the C/P do not necessarily go hand in hand. Best performance in port cannot be guaranteed only by executing port call according to the contract. If no dispatch rate is included in the C/P, only goodwill and the port's overall efficiency and economics remain relevant for the performance of the port. This

can easily lead to the port not having quick port operations as a high priority with the effect that the loading or discharging of the vessel will not be completed before the end of the allowed laytime.

On the other hand, because of how laytime is calculated, it can be beneficial for the shipowner to have the vessel rush to port even when it is known that port operations cannot commence immediately, and the vessel will have to wait. An example of this is when the vessel is arriving a day ahead of loading, communicated by the port agent but still within laycan. If the captain expects to arrive to the loading port around noon, it can be beneficial for shipowners to have the vessel give notice of readiness before and including 12:00. In gencon 94 laytime shall commence at 13:00 if notice of readiness is given before and including 12:00 the same day. The constraint of laytime will here act in favor of the shipowner and will force the shipper to execute the loading as fast as possible, in order not to let the vessel go on demurrage. (Bimco, 2018)

3.6 Coaster and mini bulker capabilities

Short sea shipping in the Baltic region is characterized by the mini bulkers (sub 10000 DWT) and similar general cargo ships (Marinewiki, 2018). These ships are generally being used for the transportation of bulk cargo in the fashion of short sea shipping. However, these vessels often have other capabilities than just transporting bulk cargo. Most are equipped with container fittings in the hold and on deck and can also, with lashing, load various different break bulk and project cargos. An example of a coaster with the possibility of carrying containers is M/v Flex Keston, 4800 DWCC, with a specification that its hold is fitted for 120 TEU and its deck is fitted for 56 TEU (Meriaura, 2018). There are of course limits to the number of containers that is safe to load, e.g. with regards to stability when loading layers of containers on deck. However, even when taking limits into account, the ability to carry containers is considerable.

3.7 Expenditures for shipowner

The running costs of larger vessels have been thoroughly researched and these have many costs common with smaller vessels. The figure below serves as a guide to major cost items relevant to the shipowner:

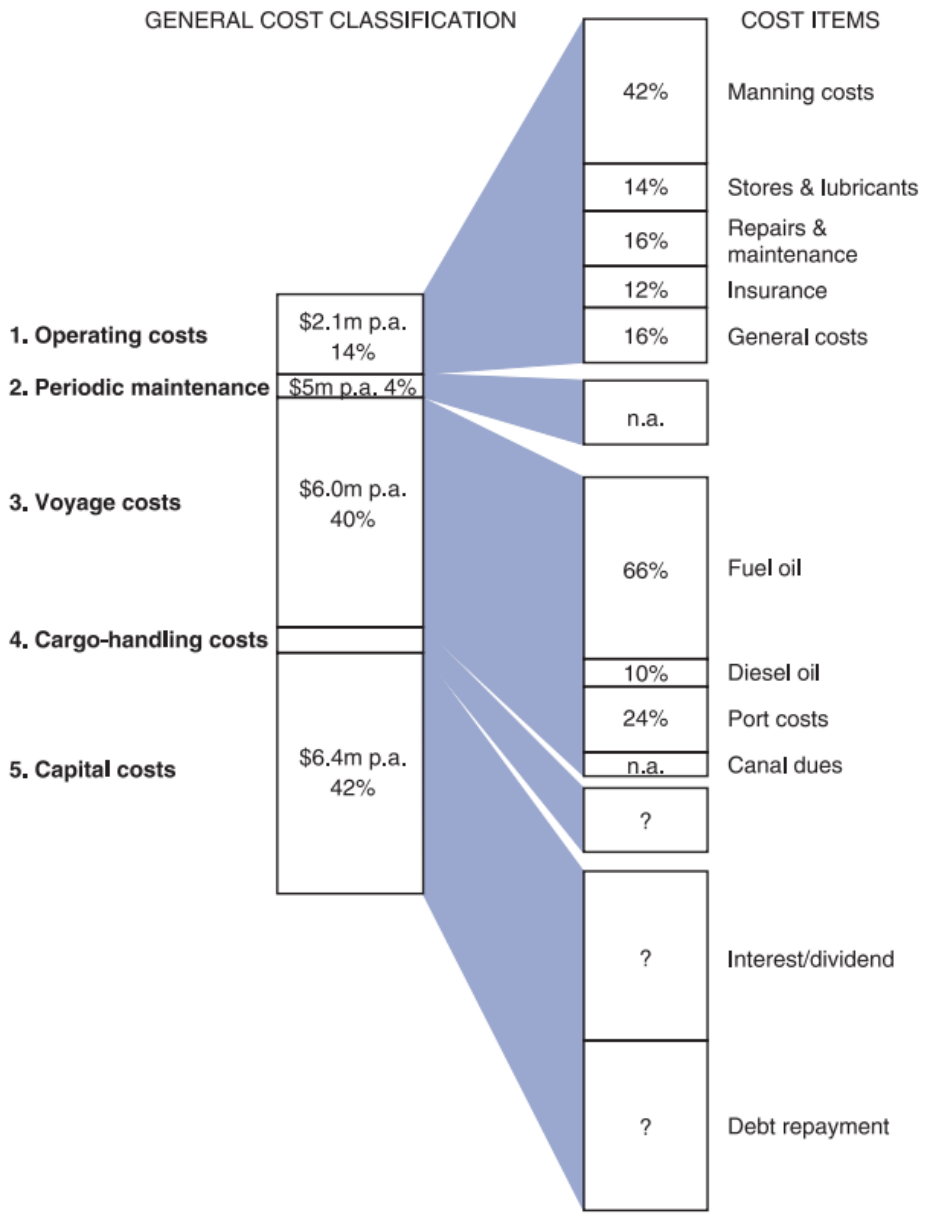

Figure 5 Major costs of running a Capesize bulk carrier at 2005 prices (Stopford, 2009).

The time charter for the smaller-sized vessels is lower than that of a Capezise bulker but is of meaningful size compared to the freight payed. The time charter is the vessel's "rent" and the cost for the shipowner is linear with time as the vessel cannot be taken on and off charter outside of the contract terms. The effects of this is that a voyage will cost less in time charter with higher sailing speed and good timing. However, the time charter can become a big, costly burden with bad planning and bad luck.

The cost of bunker is close to the cost of time charter while at sea. However, in port, the vessel will only consume a minimal quantity of bunkers. Vessels not fitted with a scrubber cannot run on heavy fuel oil because of the sulphur restrictions; the alternate fuel is marine gas oil (MGO) that has only a low amount of sulphur. The bunker consumption and cost are dependent on distance and speed. However, even though slow steaming can decrease bunker consumption for the voyage, it can be costlier because of the time charter that has to be paid according to time used.

Below is a list of the costs linked to the port call that the shipowner is subject to. These are not only dependent on the vessel but also on the country and the specific port.

- Pilotage
- Fairway dues that are part of the port call
    - E.g. the mandatory fairway dues when entering a Finnish port after being on international waters. These dues are waived after 10 payments.
- Mooring
- Shifting
- Wharfage
- Quay planning in Kaliningrad Svetly (as an example of variety)
- Tonnage dues
- Agency fee

When entering and departing the Baltic Sea, the shipowner might choose to go through Kiel Canal. Below is a list of the costs linked to passage through Kiel Canal:

- Fairway dues
    - For a vessel with the GT of 2481
        - Cost: 3030 EUR (United Canal Agency GMBH, 2018)
    - For a vessel with the GT of 3405
        - Cost: 3712 EUR (United Canal Agency GMBH, 2018)
    - Helmsman if vessel is over 100m in length 15.5m beam and 6.1 draft (National Geospatial-intelligence Agency, 2006)
        - Helmsman cost: 897 EUR (United Canal Agency GMBH, 2018)

The fairway dues can be subject to smaller savings and pilotage dues can at times be avoided if the captain of the vessel has had necessary training.

The Kiel Canal makes for an interesting calculation exercise. At times it can be wiser to go around Jylland, but with a tighter schedule the vessel will most often be forced to go through the canal. Choosing the route around or through is dependent on schedule, bunker cost and consumption, time charter and fairway fee.

There are many costs that are hard to identify, especially those related to inefficiency not visible in the shipowner's cost structure. An example of this are the smaller posts in e.g. overhead that are tied to the information flow, and their link to overall earnings. The European Commission (EC) has identified short sea shipping cost drivers in the administrative burden that could be solved through new directives on reporting formalities. The mechanism here is that the costs associated with administrative burden at ports and delays of vessels for customs clearance will be reduced. The EC believes that the cost savings will lead further to reduced operating speed during journeys and a reduction of the total fuel consumption. It is expected that directives on reporting formalities could lead to a reduction of 3-5% of maritime costs per journey. (European Commission, DG Mobility and Transport, 2015)

The EC also sees digitalization initiatives as a driver for cost reduction. The report finds that the initiatives have a combined potential of cost savings of on average 1.5-2%. The initiatives include functions for time savings for trucks through: automated port gates, e-Maritime that will support communications between maritime transport as well as multimodal logistics. (European Commission, DG Mobility and Transport, 2015) The report finds no solutions for low overall utilization in the short sea shipping market.

In shipping, pricing is most often cost driven. The shipowner calculates his costs for a voyage and then applies and negotiates the margin. With cost driven pricing, the shipowner needs to be good at estimating the costs for the voyage. The expected voyage cost is often calculated based on a best-case scenario and then adjusted for risks, dependent on their cost and likelihood. Pricing based on cost for a certain voyage can be misleading for better returns.

3.8 Emissions

International shipping was responsible for 2.2% of total emissions of CO_2 in 2012 and 2.8% of total emissions of CO_2 in 2007 (International Maritime Organization, 2015). In the same IMO GHG study 2014, CO_2 emissions from international shipping could grow between 50% and 250% depending on economic growth and energy developments (International Maritime Organization, 2015). CO_2 emissions vary by ship type and is directly linked to the quantity of bunkers consumed. Even though emissions on a per ton basis for commercial vessels is low, there is a high interest in lowering ship emissions due to the high total amount of fuel being used. The three major emitters of CO_2 by ship type are oil tankers, containers and bulk carriers as seen in the figure below:

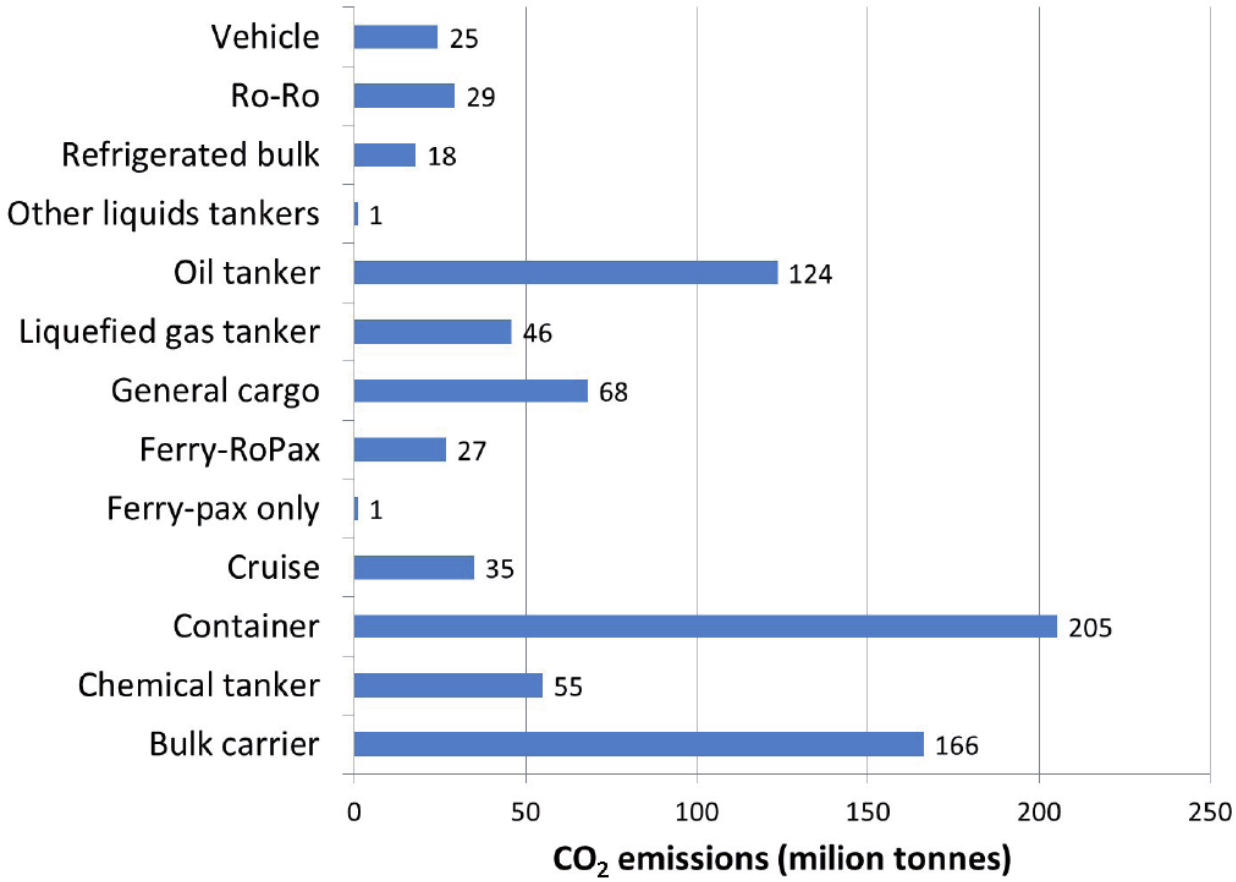

Figure 6 Bottom-up calculation results of CO_2 emissions from international shipping by ship type 2012 (International Maritime Organization, 2015)

The CO_2 emissions are directly tied to the quantity of bunkers consumed as can be seen when comparing the previous figure to the following figure:

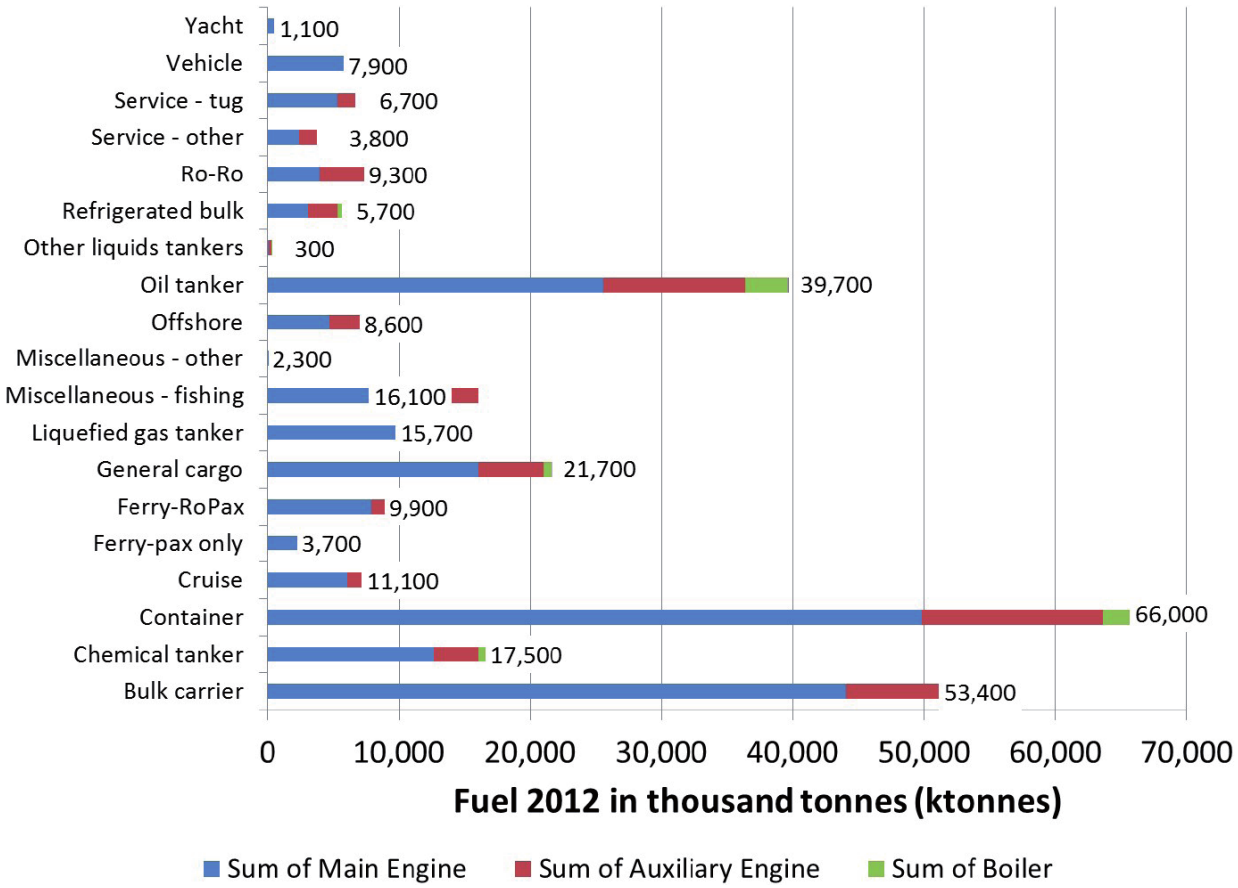

Figure 7 Graph displaying annual fuel consumption by ship type and component in machinery, 2012 (International Maritime Organization, 2015)

Figure 7 illustrates that with the same bottom up method, the total fuel consumption has been estimated with an error bar derived through a Monte Carlo simulation factoring in important parameters. (International Maritime Organization, 2015)

There is a rising trend in the interest of combating the CO_2 emissions. This has led to the political will to connect the cost of emissions to those emitting it. The EU emissions trading system (ETS) was set up in 2005 and is seen as a cornerstone of the EU's policy to combat climate change. (European Commission, 2018)

The EU has made a provisional agreement on the general ETS-reform that calls for shipping to be put under the scope of the EU ETS unless there is meaningful action for

cutting of emissions from the International Maritime Organization. (Thomson Reuters, 2017)

Also, other authorities have tried to put a monetary value on emissions. The Finnish transport agency, Liikennevirasto, has identified the CO_2 emission cost of sea traffic to a total of 126 M€ 2007 (in 2010 year's €) with a value of 37 €/tCO_2 (Liikennevirasto, 2015). However, the estimated vehicle CO_2 emission cost in 2012 was 40 €/tCO_2 (Liikennevirasto, 2012).

Emission costs can also be measured in damage cost approach (SCC) and marginal cost approach (MAC). Isacs et al. identifies a range of costs for CO_2 emissions where MAC and SCC costs are measured in 2015 and 2050. The MAC cost in 2015 ranges from 6.5 to 7.3 €/tCO_2 and the projected cost in 2050 is from 133 to 398 €/tCO_2. The SCC cost in 2015 ranges from 6.1 €/tCO_2 to 724 €/tCO_2 and the estimates for 2050 are between 13.4 €/tCO_2 and 1214 €/tCO_2. To this can be added that the minimum Swedish tax rate in 2015 is 660 kr/tCO_2. (Isacs, et al., 2016)

Spot prices for the CO_2 European emission allowances have been varying with a significant uptrend during this past year as can be seen in the figure below:

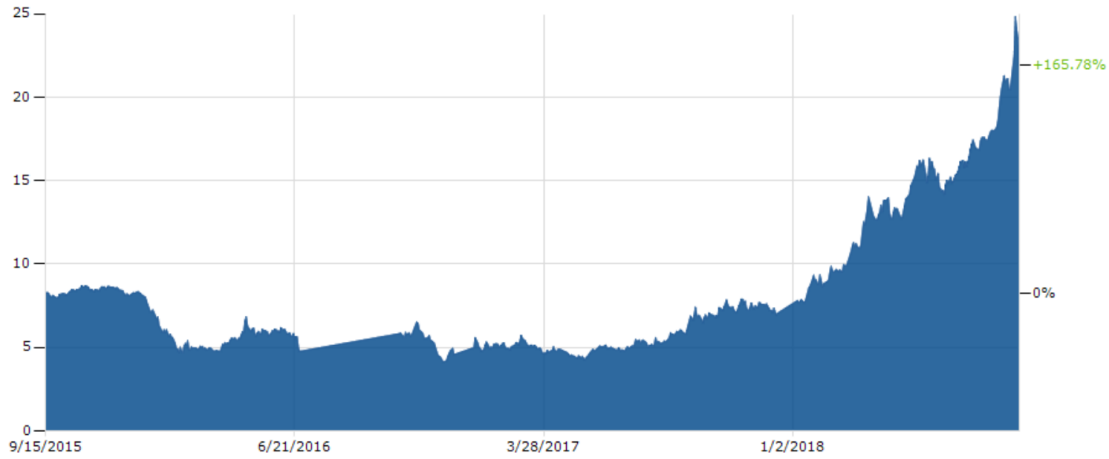

Figure 8: CO_2 European emission allowances in €/t (Business Insider, 2018)).

As can be seen in figure 8, the cost of CO_2 emissions varies a lot. If the cost of CO_2 rises significantly, it can indeed be a great opportunity for emission conscious shipowners to deliver better value for money.

3.9 Automatic coordination, optimization and brokerage services

Digitalization and new tools provide the possibility to modernize the current marketplace. The idea of a digital centralized marketplace for sea freights is an enabler for providing a higher efficiency and utilization of vessels. To have shipment need and vessel availability brought together in one place is very different from how the markets currently operate. Not only are there problems with the information flow but also with the matching. Matching will be difficult even with perfect market knowledge for a person, considering the possible matching of hundreds of cargos to a fleet. This leads to the fact that the best total value is seldom delivered.

For better matching, the two most important things will be better transparency in the market, and better calculations of value delivered, based on what is known about the market at that moment. Information transparency becomes critical to the performance and value added by a marketplace, that tries to deliver better matching of vessels and shipments.

Considering above, a relevant electronic marketplace needs to be able to collect and show market information, but also be able to provide best alternatives in order for the charterer's and shipowner's needs to be filled. To rapidly grow the amount of C/P:s signed with the help of an electronic marketplace, the information base needs to grow as quickly. A low threshold to insert needed information in terms of difficulty and cost is important. The electronic marketplace will have to provide an interface that is easy to use for non-tech-savvy participants of the freight market.

Optimization:

In solving the problem of inefficient shipping, better matching is essential. Matching needs to take into account several parameters: the needs of the charterer in the form of time, cargo capacity etc. but also the shipping capacity of the shipowner in the form of vessel availability, vessel capability etc.

The idea behind automatic coordination, optimization and brokerage services is providing an electronic platform for broking cargo and vessels. The platform is extended with some value-adding functions, such as giving matching proposals and a base for the C/P after agreement between the charterer and the shipowner, simplifying the broking process.

Information about open vessel positions is gathered from the shipowners on the platform, and this is the backbone for the matching process. When a match for the open position is found, the shipowner receives notice and the platform will suggest a price and terms and give room for negotiation. The matching can also go the other way, a charterer can put out a request and receive a match.

The platform is dependent on information and is enforcing a level of transparency for parties to participate. Enforcing transparency can in itself make the market more effective with parties sharing more information with each other. Below is the information flow of the shipment request illustrated:

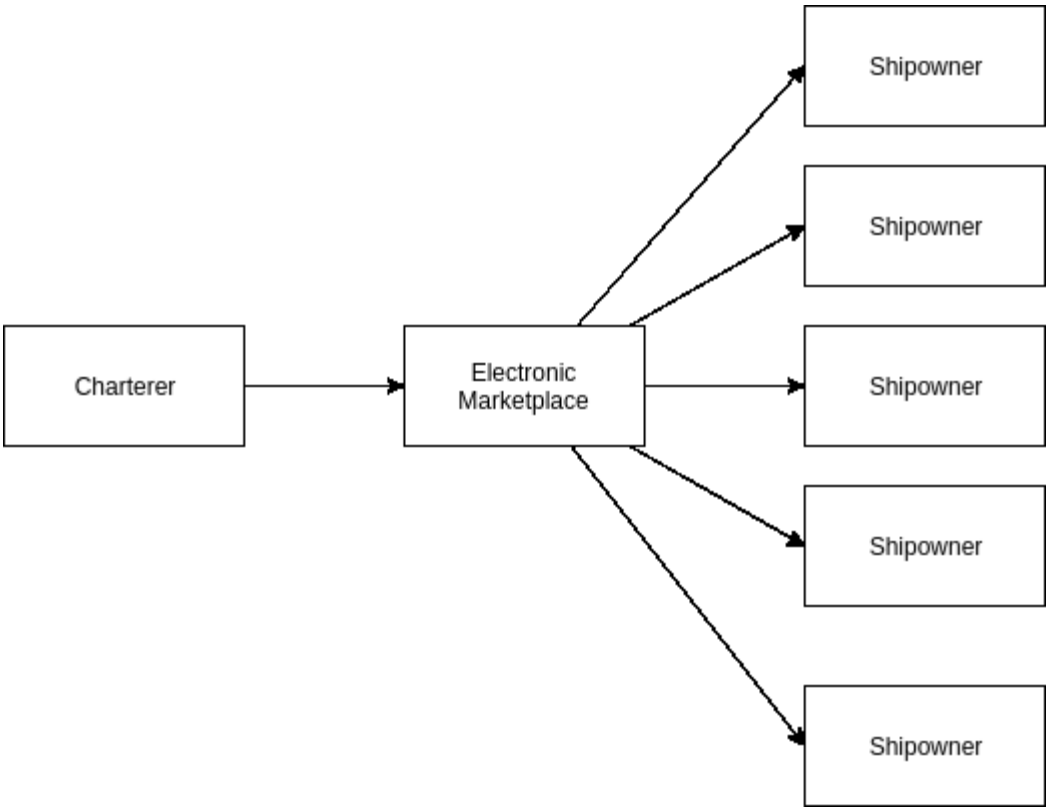

Figure 9 Information network in automatic coordination, optimization and brokerage services with regards to a shipment request

Shipment information going through one major platform ensures simplicity for the participants, where one channel is enough to share the needed shipment information. This ensures that no duplicate offering will take place. The platform automatically reaches and utilizes relevant contacts.

The platform also hands back control of the offering to the charterer by providing direct communication and proposals for the shipment at hand. This lowers the threshold for new entrants by not requiring a pre-existing contact network when participating in a new market. This barrier has worked as a lock-in for the cargo brokers. New entrants can in turn provide better flexibility and growth to the short sea shipping market.

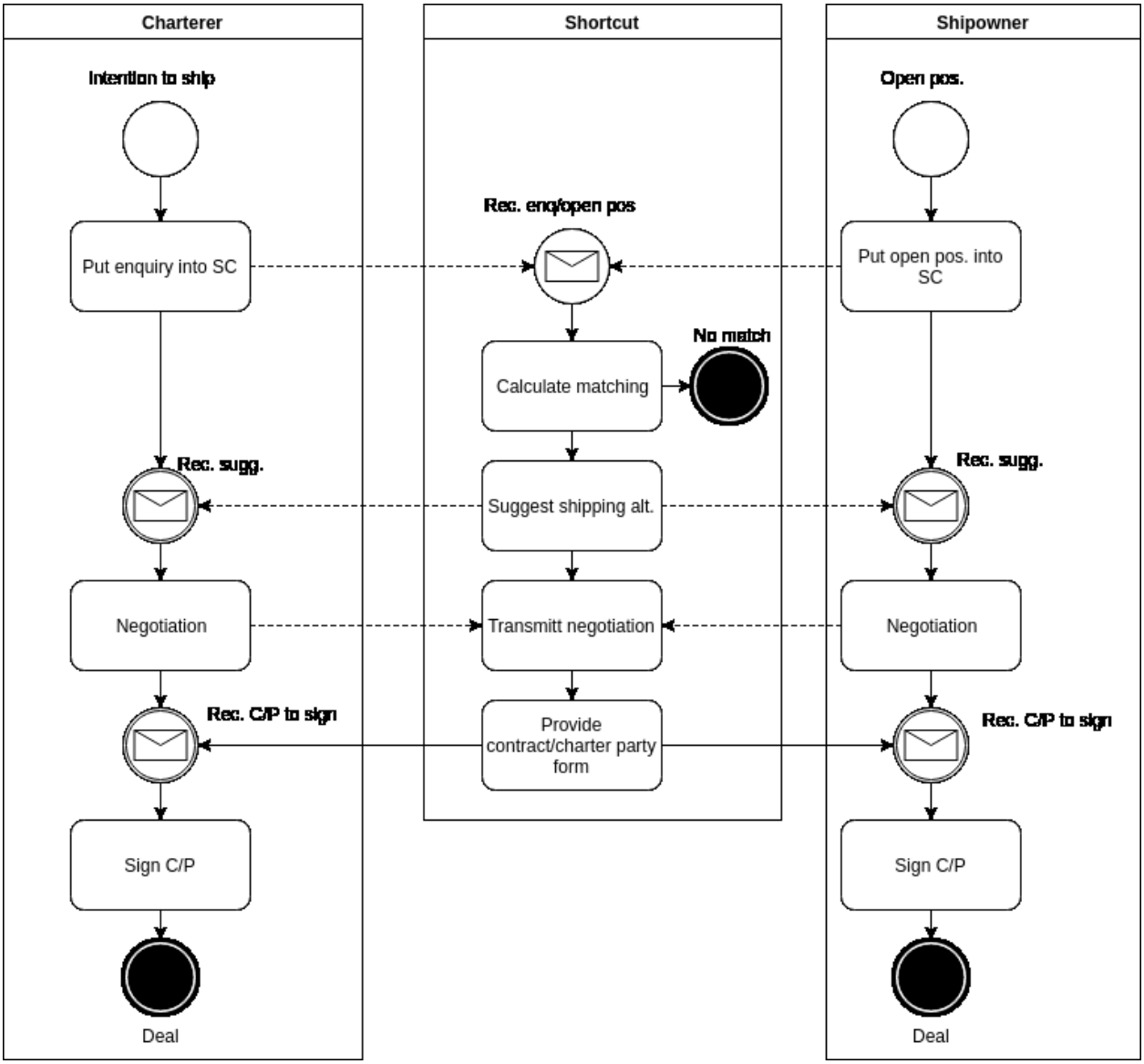

Figure 10 Information flow for matching in automatic coordination, optimization and brokerage services starting from enquiry and open position.

Automatic coordination, optimization and brokerage services can help in streamlining the negotiation between the charterer and the shipowner. To push the negotiation forward, the platform needs smart time limits on offers provided. When the offer is agreed, the platform provides a form for C/P to be filled, based on the accepted offer.

The earning logic in automatic coordination, optimization and brokerage services is similar to a cargo broker's: the platform earns a commission on the contract value. This leads to a low threshold for new entrants to the platform with no cost in sharing possible

shipment information. With a high enough amount of shipments brokered through the platform, the commission can be kept low owing to the low operating cost of the platform.

3.10 Scenario part cargo

In the Baltic short sea shipping industry it is typical to only load one type of cargo from one owner for one voyage. The lots being shipped do not always match the vessels very well, the result of this being that available tonnage is not being used even when the vessel is loaded for a voyage. An example of this would be a dry bulk vessel with a DWCC of 4500t but that can only take on 4000t of soybean meal before the hold is full. In this case the vessel has an excess of 500t in carrying capacity.

What is the capacity of the vessel, what can it take on board?

The idea of part cargo is to not look at completely empty vessels but to combine different shipments. This would mean utilizing existing free tonnage that is already sailing somewhere. To have different charterers for one voyage is not unheard of in e.g. the parcel tanker trade (Handybulk Shipping, 2018). Part cargo, however, is not the standard in the Baltic dry bulk market where charterers have preferred to not share the vessel, or the information network to coordinate a part cargo voyage has not been available.

Introducing part cargo to the short sea shipping market can have some obstacles. Difficulty in arranging a part cargo voyage can depend on several issues:

- Limiting C/P contracts where the charterer does not want to share the vessel.
- Hard to find the extra cargo.
- Insurance can limit having different cargos in the same hold.
- Available ports and their schedule for the extra cargo might not fit with first cargo and voyage plan

- Too high a risk for the charterer or the shipowner if extra cargo operation has a delay.
- Part cargo not covering the cost of extra time and port call costs.

The C/P contracts could in some cases be amended if the charterer sees a higher productivity of the vessel as a positive and the risks of sharing the vessel as low. Finding the extra cargo could be easier with better awareness among charterers about the possibility of open vessel positions and better information systems showing available tonnage.

The charterer might be worried about insurance complications from sharing a vessel with others. Insurance companies could be more practical in evaluating actual risk; two inert non-food dry cargos should have a low risk in sharing the hold with separating bulkheads.

Finding available ports for handling the extra cargo might prove difficult problem to solve. This is partly an information problem as it can be hard to find all the suitable ports and their time slots for cargo handling. There is most often more flexibility and possibilities than can be seen and found. Involving an extra risk is inevitable when taking on part cargo. There are also complications that come from pricing them correctly.

For the shipowner, the largest risk lays in how it affects the time schedule for present and following voyages. A shipowner's risk with part cargo is a case-by-case issue, the shipowner will seldom have the same schedule following the present voyage. Breaking schedule can be costly but is also an issue without part cargo. The shipowner needs to be able to calculate the cost of breaking schedule and what the risk of it happening is. The terms for port operations greatly affect the risk of part cargo; if the handling of part cargo leads to the main cargo being delayed by a weekend with sshex-terms, the cost is way higher than if not.

Also, the charterer might have a tight schedule with regards to delivery of cargo. The cost of a delay for a charterer must be determined by the same charterer. If part cargo does not cover the extra costs associated with it even though there has been good execution of the voyage, that particular part cargo was not economically viable in the first place.

These difficulties are still factors even if part cargo is possible to arrange. Therefore, there needs to be a standardized way of calculating costs and risks that arise. For the shipowner there are direct extra costs in the form of time charter of the vessel, bunkers and extra port calls. These costs depend for the most part on if the voyage is changed from a 1+1 to 1+2 or 2+1 concerning loading and discharging ports. If the case of 1+1 can be maintained, the extra risks and costs for the shipowner remain low. Extra costs could come from shifting between terminals in the port to handle different cargos. There are variations in port call costs for the shipowner but most common is a fixed rate based on net tonnage of the vessel, regardless of cargo. The cases of a 1+2 and a 2+1 voyage are similar. Because of the additional port in the voyage, the extra time spent will be less, the shorter the deviation from the original route the extra port call entails. Big deviations from the original route will seldom be profitable due to the low margins on a voyage.

To load part cargo on a vessel depends on many factors, including:

a) Availability of cargo capacity

The capacity to carry additional cargo depends on the vessel's capabilities as well as the original cargo. The first limit one must consider is the overall carrying capacity. The additional cargo can be loaded into the cargo hold or on deck. When loading on deck the stability of the vessel needs to be considered as on deck cargo leads to a higher center of gravity. To calculate this the cargo owner needs to provide details on weight of the cargo.

b) Ability to carry different kinds of part cargo, e.g. container fittings

The ability to carry different types of cargo does not only depend on weight and how it is distributed but also on the types of cargo the vessel is able to carry. This is dependent on the vessel's fittings.

A vessel with different types of cargo can also benefit from having its own gearing to move the cargo around. We can take the example of a coaster that is loaded with grain in the hold and containers on deck where the grain is to be discharged first. In this case it can be beneficial to be able to move the containers on the deck while different hatches are unloaded, not having to discharge the containers to the quay. Not only the particulars of the vessel have to be in order to be able to carry part cargo but the insurances for cargo and vessel have to be in order as well.

When the previous mentioned particulars are in order to ship part cargo, the ports need to also be able to handle the part cargo with regards to lifting gear, extra stevedore capacity, storage in port and logistics of different quays being available.

As stated earlier, emission considerations are becoming more important. Part cargo has implications on the emissions of the cargo transported, i.e. tCO_2/ (t cargo * nm). The vessel's total bunker consumption and emissions vary little as the amount of loaded cargo changes. Therefore, utilization is strongly linked to emissions caused by the cargo. The overall utilization has an even bigger impact on cargo emissions when considering that carried cargo has to also bear emissions from ballast legs.

4 Analysis

With the short sea shipping business ecosystem in a leadership or self-renewal stage, it is of interest whether the companies will be able to co-evolve around the new innovations emerging. Another question is how a shipowner should take on the competitive challenge of maintaining a strong bargaining power as the landscape changes. Can the shipowner shift focus from competing on efficiency to focus on innovation?

4.1 Part cargo and automatic coordination, optimization and brokerage services for the shipowner

With better communication and the strive for higher utilization, part cargo will probably gain popularity on the short sea shipping market. How this part cargo is implemented is key to success in this low-margin business. There remain many question marks to the implementation of part cargo.

Types of part cargo and their origin

There are several types of cargo that can be loaded on a coaster/minibulker vessel where also the modality plays a role. As stated earlier, the minibulkers often have the ability to load both containers, project cargo and dry bulk. The base assumption is that the main cargo would be transported in the same way as earlier and that part cargo would not impact the transport of the main cargo in a major way. Then the question lies in the transport of the additional cargo that presumably could be in the form of dry bulk, containers and project cargo. The containerized cargo could stem from different sources with possibilities in existing ro-ro traffic and land transport. As seen in the motorways of the sea logistical chain, one can push the cargo modality from land transport to sea. (European Commission, 2018). The land transport that goes between central Europe and mid to north of Sweden, Finland, north Baltic and the parts of Russia close to the Finnish

gulf makes for good possibilities. There are also other similar land transport routes that might be good alternatives.

Due to economics of scale, the part cargo will probably not compete with ro-ro when the origin and destination of the transport are close to the ro-ro line's ports. The economics changes when long land-driving distances can be avoided when choosing part cargo instead of ro-ro. There are also differences between transferring road cargo to hold and road cargo to deck. For containerized cargo the most straightforward way to load previous road cargo is to simply load it on deck.

Part cargo could enable new customers, especially in the case of cargo with a high value. With a too high value and big lots the customer simply is not able to order a complete vessel but must find his cargo through other channels. In the case of dry bulk, different types of fertilizers could be an example. The lots could simply be divided by existing bulkheads in the vessel.

Another type of cargo is the project cargo that can be transported on its own dedicated vessels or, at times, on coasters. Project cargo is a term used to broadly describe the national or international transportation of large, heavy, high value, or complex pieces of equipment. Planning is key to successful project cargo. (More than shipping, 2018) Project cargo is most often transported on its own. Why is this and what can be done to make it work as part cargo? This could be due to the complexity of planning project cargo where considering other cargos at the same time proves to be too difficult with current methods. Therefore, the planning methods need to be evolved to further take on project cargo as part cargo.

There might also be types of cargo not currently considered that are enabled by the part cargo concept. As flexibility in the system becomes better some, new cargo could be preferable to shift to part cargo.

We can speculate that part cargo would provide better access to the short sea shipping market for some customers. Customers with smaller lots that could otherwise not afford

to charter a complete coaster would certainly benefit if they were able to charter only part of the coaster and leave some of the carrying capacity to be chartered by someone else.

Part cargo has effects on emissions that are linked to the utilization of the vessel. As the utilization goes up, the emissions on that particular voyage goes down. Part cargo can be seen as an enabling concept for lowering of emissions. The concept also raises the question of what loaded cargo is carrying the emissions when sailing and what emissions are to be accounted for.

An interesting example is when considering a voyage with the total emissions for one leg, and a main cargo that is to be transported. If an additional cargo is loaded on the same vessel on the same voyage and the total emissions for that voyage are raised only by a fraction, can those emissions be considered separately for the different cargos?

Part cargo and the shipowner

Part cargo will in a straightforward way increase the utilization of a vessel in the case of simply adding a second cargo to the same voyage. Part cargo could lower the utilization of a vessel, if the voyage time needed increases over a certain threshold. This is to be avoided unless it makes economic sense for that particular voyage.

Additional cargo will probably increase complexity for the voyage in the selling, planning and operational phase. This, in turn, leads to increasing importance of good communication and information flow, especially as regards loading. The shipowner needs to ensure good communication as it stands vulnerable to delays.

Even though the additional cargo would only provide a little more revenue on the voyage, it could have considerable effects for the shipowner because of the low margins on shipments and the overall high capital intensity. Part cargo would have low impact on both fixed costs and operational costs. The biggest impact on cash flow would be additional time in port and the time charter associated with it.

If the additional cargo only raises the emissions marginally for the voyage, could the shipowner sell the additional cargo as a way to transport cargo with considerably lower emissions? This entails the possibility for an emission-conscious shipper to buy shipping with low emissions and lower their emission footprint for the cargo shipped. With the current trend of monetizing emissions, this could be a big possibility for the shipowner. Part cargo undeniably provides a possibility for business model development, new pricing models and earning logic development.

Part cargo could raise the risk of poor performance with the higher complexity for the voyage, as the cargos on board are now codependent. This could be the biggest barrier to utilizing the concept and, therefore, the risk must be well managed to have better average expectancy of the performance of voyages. The shipowners' interest lies mostly in avoiding knock-on effects on later voyages, the importance of avoiding risks that will delay the schedule rises with a tighter booked vessel schedule as there is less room for error.

Automatic coordination, optimization and brokerage services

Automatic coordination, optimization and brokerage services could raise the utilization by better matching of sailing vessels and cargo on the market. The better matching could be affecting current ballast voyages and overall poorly matched voyages. Ballast voyages are a structural problem for all parties involved and their number should be minimized for better performance of the short sea shipping ecosystem.

Automatic coordination, optimization and brokerage services and the shipowner

Automatic coordination, optimization and brokerage services provide both novelty and efficiency for the shipowner and can have implications for the shipowner's business model. The services can be a great tool for the shipowner if the utilization of the vessels can be raised, as this is one of the biggest factors for the economic performance of the shipowner. With a lower brokerage fee, the services could have a considerable impact

on the cost side of the cash flow for the shipowner. When considering separate voyages, a lower brokerage fee would have the highest impact on low to negative margin voyages for the shipowner. This could, in turn, not only impact the voyages currently sailed but could shift the limit for what type of shipments to take on with regards to profitability. With a different profitability limit, shipowners would be incentivized to sail with cargo when they otherwise would wait or sail ballast legs.

4.2 How the shipowner's activities are affected by part cargo and automatic coordination, optimization and brokerage services

The introduction of an electronic marketplace would implicate big changes for the activity of selling freights and fitting them into a fleet schedule. The most obvious change would be how the shipowner finds their freights in the market. An electronic marketplace could present shipping alternatives in the form of shipments to be transported and vessels' open positions matched to a shipment as a proposal. With most shipment alternatives available through one interface, less time and resources would be wasted in probing the market only to look for available shipments.

To have more information gathered with regards to shipment need in one place not only helps finding freight but also helps in keeping track of what is available in the changing market. This is a key feature in good manual matching of vessels to available freights and can be seen in the amount of work going into searching for available shipment information.

A software that can simulate voyages with matching of vessels and freights according to the highest value delivered to the system can provide good voyage alternatives to the shipowner. If shipowners are able to appropriate value, their margin will go up as higher value is delivered.

The key point for the change regarding selling freights is how the impact will be on the utilization of the fleet. We know from data that utilization is low. Thus any means available to raise utilization should be considered.

The tools available through automatic coordination, optimization and brokerage services could alter the selling activity for the shipowners' chartering department. Strategically the shipowner could shift the focus from pure selling and planning towards planning with the help of new tools. Here the shipowner can really put an emphasis on raising the utilization through planning the voyages tighter and avoiding ballast legs between shipments.

Another new emphasis for the chartering department could be to build better relationships to the shipowner's customers. Through better understanding of the customers, the shipowner can provide shipments that suit the needs of the customers better. An example of this could be providing packages of low-emission freight for emission-conscious customers.

The platform provides room for the shipowner to shift focus from selling voyages and operating vessels to new value drivers. Interesting goals for the shipowner could be being the best proprietor of a fleet with regards to:

a) Utilization
b) Reliability and operational execution
c) Emission efficiency
d) Vessel investments
e) Other activities not yet identified

5 Summary with recommendations

As the market evolves with new innovations, the shipowner has possibilities to co-evolve with the new innovations and other actors. The innovative shipowner could have a first mover advantage in early utilization of these innovations. If the shipowner can raise his utilization and lower his administrative burden in managing his fleet, there is room to grow on the Baltic Sea short sea shipping market filled with inefficient shipowners.

It can be considered that the short sea shipping market has already gone through a long phase of cost cutting and there is currently little to gain on further cost cutting. Instead of cost cutting, the shipowner should focus on delivering more total value. The total value delivered to the system is dependent on the factors utilization and value delivered to the customer on each voyage. The combination of the two is challenging but at the same time offers areas where the shipowner can stand out from the competition through strategic moves.

The shipowner should take advantage of the current trends in further digitalization, emissions monetization and flexibility. The trends can be used as a guide to where the shipowner can put an emphasis on delivering more value from his fleet.

Utilization is a mindset and a way of working. The shipowner might switch strategy and choose to take on cargos with poor economic outcomes for those particular shipments. The key question then becomes, what is the overall result of avoiding vessels waiting and raising utilization through taking on shipments that do not pay well?

The shipowner should focus on the activities that can help him deliver more total value in the long run. An example of this is focusing on customer relations. This can be a good move if the brokering activity becomes more and more anonymized over time through digitalization. Good customer relations help the shipowner stand out through his reputation. The shipowner could also help the selling activities of shippers through emissions monetization or simply by calculating and marketing the low emissions. A

flexible shipowner could push for a modal change in some transportation areas by providing and certifying his emissions towards the customer. The customer could then broadcast his low-emissions freight for his products. The trend points to low-emissions freight becoming more important, not less.

Some activities could also be advantageous to let other actors provide. The shipowner could have an advantage in outsourcing pricing of shipments to an actor with better supply and demand insight. Better market insight leads to better possibilities for optimal pricing (cf. Uber) that can take advantage of both surge pricing for maximal profit on a voyage and lower prices for other voyages that can lead to better utilization for the shipowner by avoiding vessels sailing empty or vessels waiting for orders.

Pricing is also a tool for gaining market share in promising areas of the market as well as new markets. The shipowner might also find it advantageous to have low profit margins on key voyages that raises the utilization.

6 Follow-up on the thesis' aim

This thesis analyzes some of the shipowner's activities and how they are tied to the business model. With the current situation for the shipowner made clear, the thesis discusses possible disruptions in the short sea shipping ecosystem. Some of the disruptions are then analyzed as to how they might affect the shipowner and his activities. The thesis further proposes actions that can be taken by the shipowner with regards to the shipowner's activities.

Limitations: Even though the participation in the shipowner's operations and development of the automatic coordination, optimization and brokerage services gave good insight into the current situation, there is still a significant amount of work to do to give a clear roadmap for how the shipowner can develop his business model and activities.

7 Short sea-redaren tar på sig nya vågor av innovation

Lånebegrepp: short sea shipping = sjöfrakt för kortare sträckor, etablerat begrepp

7.1 Bakgrund

Man har kommit fram till att short sea shipping i Östersjön inte är effektivt. Ineffektiviteten kan ses i låg utnyttjande grad av fartyg och långa hamnanlöp; hälften av de fartyg som inte är i hamn är tomma minst 40 % av tiden. Fartygen har långa ballastresor och väntar ofta på nya resor. Kombinationen mellan fartygens stora fasta kostnader och den låga utnyttjandegraden leder till onödigt höga kostnader för både redare och industri. Redaren har endast liten insyn i möjliga frakter trots sitt kontaktnät. Flera aktörer på marknaden har inte incentiv att ge ut den marknadsinformation de har. T.ex. mäklarens affärsmodell bygger på att skydda den information de har.

Transparensen i informationsflödet mellan de olika aktörerna är låg, detta syns också i driftsfasen när redaren ska utreda hur en pågående och nästa bokade frakt kommer att gå. En elektronisk plattform kunde lösa problemet med transparens genom att tvinga aktörer dela med sig tillräcklig information för att matcha fartyg med laster.

Matchningen är beroende av många variabler, vilket i sin tur gör systemet komplicerat. Ett sätt att ta all tillgänglig information i beaktande för bättre matchning är att simulera sjöresor med tanke på begränsningar i tid och kapacitet. Resultatet av simulationen kunde sedan förmedlas som förslag i en elektronisk plattform.

Ett annat problem i marknaden är att fartyg ofta seglar med en last som understiger fartygens kapacitet. Detta fenomen kan vara svårt att urskilja i statistiken men har en betydande effekt på den genomsnittliga utnyttjandegraden.

Syftet med avhandlingen är att analysera redarens affärsmodell och de aktiviteter som berör redaren, beskriva möjliga förändringar i ekosystemet, analysera hur förändringarna påverkar redaren och föreslå en affärsmodell för redaren samt föreslå hur redaren kunde omorganisera de aktiviteter som är beroende av förändringarna.

7.2 Teori

Företag agerar i komplexa nätverk med andra aktörer och om man jämför företag rakt av är det nästan omöjligt att svara på frågan vad företaget borde göra för att överleva och frodas. Ett systematiskt tillvägagångssätt för strategi är att se företaget som en del av ett affärsekosystem. Affärsekosystemen kretsar ofta kring innovationer och man kan se viss innovation inom sjöfart vad gäller digitalisering.

Ett sätt att analysera affärsekosystemet är att ta ett aktivitetsperspektiv. Man kan här se på de aktiviteter som är länkade till värdeskapandet i fråga om hur de genomförs och hur de är länkade till varandra. Valet av affärsmodell leder till valet av en viss uppsättning av aktiviteter och tillgångar för att kunna genomföra affärsmodellen. För att kunna nyttja verktygen i aktivitetsperspektivet måste man fokusera på design på systemnivå istället för partiell optimering.

Aktiviteterna är länkade till varandra genom ett ömsesidigt beroendeförhållande och ger insyn i processerna som möjliggör evolution i företagets aktivitetssystem när omgivningen förändras. Aktiviteterna som är relevanta för företaget är utförda av företaget eller dess partners, kunder eller leverantörer. Affärsmodellen, och med det aktiviteterna, bestämmer hur väl företaget kan skapa och tillägna sig värde. Värdet som skapas för företaget ur ett aktivitetssystemperspektiv är beroende av elementen originalitet, inlåsning, komplement och effektivitet. Dessa element blir viktiga för redaren då man vill förbättra värdeskapandet och anslaget av värde.

Sjöfarten är en tillgångstung industri som samtidigt är nära förankrad till marknadscykeln. Utbudet inom sjöfrakt är beroende av tillgången till fartyg, tiden mellan beställning och leverans av ett fartyg är dock lång och således blir utvecklingen av utbudet eftersläpande jämfört med marknadscykeln. Detta leder i sin tur till att investeringen i fartyg följer en cykel med överdriven investering under goda ekonomiska tider som sedan nästan helt stannar av under sämre konjunktur. Det eftersläpande utbudet leder till att fraktpriserna också har hög variation. De senaste årens sjöfraktsmarknad har varit präglad av överinvestering i fartyg före den senaste finanskrisen.

Priset på frakt är också beroende av vad kunden vill betala för. Det finns trender i efterfrågan på frakt med låga utsläpp där redaren tidigare har haft svårt att få betalt för lägre utsläpp. Transportsektorn ser ett ökat tryck om att den borde sänka sina utsläpp eftersom den står för en stor del av världens totala utsläpp. Detta är sant också inom sjöfrakt som står för en stor del av utsläppen, men som å andra sidan är den huvudsakliga fraktmodaliteten vad gäller total volym.

7.3 Empiri

Redaren utför flera aktiviteter och är beroende av många aktiviteter utförda av andra aktörer. En problematisk aktivitet för redaren är hamnanlöpet som kan dra ner på redarens operativa effektivitet. Eftersom fartygets tidtabell är direkt beroende av hur hamnanlöpet lyckas kan oförutsedda problem i anlöpet ha stora effekter på effektivitet och lönsamhet. Ett exempel på ett ineffektivt hamnanlöp är när fartyget inte hinner lastas eller lossas före veckoslut och kontraktet inte medger lastning under veckoslut. I detta fall måste fartyget ofta vänta på att lastas eller lossas tills dess att stuvandet återupptas på måndag samtidigt som dygnshyran för fartyget belastar redaren under tiden fartyget står. Till detta hör dessutom att kommunikation mellan hamn och redare ofta är bristfällig samt att hamnens tidtabell kan vara svår att förutse. Nuvarande certeparti med tillhörande tidräkning leder inte till effektivt stuvande för redaren. Sättet man beräknar

liggetid och kösystemen i hamnarna leder till att redaren skyndar mot hamnen för att sedan vänta.

Redaren säljer sina egna frakter och en stor del av detta arbete går åt till att följa marknaden för att se vad för laster som är ute på anbud. Vid säljandet av frakter passar redaren frakterna mot nuvarande tidtabell för flottan. Nuvarande tidtabellsplanering är manuell till sin karaktär samtidigt som den är komplex på grund av många inblandade variabler.

Fraktmäklarna mäklar frakterna mellan befraktare och redare. Mäklarna söker antingen efter fartyg för lasten eller last för ett fartyg. Mäklaren har i dagens läge en central roll i marknaden, centraliteten är avgörande för mäklarens affärsmodell. Dagens mäklande bygger på att ha ett kontaktnät för att förmedla information om aktuella frakter. Värdeskapande i mäklandet ligger i att kunna knyta ihop last och fartyg samtidigt som man förhandlar fram fördelaktiga kontrakt för endera part. Fraktmäklandet idag visar på hur decentraliserad marknaden är och hur marknadsinformation måste gå genom många parter för att nå rätt aktör.

Redarna driver fartygen för att klara av att genomföra tidtabellen med frakter. När ett fartyg har fixerats till en frakt meddelar redaren kaptenen om alla detaljer till resan. Redaren uppdaterar sedan dagligen berörda aktörer om hur man förväntar sig att resan kommer att gå och hur den går vid det tillfället. Vid hamnanlöp tar fartygsagenten över informationsdelningen. Medan nuvarande resa utvecklas påverkar den också resten av fartygets tidtabell och möjligen andra delar av flottans tidtabell som justeras kontinuerligt. Redaren kan ha incentiv att informera om tidtabell i bästa fall istället för troligt utfall för att säkerställa bäst utfall för sig själv. Driften av fartygen står ofta inför oförutsedda händelser och kan bli påverkad av t.ex. förseningar i hamnanlöpet.

Hamnanlöpen utförs enligt certeparti som inte är fokuserade på total effektivitet. Stuvandet genomförs så att det blir så billigt som möjligt inom ramen för kontraktet och faller under tidspress först då man närmar sig gränsen för liggetid. Kontrakt med fokus

på effektivitet kunde leda till ett mer kostnadseffektivt system. Ett incitament som kunde leda till högre effektivitet är att ta i bruk ersättning för inbesparad tid.

Short sea shipping-ekosystemet står inför förändring vad gäller innovationer. Digitaliseringen möjliggör modernisering för marknadsplatsen. En intressant idé är en digital marknadsplats med mål om att förbättra effektivitet och utnyttjandegrad av fartygen. Fokuset här ligger på att skapa bättre matchningar med hjälp av ett bättre informationsflöde och ett system som kan ta de många variablerna i beaktande samtidigt. För bättre matchning kan man skilt se på optimering av resurserna och samlandet av information på ett ställe. Genom enkel budgivning ger den digitala marknadsplatsen mer kontroll till både redare och befraktare.

En annan innovation är att med hjälp av bättre informationsflöde utnyttja fartygens kapacitet bättre genom att lasta flera laster samtidigt. Detta är möjligt då den ursprungliga lasten inte använder fartygets lastkapacitet till fullo och man har möjlighet att lasta en eller flera ytterligare laster och samtidigt för den resan öka utnyttjandegraden genom dellaster. Redaren måste dock kunna utvärdera risken noga mot förtjänsten. Ett systematiskt sätt att utreda risken kan vara att föredra så att den administrativa bördan hålls låg för den extra lasten. Risken, samt marginalkostnaden för den extra lasten varierar mycket från fall till fall och är speciellt beroende av om det sker en förändring i antalet ändhamnar för resan.

7.4 Analys

Redaren kunde dra nytta av dellaster om informationsflödet på marknaden förbättras. Hindret för att ta på sig många dellaster är administrativ börda, låg tillgång till information och svårkalkylerad risk. Redaren kan ha svårt att konkurrera om dellaster på linjer där det redan går ro-ro trafik men kan i många andra fall, speciellt då ändhamnarna är nära start och slutdestination för lasten, konkurrera tack vare den låga marginalkostnaden för den extra lasten. Dellaster öppnar också upp för en ny marknad för laster som annars inte medgett hyra för ett helt fartyg. Konceptet om

marginalkostnad öppnar också upp idén om marginalutsläpp. Kan redaren sära på utsläppen för den last som ändå skulle fraktas och den extra lasten som kommer ha liten inverkan på de totala utsläppen?

En digital marknadsplats för laster kunde ha inverkan på redarens utnyttjandegrad, och skulle i så fall ha stor inverkan på kassaflödet på grund av de förhållandevis höga hyrorna för fartygen. Den digitala marknadsplatsen skulle ha stor inverkan på säljandet och hur man passar in frakterna i flottans tidtabell och säljandet skulle istället kunna fokusera på utnyttjandegraden genom att undvika ballastresor och segla med tätare tidtabell. Med hjälp av en digital marknadsplats kunde redaren använda en del av resurserna, som nu används till säljandet och drivandet, till andra områden. Redaren kunde istället lägga resurser på att bli bäst inom t.ex. utnyttjandegrad, pålitlighet, utsläppseffektivitet, fartygsinvesteringar och andra nya möjliga aktiviteter. Nya möjligheter i en stillastående och ineffektiv marknad ger redaren tillfälle att få ett försprång med hjälp av innovationer.

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