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THE STATE AND CHALLENGES OF GLOBAL CONTAINER
SHIPPING IN 2018

Merenkulun koulutusohjelma
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GLOBAALIN KONTTIRAHTAUKSEN TILA JA HAASTEET VUONNA 2018

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Opinnäytetyön tavoitteena oli tarkastella modernin konttirahtauskuljetuksen nykytilaa kartoittamalla toimialan suurimpia haasteita maailmanlaajuisesti. Tämän lisäksi tavoite oli tarjota varustamoille taloudellisesti tehokkaampia keinoja vastata kyseisiin ongelmiin. Tutkimus tehtiin valitsemalla ensin ajankohtaisimmat aiheet kartoittamalla olemassa olevia akateemisia, hallinnollisia ja konsultaatio – tutkimuksia ja dataa konttirahtiliikenteen alalta. Aiheenvalintojen jälkeen teemojen yksityiskohtiin syvennyttiin, sillä suurin osa valituista ongelmista on kiertänyt alalla jo kymmeniä vuosia ilman ratkaisua.

Tutkimus rajattiin koskemaan ainoastaan konttirahtauksessa toimivia varustamoita ja aluksia. Rajaus tehtiin konttirahtiliikenteen uniikin asiakaspohjan vuoksi, joka eroaa laajuudellaan irtotavara- ja erikoiskuljetusten määrästä. Koostaan riippuen yksi konttialus voi asioida tuhansien rahdinlähettäjien kanssa ja on siten vahvasti liitoksissa kansainväliseen kaupankäyntiin ja sen vaihteluihin, siinä missä irtotavara- ja erikoisrahtaukset neuvotellaan yleensä yhden tai korkeintaan muutaman lähettäjän kesken.

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The aim of this thesis was to examine the state of modern container shipping by considering the most substantial challenges that the industry is facing globally and additionally, provide methods for a more financially efficient way of operating in the market. The research was done by first selecting the prominent issues by exploring the existing academic, administrative and consultancy papers and data from the container transport field. After the issues had been identified, the focus moved on understanding the often prolonged and problematic questions, since majority of the selected topics have circled around the industry for decades without conclusions.

The paper was narrowed down to consider companies and vessels that operate in the liner charter market, excluding those that are engaged in the bulk or specialized cargo transport. Reason for this choice was the unique shipper base of container market. Whereas the bulk or specialized cargo shipping companies often deal with a single shipper, the largest container companies serve thousands of shippers on each voyage.

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1 INTRODUCTION

Liner shipping competition in the global freight market is at an all-time high. Due to economies of scale, major shipping owners are dominating the market and forcing smaller players to make a decision between joining them or being squeezed out of the market. The global container capacity has increased steadily over time and the total amount, in November 2018, is at an estimated 256 million deadweight tons, with the overall increase of 3% compared to 2017 (UNCTAD, 2018). The current supply of capacity is exceeding the need for transport services, which is causing discomfort throughout the industry. This mismatch between supply and demand, overcapacity, is a problem that has been haunting the industry for a decade and is one of the main reasons for the hardship in several shipping companies.

Every pending year there is a discussion in the container industry about the growing size of container vessels and speculation of their maximum limit. Despite the criticism from the consultants and port authorities, the resourceful shipping companies keep ordering larger vessels in the hopes of reducing unit costs even further. Now, as the order book of the French CMA CGM company indicates the breaking of the 22000 TEU limit cap in 2019, the concerns regarding the port infrastructure capacities are as high as ever. (World Maritime News, 2018).

Liner network optimization is a shipping company strategy method, with a purpose of matching the vessel sailing routes around the globe with the highest demand areas. Route optimization saves money directly in reduced fuel costs, when vessels are taking the shortest route to destination, but more importantly by serving trade routes that enable vessels to sail with full cargo. The main issue with networks is the empty container repositioning problem, which is caused by imbalances in the trade flows. Since transporting empty containers won't generate any revenue, but have to be moved back to be loaded again, they pose a considerable challenge in the network creation. The shortcoming is most evident in the Asia-Europe route, where the difference between transported volumes can be as high as 40% (Guericke, 2014).

The purpose of this thesis is to determine the available means for container shipping companies in order to improve efficiency and performance in the management and operational levels. Research was done by using integrative literature review with a purpose of building a frame of the most influential challenges in the industry by examining academic papers. An integrative review is a method in which the past empirical and theoretical knowledge is collected and used for the purpose of creating a more comprehensive understanding to a specific theme or issue (Whittemore & Knafl, 2005). The reason for choosing the previous method was the substantial amount of existing data from the container industry, which made it impractical to build my own data by sending surveys to shipping companies, since the data from professional consultant agencies and data-analyzing companies would have at any rate more credibility. This is because their daily data is also being utilized by shipping companies in their evaluations of the market situation. Whereas most of the academic work circles around solving specific individual problems, the point of this paper was to make a collection of the most important ones and thus provide reader with a comprehensive outlook on the state of the container industry in 2018. Approach was aimed more to evaluating the weight of each of the issues in modern day shipping and less to in depth analyzing. The effort was to present the most redeemed solutions in a way that is functional and constructive, which would make them possible to apply in practice.

It is essential to understand that these methods, as well as the issues, may not be suitable for the whole scale of companies, since the size of capital, fleet and the sheer power in the market varies tremendously between big and small players. Hence, the possibilities for implementing these ideas, especially in small shipping companies are limited.

2 MARKET OVERVIEW

The biggest challenge haunting the container shipping industry for the past few years has been the mismatch between supply of container vessels and demand for the transport services (UNCTAD, 2017). The economic expansion that followed the global financial crisis of 2008 brought positive prospects for the shipping company managers to expect rising demand for container services. Hopes for a rising demand gave shipping company managers an incentive to increase their transport capacity. However, combined with economies of scale, this exaggerated positivity to future markets gave way to the situation the industry is still suffering from. As a result, inflated fleet size mixed with a dragging increase in demand, inevitably lead to a decline in container freight rates. However, in spite of the stagnant market trend recently, there are positive outlooks for this year with BIMCO forecasting a demand grow of 4.0-4.5% against a fleet growth of 3.9% in 2018.” (Sand, 2018).

Container shipping market has concentrated for a few major companies and alliances for so long that the since trend has become a new norm in the industry. According to liner database Alphaliner (Image 1), there are now five companies that control 63.4 % of the world’s transporting capacity, measured in TEUs. With sheer size these gigantic operators have an advantage over the smaller players, which is mostly brought by economies of scale, meaning bigger vessels and lower unit costs, as well as the ability to withstand poor market conditions and enduring losses for longer periods. This trend does not favor the smaller companies, who have had to either join forces with other smaller operators, such as NYK Line, MOL and K Line in Japan (JOC.com, 2018), or merging themselves into an already existing alliance, such as Hamburg Süd being acquired by APM-Maersk (Madsen, 2017).

Ra...	Operator	Teu	Share
1	APM-Maersk	4,013,590	17.8%
2	Mediterranean Shg Co	3,249,043	14.4%
3	COSCO Group	2,827,691	12.5%
4	CMA CGM Group	2,642,556	11.7%
5	Hapag-Lloyd	1,584,161	7.0%

Image 1. Largest companies by TEU (Alphaliner, 2018)

Current year has brought along a number of major changes to geopolitics and rise of protectionism in the world. The emerging trade war between United States and China has brought tariffs to a number of products, overall valued at USD 50 billion, and a similar situation is forming between United States and Europe. As a payback for United States declaring a 25 % tax on European steel and a 10 % tax on aluminum, European Union declared a 25 % tax to a number of imports from the United States, ranging from industrial components to food and cosmetics (Rear, 2018). This new direction in politics is sure to cause repercussions to shipping industry correspondingly, but to what extent, it remains to be seen. Open markets and global connectivity are basic requirements for modern shipping, and the constantly changing policies in world trade are making it challenging for shipping companies to foresee and predict future market conditions. An ability to accurately forecast future markets is a massive financial component in the decision-making of shipping companies. Newbuilding market is a prime example of the importance of forecasting, since the time between order and delivery can be anything from two to three years (Stopford, 2009, p. 207). It is an enormous liability to manufacture vessels to an era with low demand; hence the stability of global world trade is a cornerstone when predicting correct time to invest.

Other notable factor transforming the shipping industry is the development of autonomous vessels. Discussion regarding the future of shipping has been circling the industry for years now and although there are still a number of challenges extending from economic, environmental, legal and technological aspects, the progress is going forward. One of the main drivers for the development of autonomous vessels is the desire from the shipping companies to reduce crew expenditure. According to Stopford (2009), manning costs make up about 42 per cent of the costs of operating a vessel, thus having none or only a few sailors on board would make a reasonable cut in the expenses. Led by the Norwegian industrial company Kongsberg, the first fully electric and autonomous container vessel, Yara Birkeland, is planned to be operating in 2022. (Kongsberg Maritime, 2018).

3 OVERSUPPLY

Oversupply is the biggest issue damaging the liner industry currently. The amount of container capacity is exceeding the need for transportation services and the situation has led to freight rate stagnation. The industry is still recovering from the aftermath of global financial crisis in 2008, which produced a notable mismatch between demand and supply. Despite the strong boost in demand accompanied with only a moderate capacity increase in 2017 the issue of oversupply still exists (UNCTAD, 2018).

Important feature that characterizes container transport industry, in comparison to liquefied and bulk freight transport, is that it is widely subject to fluctuations in the world economy and global trade. For this reason, the companies will constantly have to evaluate the modern day developments in trade policy and their effect on often fast shifting trends in demand. This is why competent forecasting is highly valuable for shipping company managers, who make decisions that may only be resolved a few years later.

3.1 Inaccurate forecasting

Dominant reason for the growth imbalances in 2009 was inaccurate forecasting. In 2007 Drewry, appreciated as one of the world's leading shipping consultants, estimated a yearly demand growth of 9.7% for Asia-North Europe trade and 7.8% for transpacific trade in 2009 (Davidson, 2007). In the past three years demand on the same routes had been growing on average, respectively, by 13.3% and 13.5%. The UNCTAD report (Image 2) from 2017 displays the realized numbers and a demand *decline* of 9% in 2009. This contrast between the estimated rates to the actual values highlights the reasons for the distorted situation that the industry still suffers from.

Taking into account the scale of the 2008 crisis, it's reasonable to assume that even if the crisis could have been forecasted beforehand, its effects for a globally connected industry, such as container shipping, could not have been avoided. The extent of the shock is the only thing that could have been moderated with prior information.

As illustrated by UNCTAD (Image 2), the efforts of reaching equilibrium are currently present. Especially in 2016 the growth of supply decreased by 7% allowing the gap to be inverted. The market is heading to the right direction, but the differences between demand and supply growths currently are still inadequate to correct the situation in the short-term. Without considerable cuts in the overall capacity the carriers can expect, at best, moderately growing freight rates in the upcoming years.

Figure 3.1. Growth of demand and supply in container shipping, 2006–2017 (Percentage)

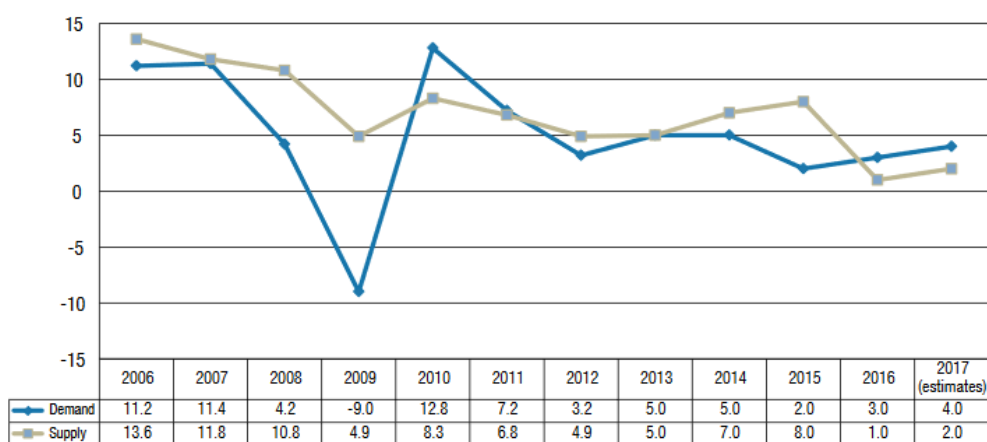


Image 2. Growth of demand and supply 2006-2017 (UNCTAD, 2017)

3.2 Contracting supply growth

Solution to the oversupply puzzle is evident: contracting the amount of operating vessels. The difficulty is in the execution. Who should carry the responsibility for the issue that haunts the whole industry? The idea that one player should voluntarily give competitive advantage to others, by diminishing its own fleet, is against all business logic. Similarly, the idea of all shipping owners cutting capacity proportionately and in relation to one's own resources seems to be equally absurd. However distant the options may seem they are, alone or jointly, necessary for the industry. AlixPartners maritime practice suggests that increasing consolidation in the container industry might play a key role in solving the problem, since the number of executives making decisions about future capacity gets smaller (Berman, 2018). It is a necessity that

these executives make decisions for the benefit of the industry and not only for one's own company. Otherwise the problem will persist.

Shipping companies are playing a game of who can withstand the vigorous market conditions for the longest. In this game the financially solvent mega companies, such as APM-Maersk and Mediterranean shipping company are, by their nature, prevailing. For example, in 2016 Maersk Line reported a loss of USD 376 million, which they stated was a cause of a 19% decline in freight rates compared to 2015 (Maersk, 2017). In the annual report of 2017 Maersk Line reported a profit USD 541 million, which again was attributed to the increase of 11.7% in freight rates compared to 2016 (Maersk, 2017). In the company that has annual revenue of USD 30 billion, there is a substantial amount of leeway that can be used to patch up operations that are not holding up well financially in the short-term. In the industry where the differences between profits and losses in the span of one year can be as dramatic as in the Maersk case, the advantage of just having time to endure for the next year is crucial and can either make or break a company.

The ability to withstand through spikes in freight rate variation is important, but pumping money into the problem and waiting for it to solve itself is not a long-lasting solution, nor should it be. This is why shipping companies have a range of possible methods to implement. In accordance to scrapping or selling the pre-existing fleet and delaying the order of new builds, Mason and Nair suggest supplementary tactics. For contracting the supply of the existing fleet, they divide the problem into three categories, which are (Mason & Nair, 2013):

- Reducing the number of owned vessels,
- Reducing the carrying capacity of vessels and
- Extending the length of the journey.

For reducing the number of owned vessels they suggest switching vessel ownership more to other companies, which means increasing chartered vessels instead of owning them. Excluding bareboat chartering, this method would significantly reduce the risks included in providing the transport service, since the owner would still bear the capital risks of the acquisition of the vessel itself, its interest, insurance and major maintenances.

In reducing the capacity they suggest limiting the available cargo space in vessels by cordoning, while mentioning that this measure has collectively been restricted by regulation. Still, the regulation does not prevent utilizing this method at a small-scale or individual vessel level. The influence of cordoning deck-space is not likely to make a big dent to the overall supply, but it might have effect for individual carriers in reducing excess capacity.

Last, the idea of extending the length of voyages is in providing carriers the possibility to deploy more capacity in the route that was previously allocated to a single vessel. This method is executed simply by slowing the speed of a particular vessel, which is known as slow-speeding. It was established in the wake of the financial crisis in 2008, when the mismatch between supply and demand of transport services was at its highest. The major benefit of slow-speeding are saves in fuel costs, when the ship is going under the design speed. Notteboom and Carriou have estimated (Image 3) the fuel consumptions of container ships of different sizes. For example, a 7000 TEU container ship would consume about 200 tons of fuel per day by going 24 knots. By slowing down to 21 knots, the consumption would drop to approximately 125 tons, a decrease of 37.5%. When fuel cost contribution in vessels' combined operating and voyage costs can surpass 50%, the mentioned decrease is significant. In addition to saving money, slow-steaming is more beneficial to the environment, as the vessels emit less greenhouse gases to the atmosphere.

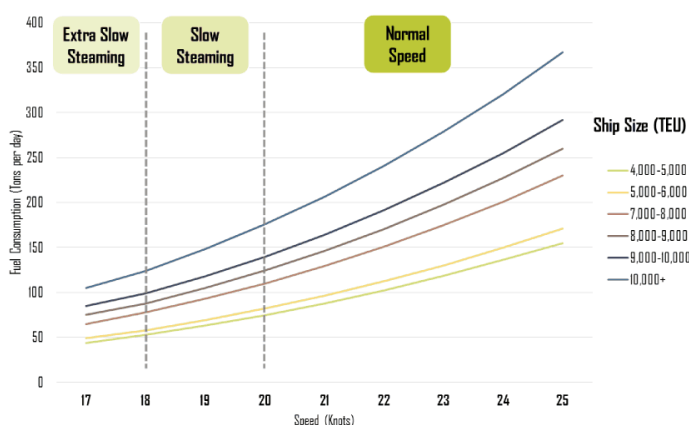


Image 3. Fuel consumption by containership size and speed (Notteboom & Carriou, 2009)

4 ECONOMIES OF SCALE

Economies of scale is a term that means the decreased unit costs of manufactured products when the produced quantity of those items is increased. For example, when a successful container liner grows over time, it would typically purchase ships that have more capacity than the previous ones. This makes transporting larger quantities of containers accessible, and simultaneously the unit costs of moving a single container are decreased given that other factors, such as operational costs and the cost of the vessel, rise only marginally.

The average size of container vessels has increased steadily over time. Between the years 1981 and 2006 the average size of a container vessel in deadweight tons has gone up an estimated 12000 tons. Shipping companies are utilizing economies of scale as a tool in reducing the unit costs of transported containers. As the size of a vessel goes up, the associated costs regarding building, crewing and cargo-handling are not rising linearly as much as the capacity. This method has been successfully utilized by the shipping companies over the years, and the trend still maintains. (Stopford, 2009, p. 76.) It has arguably been the single most effective method in improving efficiency for liner companies over time.

Increasing vessel size has served shipping companies well in the past, but there are serious concerns that it has now reached a maximum limit. In a paper concerning growing containership sizes, Malchow finds that increasing ship sizes would not contribute to lower transport costs significantly any longer. He reasons that the other participants in the supply-chain, mainly ports and terminals, are forced to invest more capital in the infrastructure for handling the few mega-sized vessels. If the investments by the ports are not made, the harbors will become bottlenecks for vessels, which would increase the time used in port operations. This can already be seen in the liner networks, since most mega-sized vessels sail between Asia and Europe as the ports in the United States are unable to operate with these vessels. He further concludes that the present situation is harmful for all the participants in the chain, including the shippers. So instead of sizing up, he suggests that ports should join forces to pressure shipping companies for moderation, and make an agreement

on the maximum vessel size, since continuing to purchase larger equipment and dredging the harbor will be extremely expensive for ports and counterproductive in the long-run. (Malchow, 2017).

Other apparent challenge with mega-sized vessels is filling them when demand is low. Even though the cost benefits of full load against higher operational costs are evident when international trade is booming, in times of recession or economic downturn it might be impossible to take full advantage of the ship's capacity. When demand is able to change radically just between the date of order and the date of delivery as seen in 2008, forecasting demand for the ship's lifecycle, 20-30 years ahead, is next to impossible. This is why larger vessels bear proportionately larger risks than the smaller ones and the element of chance in the revenue that a vessel generates is higher. The shipowners who order mega-sized newbuilds, such as Hong Kong based OOCL which currently holds the podium for owning the six largest container vessels, will always have the possibility of huge losses weighing down the opportunities in the long term.

4.1 Service differentiation

Economies of scale has provided shipping companies with profitability and efficiency which possible no other single policy can compare with. However, there are continuous efforts on the behalf of shipping companies to find new strategies to replace economies of scale. One such method could be service differentiation. It simply means providing an alternative faster service of container transport which would work together with the conventional, slower, liner service. Introduced by Lindstad et al. (2016) the method investigates the possibility of container shipping companies to acquire a portion of air freights, while the slower vessels utilizing slow-steaming would still compete in the traditional container transport market. Typically sea and air freights are considered separately with a mention that the more valuable goods and those that require faster delivery time are transported explicitly by air freight while bulk and goods with less value move by ships. In multiple instances, such as quickly expiring food products, it is obvious that container shipping is not able to compete with air freight due to sheer nature of delivery times.

However in other ones, such as expensive cars, machines, tools and spare parts, the container shipping could provide a notable alternative.

According to the authors, a great advantage of service differentiation is that it doesn't yet have any candidates who have tried out the method. For this reason there is also no evidence of how it would work in practice and the report further acknowledges that it would be a major challenge for any container liner to implement this method into their strategy. However, if the method would be tested by a courageous shipping company it could turn out to be highly profitable, since being the sole provider a particular service in any market is a position any company wishes to be in. Moreover, there is no concern of having to create new demand, since the whole point of the method relies on acquiring cargo from air freight. Still it is worth to mention that even in today's market the air and container transport aren't completely separate segments, since multimodal transport offers solutions where a package can move to certain lengths by sea, followed by air transport and finally ending up to the recipient.

5 LINER NETWORKS

Liner network is a series of ports in which a single or multiple container vessels of a certain ship owner operate in. By having prefixed routes the liner service differentiates from tramp shipping, where vessels sail between different ports without having a known schedule much in advance. Similarly, liner service differs from industrial shipping by serving demand in certain geographical regions with a multitude of smaller shippers, whereas industrial shipping usually serves an individual customer and sails explicitly by the needs of the customer. (Mulder & Dekker, 2016).

Container carriers possess the freedom of choosing the area, in which to operate, with the highest profits. With a mix of the right marketplace and the most optimal routes in these locations, the carriers are able to operate competitively and save money before a single vessel has been deployed. Route optimization is often just taking the shortest route to destination, but if there are channels between the port of departure and port of call, the companies have to decide either to sail through them and pay the channel fees, or to navigate around them and burn more bunker fuel. In long-haul routes, such as between North-Europe and Asia, the shipping companies might deploy a vessel to sail a single route for a year. In these long voyages with a few ports the vessel spends a big majority of its time in sea, which makes choosing the right routes ever more important.

5.1 Main shipping routes and transshipment hubs

Largest container shipping companies are serving customers globally and in order to do so, they require globally covered routes. Main maritime shipping routes are illustrated in the below (Image 4), which shows the most frequent traffic occurring in the developed economies, mostly in northern hemisphere. The three most important routes are: Asia-Europe through the Indian Ocean, Asia-United States through the Pacific Ocean and Europe-United States through the Atlantic Ocean. These routes employ the world's largest container vessels and the challenge for the shipping companies is in utilizing that capacity in maximum.



Image 4. Major maritime shipping routes and strategic passages (Rodrigue, 2017)

The largest vessels handle the long-hauls between continents, but shipping companies also require a fleet of smaller vessels, the feeders. Their purpose is to serve the regional trade in the market zone, and provide liner service between the smaller ports, called spokes, and larger ones, called hubs. The hubs are usually the largest transshipment ports of a region, such as Rotterdam in Europe or Singapore in Asia, and they act as meeting places between different modes of transport. For example, a feeder vessel would pick up its cargo from a hub and deliver it to a spoke in its region. Inversely it picks up the regional cargo from spokes and delivers it to a hub, wherefrom it's transported by the larger carriers into another continent.

Acting as a transshipment hub requires enormous investments and efficiency from the port operators and instead of using nationalized ports the financially solvent shipping companies can decide to build their own. An example of such private terminal is the APM Tangiers in Morocco, which is right in the middle of east and west –bound trading lanes and owned by Maersk Group. The advantage of owning the terminals include reductions in the port charges, and the ability to purchase equipment and port operators, which fully comply with the business strategies of the host shipping company. Despite bearing tremendous expenses in the short-run, the private terminals can give major competitive advantage to the host companies

compared to those using the existing transshipment hubs. Reason behind is the difficulty of managing a port with an endless container flow that requires extreme amount of scrutiny in order to function efficiently. If the berthed vessels cannot be loaded in schedule, they will endure increased loading times and delayed voyages.

5.2 Empty container repositioning

The problem of repositioning empty containers has haunted the container shipping industry since it first started. It means the stacking of containers in the importing trade zone, from which they have to be transported back to the area of export. The revenue generated by shipping companies comes from transporting goods and not containers, so the movement of empty containers is profitless business. The root cause is the trade imbalance between different trading zones, such as Asia-Europe in which the difference between transported volumes can be as high as 40%. Since shipping companies are completely powerless in influencing the world trade, the problem is likely to persist. The costs of repositioning containers are estimated to be approximately 27% of the running costs in the world fleet, which means the problem is immensely burdensome to shipping companies. (Guericke, 2014).

The trade imbalances are not disappearing, so the shipping companies have to include and address the problem in their network designs. The first measure in order to even out the volume imbalances is to laden all possible containers on their voyage back to the major exporting economies. After a container has been received by the importing customer, it is moved to a depot of empty containers, which can be located either directly in the port or further away inland. Since shipping companies today often provide a door-to-door service, they either purchase the container, or lease them. That means the shipping company must also bear the costs of moving the empty container inland. As a result, the decision of where the empty container depot is established is a financially vital one. In the end, the shipping company with a more optimized network than the competitors will be able to transfer reduced costs into their freight rates, which will be illustrated in a higher profit margin and stronger position in the market.

6 COMPETITION AND STRATEGIC ALLIANCES

Competition between liner carriers is ruthless and many have found that the best option for survival is to merge with other companies. By joining into an alliance or merging with a larger company, the joining party is able to gain access to the information and business practices of the parent company. There are plenty of benefits in co-operation, but in reverse the joining party loses influence in its own company, even if the partnership does not include acquisition, by having to adopt the strategies of the host. Latest developments in the industry are the merging of China's largest container companies COSCO and CSCL into COSCO container group and Maersk-APM acquiring Hamburg Süd. In the interest of building more power in the freight market and offering the best possible service with global coverage, it has proved to be a functioning tactic. Since a large portion of the container market is already concentrated to a few mega-sized companies, for some smaller companies it might well be their only option for continuity.

Acquiring smaller companies and merging with others of matching size are not the only options of co-operation. The formation of alliances between liner companies has been seen as a valuable resource, since the ten largest container shipping companies are all currently part of an alliance. In the end of 2018, there are now three mega alliances: 2M Alliance that consists of MSC, Maersk and Hyundai; Ocean Alliance with CMA/CGM, COSCO, Evergreen and OOCL; ONE Alliance with Mitsui OSK Lines, NYK Lines and the 'K' Line (Image 3). Together these three account for almost an 80% of the container trade and 90% of its volume (Logistics Plus, 2018). These numbers highlight the debatable point that the container liner industry is concentrated to an extent in which some of the basic rules of competition, such as an abundant of amount suppliers, are not met. Even though the market share is at present divided to a somewhat narrow group of players, it is improbable that the industry should monopolize. Much the same as with mergers, the point of alliances is to combine resources by making better use of the excess capacity on container vessels, along with increasing global routing and increased market share.

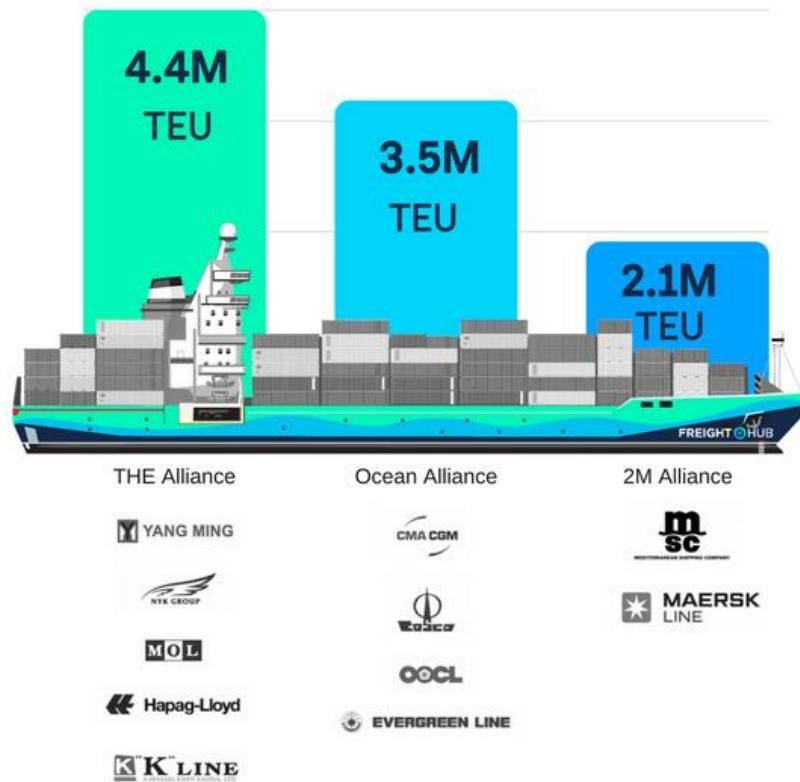


Image 5. Three largest container-carrier alliances (Carnarius, 2017)

6.1 Liner Conferences

The third most popular, although disputed, construction of co-operation between shipping companies, apart from mergers and alliances are liner conferences. Liner conference in essential is an agreement between two or more shipping companies to offer uniform freight rates and fixed schedules between trade routes in a certain geographical area (UNCTAD, 1975). The advantage of the mentioned practices, respectively, are the elimination of price competition, and overall a more efficient supply-side management. This kind of co-operation was, for centuries, believed to provide a more stable and transparent market conditions for importers and exporters all over the world and to some extent did so. However, the increased price fixing and market consolidation over the 20th century promoted cartel-like characteristics and made the motives of liner conferences questionable.

For having perspective on the controversial nature of liner conferences, it is suitable to take a brief look at the history. Even though the first liner conference, United

Kingdom Calcutta Conference, was held as early as 1875, their existence in the universal scale was acknowledged essentially in 1974 in the United Nations Convention on a Code of Conduct for liner conferences. The UNCTAD convention was the first to offer regulatory guidance to liner conferences. Next milestone development occurred in 1986 when European Union presented Regulation 4056/86, which allowed a block exemption for liner service providers to fix prices and regulate capacity on vessels (EEC, 1986). In the context of free competition, the former regulation granted exceptional capabilities for liner conferences to control the freight market at the expense of shippers and those shipping companies that were not involved in the conferences. In the next 20 years after the former regulation was implemented, the power ratios between shipping companies were to change radically: “If in 1990 the twenty largest linear carriers controlled about 40 % of the container capacity of the world fleet, then in 2000 the twenty largest liner carriers controlled 81 % of the tonnage.” (Drozhzhyn & Revenko, 2018).

In 2006 the European Council reviewed the block exemption with an intention to see if it was still valid on modern standards. The underlying point of the regulation had been price fixing, which liner conferences argued was a necessity in order for stability in the market. However, the council found that the freight rates had been volatile throughout the whole era at which the block exemption had been enforced. In addition to price fixing, the defenders of liner conferences claimed that the industry must be protected from competition to a certain extent, since it could threaten the service reliability and cause excess capacity. Again, the council stated that carrier trade did not significantly differ from other forms of transport trades and should not be favored any longer in terms of protection from competition. As a result, the 1986 block exemption was repealed and European liner conferences abolished. (Benini & Bermig, 2006.)

7 STRUGGLE FOR FREIGHT RATES

Freight rate is a price which the user of transport service, shipper, must pay to the shipping company. Despite being a single figure it holds multiple components of which it is formed. When a customer buys an apple from a store, he is not paying only for the product, but also for the transport costs, taxes and other assimilated charges, such as rent, topped with profit that the storekeeper has chosen.

Since a high freight rate is a large component in companies' profit-making ability, it would be lucrative for all the players to keep it at a high level. However, much like in many other industries, price has become the fundamental element which the shipping companies are competing against one another.

Naturally the freight rate should at least be at a level, which keeps transporting cargo cost-effective. In theory this level should be in the intersection of supply and demand, the equilibrium. Yet in practice there are numerous different variables which are constantly moving, making it complicated for shipping companies to determine the optimal level. If the rate is too low, the flow of revenue is insufficient and the ships should be laid-up, sold or scrapped in the worst situation. If it is too high, the shippers will prefer a more affordable option and search for another transporter.

The base of container shipping freight rates is formed in a similar fashion with any store produce, but the overall rate includes some additional factors. Oblak and Jugovic (2016) have divided the freight rate concept into two classes, basic elements and surcharges. Basic elements are the costs that shipping company has to pay for day-to-day operation and navigation of a certain vessel. They include crew wages, repair costs, bunker fuel expenditure, administrative/port charges and capital costs considering ship acquisition. Surcharges are additional costs added on top of the basic rate, and their purpose is to protect the shipping company of changing price conditions.

The three main surcharges are:

- Terminal handling costs (THC) – includes cargo handling costs in terminals,
- Bunker adjustment factor (BAF) – fixed to a certain level to give protection from the volatility of bunker oil price change and
- Currency adjustment factor (CAF) – protects shipping company from the variation of currency exchange rates.

In addition to the above surcharges, there are multiple others which may more or less be utilized by individual shipping companies.

Important consideration about the surcharges is that they tremendously exceed the value of the basic rate, which gives shipping companies less power to influence the overall rate by their own actions. In other words, if only a small slice of the freight rate cake is under the influence of shipping companies, then expanding it or chopping it even smaller won't make much difference in competitiveness of the company. Surcharges still bear more benefits to shipping companies than their absence, since the calculating the combined behavior of the three main rates behind surcharges would, at first, be incredibly hard to predict and furthermore cause obstructions in the day-to-day operation of the shipping companies.

An excerpt from the freight rate index shows how volatile and inconsistent, within seasonal limits, the rates are, and how the value of the rate can change considerably in a relatively short amount of time. Shanghai Containerized Freight Index (Image 3) tracks the spot rates of Shanghai export container market and clarifies the erratic behavior of freight rates. For example, from the beginning of February to the end of March 2018, the index declined from USD/TEU 875 to USD/TEU 650, by 25.7%. Contrarily, the expansion between the trough in March, USD/TEU 650, and the peak at the end of August, USD/TEU 940, was 44.6%.

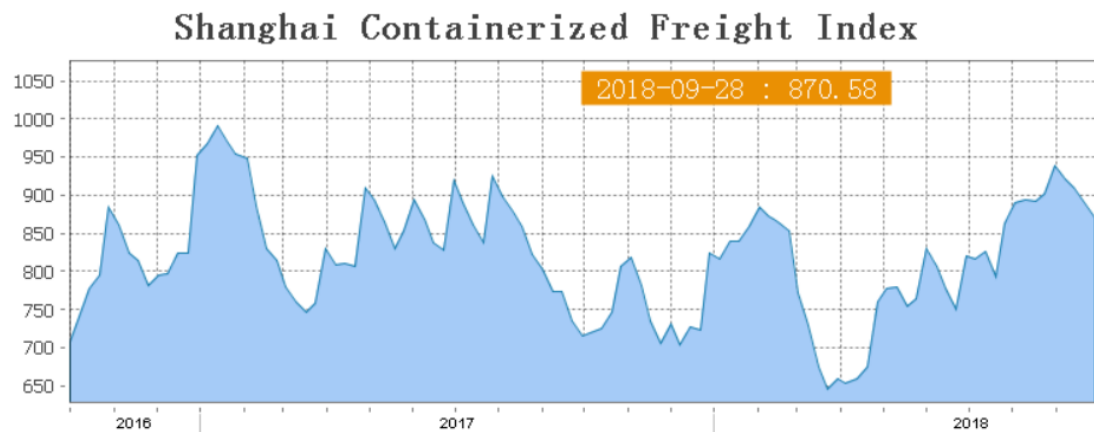


Image 6. Shanghai Containerized Freight Index (Shanghai Shipping Exchange, 2018)

If the value of carriers' main source of revenue drops by a quarter in just two months, due to reasons that the carriers themselves have only little or no control over, then only the companies with best flexibility strategies and a quick decision-making management are able to endure without suffering losses. Most effective way to respond to a trough would be deactivation of excess fleet, but since the time between expansion and reduction in the rate is often swift, the costs of reactivating the same capacity again could outweigh the costs of just keeping the fleet operating. Similarly in the time of expansion the delays in reactivating the fleet could prevent the shipping company from gaining from the beneficial growth.

Changes in seasonal demand make the freight rate variation less irrational and more predictable to a certain extent. Freightos, international freight marketplace, specifies two main peak-seasons for container shipping. First one is the holiday-retail peak from mid-August to mid-October and the second one is the Chinese New Year from January to February (Freightos, 2017). Preparing for seasonal peaks and troughs is nothing new as far as strategies go, but it's just one method of reducing uncertainty in forecasting. By constantly analyzing the persisting trends and new ones in consumer behavior, the shipping companies enable themselves a more efficient use of capacity accompanied by reduced risks.

8 ENVIRONMENTAL IMPACT

Environmental agenda for reducing greenhouse gas emissions in shipping is an ongoing topic and will likely gain more significance in years to come. The international pursuit of keeping global temperature from rising above two degrees of pre-industrial levels is a mission all corporations in each business sector, as well as people in general, are encouraged to participate in. Regarding container shipping, IMO has taken ambitious action in decarbonizing the whole industry within the century and decreasing the greenhouse gas emissions by at least 50% by 2050. (UNCTAD, 2018).

IMO has presented the framework for two different models which aim to decrease carbon-dioxide and other greenhouse gas emissions. The two market-based measures are:

- Cap-and-trade system, where allowances for emitting carbon-dioxide are either auctioned or freely distributed among the carriers. IMO would then determine a maximum amount of allowances given, thus directly restraining the amount of produced emissions.
- Baseline-and-credit system, where there is no maximum amount of allowances, but those companies keeping their emission levels below a pre-determined baseline would gain credits that could be sold to other companies that require more leeway in coping with emission requirements.

A third, non-market-based option is to tax the fuel directly, by the amount of carbon content it's composed of.

Altogether, the first two market-based models are certain to keep emission levels restricted, but cannot control the anticipated price inflation they will inflict on the freight rates. Inversely, the carbon tax would fix the price and perhaps keep the market more stable, but its impact in reducing emissions is unknown. However, the models are not mutually exclusive and both could be utilized simultaneously. (UNCTAD, 2018).

The means of how the emission reduction operation will be conducted are still up for discussion, but the existing proposals are expected to cause additional costs to the shipping companies and hence, to the freight rates. Consequently this would decrease the relative value of base rate component in the overall freight rate, which would lead shipping companies to have less influence in manipulating the freight rate by their own actions. Contrarily, as the awareness of environmental matters among shippers' increases, it might play a more significant factor in deciding which shipping company to employ. Hence, by adopting more environmental friendly policies the shipping companies could increase their appeal in the container market and gain competitive advantage over other players.

9 CONCLUSIONS

The aim of this thesis was to introduce common challenges and solutions that had emerged in the container shipping industry. Managing a modern, globally operating shipping company efficiently is an intricate craft that requires detailed knowledge of the strategic and operational procedures. The spectrum of challenges that a shipping company has to address, from the level of handling a single vessel up into managing a fleet of hundreds of vessels, is immeasurable. A fierce competition between the carriers demands shipping companies to employ highly competent personnel throughout the chain of management, from executives to seafarers. The same competition has left smaller companies to face a choice between merging themselves into a more powerful company, or the reality of getting slowly squeezed out of the market.

Deciding the depth of each topic in this paper was one problem which caused a bit of obstacles in the writing process. The idea of giving a clear outlook and view of the state of container industry could have turned out too ambiguous, if often complex mathematical models on solutions would have been included. Adding the models would have required much more from me familiarizing myself to the topics and thereby it would have required more prior knowledge from the reader as well. On the other hand, leaving the models out, there was a danger with the chapters becoming too shallow or trivial without any discussion of the actual models.

I feel I learnt a lot from the industry while doing this paper and another debate I had to constantly have with myself was if I knew, and had enough credibility to be writing about the topics I chose. Looking retrospectively back at the process and how the paper turned out, another plausible approach could have been to write about fewer topics, but with more depth to them. By putting on more limitations the paper might have suited better for the bachelor's thesis requirements, since I felt that the extent and scale of these topics could have been better in master's thesis with the solution models included.

The topics presented in this paper are only the tip of the iceberg that covers the most distinguished themes that are affecting the container shipping industry today. Many of them, such as uncertain trade policies or rapid changes in the world trade, are issues that container industry is unable to participate in. Therefore accurate forecasting of supply and demand are foundations on which the strategies of shipping companies are built. However, as seen in 2008, even the most appreciated consultants can get wrong and when that happens, the price tag of miscalculation soars high up and the tactics of minimizing losses come into question.

The topics are persisting difficulties, such as the question of oversupply, which cannot be solved by a single executive decision or even by a single company. In terms of oversupply, the companies are well aware that the amount of deployed vessels must be brought down for the issue to be solved. Before the repeal of influential block exemption the carriers would have been able to regulate supply in liner conferences by themselves, but as it would inevitably lead to freight rate inflation, the European Union saw it best to prohibit this kind of capacity manipulation. Competition and the need of having advantage over the other players in the market is preventing shipping companies from reducing their fleet size and the issue stays unresolved.

Economies of scale, the order of continuously growing newbuilds, as a mean of reduced unit costs is estimated to come to an end at current scale. Ports' inability to handle growing ship sizes leads to diseconomies of scale, which leads to vessels spending more time in ports as well as increased port charges. Shipping companies need to develop alternative approaches on the issue. Service differentiation is one of those options, but there isn't yet any concrete evidence of its functionality. Moreover, it seems that there will not be any individual method that could reap the benefits that growing ship size has brought. Thus the shipping companies have to combine a set of methods that would collectively provide similar results as scaling the vessels themselves.

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